IDEATE: Designing an outcomes measurement methodology for a retrospective outcomes-based agreement for a metastatic breast cancer medication in Wales, 2018-2020

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Summary

- **We have collaboratively created a methodology to enable robust outcomes measurement in an outcomes-based agreement for a medicine.**
- **Data linkage is possible within the NHS Wales infrastructure allowing measurement of clinically relevant patient centered outcomes**
- **Limitations in data availability prevented measurement of a wider variety of outcomes. Future work should focus on identifying methods to capture such outcomes, including patient-reported outcomes measures (PROMs), and address missingness/data availability**

Introduction

- Outcome-based agreements (OBAs) for medicines have the potential to align incentives for payers and providers around improved patient and population health outcomes.
- However, several challenges prevent their routine adoption.
- By making improvement in patient health outcomes the primary goal of treatment reimbursement, healthcare systems and life sciences can align to solve the scientific and operational barriers associated with the design and implementation of OBAs.
- Project IDEATE used a rigorous methodology and cross-organizational team to identify the key requirements for selecting patient health outcomes and the appropriate patient population for an experimental, retrospective OBA using real-world data in patients treated for metastatic breast cancer (mBC) in Wales.

Methods

- An iterative process involving oncologists and data experts from NHS Wales and life sciences [Pfizer], as well as Value-Based Health Care experts at Swansea University reached consensus on the final outcomes measurement framework.
- Within the Secure e-Research Platform (SeRP), a trusted research environment, we created a novel oncology linked-data environment consisting of the Welsh Breast cancer audit with Cancer Network Information System Cymru (CaNISC), ChemoCare, Patient Episode Database for Wales (PEDW), Admitted Patient Care (APC), Outpatient appointments (OPA), Emergency Department Dataset (EDDS), and Office of National Statistics (ONS) mortality datasets.
- All data was de-identified and pseudonymised by Digital Health and Care Wales (DHCW) and analysed by Lane Clark and Peacock.
- The design of the outcomes framework involved the following steps, shown in Figure A:

1. Selection of the patient cohort, including refined inclusion/exclusion criteria upon data feasibility assessment (Figure B);
2. A literature review of mBC health outcomes to create a long list, including clinical and patient-reported (PROMS), reviewed by oncology consultants;
3. Workshop to assess completeness of list and gap analysis;
4. Priorisation of outcomes through clinician input; focus on outcomes driving biggest impact on patient long-term health and impact to daily life;
5. Voting exercise to create a shortlist of outcomes to feed into OBA measurement framework;
6. A mapping and feasibility test of short-list outcomes available in Welsh datasets with exclusion of free-text variables and outcomes not available in EHRs;
7. For outcomes deemed a priority, but not routinely collected/in an easily extractable format (e.g. free text or PROMs), proxy variables were constructed with clinical feedback;
8. Further exclusion of outcomes with a high level of missingness led to finalization of the framework.

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Figure A – Outcomes Selection Methodology for patient centred OBA design

47 original source identified from literature
(including NICE guidelines, government/ policy on cancer services, whitepapers, research papers, national metrics, clinical trials)

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20 sources with relevant content and for an mBC population

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219 outcomes extracted for an Outcomes Reference Guide
(outcomes classified as Clinical, Social, or Patient-Reported)

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Cross-disciplinary Outcomes Workshop
(to shortlist outcomes for OBA measurement with clinicians/ consultants, goal was 10)

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Outcomes Longlist: 57 outcomes
(additional outcomes of priority identified by clinicians: patient-reported outcomes)

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Outcomes Shortlist
(17 outcomes selected by voting of clinicians)

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Outcomes Shortlist Refined: 10 total outcomes
(predicted measurement feasibility assessed and ranked low/medium/high to refine)

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Actual Real-world data feasibility test in linked-data environment in SeRP

Figure B- i) General inclusion criteria development ii) Additional inclusion criteria for comparator population iii) Additional inclusion criteria for study population

