

Breast Cancer Research Program

Strategic Plan

INTRODUCTION

The Congressionally Directed Medical Research Programs (CDMRP) represents a unique partnership among the U.S. Congress, the military, and the public to fund innovative and impactful medical research in targeted program areas.

In 2015, an ad hoc committee of the National Academies of Sciences, Engineering, and Medicine was assembled to evaluate the CDMRP's two-tier review process and its coordination of research priorities with the National Institutes of Health (NIH) and the Department of Veterans Affairs (VA). As part of their final report,¹ the committee recommended that each CDMRP program "... develop a strategic plan that identifies and evaluates research foci, benchmarks for success, and investment opportunities for 3–5 years into the future," and that these strategic plans "should specify the mission of the program, coordination activities with other organizations, research priorities, how those priorities will be addressed by future award mechanisms, how research outcomes will be tracked, and how outcomes will inform future research initiatives."

In response to these recommendations, this document presents the current strategy for the CDMRP's Breast Cancer Research Program (BCRP). The BCRP Strategic Plan identifies the high-impact research goals most important to its stakeholders while providing a framework that is adaptable to changes in the medical research environment to address those goals. This plan has been formulated to provide greater clarity of the program's goals over time to the public and other stakeholders. Funding for the BCRP is congressionally appropriated on an annual basis; therefore, there is no guarantee of future funding. The BCRP Strategic Plan will be reviewed during the program's annual Vision Setting meeting and updated as necessary.

BCRP BACKGROUND AND OVERVIEW

Based on recommendations from its Programmatic Panel, the BCRP has developed the following vision and mission in response to Congressional intent:

VISION: A world without breast cancer

MISSION: To end breast cancer for Service members, Veterans, and the general public by funding innovative, high-impact research through a partnership of scientists and consumers

BACKGROUND

When the BCRP received its first Congressional appropriation in 1993, the Institute of Medicine (IOM) (now the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine) was commissioned to make recommendations to the Department of Defense (DoD) on: (1) the peer review procedures that should be employed and (2) the preferred programmatic investment strategy for the funds.²

The following IOM recommendations continue to be the guiding principles of the BCRP:

1. Conduct a two-tier peer review system.

The IOM recommended "a peer review system that reflects many of the traditional strengths of existing review systems but that is tailor-made to accommodate the goals and the novel and complex program the committee has proposed."

The primary criterion for awarding grants is scientific excellence (first tier – peer review). Programmatic relevance is a secondary criterion (second tier – programmatic review) to ensure that awards are made to the excellent proposals that best meet the programmatic goals.

The IOM also recommended that consumers (breast cancer survivors) should be included as members of the panel conducting the programmatic

review. The BCRP adhered to this guidance when the program was initiated in 1993 and expanded it by further integrating consumers as peer review panel members beginning in 1995.

2. Enable scientists to propose their best ideas, not restricted by the program.

The IOM recommended that “the best way to ensure that only first-rate research is funded is not to target specific disciplinary areas but, rather, to create a structure that allows the best ideas to emerge from all disciplines.” The IOM further recommended to “encourage innovative ideas and cross-cutting proposals that can shed light on the fundamental questions in the causation, prevention, detection, diagnosis, and optimal treatment of and recovery from breast cancer.”

The BCRP invests in research across the full spectrum of basic, translational, and clinical research. Consistent with the recommendations made by the IOM, the BCRP designed award mechanisms that meet the following objectives:

- Accelerate high-impact research
- Encourage innovation and stimulate creativity
- Bring new investigators into the breast cancer field
- Facilitate meaningful collaborations

Appropriations for fiscal years 1993-2017 (FY93-FY17) totaled \$3.4 billion. The BCRP has supported over 6,600 awards through a competitive peer review process targeted toward the program’s vision. An additional 100 awards are anticipated for FY18, depending on the quality and budgets of the recommended applications. The BCRP has funded research at for-profit, nonprofit, public, and private organizations such as universities, colleges, hospitals, laboratories, and companies. Award data and abstracts of funded research proposals can be viewed on the CDMRP website (<http://cdmrp.army.mil>).

MAJOR ACCOMPLISHMENTS

BCRP-funded projects contributed to the following breakthroughs in treatments, diagnostics and imaging, risk assessment, and resources:

Treatment

- Trastuzumab (Herceptin®) to treat HER2⁺ breast cancer
- Palbociclib (IBRANCE®) to treat ER⁺ breast cancer
- Ribociclib (KISQALI®) to treat ER⁺ breast cancer
- Abemaciclib (Verzenio™) to treat ER⁺ breast cancer
- ATLAS clinical trial, which changed the standard of care for tamoxifen treatment of ER⁺ breast cancer from 5 years to 10 years
- Prone Radiotherapy, which reduces harmful radiation to the heart and lungs

Diagnostics and Imaging

- Sentinel lymph node biopsy, a standard of care technique that enables clinicians to determine tumor staging and whether more extensive lymph node surgery is necessary
- Digital mammography and digital breast tomosynthesis, a 3-D digital mammography tool
- Molecular breast imaging, a nuclear medicine technique that provides high-resolution functional images of the breast

