Protocol

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The association of breast surgery ASPIRE: breast pain pathway rapid evaluation project – study protocol

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Background: Breast pain accounts for 20–40% of new referrals to breast units in the UK and these patients have a very low risk of breast cancer. Patients have previously been assessed in resource-intensive, cancer-exclusion, one stop clinics, which are now failing to meet government targets due to excessive demand. UK Breast units are increasingly piloting Breast Pain-only Pathways (BPP) to assess these patients, and there is no consensus for the optimal pathway. The aim of this prospective multicentre study is to assess the safety and patient satisfaction of different BPPs to inform future BPP design and implementation.

Methods: All UK breast units will be invited to join the ASPIRE study between January 2023 and December 2023. Units with a BPP are invited to submit their pathway for evaluation; and those without a BPP who see patients with breast pain-only in a one stop clinics setting are also invited to join the study to evaluate the traditional pathway model concurrently. Patient satisfaction assessments will be collected after their initial consultation and patient outcomes, including subsequent cancer diagnosis, will be followed up at 12 months to determine if they have cancer diagnosis after discharge to assess pathway safety.

Keywords: breast, neoplasm, clinic

Introduction

Breast pain (mastalgia) accounts for 20–40% of the more than 700 000 referrals to NHS breast clinics every year[1–3]. The incidence of breast cancer in patients presenting with breast pain alone in a recent prospective cohort study was 0.4%[1], which is below the National Institute for Health and Care Excellence (NICE) threshold for an 'Urgent, Suspected Cancer' (USC) referral (3%)[4] and the screening cancer detection rate in asymptomatic women in the UK (0.8%)[5]. Although the symptom of breast pain does not fulfil NICE criteria for USC appointment[4], these patients are referred via the 'exhibited breast symptom (cancer not initially suspected)' pathway, which still necessitates a patient assessment within 2 weeks. Therefore, providers rarely separate the referral pathways and patients with breast pain are seen within resource-intensive one stop clinics (OSC) where clinical assessment, radiology, and pathology biopsy (if required) may be undertaken at the first clinical encounter. The NHS cancer referral pathways, and specifically the Breast OSC, are under increasing demand with urgent referrals doubling in a decade[6]. In February 2023, only 82% of patients referred USC for breast cancer were assessed within 2 weeks of referral from a general practitioner (current target of 93%)[7], causing potential diagnostic and treatment delay to

HIGHLIGHTS

- This project aims to evaluate novel breast pain only pathways, to gather evidence and inform future pathway development.
- The pathways will be evaluated in real-time investigating safety, patient satisfaction, and clinical effectiveness.
- This methodology of evaluation can be modified and applied to a range of different cancer sites and different pathways, allowing clinicians to have a pragmatic tool box to evaluate changes in patient care pathways in real-time.

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those patients with breast cancer. The introduction of the Faster Diagnosis Standard (an NHS framework to ensure patients are given a cancer or not cancer diagnosis within 28 days of referral) may alter the metrics utilised to monitor pathway performance, but is unlikely to change the imbalance between current demand and limited diagnostic resources[8].

The utilisation of OSC appointments for patients with mastalgia and a very low risk of breast cancer is therefore under review. A number of new 'breast pain only' pathways are being established in the UK, where patients are seen or assessed in settings separate to the OSC. This is to reduce the demand for OSC and improve efficient use of limited diagnostic resources. Referral to a OSC (a primarily cancer pathway) can cause patient anxiety[9], and so assessing patients in a different setting may improve patient satisfaction. Multiple UK pathways have been described and are being evaluated. Examples that have been reported include the Manchester pathway, which is a telephone consultation based in secondary care, with imaging only offered to women over 40[10]. For comparison, the East Midlands pathway includes clinical examination and a formal family history risk assessment within a primary care setting[11].

The Association of Breast Surgery (ABS) breast pain pathway rapid evaluation project (ASPIRE) was initiated to provide a standard method of evaluation for novel breast pain pathways. The ABS recognises that multiple NHS Trusts are establishing breast pain-only pathways (BPP). The setting (primary vs. secondary care), assessment (face-to-face clinical assessment vs. telephone consultation), and imaging (mammogram +/- ultrasound offered vs no imaging) differs between pathways. Therefore, patients with the same symptom are having entirely different assessments according to which NHS Trust they are referred, with minimal prospective evaluation as to outcomes and experience achieved – contrary to the ethos of Getting It Right First Time[12]. The aim of the ASPIRE platform study is therefore to evaluate all pathways in a similar manner, adopting a collaborative approach to achieve sufficient study power to assess safety and to inform future BPP development.

