Genetic testing for BRCA mutations: country profile for France 2019
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Key facts and figures on breast cancer and BRCA mutations in France

- France has the 4th highest incidence rate and the 14th highest mortality rate of female breast cancer in Europe.¹
- It is estimated that around 2 in 1,000 women carry a BRCA1 or BRCA2 mutation.²
- In 2017, 2,084 women were found to carry a BRCA1 mutation and 2104 a BRCA2 mutation.³
- A woman in France has a lifetime risk of breast cancer of 51–75% if she has a BRCA1 mutation and 33–55% if she has a BRCA2 mutation, compared with 12% for the general population.⁴,⁵
- Geographical clustering of specific BRCA1 mutations in the north-east and Alsace-Lorraine⁶ suggests a founder effect, meaning that small groups of people have shared ancestors, giving rise to a higher prevalence of specific, rare mutations among these groups.⁷
Introduction

Mutations in the *BRCA1* and *BRCA2* genes put women at significant risk of developing breast cancer. Based on international data, it is thought that most women have a 12.5% risk of developing breast cancer in their lifetime. This risk increases to 60–90% among women with a *BRCA1* mutation and 45–85% among women with a *BRCA2* mutation. Breast cancers related to *BRCA1* mutations are more likely to be triple-negative breast cancer, which is difficult to treat.

It is important for women to know whether they carry a BRCA mutation. BRCA-mutation carriers who are asymptomatic can be supported to make an informed choice to reduce their risk of developing breast cancer through, for example, preventive surgery and, in some countries, chemoprevention. They can also reduce their chance of breast cancer mortality through regular monitoring which can pick up earlier cases of the disease. Knowing whether a woman with breast cancer carries a *BRCA* mutation can also help to inform decisions around treatment and surgery. In addition, identifying BRCA-mutation carriers allows for family members to be tested.

Men can also benefit from knowing they carry a BRCA mutation. BRCA mutations can increase the risk of prostate and other cancers, so men with identified mutations can be closely monitored for early signs of the disease. In addition, men who carry a BRCA mutation can pass it on to their daughters.

However, many people at high risk of BRCA-related breast cancer cannot access a genetic test, while many who have been found to carry a BRCA mutation face gaps in accessing ongoing care and support.

This country profile presents an overview of the BRCA policy landscape in France with a view to guiding policy development. It considers gaps, challenges and advances in four areas policymakers should prioritise when looking to improve access to genetic testing and care for people with BRCA mutations:

1. Comprehensive, evidence-based policies for BRCA testing and the management of BRCA-related breast cancer
2. Greater public and patient understanding
3. Comprehensive care pathways
4. Improved awareness and knowledge among healthcare professionals.
Comprehensive, evidence-based policies for BRCA testing and the management of BRCA-related breast cancer

France has well-developed policies and strategies in place for improving the prevention of hereditary cancers.

**Inclusion of BRCA genetic testing in national plans for cancer and genetics**

National policies and strategies include plans which support people with BRCA mutations. The French Cancer Plan (2014–2019) calls for the development of care pathways for people with rare and hereditary cancers,\(^\text{14}\) while a national plan for rare diseases has also been developed.\(^\text{15}\)

In addition, France is planning to develop a national plan on personalised medicine. ‘Genomic Medicine France 2025’, which was published in 2016, calls for healthcare and manufacturing firms to pilot genomic sequencing platforms that are integrated into healthcare pathways for diagnostic and therapeutic follow-up. By 2020 the aim is to establish a network of centres able to process around 235,000 samples for whole genome sequencing, whole exome sequencing or RNA sequencing per year. This will include the genomes of around 175,000 patients with metastatic tumours.\(^\text{16}\)

**Legal protection of BRCA-mutation carriers**

Legislation is in place to protect people with BRCA mutations from discrimination. French legislation prohibits the use of genetic information by insurance companies and employers, even if the information is disclosed by the employee or the insurance applicant themselves.\(^\text{17}\) However, a recent study found that one third of BRCA-mutation carriers surveyed disclosed their results to their employers. Women who had undergone preventive surgery and women of lower educational status were the most likely to disclose their test results.\(^\text{17}\) Those with BRCA mutations and their families are also protected by legislation that allows carriers to inform their family members of their genetic test results anonymously\(^\text{18}\) via their doctor.\(^\text{19}\)
Greater public and patient understanding of BRCA mutations and their association with breast cancer

A number of patient organisations are working to raise awareness of BRCA mutations and advocate for improvements in care.

