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Perceptions and experiences that may influence consideration of breast imaging as a career option

K. Taylor [a, *], L. Orlowski [a], R. Strudwick [b]

[a] Cambridge Breast Unit, Addenbrookes Hospital, Hills Road, Cambridge, CB2 0QQ, England
[b] University of Suffolk, Waterfront Building, Neptune Quay, Ipswich, IP4 1QJ England

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ABSTRACT

Introduction: Staff shortages and increasing workload raises concerns about maintaining breast services. Recruitment and retention of radiographic staff is vital. We explore views of UK undergraduate radiography students and breast radiographers to gauge how training experiences influenced their career choices on graduation.

Method: Two questionnaires were distributed on line, one to female final year undergraduate radiography students, the second to screening and symptomatic breast units, targeting radiographers in post ≤10yrs.

Results: There were 133 student and 126 radiographer responses for analysis. Sixty nine per cent of student respondents were ≤25 yrs. Over 40% of radiographer respondents were ≥36 yrs Seventy five per cent of students and 70% of radiographers had a practice placement in breast imaging (BI), many commenting this should include positioning technique. Experiences during placement were more influential than academic content for career planning. Seventy per cent of students and 50% of radiographers felt BI suitable as a first post. Negative influences came from higher education institution staff and qualified radiographers. Ninety per cent of students intended working in general radiography first, 47% considering BI in future. Sixty nine per cent of radiographers did not choose BI for their first post. Interest and career progression influenced radiographers choosing to subsequently train in mammography.

Conclusion: Most respondents took a non BI post first with later attractions into BI including interest and career progression. Practice placement was the most influential aspect of training for both groups citing a need for 'hands on' experience and positive engagement from mammographers.

Introduction

Mammography is one of the X-ray examinations most frequently performed in the healthy female population in the United Kingdom (UK) and worldwide. It remains the gold standard for breast screening and is an integral part of the triple assessment work up of symptomatic breast cancers.[1,2] Previously reported staff shortages of both radiographers and radiologists, also an increasing mammography workload have raised concerns about maintaining future services.[3,4] This has focussed recent research to investigate possible causes for radiographers not choosing a career in breast imaging. Currently UK radiography training comprises a BSc (Hons) Diagnostic Radiography. Those choosing to pursue a career in breast imaging then undergo further post graduate training at masters' level to obtain a post graduate award in mammography. A previous study undertaken by the authors explored the extent of breast imaging (BI) education within the UK undergraduate (UG) diagnostic curricula.[3] Results demonstrated a marked variation in both academic teaching of breast imaging and clinical placements in mammography in UG radiography programmes.

Following recommendations from this work, the primary aim of this study was to establish if course content influences workforce perception of breast imaging and consideration of the specialism as a career option.

The objectives of the study were:

- to further explore views of current female students on mammography UG education

* Corresponding author. Fax: +44 01223 217886.
E-mail addresses: kathryn.taylor@addenbrookes.nhs.uk (K. Taylor), liz.orlowski@addenbrookes.nhs.uk (L. Orlowski), r.strudwick@uos.ac.uk (R. Strudwick).

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- to survey the recently recruited radiographic BI workforce to find out why they chose to work in this specialism and what initially attracted them

Method

A mixed methods approach was used; both quantitative and qualitative data were collected using an online questionnaire. Two questionnaires were designed by researchers to address the aims and objectives of the study, one for female UGs and one for radiographers, with stakeholder input from UG students and newly qualified radiographers. The UG questionnaire was initially sent to two Higher Education Institutions (HEIs) to test for content validity. It was distributed online using 'Online surveys' RTM via course leaders at all 24 UK HEIs offering the BSc (Hons) Diagnostic Radiography course. Final year female students were asked about the academic content of their course which related to BI, also their experiences on clinical placement and their perceptions of both aspects of their undergraduate education (Appendix 1). A second questionnaire was similarly devised with input from two radiographers as stakeholders. It was distributed online to both screening and symptomatic centres targeting radiographers who had been in post <10yrs requesting information about the drivers for their career choice and any influence their UG course content may have had (Appendix 2). Dissemination of the survey to screening centres was assisted by the NHS breast screening programme and the British Society of Breast Radiologists distributed the survey link to symptomatic centres. There were also two adverts placed in Synergy News.