	Initial feasibility assessment	Changes	Data feasibility study
i)	**Hormone status:** • HER2 negative • ER positive • Age: • 18+ **Stage:** • Locally advanced/ metastatic breast cancer* **Health status:** • Performance status 3 or less	**Removed** **Health status:** • Performance status **Added** **Stage:** • Non-operable (No surgery after diagnosis or target medication start)	**Hormone status:** • HER2 negative • ER positive **Age:** • 18+ **Stage:** • Locally advanced/ metastatic breast cancer* • Non operable cancer **Health status:** • N/A
ii)	**Entry date (diagnosis/ staging):** • 2014 - 2016 **Medication:** • Letrozole	**Removed** **Medication:** • Letrozole	**Entry date (diagnosis/ staging):** • 2014-2016 **Medication:** • NA
iii)	**Entry date (diagnosis/ staging/ treatment start):** • 2017 - 2019 **Medication:** • Target medication	**Changed** **Entry date:** • 2017 – 2020 • Only include if diagnosed after 2017	**Entry date (diagnosis/ staging/ treatment start):** • 2017 – 2020 • Exclude pre 2017 diagnoses **Medication:** • Target medication

Results

- The final cohort for the experimental OBA included 92 patients diagnosed with mBC between 2018 and 2020 with a median age of 72.
- From 47 sources identified through literature search, 20 were reviewed based on content relevance and a mBC population, creating an extracted long list of 57 health outcomes to reflect a patient's holistic experience of breast cancer (including mortality & survival, diagnosis, disease progression/recurrence, disruption of care, time to treatment, disease symptoms, employment, and end of life care).
- After clinician prioritisation, 17 outcomes were shortlisted with 7 not available in datasets, resulting in ten outcomes, as shown in Figure C.
- However, with data feasibility tests, we found only 4 outcomes could be measured reliably in our patient cohort of mBC patients due to lack of additional dataset access, free-text format, and high missingness:
  1. 1-year survival;
  2. days disrupted by care;
  3. intolerance to treatment, including:
     a. intolerance due to treatment deferral.
     b. intolerance due to discontinuation.

Figure C – Ten outcomes selected before data feasibility test in novel-linked data environment SeRP

Outcomes agreed as most relevant (literature & workshops with HCPs)	Outcomes available in data
• **1-year survival** • **Days disrupted by care** (no. days in hospital during contract period) • **Intolerance to treatment** (% cycles deferred due to intolerance) • **30-day mortality** (% patients who died within 30 days of receiving treatment) • **Symptom control in palliative care** • **Severe bowel symptoms** (symptom scores during contract period) • **Pain control** (prescription for pain relief or pain symptom score) • **Treatment response** (identification of tumour shrinkage following treatment) • **Progression-free survival** (time from diagnosis to progression) • **Spinal cord compression** (no. occurrences of spinal cord compression diagnoses)	**Included** • **1-year survival** • **Days disrupted by care** Modified • **Intolerance to treatment** (deferral) • **Intolerance to treatment** (discontinuation) **Excluded** • **30-day mortality** (never event and safety outcome, not deemed appropriate in an OBA) • **Symptom control in palliative care** (data not available in PalCare) • **Severe bowel symptoms** (ICD-10 codes unspecific for this outcome) • **Pain control** (lack of prescription data) • **Treatment response** (lack of non-free text fields in radiology dataset) • **Progression-free survival** (data in free-text) • **Spinal cord compression** (incidence <5% in study population)

Conclusion

- We designed an outcomes measurement methodology to better understand how to assess patient-centred health outcomes at scale and meaningfully incorporate them into the way medicines are reimbursed.
- The iterative, clinically informed design offered an opportunity to create continuity across the treatment pathway and reimbursement.
- Some limitations exist in data generated in clinical treatment of patients with mBC in Wales, including missingness, and not easily extractable format.
- Our research identified key areas for future developments to the surveillance system, including extraction of data from free-text fields in EHRs, which may help address level of missingness across multiple variables including 'progression-free survival,' and include broader capture of patient-reported outcome measures to enhance OBA measurement of patient benefit of treatment.

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