Data on levels of awareness and understanding of BRCA mutations in France are limited. The extent to which people understand their risk of carrying a mutation is unclear.

BRCA-France, established in 2015, is the only patient organisation focused on people with BRCA mutations or those who may be at risk. It hosts an online community for those with BRCA mutations, along with information on BRCA diagnosis and strategies to reduce the risk of breast cancer among mutation carriers.20

Other, more general patient organisations advocate and raise awareness for BRCA, such as Geneticancer which publishes patient information on inherited cancers, focusing on genetic predisposition for breast and ovarian cancer.21

BRCA-France is also involved in public advocacy, aiming to expand genetic testing criteria. It states that many who carry a BRCA mutation are being missed by current screening practices, as mutations carried by the father are currently missed in family-tree mapping used by geneticists. The organisation is also calling for genetic testing criteria to be expanded to include the 8,000–10,000 women in France with metastatic breast cancer.22
Evidence-based national eligibility criteria and referral pathways for BRCA testing

Referral pathways for testing, diagnosis and management of people with BRCA mutations are well defined in national recommendations. The Haute Autorité de Santé (HAS) published recommendations on cancer screening in France which are based on family and personal history of cancer. These are complemented by recommendations from the French National Cancer Institute (INCa). Eligibility for genetic testing, which in France is undertaken through multi-gene panels that test for mutations in multiple genes at the same time, is likely to further expand in the coming years. INCa has convened an expert group which has been working to discuss how the anticipated expansion of BRCA testing to all women with metastatic breast cancer can be managed.

Genetic testing rates have increased due to greater awareness, more genetic consultations and improvements in gene sequencing techniques. The number of genetic consultations increased more than sixfold between 2003 and 2017 (from 12,696 in 2003 to 77,478 in 2017). In 2017, 54,936 of these consultations were due to breast and/or ovarian cancer concerns, of which 18,180 women were tested for a BRCA mutation.

Equitable and timely access to genetic testing

Infrastructure for comprehensive genetic testing is in place. Le dispositif national d’oncogénétique (national cancer genetics system), which was established following the National Cancer Plan, is organised around 147 consultation sites in 104 cities. It also has 25 laboratories responsible for carrying out genetic testing which are linked to genetic consultation sites.

Waiting times for genetic tests are relatively high, although they have decreased since 2012. On average, people currently wait 12 weeks for a first genetic consultation and 22 weeks to receive a complete BRCA genetic test – a 14-week reduction since 2012, largely due to advancements in genetic sequencing techniques. However, major efforts are being made by public laboratories to reorganise and automate the analyses, which could reduce the result delays to a few weeks.
Supporting oncologists to take a more active role in prescribing genetic tests for cancer patients may streamline this pathway and reduce waiting times. Oncologists are currently able to prescribe genetic tests for patients with cancer, although often they do not. As multigene panel testing and BRCA-specific treatments become available, however, oncologists and surgeons are likely to increasingly request genetic testing of tumours to guide treatment decisions. This will require them to work closely with geneticists.

Guidance is being developed and shared with these healthcare professionals to ensure the advice of geneticists is included in the genetic testing pathway.

Genetic consultation and testing are available in every region of France, but utilisation is uneven. Consultation rates vary from 65 per 100,000 inhabitants in the centre of France to 172 per 100,000 inhabitants in Pays de la Loire. Diagnosis of breast and ovarian cancer-related mutations (predominantly BRCA) varies from 21.3% to 67.1% between laboratories. This suggests variable implementation of national testing criteria at the referral and genetic consultation stages.

Clinics and laboratories providing cancer genetic services are organised by the Cancer Genetic Group of Unicancer, a network of private, non-profit hospitals. This network has developed a set of guidelines for screening, prevention and genetic counselling for multigene panel testing for breast and ovarian cancer. In addition, the Cancer Genetic Group has contributed to the classification of mutations which present an unknown risk of breast cancer, known as variants of unknown significance (VUS), especially for BRCA1 and BRCA2 genes.

Role of private genetic testing providers

Some public-sector clinics are beginning to request genetic tests from private laboratories in an attempt to speed up the testing process and reduce costs. Experts have commented, however, that the continued role of university laboratories is critical in ensuring high-quality testing and the classification of rare or novel VUS mutations.

