Metastatic Breast Cancer MBCalliance

San Antonio Breast Cancer Symposium® | December 5-9, 2023

Analysis of Trends in Funding of Metastatic Breast Cancer Research

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Presentation ID: PD5-05-10

BACKGROUND

- Metastatic breast cancer (MBC) is the **primary cause of breast cancer deaths**, with an estimated 43,700 deaths that will occur in the U.S. in 2023 and nearly 700,000 globally.[1,2]
- The Metastatic Breast Cancer Alliance (The Alliance) is a collaborative group of breast cancer advocacy and research funding organizations, patients and patient advocates, and pharmaceutical partners with **a common goal to improve the lives of people living with MBC**.
- At its inception in 2013, the Alliance conducted an analysis of the landscape of MBC (Metastatic Breast Cancer Landscape Analysis) that included awareness of the disease, quality of life measures and access to care, clinical trials, and research in MBC. The analysis of research funding in MBC in this 2014 published report **showed that just 7% of all funds for breast cancer research** during the funding years 2000-2013 **were devoted to metastasis**.

OBJECTIVES

- Update **how research investment in MBC has changed** between 2014 and 2020 compared to our previous analysis.
- Determine **what types of research** were being conducted.
- Understand how relevant the research is to **key areas of interest to people living with the MBC**, so that funders' strategic investments can take account of both current investment and the priorities of those living with the disease.

METHODS

- **Funders and patients collaborated** to analyze funded breast cancer grants (2014-2020) from 83 non-profit organizations worldwide, including the International Cancer Research Partnership (ICRP) database, the Health Resource Alliance (HRA) database, and projects funded by Alliance non-profit members.
- Grant titles, abstracts, and classifications were extracted. A **coding tool** that used a machine learning algorithm **was built to identify grants related to metastasis** (Met Y/N)*, trained on manually coded grants from the 2000-2013 analysis, and validated by expert coders.
- Alliance members living with MBC were **surveyed about research priorities**, which were converted to language that could be queried with the tool.
- **Metastasis-related projects were identified**, and also coded to categories such as type of research (e.g., treatment), genes or proteins studied, site of metastasis, breast cancer subtype, and patient priority questions.

*Met Y projects included the biology of metastasis (including mechanisms of invasion relevant to metastasis), preventing metastasis, detection & prognosis, treatment, research relating to living with metastasis, and outcomes or health systems research. Projects were excluded (Met N) where research in metastasis was not specified, including research in normal cell migration, prevention of recurrence, and quality of life/survivorship that was not specific to MBC.

References
1. American Cancer Society. https://www.cancer.org/research/cancer-facts-statistics/breast-cancer-facts-figures.html. Accessed Oct 27, 2023.
2. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/breast-cancer. Accessed Oct 27, 2023.

RESEARCH PRIORITIES OF MBC PATIENT ADVOCATES

HIGHEST PATIENT PRIORITY:
Understand how treatment resistance can be overcome in different subtypes

REMAINING PRIORITIES:
Define subsets of triple-negative MBC and appropriate treatments for those subsets

Identify better treatments for brain metastases and central nervous system metastases

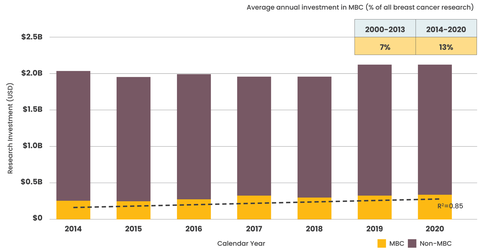
Research that identifies how side effects of treatments can be better managed

Identify and define the role of somatic genes in metastatic tumors and the role of tumor heterogeneity in the selection of treatments for MBC

RESULTS

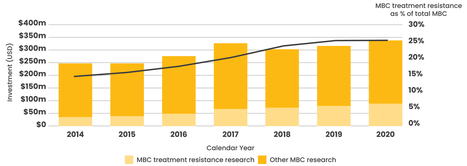
- In total, 6607 projects active from 2014 through 2020 were found to be relevant to MBC, representing investments from 83 ICRP, HRA, and Alliance organizations. Investment in MBC research nearly doubled from 2014-2020, and the average annual investment was 13% of all BC investment, rising from $249m in 2014 to $337m in 2020 (a 25% rise above the rate of inflation). The 6607 MBC projects made up 13% of all breast cancer projects. The numbers of projects fell slightly in 2020, but investment continued to rise (the average value of each project rose from just over $492K in 2014 to over $580K in 2020).
- Investment by charities and foundations rose from $49.9m in 2014 to $58.8m in 2020.
- Despite this trend, research investment for MBC remains insufficient, and this research has not led to outcomes that are meaningful to patients.

