

National Breast Imaging Academy

Economic Evaluation

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Table of Contents

1	Key Findings	3
2	Context	4
2.1	Background	4
2.2	The National Breast Imaging Academy	5
3	Economic Analysis	6
3.1	Overview of Method	6
3.2	Individual Initiatives.....	7
3.3	Value of the NBIA	7
4	Results	8
4.1	Overview	8
4.2	Results for Individual Initiatives	9
4.3	Sensitivity Tests	9
5	Overall Conclusions	10

1 Key Findings

Economics By Design (EbD) has been contracted by the National Breast Imaging Academy (NBIA) to undertake an economic analysis of the Academy and the services it provides.

The key findings are:

- ❖ The NBIA provides a national focal point for effective action to be taken in collaboration with partner stakeholders, to address workforce shortages in Breast Imaging. It has enabled trainers from across the country to work together providing innovative solutions for the workforce challenges.
- ❖ Several initiatives have been developed by the NBIA to promote an increase in the workforce supply and workforce development.
- ❖ These initiatives include the development of a Mammography Apprenticeship, a new Breast Clinician Credential, Radiology Fellowships, and E-Learning resources for breast imaging.
- ❖ These initiatives will individually and collectively increase workforce capacity and the quality of services and deliver significant improvements in outcomes for patients experiencing Breast Cancer.
- ❖ It is difficult to predict the benefits to patients of the investment. However, it is possible to estimate the efficiency of the initiatives by comparing the monetary value of the resources used for these initiatives with the value of alternative, traditional approaches such as the use of agency and locum staff. In practice, it is very difficult to find such staff, so these are essentially theoretical alternatives.
- ❖ Estimates of efficiency suggest these initiatives can be expected to deliver a combined present-day value of just under £50m over a ten-year period. Whilst the NBIA has played a critical role in these initiatives, they are not solely responsible for enabling the benefits. Considering the unique contribution of the NBIA to each initiative, the present-day value of the benefit attributable to the NBIA is £39m over a ten-year period.
- ❖ The present value of running costs over the same period are estimated at approximately £7.0m., resulting in a present value of net benefits of £32m; a benefit to cost ratio of over 4.5 to 1.
- ❖ Sensitivity tests show that these positive efficiency results are robust to changes in key assumptions.

The results are presented in more detail in this short report. The report is accompanied by a separate technical appendix which describes the method used, the data sources and more detailed results.

2 Context

2.1 Background

Breast cancer is the most common cancer in UK and the leading cause of death from cancer¹. Early diagnosis (detected from imaging) saves lives². There has been a substantial increase in referrals in recent years, due to widening of screening programme and population growth. More worryingly, estimates suggest that the backlog from COVID-19 will delay diagnosis and result in additional cancer deaths owing to delays in breast screening, further exacerbated by the current national failure to meet the 2-week referral target (Duffy et al, Feb 2022)³.

There is a long-standing national workforce shortage in breast radiology (and radiology generally) and mammography; this will be exacerbated as 40% of senior doctors are likely to retire by 2025. This affects service delivery and training supervision, which itself exacerbates the workforce shortage as trained staff experience burnout and are at higher risk of leaving the profession.

To mitigate this risk, there are significant opportunities for new workforce models (apprenticeships, fellowships, and credentials) to increase and accelerate workforce supply. There is also potential for workforce efficiencies from new operating models, new technology, and AI supported image interpretation.

There are many stakeholders involved in the development and oversight of imaging services and the imaging workforce. These include:

- ❖ Health Education England
- ❖ Office for Health Improvement and Disparities (OHID), in the Department of Health (DHSC), including:
 - UK National Screening Committee
- ❖ NHSE/I (National Screening Programmes), including
 - The NHS Breast Screening Programme
- ❖ Royal College of Radiologists (RCR)
- ❖ Society and College of Radiographers (SCoR)
- ❖ British Society of Breast Radiology (BSBR)
- ❖ Association of Breast Clinicians (ABC)
- ❖ Breast Cancer Now
- ❖ Breast Imaging Training Centres
- ❖ Breast Units

These have complementary roles and common goals, but do not have a formal mandate for the collective action that is urgently needed.

¹ <https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer>

² <https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/survival#heading-Three>

³ Duffy, S.W., Seedat, F., Kearins, O. *et al.* The projected impact of the COVID-19 lockdown on breast cancer deaths in England due to the cessation of population screening: a national estimation. *Br J Cancer* **126**, 1355–1361 (2022). <https://doi.org/10.1038/s41416-022-01714-9>

2.2 The National Breast Imaging Academy

The National Breast Imaging Academy was established to provide the focus for collective action. Its brief is to enable and accelerate the adoption of new workforce models for Breast Imaging.