Responses were anonymous but respondents were asked for voluntary telephone or email contact details for follow up of potentially interesting responses or those requiring elucidation.

Qualitative data including stakeholder responses were analysed using a thematic analysis, this was carried out by two members of the research team to reduce bias and increase credibility and dependability. Quantitative data were analysed for trends.[5] The qualitative themes were categorised and then coded.[6] The use of comparative analysis and theoretical coding provided a structured methodological approach to the topic. Each stage of the research verification process was systematically conducted and all three members of the research team were involved throughout.

The whole approach was iterative and inductive in that the initial results from the questionnaires were analysed first and these were used to formulate questions for the follow up telephone interviews with students who had consented to this on submission of their responses. Those interested in being contacted for follow up information were asked to indicate their willingness as part of the questionnaire. It was decided that rather than conducting follow up interview by telephone any follow up questions would be posed by email. This was due to the difficulty in finding a mutually convenient time for a telephone interview. The aim of these follow up questions being to explore the themes identified from the questionnaires.[7,8] The questions used in follow up emails are in Appendix 3.

The rigour of the data analysis process ensured that the themes were strongly evidenced and triangulated by all of the data sources (i.e. questionnaires and email follow up). Findings were validated by examining all of the data from the study. Results were confirmed by using data from different sources to give them authority.[9] An audit trail was used to record how data were collected and conclusions were reached increasing the dependability and credibility of the research findings.[10] The researchers also kept a research journal which recorded the timing of data collection and a reflexive account of the study. All the follow up questions conducted via email were subject to member checking, whereby each participant was sent a copy of the themes that were found from the follow-up emails to verify the findings.[11] Transferability of the results was achieved by providing a thorough description in order to provide a context for the data. This allows the reader to make inferences about contextual similarities.[12]

Ethical approval for the study was gained from Cambridge University Hospitals NHS Foundation Trust Safety and Quality Support Unit. All data remains confidential, securely stored and only viewed by members of the research team.

Results

One hundred and thirty nine final year students from 19 of 24 UK HEIs responded. There were six exclusions, two from male students and four from 2nd year female students leaving 133 responses for analysis. We estimate the response rate to be approximately 22% of students; HEI's were unwilling or unable to give us accurate numbers of female students in the final year.

One hundred and twenty six breast radiographers qualified for ≤10 years responded. Of these 94% trained in the UK. There were nine exclusions, seven trained overseas, one questionnaire was nearly blank and one radiographer was qualified >10 years, leaving 117 responses for analysis. Year of graduation is given in Fig. 1.

Respondents were divided into four age groups; the majority 69% of student respondents were aged ≤25 years. Whilst 15% of radiographers were in this range, over 42% of radiographer respondents were aged ≥36 years (see Fig. 2).

Academic teaching

Themes emerging from the data were:

- course content
- quality of lecturer
- timing of lectures
- differences for male and female students
- relevance

Academic components of mammography teaching are shown in Table 1.

Comments from students regarding course content included:

'Breast imaging and pathology was rarely covered, if mentioned it was part of a bigger picture such as metastatic breast cancer.'

'We only had one lecture on breast imaging.'

'The lecture was more about designing a screening programme that specific detail on breast imaging.'

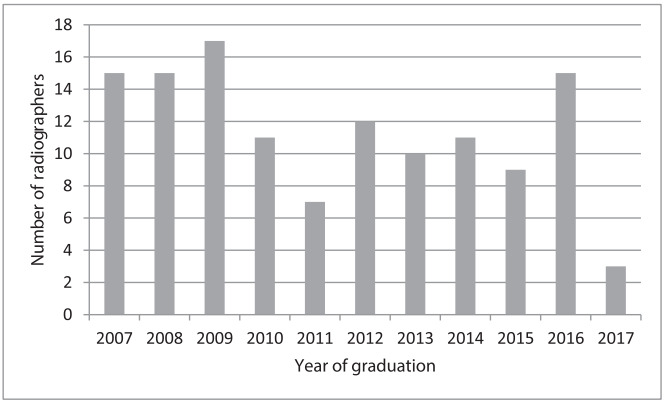

Figure 1. Radiographers by year of graduation.

