Epidemiology of breast cancer in France

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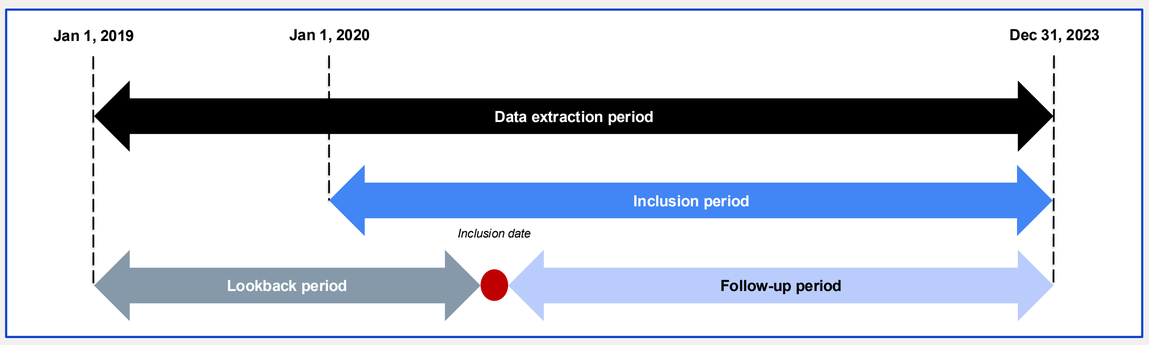
Background

- Breast cancer (BC) is the most common cancer and leading cause of cancer death among women in France.[1] In 2022, the age-standardised incidence rate of BC in France was estimated at 105.4 cases per 100,000, which is significantly higher than the global age standardised of 46.8 cases per 100,000.[2]
- Recent advances in BC management include endocrine therapy for patients with hormone receptor–positive (HR+) BC, anti–human epidermal growth factor receptor 2 (HER2) therapy for patients with HER2+ BC, and immunotherapies for those with triple-negative BC.[3] Despite increased understanding of—and tailored treatments for—BC molecular subtypes, there is a lack of current data to describe the epidemiology of these subgroups in France.
- NINE was a real-world database study designed to capture the evolution of BC incidence, prevalence, and treatment patterns over time. The present analysis from NINE aimed to estimate the incidence of BC in France between 2020 and 2023, both overall and in patients grouped by molecular subtype and treatment phase.

Methods

- NINE was a retrospective, observational analysis of data from Magellan, a database containing 5 years of national healthcare data from the Système National des Données de Santé (French National Health Data System; SNDS). The SNDS covers approximately 99% of the French population (~67 million people) and contains pseudonymised data on all healthcare claims (e.g., medical visits, diagnostic tests, drugs and medical devices, chronic diseases and disabilities, hospitalisations) made from birth until death.[4]
- Eligible patients were women (aged ≥18 years) in the Magellan database with evidence of BC between Jan 1, 2020, and Dec 31, 2023 (inclusion period; Figure 1). Patients were included if they met two evidence criteria: (1) evidence of ≥1 hospitalisation for BC or active long-term disease related to BC (based on International Classification of Diseases [ICD-10] codes); and (2) evidence of receiving treatment specific to BC during this period (based on Anatomical Therapeutic Chemical [ATC] or Classification Commune des Actes Médicaux [CCAM] codes).
- The prevalent BC population in this analysis included eligible patients who were both screened and treated for BC during the inclusion period, as defined in Table 1.
  - The inclusion date was defined as the date of first evidence of BC (hospitalisation, treatment, etc) during the inclusion period.
  - The diagnosis date was the date of first evidence of BC diagnosis (biopsy, cytology, or breast imaging) in the lookback period.
  - The lookback period was from Jan 1, 2019, until the inclusion date; the follow-up period was from the inclusion date until death from any cause, loss to follow-up, or Dec 31, 2023 (Figure 1).

Figure 1. Study design.



- This analysis estimated the overall and yearly incidence of BC in France during the inclusion period (2020–2023).
  - The incident BC population consisted of all patients in the prevalent BC population for year N, excluding those with prior evidence of BC during the lookback period.
  - Age standardized person year (PY) incidence was estimated and reported per 100,000 PY.
  - Subgroup analyses evaluated the annual incidence of BC in patients grouped by molecular subtype and treatment phase, based on treatments received during follow-up (Table 1).
  - Mean age at first evidence of BC, and the distribution of new BC cases across age groups, was also evaluated.

Table 1. Analysis population and subgroup definitions.