Risk Assessment

- OncoVue®, the first genetic-based breast cancer risk test
- The BROCA cancer risk panel for individuals with a suspected hereditary cancer predisposition
- The Breast Cancer Index test for predicting the likelihood of benefit from extended endocrine therapy and risk of late-distant recurrence
- Discovery of the BRCA2 617delT founder mutation, now a commercially available genetic risk test
- Discovery of the PTEN mutation, now a commercially available genetic risk test
- Discovery of the PALB2 mutation, now a commercially available genetic risk test
- MetaSite Breast™ test, which predicts the metastatic potential of a primary breast cancer
- MetaCalc™, a prognostic test for metastasis that is used in breast and other cancer types



Resources

- Expression Arrest™ shRNA libraries, a commercialized research tool to identify therapeutic targets
- Patient-derived xenograft models that are publically available for studying tumor growth, metastasis, drug efficacy, and prognosis
- The Margaret Dyson Family Risk Assessment Program, which provides a range of risk assessment, screening, and preventive services to individuals who have a family history of breast or ovarian cancer

Publications

- Over 18,000 publications in highly respected scientific journals

Patents and Invention Reports

- Over 1,100 patents, patent applications, and invention reports

RESEARCH AND FUNDING ENVIRONMENT

To identify gaps in the breast cancer research field, it is important to consider: (1) how much is invested and (2) which research areas are funded across the major federal and non-federal organizations. The CDMRP is a founding partner of the International Cancer Research Partnership (ICRP), a unique alliance of cancer organizations working together to enhance collaboration and strategic coordination of research. The ICRP currently includes over 100 partnering organizations worldwide. The ICRP developed the Common Scientific Outline (CSO) coding system, which is shared among the ICRP partners and enables coordination of research and funding efforts. Portfolio data coded using the CSO system are shared among the ICRP partners and are publicly available.

Every year, the BCRP analyzes: (1) dollar investments and (2) the research portfolio of the major breast cancer research funding organizations. The data below represent an analysis of the breast cancer research funded between 2012-2016 by ICRP partners, as well as the VA.

DOLLAR INVESTMENTS

The BCRP invests the second-highest amount of funds in breast cancer research, after the National Cancer Institute (NCI). However, while the BCRP invests only in new awards, the NCI invests about 15% of its funds in new awards, with the remaining funds supporting the out-years of existing continuing awards.

Funding Agency	Dollars Invested
BCRP	\$515,177,144
National Cancer Institute (all awards)*	\$2,163,439,214
National Cancer Institute (new awards)*	\$348,080,530
Department of Veterans Affairs	\$12,754,705
Susan G. Komen	\$113,489,157
American Cancer Society	\$44,844,695
California Breast Cancer Research Program*	\$26,982,550

* National Cancer Institute and California Breast Cancer Research Program funding information for 2016 was not available; data shown are for 2012-2015.

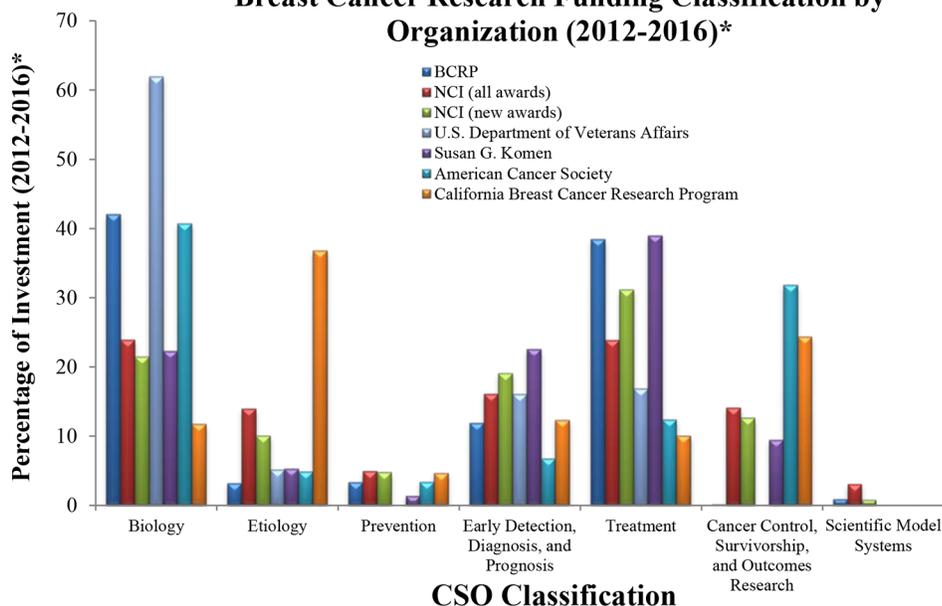


RESEARCH PORTFOLIO

Each research project was coded based on the CSO system. For projects with more than one CSO code, the funding was split evenly between the CSO codes assigned.