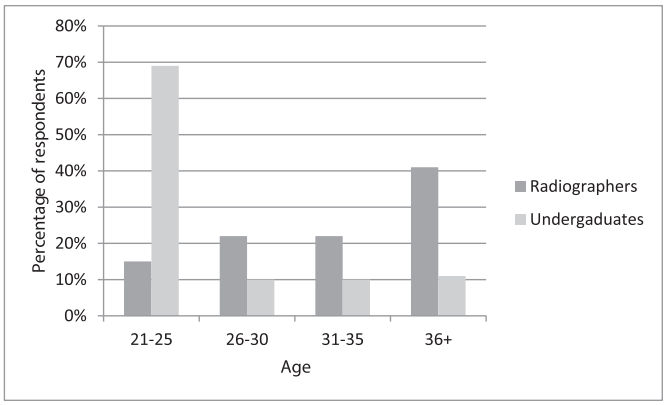

Figure 2. Age range of respondents.

Respondents from both groups reported the majority of this being delivered by university staff with some input from specialist external lecturers. Table 2

Students felt that having a specialist lecturer was important to their understanding and enthusiasm for the specialism:

'One lecture was delivered by a member of staff with expert knowledge.'

'An outside source who has practical experience in this area is much better as questions can be answered more confidently.'

For both groups, more than half (59% of students and 59% of radiographers) felt the academic breast teaching had no influence on their perception of the specialism as a possibility for a career and for some of these (37% of students and 44% of radiographers), specialist lecturers made no difference to this. However, for the 34% of undergraduates and 33% of radiographers who reported academic teaching having a positive impact on their view of BI, 71% of students and 34% of radiographers reported specialist lecturers being influential in this. Only 10 in each group (8% and 9%) felt academic teaching made them less likely to consider a post in BI with specialist lectures having little effect on their thinking. For the majority of students who reported their perception of BI being influenced by specialist lectures the most commonly cited reason was that this was an area previously unknown to them (27%) and the 2nd most commonly cited reason was because the information given was appealing (25%).

There were 62% of students and 51% of radiographers who did not have breast related learning objectives/competencies associated with the academic course component but 46% of those students and 67% of those radiographers felt there should have been.

Student comments:

'Breast imaging is a specialism like magnetic resonance imaging or ultrasound so why not have learning objectives?'

'If we knew more about BI we would be more likely to choose it as a career.'

Radiographer comments:

'You might attract more students to BI if there was more on this subject in the course.'

'It needs to be a larger part of the curriculum.'

'More specialist lectures are needed.'

For respondents not wanting any learning objectives/competencies the most frequent comment associated with this related to parity with male students

'Competencies or learning objectives would be unfair to males as only females could achieve these.'

The timing of lectures on BI was discussed by students in relation to where it sat in the programme and where it was situated in relation to placements:

'It was difficult to understand what was happening on placement due to limited lectures on the subject before placement.'

'I found it hard to understand mammography positioning until I saw it on placement, and my exam was before my placement so I did not do well on the mammography question.'

Some students felt that BI was not relevant to them:

'Good to know the theory but not a main priority.'

Other students felt that they needed more lecture time on the subject:

'Breast screening deserves more recognition; a lot of patients have breast cancer so it would be useful to have a better understanding.'

Practice placement

The themes from the data about practice placement were:

- Necessity of BI as a placement
- Observing
- Learning outcomes/objectives/competencies
- The male/female split
- Emotional involvement
- Career planning
- Influence

Table 1
The academic components of mammography teaching (% of respondents who covered this aspect of BI on their course).

Aspects covered during academic training	Students		Radiographers	
	No.	%	No.	%
Breast anatomy and physiology	97	73	70	60
Physics of equipment	79	59	49	42
Imaging techniques	87	65	55	47
Breast Screening Programme	98	74	51	44
Breast Pathology	88	66	46	39
Breast intervention	44	33	17	15
Other	4	3	18	15

Table 2
The number of students and radiographers experiencing a range of delivery methods for mammography education.

