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Evaluation of the Impact of Breast Cancer Screening

Summary Report – March 2026

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The National Cancer Institute (INCa) is the French health and scientific expertise agency in oncology responsible for coordinating cancer control in France.

1. Summary

Since 2004, France has implemented an organized breast cancer screening program. Screening is recommended every two years for women aged 50 to 74, who are asymptomatic and without particular risk factors. It consists of a mammogram and a clinical breast examination.

Eligible individuals are invited by the national health insurance system, and screening is free of charge. In addition, individual screening may also be performed on prescription.

Within the framework of the 2021–2030 Ten-Year Strategy for Cancer Control, the National Cancer Institute conducted work to evaluate the impact of breast cancer screening on the lives of the women concerned.

Modeling results indicate that the screening system in France—combining organized screening and individual screening—would reduce breast cancer mortality by approximately 20%, a figure comparable to those reported in major international studies.

In concrete terms:

- 23,000 deaths were avoided between 2004 and 2018 among eligible women who underwent screening.
- Approximately 84,000 deaths are expected to be avoided between 2004 and 2043, and nearly 95,000 by 2054.

Screening allows earlier diagnosis (–4.7% incidence of invasive cancers) and reduces the number of poor-prognosis cancers (–26% of women diagnosed at metastatic stage among those who underwent screening).

The study also shows that the earlier screening begins within the recommended age range, the greater the reduction in risk.

For example:

- a woman beginning screening at age 50, and undergoing screening every two years, may expect her lifetime risk of dying from breast cancer to be reduced by about 40%;
- if screening begins at age 60, the reduction would be about 30%;
- if it begins at age 70, about 20%.

The analysis highlights that increasing participation rates is one of the major levers for further reducing mortality. For every additional 10% increase in participation, mortality would decrease by an additional 2%.

While the benefit-risk balance of screening is considered positive, mammography—like any medical examination—carries certain risks. Overdiagnosis is one of them.

Approximately 8% of detected cancers correspond to cancers that would not have progressed significantly or threatened the patient's life. Based on current knowledge, it is not possible to distinguish those that will progress—most of them—from those that will evolve little or not at all. As a precaution, all detected cancers are treated.

Finally, mammography exposes women to X-ray radiation. Among 100,000 women participating in organized screening, it is estimated that about 22 deaths could be linked to radiation-induced cancers. This figure must be considered in relation to the number of deaths prevented.

The public-health benefit provided by breast cancer screening is therefore confirmed by this modeling. The analysis suggests that the screening strategy saves lives, allows cancers to be diagnosed earlier, and reduces the most severe forms, while presenting risks considered limited in comparison with its benefits.

2. Context

Breast cancer screening

Breast cancer is the most common cancer in women (913,089 women living with the disease in 2017) and the leading cause of cancer death among women (12,752 deaths estimated in 2022).

The 5-year survival rate has improved over the past decade, reaching 88% for women diagnosed between 2010 and 2015.

The incidence of breast cancer was 61,214 new cases in 2023, and has been increasing since 2010 (+0.6% per year).

In response, an organized national screening program has been implemented nationwide since 2004.

It involves:

- a digital mammogram every two years for women aged 50–74 without specific risk factors other than age;
- an ultrasound if a suspicious mass is seen or if breasts are dense;
- a second reading of mammograms initially interpreted as normal or benign.

The goals of the organized screening program are to:

- maximize population participation while limiting inequalities in access;
- optimize screening quality and integration of innovations;
- produce data allowing evaluation of program performance.

Performance of the screening program

Participation in organized breast-cancer screening was estimated at 46.3% for 2023–2024, below the 70% participation target recommended by the European Commission.

Participation also varies according to territorial and socioeconomic inequalities.

In addition, some eligible women undergo individual screening outside the organized program, estimated at about 14% ± 4 in 2022.

The organized program shows good cancer detection performance compared with European data. The detection rate has increased steadily since 2012 (from 7.2 per 1,000 in 2012 to 8.1 per 1,000 in 2020).

3. Objectives and Method

Within the 2021–2030 Ten-Year Cancer Strategy, the National Cancer Institute began work in 2022 to estimate the impact and efficiency of breast-cancer screening since the organized program was implemented in 2004.

General methodology

The methodology relied on:

- a medical-economic microsimulation model developed for the French context;
- a review of national and international scientific literature (2011–2021);
- validation by a multidisciplinary expert group.

The microsimulation model was developed according to recommendations from ISPOR and the French National Authority for Health (HAS).

It is based on the MISCAN-Fadia model, which simulates the natural progression of breast tumors and integrates screening practices in the French context.

The model incorporates assumptions regarding:

- the natural history of breast cancer;
- screening participation rates between 2004 and 2018;
- diagnostic and follow-up procedures;
- the population simulated, consisting of women aged 50–74 eligible for screening between 2004 and 2018.

Three strategies were compared:

1. Current strategy (“DO+DI”) – organized screening plus individual screening
2. Individual screening only (“DI”)
3. No screening (“absence”)

The analysis estimated:

- cumulative incidence
- deaths avoided
- overdiagnosis
- radiation-induced cancers
- individual lifetime benefit.

4. Results

Impact of screening

According to the model, the current strategy combining organized and individual screening would:

- reduce breast-cancer mortality by 20.4% compared with no screening;
- prevent 732 deaths per 100,000 eligible women;
- reduce the incidence of invasive symptomatic cancers by 4.7%;
- reduce the proportion of metastatic cancers by about 26%.

However, total breast-cancer incidence increases by 8.23% due to detection of in situ cancers.

Negative effects of the screening strategy

The model estimates:

- overdiagnosis: approximately 8.2% of cancers;
- radiation-induced cancers: about 22 cases per 100,000 screened women, corresponding to 4 additional deaths per 100,000 women screened.

These figures are considered small relative to the number of deaths avoided and the overall burden of breast cancer.

Cost of the screening strategy

Average estimated costs per woman: Overall, screening increases total costs by €757 per woman, equivalent to approximately €357 million per year at the population level.

5. Conclusion

Modeling confirms that the current French screening strategy—combining organized and individual screening—would reduce breast-cancer mortality by about 20% over a lifetime horizon, a magnitude similar to that reported in published studies.

Screening leads to earlier diagnosis and a reduction in poor-prognosis cancers.

Among women eligible for screening between 2004 and 2018:

- 23,000 deaths were avoided between 2004 and 2018

- 84,000 deaths are expected to be avoided by 2043
- 95,000 by 2054

At the individual level:

- starting screening at 50 years → ~40% reduction in lifetime mortality risk
- starting at 60 years → ~30% reduction
- starting at 70 years → ~20% reduction

Associated risks are estimated at:

- ~8% overdiagnosis
- 22 radiation-induced cancer deaths per 100,000 screened women

These risks are considered acceptable given the natural history of breast cancer and the benefits of screening.

Increasing participation remains one of the most important levers for further reducing mortality while maintaining efficiency.