

Blood Clotting and Mammographic Breast Density Project Information Sheet



*“Having gone through breast cancer myself, I joined the board of trustees because I was drawn to its focus on finding ways to create a future free from breast cancer – I have two daughters, and I never want them to experience what I went through. **Despite it being such a strong risk factor, there has been relatively little research into breast density.** It can help predict which women are more at risk of developing breast cancer, so if Prevent can find new treatments that can stop cancers from forming, fewer women will have to go through what I faced.”*

Breast cancer survivor and Prevent Breast Cancer trustee, Diana Harris

About Prevent Breast Cancer

Predict. Prevent. Protect. You could call it our mantra. As the only UK charity entirely dedicated to the prediction and prevention of breast cancer, we're committed to freeing the world from the disease altogether. Unlike many cancer charities, we're focused on preventing, rather than curing. Promoting early diagnosis, screening and lifestyle changes, we believe we can stop the problem before it starts. As we are situated at the only breast cancer prevention centre in the UK, we're right at the front line in the fight against the disease.

We predict – by identifying who is at risk of breast cancer

We prevent – by offering preventative interventions, to **stop** breast cancer before it starts

We protect – our goal is to **shield future generations** from breast cancer

Prevent Breast Cancer seeks to create a breast cancer free future for the next generation. We conduct ground-breaking research into the prediction and prevention of breast cancer. Our research falls under four different categories: gene research, early detection and screening, preventative drugs, and diet and lifestyle.

We are a registered with the Charity Commission in England with the Registered Charity Number 1109839.

About this project

The Need

Breast cancer is the most common cancer in the UK, accounting for a staggering 15% of all cancer diagnoses. Across the UK, 150 individuals are diagnosed with breast cancer every day; tragically 32 of them will lose their fight against the disease. Unfortunately, these figures are rising. In the last 10 years, incidence rates have risen by 4%.

Sadly, many of the reasons why breast cancer develops in women are unknown. This study aims to better understand **one of the biggest risk factors** for the development of breast cancer and by doing so could lead to completely new and exciting avenues for breast cancer prevention.

After age, the second biggest risk factor for developing breast cancer is **mammographic breast density**, which is a stiffness of breast tissue measured by whiteness on a mammogram. Although scientists have known since the 1970s that this factor increases risk, little is understood as to why high breast density promotes cancer development.

The Research Question

Our researchers have previously found that high-density breast tissue is physically different to lower density areas, with high density areas being significantly stiffer with **more connective tissue**. However, it is not yet clear why this stiffer tissue makes cancer more likely to develop.



Gene Research

Investigating how changes and mutations in genes can affect someone's risk of developing breast cancer.



Early Detection and Screening

Identifying new and unique screening methods to ensure early and accurate diagnoses.



Preventative Drugs

Investigating drugs that can be used as a preventative measure to reduce an individual's risk of developing breast cancer.



Diet and Lifestyle

Research into lifestyle factors that contribute to risk and how diet and exercise can reduce an individual's risk.

Fibroblasts are types of cells that are critical in wound healing and are the most common cells in connective tissue. These cells also create the tissue which supports milk ducts in breasts. They are the cause of the whiteness on mammograms of women with high breast density, and also cause blood clotting.

Breast cancer resembles a non-healing wound, with increased clotting in the tissue surrounding cancer cells. Previous research funded by Prevent Breast Cancer found that **there is a relationship between DCIS (ductal carcinoma-in-situ), a common precancerous condition, and blood clotting caused by fibroblasts**. Following on from this, our research team are examining whether the fibroblasts in high-density breast cells create a wound-like environment which increases clotting and **causes normal breasts to develop cancer and benign cases of DCIS to become invasive**.

Project Leader

The lead researcher in this study is Cliona Kirwan, Professor of Surgical trials at the Royal College of Surgeons, University of Manchester and Clinician Scientist in Surgical Oncology and Consultant Oncoplastic Breast Surgeon. Cliona has been involved in 55 research publications in the field of breast cancer research.

The Methods

To investigate this, our scientists will look at the behaviour of live fibroblasts on breast tissue that has been freshly removed from surgery, including looking specifically at high- and low- density breast tissue. This may explain how density causes cancer and if clotting is a possible target for prevention. Our research team is uniquely placed to collect and examine this tissue from consenting patients undergoing therapeutic mastectomies to remove cancer and DCIS.

Impact

This cutting-edge project could have a phenomenal impact on breast cancer prevention methods. If fibroblasts are causing a wound-like, clotting environment, **anti-clotting drugs** may be recommended for women who present with high-density breast tissue at screening in order to reduce their lifetime risk of developing breast cancer. **This could be life-changing for the 10% of women around the world who fall very high on the breast density scale, who are also around six times more likely to develop breast cancer.**

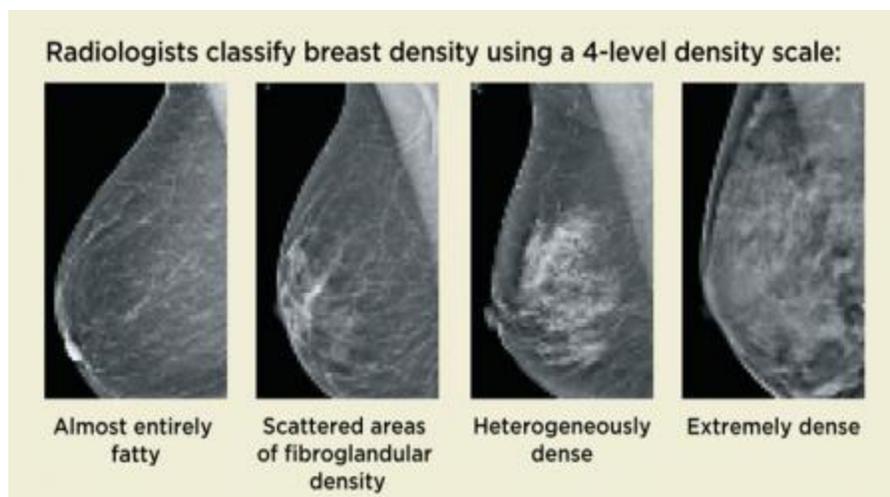


Figure 1 The Breast Density Scale as represented on a mammogram. 40% of women have 'heterogeneously dense' breasts and 10% of women have extremely dense breasts. These groups of women are more likely to develop breast cancer.

More Information

For more information about this project, please get in touch with Vicki Wilkinson, our **Trusts, Relationships and Research Manager** by emailing vicki@preventbreastcancer.org.uk or phoning 0161 291 4402.