The NBIA programme is a collaborative, national, multidisciplinary initiative whose role is to address the severe workforce issues faced in the delivery of breast imaging services across the country. It is funded by Health Education England, hosted by Manchester University NHS Foundation Trust, and working in collaboration with NHS England & Improvement, the Royal College of Radiologists, the Society and College of Radiographers, the Association of Breast Clinicians, the British Society of Breast Radiology, Breast Cancer Now, and Prevent Breast Cancer.

The academy's aim is to work with partners to facilitate and enable improvements in breast screening recruitment, improve screening targets and help to increase early diagnosis of cancer. It has:

- ❖ a unique range of staff and disciplines, not replicated in any other single body.
- ❖ a core team whose role is to take on the "heavy lifting" and break down the barriers which would otherwise decelerate or prevent change.
- ❖ access to national expertise which can be leveraged to provide support to the core team.

Individual initiatives include:

1. Developing and launching the mammography associate level 4 apprenticeship in the North of England, (in addition to training sites in London, Nottingham⁴ and Surrey and opportunities for mammography advanced practice)
2. Supporting the Royal College of Radiologists and the Association of Breast Clinicians in the development of the 3-year breast clinician credential
3. Developing and recruiting NBIA radiology fellows to benefit from a full specialist training in breast radiology and providing co-ordination for overseas recruitment
4. Developing a new e-learning for health programme in breast imaging, and a national case archive
5. Promoting breast imaging as a career, raising awareness across health professionals, and supporting return to practice – including provision of targeted courses
6. Establishing a new training facility
7. Educational bursaries (since inception)
8. Global outreach (since inception)

Since inception, the NBIA has provided the much-needed focus, energy and drive these workforce enhancing initiatives.

⁴ Not currently offering the course.

3 Economic Analysis

The Economic Evaluation is focussed on measuring the economic value of the mammography associate apprenticeship programme, the Breast Clinician Credential, the NBIA radiology fellows programme, and the e-learning for health programme in breast imaging. The evaluation has also explored the overall value of the NBIA considering the contribution it has made to the development and implementation of these programmes.

3.1 Overview of Method

The most significant benefit arising from the activities of the NBIA, is the increase in NHS capacity to diagnose and care for women with Breast Cancer. This is complex to measure and to estimate with confidence. For this reason, the focus of the economic evaluation has been to measure economic efficiency. For each programme, a comparison has been made between:

- ❖ The **initiative**: the monetary value of the resources invested in the programme, and their consequences for improved capacity, and
- ❖ The **counterfactual**: the monetary value of the resources that would have been needed by using traditional practice / approaches to achieve the same outputs.

The monetised savings from adopting the programme represent efficiency savings to the NHS system. These are not necessarily “cash releasing”, however they represent the improvement in the efficient use of NHS resources.

The NBIA played an important role in the initiation, facilitation development and implementation of these initiatives. To assess the overall value of the NBIA, an assessment was made of the relative contribution of the NBIA to each. This was used to assign a share of the net efficiency benefit from each initiative to the NBIA. By combining these benefits and comparing these with the costs of running the NBIA, it was possible to estimate the overall net economic value achieved from investing in the NBIA.

It is important to note that there are many other benefits from the work undertaken by the NBIA that are more difficult to monetise, but which are valuable to patients, staff, and the system. These have not been looked at in detail as part of this evaluation.

The economic evaluation has been prepared in line with guidance from the H.M. Treasury Green Book⁵. All information is provided at 2021-22 prices. A ten-year perspective has been taken for the calculation of costs and benefits. This timeframe was adopted since many of these initiatives involve investment in training, with benefits being realised over future years. All future costs and benefits have been converted to their present-day equivalent values using the H.M. Treasury recommended discount rate.

Details of the analysis is provided in Appendix A.

⁵ <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020>

3.2 Individual Initiatives

The table below provides a high-level summary of the initiatives and the counterfactual.

Initiative	Counterfactual
Mammography Apprenticeships	Continued use of Radiographers where shortages in Mammography exist
Breast Clinician Credential	Use of agency/locum radiology consultants to deliver services
Radiology Fellows	Use of agency / locum consultant radiologists to deliver services
E-Learning for Health (Breast Imaging)	Use of traditional learning methods (individual coaching, mentoring) and texts

For each training initiative, estimates were made regarding:

- ❖ The time required to train
- ❖ The time required for trainers to supervise the trainee
- ❖ The service delivery time provided by the trainee
- ❖ The on-going service delivery time provided by those who completed their training
- ❖ Annual workforce retention

For the training counterfactuals, estimates were made of the time required for traditional staffing models to provide the equivalent service delivery time.

For e-learning, estimates were made about the time taken to develop and prepare the courses, and the quantity of training time delivered. This was compared with the time it would have taken for clinical staff to deliver the equivalent training in a practice setting. It is not suggested that all practice-based training would be delivered through e-learning, rather that practice-based learning would be instead focused on reinforcement and experiential learning and hence undertaken more efficiently.