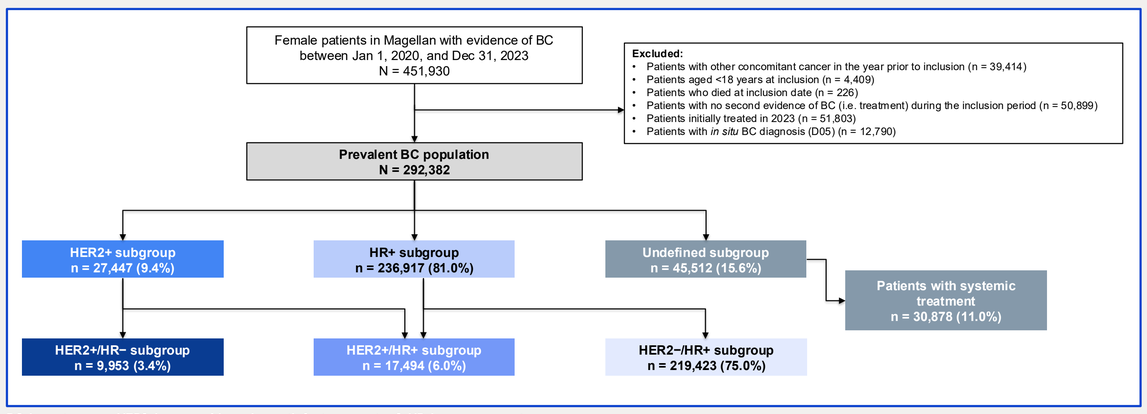
Population/subgroup	Definition
Analysis populations	
Prevalent BC population	An active prevalent BC case for year N is a patient from the Magellan population who was alive on January 1st of the year N and had has a record of cancer-related treatment/management in any of the years preceding N/any of the previous years
Incident BC population	Incident BC cases for year N consisted of the patients in the prevalent BC population for year N, excluding those with prior evidence of BC during the lookback period
Molecular subtype subgroups	
HER2+ subgroup	Patients who received anti-HER2 therapy (± endocrine therapy)
HER2+/HR+ subgroup	Patients who received both anti-HER2 and endocrine therapy
HER2+/HR− subgroup	Patients who received anti-HER2 therapy without endocrine therapy
HR+ subgroup	Patients who received endocrine therapy (± anti-HER2 therapy)
HER2−/HR+ subgroup	Patients who received endocrine therapy without anti-HER2 therapy
Undefined subgroup	Patients who received neither anti-HER2 nor endocrine therapy
Treatment phase subgroups	
Early	Patients identified in the neoadjuvant or adjuvant phase
Neoadjuvant	First identified treatment started before surgery date
Adjuvant	First identified treatment started within 4 months after surgery date
Metastatic	Patient treated with a systemic treatment with no trace of surgery

Treatments and diagnoses were based on ATC, CCAM, and ICD-10 codes. ATC, Anatomical Therapeutic Chemical; BC, breast cancer; CCAM, Classification Commune des Actes Médicaux; HER2, human epidermal growth factor receptor 2; HR, hormone receptor; ICD-10, International Classification of Diseases, Tenth Revision.

Results

- In total, 451,930 women with evidence of BC were identified in the Magellan database between Jan 1, 2020, and Dec 31, 2023 (Figure 2). After exclusions, the prevalent BC population comprised 292,382 patients who were both screened and treated for BC during the inclusion period.
- Based on treatments received during follow-up, 75.0% of these patients had HER2−/HR+ disease, 6.0% had HER2+/HR+ disease, and 3.4% had HER2+/HR− disease; molecular subtype was undefined in the remaining 15.6% of patients. Of the patients with undefined molecular subtype, 68.0% (11.0% of the total population) were treated with a systemic treatment.

Figure 2. Patient disposition.



BC, breast cancer; HER2, human epidermal growth factor receptor 2; HR, hormone receptor.