	Students		Radiographers	
Method of delivery	No.	%	No.	%
Breast specific lecture	61	46	57	49
Incorporated into more generic teaching	27	20	41	35
Both	45	34	19	16

Seventy five per cent of students and 70% of radiographers had a placement in BI, of the 25% of students and 30% of radiographers who didn't have a placement 73% of students and 86% of radiographers said they would have liked to have had one. The main reason in both groups for not wanting a placement in BI was lack of interest in this specialism. Placements lasted between one day and two weeks. Most, 60% of students and 50% of radiographers had a placement lasting between two days and one week, 20% of students and 29% of radiographers had a placement lasting one day and 20% of students and 15% of radiographers had a placement lasting one to two weeks. Whilst most acknowledged these were shorter than other placements, 62% of students and 41% of radiographers thought their placement was about the right length. More radiographers than students 42% vs 20% thought the placement was too short.

For students the most frequent comment relating to length of placement, irrespective of whether the student felt the right amount of time was spent, related to the observational aspect:

Students who said it was 'About the right length of time'.

'Long enough and suggested it was/might be a bit boring to do any longer due to observational nature of the placement'.

'I believe that a basic knowledge and understanding is sufficient'

Students who said the placement was too long:

'Placement observational so limited in what you can do/particularly if not interested.'

'I found it all very repetitive.'

Students who said the placement was too short:

'Not enough time to learn positioning.'

'Not long enough and not enough involvement in the examinations'.

Some students would have preferred to be more 'hands on':

'I think more hands-on work would be beneficial.'

'I would have liked more 'hands on' experience as it made my time there a bit dull after a while as I wasn't doing much.'

Placement content is shown in Table 3. Less than 90% students observed breast ultrasound and interventional procedures in addition to mammography, with almost half (48%) attending multidisciplinary team meetings and 22% visiting a mobile screening van.

Approximately two thirds (60%) students felt their placement made them more likely to think about a career in BI, 11% less likely, 29% were neutral.

Forty one per cent of students and 31% of radiographers had competencies associated with their placement. Of the 59% of students and 43% of radiographers who did not, 34% of students and 63% of radiographers felt there should have been competencies. For those not wanting placement, the most frequent comments related to the observational nature of the placement and the disparity for male students. Twenty seven per cent of radiographers couldn't remember whether there were competencies or not.

Opinion in both groups was mixed about having specific learning outcomes, competencies or objectives for BI:

'Having competencies would have made my time more focussed and enjoyable.'

'There should be competencies for all aspects of radiography.'

'Only observation – not necessary to have competencies.'

'There are no competencies required under the standards of proficiency.'

Not all students do BI placements, there is a male/female split, five students mentioned men specifically.

'Male students are not allowed in the mammography unit.'

'As there is a mix of male and female students I feel that compulsory learning objectives would be hard to complete for the men.'

Some students suggested that it was not necessary to have a placement in BI:

'Mammography is post graduate work so it is not needed for newly qualified radiographers

'We are not training to do mammography.'

'We have enough to learn without the added pressure of another modality.'

'I do not feel that it (BI) is necessary at undergraduate level.'

Other students mentioned the emotive and sensitive nature of BI. They felt that dealing with a patient in BI is a sensitive matter and they were concerned that patients would be concerned about the results of the examination, which required additional training for them as they did not feel ready.

'I was surprised at how stressed and anxious the patients were.'

'I don't think that I would be able to handle the emotional involvement.'

'It is a very intimate examination.'

'I did not want to embarrass the patient.'

The final questions for both groups related to their career planning for first post and in the future and any influences to their decisions. Seventy per cent of students felt it was acceptable to work in BI as a first post. For respondents in both groups who didn't feel it was acceptable the biggest influences came from HEI staff and both qualified mammographers and radiographers (see Table 4).

'Radiographers could have been more encouraging of this as a first career option, most seemed to be of the opinion that a newly qualified radiographer should do their time in general X-ray before venturing into the world of breast imaging.'

'Although I was able to gain my first post as a trainee mammographer, there is a lot of emphasis at university and on placement that 2 years general radiography experience is required before specialising in a modality.

Eighteen per cent of radiographers reported that at the end of their UG radiography training they felt it was acceptable to work in BI as a first post. However once working in BI, numbers increased to 50% of radiographer respondents confirming BI suitable as a first post.

Forty seven per cent of students said they would consider a post in BI in future, however 90% intended taking a non-breast radiography position first. Factors influencing their choices are shown in Table 5.