The value of time was converted to monetary values using the PSSRU Unit Costs of Health and Social Care 2021⁶.

The source of funding for each programme was not taken into consideration as all costs were included in the analysis regardless of source.

3.3 Value of the NBIA

The costs of the NBIA were compared with the efficiency benefits achieved from each of the initiatives. The relative contribution of the NBIA to each initiative was assessed in a workshop with NBIA stakeholders. The evaluation also examined what the contribution from the NBIA would need to have been for each initiative, to cover the entire costs of the NBIA – known as the “break-even” value.

⁶ <https://www.pssru.ac.uk/project-pages/unit-costs/unit-costs-of-health-and-social-care-2021/>

4 Results

4.1 Overview

Table 1 provides a summary of the net economic efficiency value of each of the initiatives taken over a 10-year period. Overall, these initiatives are estimated to contribute NHS efficiency benefits of more than £49m from 2020-2029.

Table 1: The Net Economic Efficiency Value of Each Initiative.

Initiative	Net Present Value over 10 Years (savings = efficiency) ⁷
Mammography Apprenticeships	-£17,771,204
Breast Clinician Credential	-£9,023,232
Radiology Fellows	-£11,724,736
E-Learning for Health (Breast Imaging)	-£10,935,961
TOTAL	-£49,455,133

Table 2 provides a summary of the net efficiency value added by the NBIA. Once the costs of the NBIA are factored in and compared to the NBIA share of the net benefit, the analysis shows a net economic benefit of £32m attributable to the NBIA itself for the period 2020-2029.

Table 2: The Net Economic Efficiency Value of the NBIA

Initiative	Contribution to Value Made by NBIA	Net Present Value over 10 Years (savings = efficiency)
Mammography Apprenticeships	75%	-£13,328,403
Breast Clinician Credential	33%	-£2,977,666
Radiology Fellows	100%	-£11,724,736
E-Learning for Health (Breast Imaging)	100%	-£10,935,961
TOTAL	78.8%	-£38,966,767
Costs of running NBIA (excluding specific programme costs)		<u>£7,024,109</u>
Net Efficiency Value added by NBIA		-£31,942,658

It is important to note that this assumes the NBIA continues to operate until 2029, and that no new service initiatives are launched. In practice, new additional initiatives are likely to be introduced going forward (these benefits are not included).

⁷ A negative figure indicates a saving compared to the counterfactual.

4.2 Results for Individual Initiatives

Table 3 shows the breakdown of the net present monetary value of each of the initiatives, compared with each counter-factual taken over a 10-year period.

Table 3: Efficiency Savings and Return on Investment by Initiative

Initiative		Net Present Value: 10 Years
Apprenticeships	Monetary value of resources used for the initiative	£34,873,006
	Monetary value of resources that would have been needed using traditional approaches	£52,644,210
	Efficiencies (Negative = savings)	-£17,771,204
	Economic Return on Investment (System)	51.0%
Breast Clinicians	Monetary value of resources used for the initiative	£19,602,456
	Monetary value of resources that would have been needed using traditional approaches	£28,625,687
	Efficiencies (Negative = BCC savings)	-£9,023,232
	Economic Return on Investment (System)	46.0%
Fellowships	Monetary value of resources used for the initiative	£38,361,681
	Monetary value of resources that would have been needed using traditional approaches	£50,086,417
	Efficiencies (Negative = Fellow savings)	-£11,724,736
	Economic Return on Investment (System)	30.6%
E-Learning	Monetary value of resources used for the initiative	£701,256
	Monetary value of resources that would have been needed using traditional approaches	£11,637,216
	Efficiencies (Negative = E-learning savings)	-£10,935,961
	Economic Return on Investment (System)	1559%

4.3 Sensitivity Tests

Sensitivity tests have been done to examine the effect of key assumptions and, in particular, the number of initiative participants, retention rates, levels of supervision, and premium rates for use of locum/agency staff in the counterfactual. For all sensitivity tests, the efficiency savings remained positive.

The attribution of efficiency savings from the initiatives to the NBIA was based on a subjective assessment by NBIA stakeholders. As can be seen from Table 2, it is estimated that overall, 78.8% of the savings achieved from the initiatives can be attributable to the investment in the NBIA. Sensitivity tests suggest that this attribution estimate would need to be less than one quarter of this value (below 18%) for the NBIA to have delivered a negative return on investment.

5 Overall Conclusions

The NBIA has provided a focal point for the development, implementation, and oversight, of initiatives designed to address chronic workforce issues relating to the Breast Imaging workforce. Although there are many stakeholder organizations with an interest in Breast Imaging, none have a unique mandate to initiate, facilitate, develop, and implement solutions to the workforce problems. The initiatives promoted by the NBIA will each add significant value to the system, ensuring services for patients are delivered and that outcomes for women with Breast Cancer are improved. Alternative strategies would have been less efficient (even if they were achievable).