- The two research areas in which the DoD BCRP has invested the most funds are Biology and Treatment. The BCRP did not invest in Cancer Control, Survivorship, and Outcomes Research, which is consistent with the program’s focus on research aimed at eradicating breast cancer.
- The NCI’s new awards were invested in all research areas, with Treatment as the highest funded, followed by equivalent amounts invested in Biology; Early Detection, Diagnosis, and Prognosis; Etiology; and Cancer Control, Survivorship, and Outcomes Research.
- The research area that is the least funded by all organizations is Prevention.

Breast Cancer Research Funding Classification by Organization (2012-2016)*



BCRP STRATEGIC DIRECTION

Considering the major accomplishments resulting from BCRP-funded research and the priority research areas funded by other federal and non-federal organizations, the BCRP remains focused on addressing the knowledge, research, and clinical gaps that continue to make breast cancer a global health issue.

The overall goal of the BCRP Strategic Plan is to establish a strategy for making breakthroughs toward ending breast cancer. It is expected that the outcomes of this research program will benefit Service members, Veterans, and the general public, all of whom are affected by and/or at risk for breast cancer.

The BCRP’s *Breast Cancer Landscape* (http://cdmrp.army.mil/bcrp/pdfs/bc_landscape.pdf) provides the program’s strategic direction. This document, which is publicly available, is a broad overview prepared by the BCRP that covers what is currently known, as well as the gaps and needs, regarding the topics that are most pertinent to the BCRP’s vision of ending breast cancer. The intent of the *Breast Cancer Landscape* is to provide the breast cancer community with concise information about the “state of breast cancer.” Potential applicants to award mechanisms are strongly encouraged to read the *Breast Cancer Landscape* before preparing their applications.

The BCRP’s strategic goals are the program’s priorities for addressing its Strategic Direction and its vision of ending breast cancer. Progress toward meeting the strategic goals will be assessed in the near-term (3-5 years) and medium to long-term (6+ years).

To address its Strategic Direction, the BCRP seeks to invest in the following strategic goals, which represent the most important overarching challenges within the BCRP’s vision. Consistent with the BCRP’s historical strategic approach of enabling investigators to propose their best ideas, the program does not define what types of research projects or products will be funded. Strategic goals may span from basic research studies to translational research projects and clinical trials.



STRATEGIC GOALS

- Prevent breast cancer (primary prevention)
- Identify determinants of breast cancer initiation, risk, or susceptibility
- Distinguish deadly from non-deadly breast cancers
- Conquer the problems of overdiagnosis and overtreatment
- Identify what drives breast cancer growth; determine how to stop it
- Identify why some breast cancers become metastatic
- Determine why/how breast cancer cells lie dormant for years and then re-emerge; determine how to prevent lethal recurrence
- Revolutionize treatment regimens by replacing them with ones that are more effective, less toxic, and impact survival
- Eliminate the mortality associated with metastatic breast cancer

The BCRP intends all information, data, and research resources generated under the awards funded by the program to be made available to the scientific research and consumer advocacy communities and to the public.

INVESTMENT STRATEGY

The BCRP's 5-year investment strategy (FY18-FY22) outlines the program's approach to soliciting the type of research that will facilitate accomplishment of its strategic goals. After each fiscal year, the program will decide whether the award mechanism supporting each strategic investment is working well or needs to be improved. BCRP award mechanisms fall under the following categories:

- Innovative Early Ideas
 - Breakthrough Award Level 1
 - Breakthrough Fellowship Award
- Mature Ideas
 - Breakthrough Award Level 2
- Translational
 - Breakthrough Award Level 2
 - Breakthrough Award Level 3
- Clinical
 - Breakthrough Award Level 3
 - Breakthrough Award Level 4
- Investigator-Focused (may span basic, translational, clinical)
 - Era of Hope Scholar Award
 - Distinguished Investigator Award
 - Innovator Award

MEASURING PROGRESS

NEAR-TERM OUTCOMES (3-5 YEARS)

The near-term outcomes will be measured by the amount of funding invested in each strategic goal (Overarching Challenge). Tracking these investments will enable the program to identify Overarching Challenges that are understudied and encourage more research in those areas. In addition, short-term publications, patents, and clinical trials will be tracked and are expected to vary based on the stage of the research project.

MEDIUM TO LONG-TERM OUTCOMES (6+ YEARS)

The medium to long-term outcomes will be measured in each strategic goal (Overarching Challenge), and will include publications, patents, clinical trials, commercialization of products, and changes in standard of care for patients. It is expected that this will vary based on the stage of the research project. Analyses of these outcome measurements within each major breast cancer subtype may also be performed.

REFERENCES

1. *Evaluation of the Congressionally Directed Medical Research Programs Review Process, a Report of the National Academies of Sciences, Engineering, and Medicine*. 2016. The National Academies Press, Washington, DC. (<http://nationalacademies.org/hmd/reports/2016/cdmrp.aspx>).
2. Institute of Medicine, *Strategies for Managing the Breast Cancer Research Program: A Report to the U.S. Army Medical Research and Development Command*, The National Academies Press, 1993.