For 32% of radiographers, a BI post was their first post after graduating. The biggest reason given was that BI was an area of

Table 3
Placement content.

Experience on Placement	Students (n = 100)		Radiographers (n = 82)	
	Number	%	Number	%
Visit Mobile Van	22	22	32	39
Multidisciplinary meeting	48	48	43	52
Breast Ultrasound	90	90	69	84
Breast intervention	93	93	68	83
None of the above	4	4	39	48

Table 4
Negative influences for respondent who thought that working in breast imaging was not suitable at a first post (% of respondents who cited each influence).

Influence	Students (n = 40)		Radiographers (n = 96)	
	Number	%	Number	%
HEI teaching staff	11	28	26	27
Radiographer- BI placement	13	33	31	32
Radiographer- non BI placement	17	43	43	45
Other students	10	25	14	15
Literature	9	23	14	15
Other	18	45	34	35

particular interest, other reasons included career development opportunities, there being a vacancy at the time and experience on clinical placement during training. Sixty eight per cent chose other areas for their first post, the most common (86%) being in general radiography. The biggest influences for working in areas other than BI were geographical location, a vacancy at the time and experience on clinical placement during training (Table 6). The most common reason for them taking up a post in BI was the potential for career development, followed by BI being an area of particular interest, no unsociable working hours and wanting to gain experience in another area of radiography.

Students made some comments about career planning from their own perspectives:

'If I knew more about BI I may have considered it.'

'I think that as a student you already have a firm idea about if you do/do not want to specialise in mammography.'

'I don't want to specialise too early.'

'Mammography is appealing to me.'

Experiences during clinical placement were the most important factor in students being interested in a career in breast imaging.

'Practice placement had more influence in thinking about mammography as a post graduate career.'

'I enjoyed my specialist placement in BI.'

Similarly, 45% radiographers who stated some aspect of their undergraduate training influencing their decision to work in BI, positive experience during clinical placement was the most cited reason.

'Practice placement was more influential than university.'

'More course content on breast screening and symptomatic service could be included so more students are aware of the opportunities available.'

'Staff working in BI need to be more proactive and positive with students.'

'We need to show young graduates that mammography is not just for radiographers in their 40's or 50's.'

Student opinions of staff in practice were mixed; some had experienced negative attitudes and some had positive experiences.

'The mammographers were not very helpful and did not try to engage with me or my learning.'

'Staff did not like the idea of students in mammography… I was sent home early every day.'

'The BI team were lovely and inviting.'

'Staff members were very supportive.'

'I had a great experience as the staff were very friendly, welcoming, and excited about their work. This developed my interest.'

Discussion

The current and impending national shortage of mammographers in the face of ever increasing activity has been widely documented.[13,14] Similar challenges are reported in Europe and beyond[15,16] Evidence is needed to inform a survival strategy, not least in ways to encourage recruitment and retention of mammography staff.

It is difficult to gauge our response rate particularly from within the population working in the symptomatic service where staffing levels are not easily quantifiable, unlike the screening service. Nevertheless, numbers are such that trends and themes can be considered reasonably robust. Previous literature has demonstrated diversity in the amount and type of teaching related to BI with course providers having difficulty in fitting the entire curriculum into the course timetable.[3] In our study, students report a wider breadth of teaching than that experienced by radiographers.

Table 5
Reasons for students choosing their first post after graduating.

Main reason for choosing first post after qualifying	Number	% of students citing this reason
University course content	45	37
Experience during placement	118	97
Out of hours work required	29	24
Out of hours work NOT required	20	16
Career progression	103	84
Banding	55	45
Goals for future	86	70
Geographical location	69	57
Availability of posts	60	49
Personal recommendation	29	24
Reputation of department	50	41
Department team	62	51
Other	4	3

Table 6
Reasons for radiographers choosing their first post after graduating.

Main reason for choosing first post after qualifying	Breast Imaging N = 37		Other radiography post N = 80	
	Number	%	Number	%
University course content	0	0	1	1
Experience during placement	4	11	15	19
Out of hours working required	NA		1	1
No unsocial hours	3	8	4	5
Career development opportunities	8	22	4	5
Goals for future	4	11	1	1
Banding	1	3	0	0
Geographical location	0	0	19	24
An area of particular interest to me	9	24	4	5
There was a vacancy at the time	5	14	17	21
Personal recommendation	0	0	0	0
Reputation of department	1	3	4	5
Department team	0	0	4	5
Other	2	5	6	8

Greater inclusion of aspects such as imaging techniques, intervention and breast pathology may reflect the advances in the breast cancer detection and treatment pathways over time.