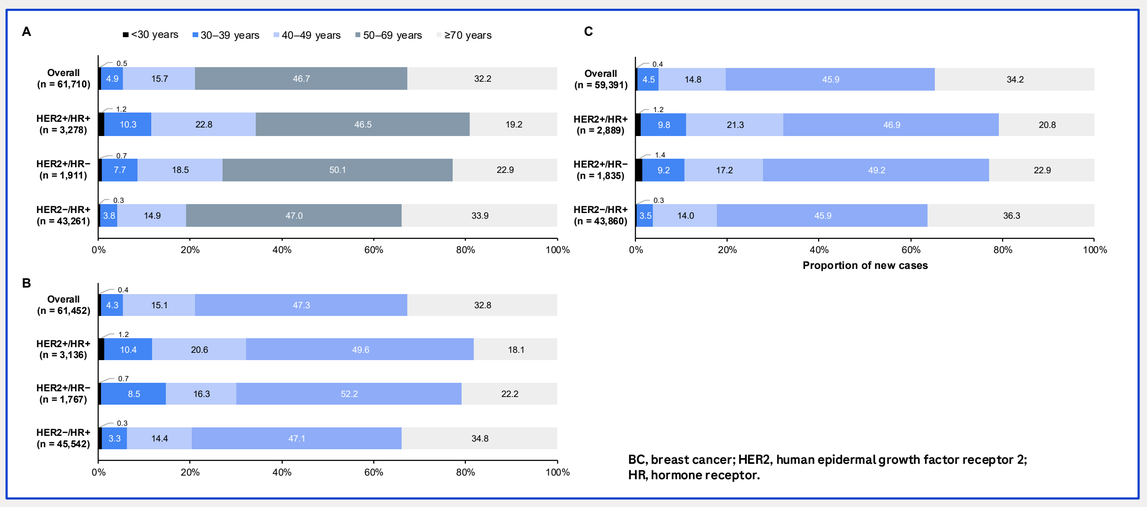
- The incident BC population included 182,553 patients with first evidence of BC management in 2020–2022; in these patients, the mean ± standard deviation (SD) age at first evidence of BC was 62.3 ± 13.9 years. When BC incidence was evaluated by year, a 3% reduction in new BC cases was observed between 2020 and 2022 (Table 2). The distribution of new BC cases across molecular subtypes was relatively stable between 2020 and 2022.
- Compared with other molecular subgroups, mean age at first evidence of BC was numerically lower for patients with HER2+ BC in 2020–2022 (Table 2). However, mean age at first evidence of BC for each molecular subgroup, as well as the distribution of new cases across age groups, was generally stable between 2020, 2021, and 2022 (Figure 3).

Table 2. BC incidence and age at first evidence of BC, by molecular subtype and year.

	2020	2021	2022
Overall[a]			
Incidence, n (%)	61,710 (100)	61,452 (100)	59,391 (100)
Incidence per 100,000 PY	220.90	218.3	210.1
Age at first evidence of BC (years), mean ± SD	62.0 ± 14.0	62.4 ± 13.7	62.6 ± 13.9
HER2+/HR+			
Incidence, n (%)	3,278 (5.3)	3,136 (5.1)	2,889 (4.9)
Age at first evidence of BC (years), mean ± SD	56.4 ± 13.6	56.4 ± 13.5	56.9 ± 13.7
HER2+/HR−			
Incidence, n (%)	1,911 (3.1)	1,767 (2.9)	1,835 (3.1)
Age at first evidence of BC (years), mean ± SD	58.5 ± 13.6	58.4 ± 13.6	58.1 ± 13.8
HER2−/HR+			
Incidence, n (%)	43,261 (70.1)	45,542 (74.1)	43,860 (73.9)
Age at first evidence of BC (years), mean ± SD	62.6 ± 13.4	63.0 ± 13.2	63.3 ± 13.4
Undefined with systemic treatment			
Incidence, n (%)	8534 (13.8)	6,909 (11.2)	7,071 (11.9)
Age at first evidence of BC (years), mean ± SD	58.0 ± 13.9	58.0 ± 13.9	58.2 ± 14.0

[a] Includes patients who received locoregional treatment only (surgery and/or radiotherapy). BC, breast cancer; HER2, human epidermal growth factor receptor 2; HR, hormone receptor; SD, standard deviation; PY, patient-years.

Figure 3. Distribution of incident BC cases by age at first evidence of BC in (A) 2020, (B) 2021, and (C) 2022



BC, breast cancer; HER2, human epidermal growth factor receptor 2; HR, hormone receptor.

- A total of 14,816 patients had first evidence of HER2+ BC in 2020–2022, at a mean ± SD age of 57.4 ± 13.9 years. In these patients, approximately 19% (3,339 cases) were treated in the metastatic setting. Similarly, among 141,966 cases with first evidence of HR+ BC in 2020–2022 (at a mean ± SD age of 62.9 ± 13.3 years), approximately 9% were treated in the metastatic settings. The distribution of new HER2+ and HR+ BC cases across treatment phases, as well as the mean age at first evidence of BC for each, remained stable between 2020, 2021, and 2022 (Table 3).

Table 3. BC incidence and age at first evidence of BC in HER2+ and HR+ subgroups, by treatment phase and year.