Aims and objectives

The aim of the ABS ASPIRE project is to rapidly and efficiently evaluate new breast pain pathways using an established platform evaluation design.

To identify separate elements being used in BPPs and assess which individual elements adds value. This will be assessed using three parameters:

1. Safety: evaluated according to number of cancers detected at 12 months after being discharged from BPP (i.e. the 'symptomatic interval cancer rate'[13]).
2. Patient satisfaction: evaluated by Patient Reported Outcome Measures (PROMs).
3. Effective use of resources: evaluated by staff time and grade, tests performed, return to clinic within 12 months.

Materials and methods

This is a national (United Kingdom) prospective, multicentre platform service evaluation. All UK breast units will be invited to join the ASPIRE study between January 2023 and December 2023 through contact with members of the Association of Breast Surgery via personal communication, membership e-mails and the ABS website. Units with a BPP are invited to submit the pathway for evaluation, and those without a BPP that assess breast pain patients in a OSC Pathway (OSCP) setting are invited to join the study and evaluate the current established pathway for comparison. A BPP is defined as a patient encounter where the sole presenting symptom is breast pain, which is managed in a clinical encounter that is specifically designed to assess and manage breast pain. A OSCP is defined as a patient encounter where the sole presenting symptom is breast pain, in a clinical encounter that is not specifically designed to manage breast pain, but rather, any presenting symptom within the breast. All pathways (BPP + OSCP) must currently be in use and be approved through local governance structures. As all pathways are currently in clinical use, and participation in ASPIRE results in no change to patient care, this project has been defined as 'service evaluation'.

Outcomes

The primary outcome will be the symptomatic interval cancer rate defined as the number of invasive cancers diagnosed in the 12 months following completion of assessment in BPP/OSCP. The secondary outcomes will include: cancer detection rate at the initial patient encounter, patient satisfaction assessed by a project- specific patient questionnaire, time from referral to assessment, number of clinical encounters after initial assessment, acceptability of pathway assessed by proportion of all breast referrals to the unit that are seen in BPP, and resource use at 12 months (number of clinical encounters, radiological, and pathological investigations per patient).

Sample size and recruitment – power calculation

For this project the primary outcome is safety using the symptomatic interval cancer detection rate as a proxy measure for this. Within the OSC setting this figure has been reported as 0.3–0.9%[13–15]. Therefore, to detect a symptomatic interval cancer rate of 1% (which would be equivalent to the published literature), 1512 patients will be needed in each group to provide 80% power. Groups will be defined by the pathway. The most recent figures suggest that 700 000 new patients are referred per annum to breast services. As at least 20% of these would be expected to be referred with breast pain only it is anticipated that UK breast units see ~140 000 patients with breast pain per year. If 20% of UK breast units participate in ASPIRE, ~28 000 breast pain only patients would be seen in 12 months.

Study design

Phase 1 – unit sign up

The breast unit submits details of pathway (either BPP or OSCP) to the ABS ASPIRE steering committee once local clinical governance approvals for service evaluation are obtained. The ABS ASPIRE Steering committee has an 'on boarding' meeting with the unit, where the pathway is discussed in detail, and the data collection set is agreed upon.

Phase 2 – unit prospective data collection

Patients meeting the inclusion criteria are recruited and information submitted. All participants are pseudo-anonymised by allocation of a study ID number. The link between the study ID

and the local hospital number is held locally at individual hospitals in a secure location, and is not available to the wider study team. During the clinical encounter, information is collected by completion of the Case Report Form (CRF), which has been developed by the study team (Supplementary Figure 1, Supplemental Digital Content 1, http://links.lww.com/ISJP/A3). At the end of encounter (defined as the end of consultation or end of any requested imaging reports), the patient is sent a project-specific patient satisfaction survey for completion (this may be via e-mail, QR code, or paper form).