Results of this study are mixed in terms of influence of academic teaching on perception of the specialism. More than half of the respondents' state that inclusion of breast related teaching had no influence on their thinking. However, for those possibly open to the idea of mammography as a career, academic teaching, especially specialist lectures, was influential. Interestingly although approximately half of the respondents had no breast related academic learning objectives, approximately 50% of them thought these should be included. Comments associated with not wanting learning objectives often centred on the disparity between female and male students. This extended into responses regarding practice placements where currently most male students don't attend due to attitudes of the clinical department and/or the HEI.[3] The idea of males as mammographers is beyond the remit of this paper but our results suggest a need for consistent practice regarding male students experiencing the BI pathway, as has been adopted elsewhere.[17,18] Also, some thought regarding their possible future place in BI departments.[19,20] Both within and outside the UK work is currently being undertaken to assess the acceptability of such a move.[4] Some countries are already employing male mammographers.[21,22]

Irrespective of whether students felt practice placement was for the right amount of time, most comments related to the mostly observational aspect of placement and whether a longer time would be more helpful if they could be 'hands on'. The sensitive and emotional side of breast imaging was noted by respondents and some admitted to feeling ill equipped to deal with this aspect.[23] They acknowledged the psychological, communication and empathic characteristics required of a mammographer, aside from the technical skill in achieving high quality images. Literature supports the need for good mentoring and clinical supervision in BI.[20,21,24–26] Our results suggest students would benefit from having practical experience, undertaking mammography under supervision to fully experience the examination and how it may differ from other radiography specialisms, whilst at the same time breaking any perceived 'taboos' regarding its intimacy.[27,28] In this study, both groups described the whole placement experience as being the most significant factor in considering mammography as a career option. Communication training, the intimate nature of a mammography examination and overall importance of practice placement are common themes in the literature. Reis et al. (2018) surveyed 97 student radiographers in 5 European countries.[29] They cited communication training and practice placement as important. They found that a mammography placement was often an optional part of the curriculum which was thought to be detrimental to the students' perception of the specialism as a career option. In a similar European study, Strom et al. (2017) reported less practical time allocated to this discipline suggesting more emphasis is needed to raise its profile.[30] Metsala et al. (2017) analysed 16 articles related to European radiographers' experiences of clinical practice, education and training in mammography.[31] They concluded that undergraduate exposure to mammography was insufficient for the quality expectations of the specialism, although their emphasis was more on technical quality and quality of practice and less on communication.

In this study, the attitude of placement staff is cited as influential in the gained perception of mammography with some students suffering indifference or negativity. This has been reported before but is not an aspect apparent in literature from outside the UK.[2] These results further demonstrate the need for the UK workforce to embrace their visiting students.

Most students and mammographers took a non-breast post as their first post following graduation but cited practice placement, interest and career progression as reasons for considering a breast post later. It is interesting to note that fewer mammographers (on graduation) than students thought it acceptable to work in BI as a first post with the number significantly increasing once they were in a breast post. Results also demonstrate fewer negative influences for students from colleagues and HEI staff towards BI. This possibly suggests a general shift in thinking over recent years towards employment based on application and person attributes rather than age and experience.

A limitation of the study could be the small number of student responses limiting the generalizability of results.

Conclusion

The study has explored the views of current UK students on mammography UG education and surveyed the recently recruited BI workforce to find out why they chose to work in this specialism and what initially attracted them. Most students and mammographers took a post other than in BI as their first post-graduation role. Those attracted to working in BI later on cited general interest and career progression as the main reasons.

Practice placement was the most influential aspect of training for both groups and the highly skilled technique associated with mammography plus the intimate nature of the examination and emotional aspect of breast cancer suggests careful mentoring and support is needed on placement to steer the student to a worthwhile experience

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Conflict of interest statement

The authors have no conflict of interests.

Appendix A. Supplementary data

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