	Treatment phase	2020	2021	2022
HER2+	**Overall**			
	Incidence, n (%)	5,189 (100)	4,903 (100)	4,724 (100)
	Age at first evidence of BC (years), mean ± SD	57.2 ± 13.6	57.1 ± 13.6	57.4 ± 13.8
	Neoadjuvant			
	Incidence, n (%)	2,419 (46.6)	2,428 (49.5)	2,460 (52.1)
	Age at first evidence of BC (years), mean ± SD	54.3 ± 13.2	54.2 ± 13.2	54.6 ± 13.3
	Adjuvant			
	Incidence, n (%)	1,365 (26.3)	1,268 (25.9)	1,283 (27.2)
	Age at first evidence of BC (years), mean ± SD	60.8 ± 13.8	60.9 ± 14.1	60.6 ± 14.0
	Metastatic[a]			
	Incidence, n (%)	1,405 (27.1)	1,207 (24.6)	981 (20.8)
	Age at first evidence of BC (years), mean ± SD	58.7 ± 13.1	59.0 ± 12.6	60.2 ± 13.0
HR+	**Overall**			
	Incidence, n (%)	46,539 (100)	48,678 (100)	46,749 (100)
	Age at first evidence of BC (years), mean ± SD	62.2 ± 13.5	62.6 ± 13.4	62.9 ± 13.5
	Neoadjuvant			
	Incidence, n (%)	5,557 (11.9)	4,934 (10.1)	4,893 (10.5)
	Age at first evidence of BC (years), mean ± SD	54.6 ± 13.7	54.9 ± 13.8	54.5 ± 13.5
	Adjuvant			
	Incidence, n (%)	36,533 (78.5)	39,120 (80.4)	37,378 (80.0)
	Age at first evidence of BC (years), mean ± SD	63.3 ± 13.1	63.5 ± 13.0	64.0 ± 13.2
	Metastatic			
	Incidence, n (%)	4,443 (9.5)	4,619 (9.5)	4,466 (9.6)
	Age at first evidence of BC (years), mean ± SD	63.0 ± 13.4	62.6 ± 13.0	62.5 ± 13.2
	Undetermined			
	Incidence, n (%)	<11 (<0.02) [b]	<11 (<0.02) [b]	<11 (<0.02) [b]
	Age at first evidence of BC (years), mean ± SD	38.8 ± 2.9	39.4 ± 3.9	36.3 ± 7.0

[a] Includes *de novo* metastatic patients or patients treated at early stage before study period and treated for their metastatic relapse during study period. [b] Due to French SNDS data privacy regulations, data describing n ≤ 10 patients cannot be specified. HER2, human epidermal growth factor receptor 2; HR, hormone receptor; SD, standard deviation; SNDS, Système National des Données de Santé.

Limitations

- Clinical data such as histology and tumour/node/metastasis staging are not available in the SNDS; therefore, patients were grouped into molecular subtypes and treatment phases based only on the treatment(s) they received during follow-up.
- Due to the study inclusion methods with patients requiring first and second evidence for BC, fewer patients with first evidence of BC in 2023 met the inclusion criteria for second evidence (treatment); therefore, additional analyses with longer follow-up are needed in order to accurately estimate the incidence of BC in 2023.
- The prevalence data only captured information on "active" patients receiving BC treatment from Jan 1, 2020 to Dec 31, 2022. A longer follow-up would be needed to provide an accurate BC prevalence.
- Due to French SNDS data privacy regulations, data describing n < 11 patients could not be specified.

Conclusions

- This analysis of national healthcare data from the SNDS estimated the incidence of BC in France in 2020–2022.
  - The number of new BC cases identified in the SNDS in 2020, 2021, and 2022 was generally consistent with estimates from the National Cancer Institute, which reported that 61,214 French women were diagnosed with BC in 2023.[1]
- The distribution of new BC cases across molecular subtypes and treatment phases, as well as mean age at first evidence of BC, remained generally stable between 2020 and 2022.
  - The distribution was aligned with data from other databases and national registries, such as the ESME, which included data on metastatic patients only.[5]
  - Of interest, a similar analysis on the entire SNDS database with longer period of analysis showed an increased incidence of BC in young women over time.[6] Further analysis of the age at first evidence of BC over a longer time period than our analysis is warranted to characterize the trend observed in the analysis by Pujol and colleagues.[6]
- Patients with first evidence of HER2+ BC were younger on average, and a higher proportion were treated in the metastatic setting, than those with first evidence of HR+ BC.

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Conflicts of interest
SB has served as an advisory board member for Roche. OT reports honoraria and grants from AstraZeneca, BMS, Daiichi Sankyo, Exact Sciences, Gilead, Lilly, Menarini-Stemline, MSD, Novartis, Pfizer, Roche, Sandoz, Seagen, and Veracyte. YD has served as an advisory board member for AstraZeneca-Daiichi Sankyo, Fresubin, Gilead, GSK, Lilly, MSD, Novartis, Pfizer, Roche, and Seagen; and a congress speaker for Amgen, Endomag, GSK, Intuitive, Lilly, MSD, Novartis, Pfizer, and Roche. DS, MM, MLFE, and ML are employees of Roche France. LM has served as an advisory board member for AbbVie, AstraZeneca-Daiichi Sankyo, Gilead, GSK, Lilly, MSD, Novartis, Pfizer, and Roche; and a congress speaker for GSK, Lilly, MSD, and Pfizer.

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