Access to genetic counselling

Genetic counselling and psychological support are prioritised in national recommendations. INCa’s 2017 BRCA recommendations emphasise the importance of genetic counselling and psychosocial support for people with BRCA mutations when making decisions on monitoring and risk-reducing strategies.

Genetic counsellors are well established and hold important positions in multidisciplinary cancer care teams. France is one of just two countries in Europe, along with Norway, to have a legal framework for the profession. This gives the role more credibility as it is defined by its own governance structure, rather than by overarching healthcare professional governance.

Despite this, France has a relatively low number of genetic counsellors compared with some other countries in Europe. In 2017 there were 83 genetic counsellors, 187 genetic doctors and 64 psychologists employed in genetic consultations. This equates to around three genetic counsellors per million people, which is lower than in countries such as Sweden and the UK. There is one master’s programme in France which trains around 20 students per year, although discussions are underway to potentially double this capacity.

Follow-up care and support for BRCA-mutation carriers

People who have been found to carry a BRCA mutation, along with their close family members, are supported by a personalised monitoring system. This includes:

- personalised, coordinated monitoring
- access to multidisciplinary skills and expertise for difficult cases
- clinical monitoring every six months from 20 years of age
- annual breast imaging from 30 years of age.

Uptake of preventive surgery in France is lower than in some other countries. According to international studies, French women are less likely to choose prophylactic mastectomy when testing positive for a BRCA mutation than their British or Canadian counterparts, opting instead for ongoing monitoring. Conversely, the uptake of prophylactic salpingo-oophorectomy is similar to other countries.
Improved awareness and knowledge among healthcare professionals

A number of professional development courses are available to address knowledge gaps among healthcare professionals.

Literature on the level of BRCA-related knowledge among both general practitioners (GPs) and oncologists is limited, although experts have indicated that it may be insufficient. BRCA and cancer genetics have only recently been included in medical curricula. Clinicians trained before this may therefore have insufficient knowledge of genetics.26

France has a national continuing professional development programme for healthcare professionals which includes modules on care for people with rare diseases, but this may be insufficient for managing genetic conditions. National orientation guidelines for healthcare professionals include ‘organisation of care for someone suffering from a rare disease’ and ‘announcement of the diagnosis of a serious illness’ but genetics is not included, other than for specialist genetic doctors.37 Furthermore, it is not clear how well coordinated the programme is, nor the extent to which it addresses key genetic knowledge gaps among healthcare professionals.26

A diploma on precise diagnosis and personalised medicine has been developed to build knowledge in this area among oncologists, geneticists and genetic counsellors. This diploma includes information on genetics, the application of diagnostic data for treatment decision-making and ethics.39 In addition, a DIU (diploma interuniversity) dedicated to cancer predispositions has been established to train students who are mainly oncologists, geneticists and genetic counsellors.40
France has developed high-quality, monitored pathways for people with BRCA mutations. This includes well-defined and up-to-date referral and diagnostic systems and a national coordinated system for testing and monitoring those with BRCA mutations. There is also clear legislation to prevent genetic discrimination by employers or insurers. As this country profile has highlighted, however, there are several challenges which must be addressed in order for people with BRCA mutations to be able to access the comprehensive care they need.

Efforts are needed to ensure that women at high risk of BRCA-related breast cancer can access timely genetic counselling and BRCA genetic testing. The rising demand for cancer-related genetic consultation and testing has led to long waiting times, which must be addressed. While investment in laboratory infrastructure is underway and should contribute to a reduction in waiting times, the role of oncologists in the genetic testing pathway should also be explored.

Greater attention is needed to ensure that all women with a high risk of BRCA-related breast cancer have access to the genetic consultations and BRCA testing they need, regardless of where they live. While comprehensive infrastructure is in place to handle BRCA testing, utilisation varies greatly by region. The reasons for this must be better understood and addressed.

All healthcare professionals supporting people with BRCA mutations must have access to high-quality information and guidance. This is urgently needed to address the significant and unacceptable knowledge gaps among some healthcare professionals, including those who are not genetic specialists, such as GPs and gynaecologists.


24. Pujol P. 2018. Interview with Sandra Evans at The Health Policy Partnership [Telephone]. 03/07/18