Phase 3 – unit retrospective follow-up for interval cancer

All patients included in phase 1 are followed up 12 months after the initial consultation, to identify if a breast cancer has been subsequently diagnosed or whether the patient has re-presented to the service. The method of follow-up will not involve patient contact and will be tailored to the participating unit. Figure 1 shows an example timeline of when the patient information is reported.

Sampling

This project aims to capture all consecutive patients attending clinic matching inclusion criteria during the active recruitment phase (determined by reaching target for adequate power as above).

Patient inclusion/exclusion

Patients included:
All patients with a clinical encounter within a BPP.
In the OSC units, only patients with breast pain as a sole presenting complaint with a clinical encounter within a OSC.
Over age of 18.
Patients excluded:
Any patient without breast pain.
Any patient with other breast symptoms in addition to breast pain (data collected, but not included in evaluation of the BPP).
Known diagnosis of breast cancer.

Data collection

Anonymised patient data will be entered via the secure RedCap electronic platform hosted by Manchester Foundation Trust, behind NHS firewalls[16]. The record linking the Redcap project number to the identifiable patient NHS number will be stored locally only at individual participating NHS trusts, behind NHS firewalls and not uploaded onto Redcap.

The CRF for each pathway will have the same core dataset allowing grouping of patients between units (Supplementary Figure 1, Supplemental Digital Content 1, http://links.lww.com/ISJP/A3). As the project is responsive to local service evaluation needs, and individual units will have the ability to add questions applicable to their local processes.

After completion of the initial patient encounter (including any additional imaging) a patient satisfaction survey will be distributed to the patient – this may be by paper form in the unit, scanning a QR code on mobile device or sent to the patient via e-mail. The patient satisfaction survey has been developed by the study team in collaboration with patient representatives and piloted extensively before use in the project. It is formed of a core dataset of questions common to every unit (Supplementary Figure 2, Supplemental Digital Content 2, http://links.lww.com/ISJP/A4), with some additional unit-specific questions based on their particular pathway (e.g. questions regarding mammograms, if this investigation forms part of the pathway).

The CRF for each patient will be completed at 12 months, when full outcome data will be available for analysis.

Data analysis

The study will be reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement[17].

The pathways are defined based on seven core components within which patients can be sub-grouped into, allowing an understanding and description of the differences between pathways (Fig. 2). Patients will be evaluated within pathways and data available for specific local evaluation of their service.