Figure 1. **Global research investment in MBC**, 2014-2020



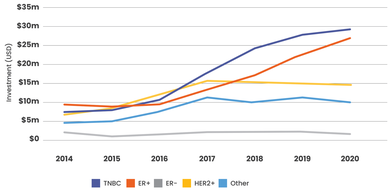
- Research into **understanding and overcoming treatment resistance,** which was the highest patient priority question, increased from 15% in 2014 to 26% of the MBC portfolio in 2020; this was a statistically significant increase above the rate of inflation.

Figure 2. **Investment in MBC treatment resistance research** compared to all other types of MBC research



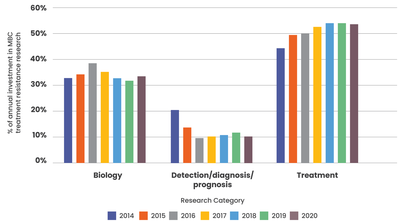
- In terms of treatment resistance according to breast cancer subtype, the highest number of projects focused on triple-negative MBC (>300)
- Fewer than 20 projects were focused on overcoming treatment resistance in metastatic invasive lobular breast cancer; these are included in the "Other" category.

Figure 3. Investment in MBC treatment resistance research **by breast cancer subtype**



- Of the categories evaluated (biology; detection/diagnosis/prognosis; treatment), the largest increase in investment was for development and clinical testing of treatments. Investment in the biology of treatment resistance was the next highest area for investment. Investment was lower for research into detection, diagnostic, or prognostic factors associated with treatment resistance.
- Not shown is the category 'Other', which includes a minority of projects focused on both MBC and non-MBC research, some of which may be relevant to the MBC setting (e.g., evaluating the financial toxicity of living with MBC) or may relate to a small subset of projects working on both early and metastatic breast cancer.

Figure 4. Investment in MBC treatment resistance research **by research category**



DISCUSSION

- Despite the almost doubling of MBC research funding since 2014, current research investments (only 13% of breast cancer research funding is for MBC) have not translated to meaningful improvements in patient outcomes; **investment continues to fall far short of the urgency** for new treatments for and prevention of MBC.
- This is the first analysis by the Alliance to assess funding in **patient priority areas**, specifically treatment resistance.
- The **positive trend for research** in this area may be a **direct result of patient advocacy**.
- The **coding tool allows for ongoing complex queries** to identify gap areas in the greatest need of further research funding.
- Current and future analyses can be used to focus advocacy efforts to **drive research funding of priorities** and understudied areas of MBC.
- A 20% increase in MBC research funding from 2014–2020 from charities and foundations **speaks to the urgency to address patient needs** in this sector.
- As the major funder of biomedical research, the National Cancer Institute and other government agencies need to **recognize this urgency and increase funding in MBC research**.

NEXT STEPS

- Analysis in 2024 and beyond will **focus on other remaining patient advocate priorities** (starting with the priorities highlighted in blue) and results will be reported via social media.

LIMITATIONS

- While it is estimated that the ICRP database includes over 60% of global non-pharmaceutical research investment, evidently not all breast cancer projects from all global organizations have been included. (ICRP does not include all grant data worldwide.)
- Coding, whether automated or manual, was dependent on the quality of the abstracts.

These findings are a call to action for advocacy organizations, researchers, clinicians, funders, industry, and regulators to accelerate research that matters to people living with MBC and to quickly translate discovery research into interventions that save lives.

Acknowledgments
The authors thank Laurie Campbell, MBCA Executive Director; Kristine De La Torre, PhD for medical writing assistance; Haeg Design for graphics; and Jim Hudson for web-based classification development and machine learning algorithms.