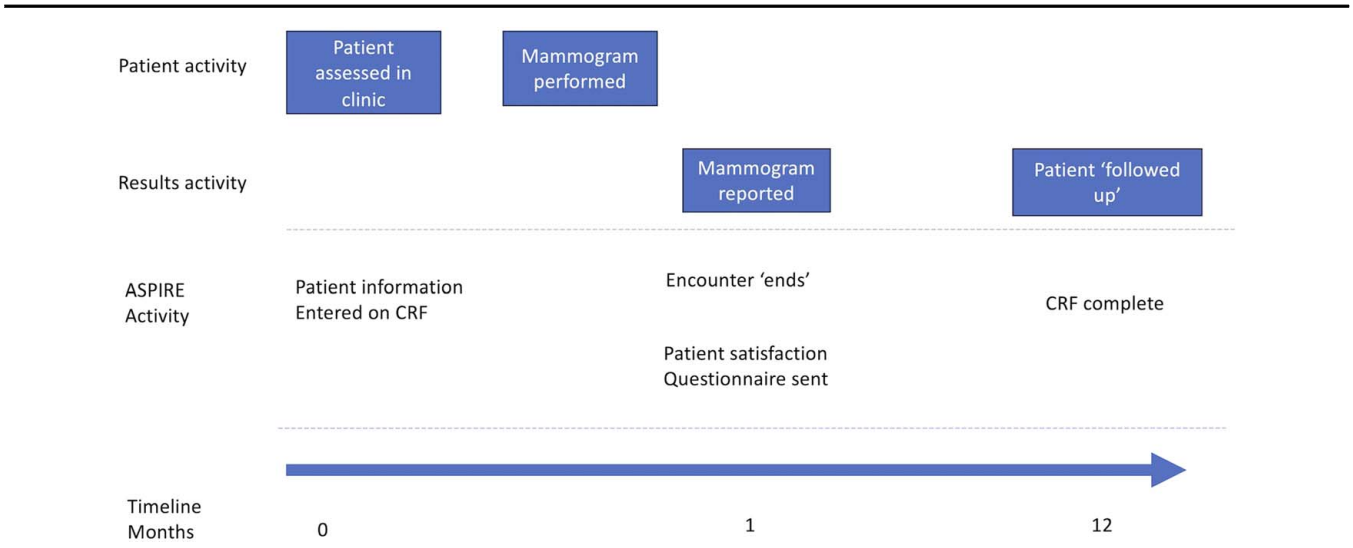

Figure 1. Example timeline of project activity for individual patient. In this example, the patient is referred for a mammogram, and when it is reported the encounter ends – this may not occur for every patient. CRF, case report form.

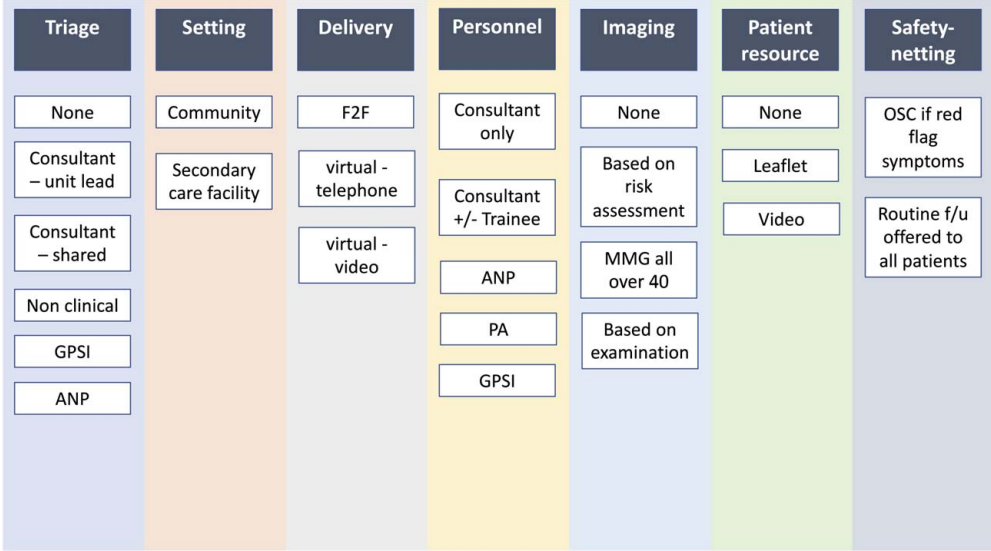

Figure 2. The components of the breast pain pathway assessed in the ASPIRE project.

Simple summary statistics will be calculated to describe demographics and outcomes in the cohort by pathway. Categorical data will be summarised by counts and percentages. Continuous data will be summarised by mean, SD, and range if the data is not skewed and median, interquartile-range (IQR) and range if the data is skewed.

We will establish the proportion and 95% CI of patients diagnosed with breast cancer in the 12 months following breast pain assessment overall and by pathway. Numbers of patients diagnosed with breast cancer in each pathway, numbers representing to secondary breast services and overall satisfaction scores will be described.

Patient and public involvement

Discussion of the best way to evaluate breast pain pathways and the establishment of the ASPIRE project was undertaken with frequent meetings with patient representatives from the ABS and Breast Care Now. There was a consensus opinion that breast pain was a common symptom, and that referral on a cancer-exclusion pathway could provoke anxiety for patients. There was agreement that evaluation of new pathways was important for patient care. PPI partners were involved in the design and pilot of the PROM questionnaires, and will be invited to review results of the project and collaborate/co-author papers and presentations for further dissemination.

Study governance and dissemination

This project is not classified as research according to the HRA Toolkit[18], and thus ethical approval is not required for this service evaluation. Each unit will register the study locally and have a local service evaluation approval in accordance with local governance approvals prior to data collection based on routine clinical data. The patient survey would be part of good clinical practice for most units, as they seek to evaluate their service. Local audit data will be available to individual units with participating centres retaining ownership of their data.

Any cancers detected within a year of review will be assessed by usual trust governance processes to determine and categorise if they are incidental diagnosis unrelated to the previous presentation or if they are true 'missed' cancers in a review process analogous to the nhsbsp interval cancer review.

The results will be presented locally, at academic conferences and to patient groups and the findings published in peer-reviewed journals.

Discussion

Breast pain pathways have the potential to reduce the demand for resource-intensive OSC, improving access to these diagnostic pathways to patients more likely to have breast cancer (e.g. those with a breast lump). This could improve cancer diagnosis times for those with cancer, whilst improving the provision of care for those with the symptom of breast pain only. There is potential for significant cost savings and prioritisation for healthcare systems, a recent estimate demonstrated that the cost of assessing patients with breast pain only in OSC was >£60k / case of breast cancer[1].

An important feature of this project is in the primary outcome of assessing the safety of the novel patient pathways. The use of the 'symptomatic interval cancer rate' as a proxy marker for safety is reasonable, as it has been reported previously from the OSC and so acceptable rates are known (between 0.6 and 0.9%[13,15]). The metric is analogous to the 'screening interval cancer rate', which is any cancer detected between the screening intervals of 3 years – known to be around 0.3%[5]. In this study, the symptomatic interval cancer rate will be assessed at 12 months. The interval cancer rate would be expected to increase with a longer follow-up after the initial phase of data collection at the index breast pain assessment. However, average tumour doubling time is 180 days[19], and 'missed' cancers from initial consultation would be expected to present within 12 months. The project will also assess the OSC, with the same outcome measures at the same interval, thereby giving a baseline

against which the new BPP might be evaluated. It is anticipated that the initial cancer diagnosis rate prior to completion of assessment will be higher in the BPPs that perform mammogram as part of their assessment, as incidental cancers unrelated to the patient's symptoms will be seen on mammography, and conversely it is possible the symptomatic interval cancer rate may be marginally higher in the BPPs that do not perform a mammogram – due to incidental breast cancers being detected (or not detected) via what is effectively a screening mammogram. Follow-up at 12 months allows assessment and evaluation of pathways in a more clinically prgmatic time frame – to delay assessing new pathways for 3 years would be disadvantageous, as the clinical pressure is immediate.

The structure of this project is based on previous, successful, platform studies such as the iBRA-NET localisation study[20]. This also used a core dataset with a focused and pragmatic approach, which allowed rapid evaluation of localisation devices in breast conserving surgery. These methods have been developed to allow the evaluation of clinical pathways, which has not been previously published. A particular feature of this project is the introduction of the ChamPionSE scheme, which allows any nonconsultant member of the breast care team (doctors, breast care nurses, and nurse practitioners) to take on a significant and demonstrable management role for the project leading to formal recognition useful for training/revalidation. This allows these comprehensive projects to be a useful resource for training opportunities and competency achievements. Many other cancer site diagnostic pathways are under similar strains within the NHS, and may also benefit from novel pathway introduction and rapid evaluation. This methodology of evaluation could be modified and applied to a range of different cancer sites and pathways, allowing clinicians to have a pragmatic tool box to evaluate changes in patient care pathways in real-time. This encourages innovation with concurrent evaluation of safety in real-time which is recognised as being essential to safe medical practice[21], whilst allaying concerns regarding safety and novel approaches to service improvement.

There remains a lack of consensus for the optimal method of assessing patients presenting with breast pain only. This project aims to assess novel pathways BPPs that are currently in routine clinical practice, evaluate their safety, and shed light on the individual components that are beneficial to patient satisfaction. The aim of this evaluation is to gather evidence and inform future breast pain only pathway development.

Ethical approval

This project is not classified as research according to the HRA Toolkit, and thus ethical approval is not required for this service evaluation.

Consent

Not available.

Sources of funding

Association of Breast Surgery provides financial support for the running of the study. The ASPIRE study group is formed of members of the Association.

TH is an NIHR funded Academic Clinical Lecturer SP is an NIHR Clinician Scientist.

Author contribution

All authors contributed in study conception, study oversight, methodology, and data analysis plan PPI involvement, design of case record forms, and manuscript preparation and review.

Conflicts of interests disclosures

RIC receives institutional research funding from SECA and Astra Zeneca. The other authors have no conflicts of interest to declare.

Research registration unique identifying number (UIN)

Not registered.

Guarantor

Study group.

Data availability statement

Fully anonymised data that support this study are available from the corresponding author upon reasonable request.

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References

[1] Dave RV, Bromley H, Taxiarchi VP, *et al*. No association between breast pain and breast cancer: a prospective cohort study of 10 830 symptomatic women presenting to a breast cancer diagnostic clinic. Br J Gen Pract 2022;72:e234–43.
[2] NHS England. NHS England Hospital Episode Statistics for Admitted Patient Care and Outpatient Data [Internet]. NHS England; Accessed 06.06.20232023.
[3] Joyce D, Alamiri J, Lowery A, *et al*. Breast clinic referrals: can mastalgia be managed in primary care? Irish J Med Sci (1971-) 2014:639–42.
[4] National Institution for Health and Care Excellence (NICE). Suspected cancer: recognition and referral [NG12] [Internet]. NICE; 2015. Accessed September 9, 2022. https://www.nice.org.uk/guidance/ng12.
[5] Michalopoulos DDA, Duffy SW. National collation of breast screening interval cancer data 2003–2005. Internet: UK Government; 2012.
[6] Gathani T, Cutress R, Horgan K, *et al*. Age and sex can predict cancer risk in people referred with breast symptoms. BMJ 2023;381:e073269.
[7] NHS England. Provider-based Cancer Waiting Times for February 2022 – 23 (Provisional) [Internet]. NHS England,; 2023 Accessed June 6, 2023. https://www.england.nhs.uk/statistics/statistical-work-areas/cancer-waiting-times/monthly-prov-cwt/2022-23-monthly-provider-cancer-waiting-times-statistics/provider-based-cancer-waiting-times-for-february-2022-23-provisional/
[8] NHS England. NHS Cancer Programme: Faster Diagnosis Framework [Internet]. NHS England; 2022. Accessed July 9, 2023. https://www.england.nhs.uk/wp-content/uploads/2019/07/B1332-NHS-Cancer-Programme-Faster-Diagnosis-Framework-v5.pdf
[9] Rowlands CE, James P, Lowe D, *et al*. Patient worry and concern associated with referral on the two-week suspected head and neck pathway. Br Dent J 2022:1–5.
[10] Robinson C, Ellis K, Fatayer H, *et al*. Efficient management of new patient referrals: Further data with increased numbers confirms the safety

of advanced nurse practitioner (ANP) led telephone breast pain clinics. Eur J Surg Oncol 2022;48:e192–3.
[11] Jahan M, Bartholomeuz T, Milburn N, *et al*. Transforming the 2-week wait (2WW) pathway: management of breast pain in primary care. BMJ Open Qual 2022;11:e001634.
[12] MacNeil F. IT. GIRFT Programme National Specialty Report. Internet: NHS; 2021.
[13] Batt J, Ainsworth R, Rayter Z, *et al*. Sensitivity and missed cancer rate in the symptomatic breast clinic-A retrospective cohort study of 40 323 patients. Breast J 2021;27:248–51.
[14] Liu X, Hubbard T, King P. Blue flag clinics–a Quality Improvement project to reduce referral pressure on breast surgery 2 week wait service. Eur J Surg Oncol 2023;49:e1–2.
[15] Britton P, Duffy S, Sinnatamby R, *et al*. One-stop diagnostic breast clinics: how often are breast cancers missed? Br J Cancer 2009;100: 1873–8.
[16] Harris PA, Taylor R, Thielke R, *et al*. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform 2009;42:377–81.
[17] Von Elm E, Altman DG, Egger M, *et al*. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Ann Intern Med 2007;147: 573–7.
[18] NHS Health Research Authority. HRA Decision Toolkit [Internet]. NHS Health Research Authority, 2022 . Accessed September 9, 2023. https://www.hra-decisiontools.org.uk/research/
[19] Dahan M, Hequet D, Bonneau C, *et al*. Has tumor doubling time in breast cancer changed over the past 80 years? A systematic review. Cancer Med 2021;10:5203–17.
[20] Dave RV, Barrett E, Morgan J, *et al*. Wire-and magnetic-seed-guided localization of impalpable breast lesions: iBRA-NET localisation study. Br J Surg 2022;109:274–82.
[21] Cumberlege B. First do no harm: the report of the independent medicines and medical devices safety review. Department of Health and Social Care, editor Internet: UK Government; 2020.