BRCA1/2 Testing in HER2- Advanced Breast Cancer (ABC): Results From the European Component of a Multi-Country Real-World Study

Michael Patrick Lux,[1] Katie Lewis,[2] Alex Rider,[2] Alexander Niyazov[3]

[1]Kooperatives Brustzentrum Paderborn, Frauenklinik St. Louise, Paderborn, St. Josefs-Krankenhaus, Salzkotten, Frauen- und Kinderklinik St. Louise, Paderborn, Germany; [2]Adelphi Real World, Cheshire, UK; [3]Pfizer Inc., New York, NY, USA

POSTER #292P

BACKGROUND

- Mutations in *breast cancer susceptibility gene 1* or *2* (*BRCA1/2*) are known risk factors for cancers, especially breast cancer (BC) or ovarian cancer (OC).
- Recently, US and European genetic screening and BC guidelines have expanded the eligibility criteria for *BRCA1/2* testing.[1-3]
- A previous analysis using the Adelphi Disease Specific Program (DSP) in adult women with human epidermal growth factor receptor 2-negative (HER2-) advanced breast cancer (ABC) reported significantly lower *BRCA1/2* testing rates in EU5 vs US.[4]
- In this DSP analysis, we further assessed real-world *BRCA1/2* testing rates in Germany, France, Italy, Spain and the UK (EU5) in adult women with HER2-negative ABC.

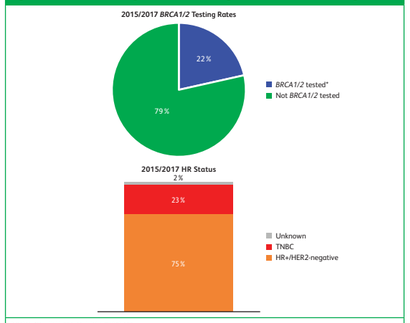
METHODS

- Patient demographics and *BRCA1/2* (somatic and/or germline) testing in adult women with HER2-negative ABC were collected from oncologists across EU5 countries.
- Data collected from two years (2015 and 2017) were merged across common variables.
- Differences in patient demographics and clinical characteristics among *BRCA1/2*-tested and *BRCA1/2*-untested patients were analysed via t-tests and Fisher's exact tests.
- *BRCA1/2* testing was analysed for the overall cohorts as well as stratifying by:
  - Known family history of BC or OC
  - Region
  - Region by year
  - Region by year, hormone receptor status (hormone receptor-positive [HR+/HER2-negative or triple-negative breast cancer [TNBC]) and age group (<45, 45-54, 55-64, ≥65 years).
- Differences in *BRCA1/2* testing rates were analysed via Fisher's exact tests.

RESULTS

- 4876 records were provided by 566 oncologists in the EU5 (**Figure 1**).
- The mean patient age was 63.6 years; 75% of patients had HR+/HER2-negative ABC, 23% had TNBC and 2% were of unknown hormone receptor status (**Figure 1**).

Figure 1. EU5 *BRCA1/2* Testing and HR Status Among Adult Women With HER2-Negative ABC



*Tested for *BRCA1* and/or *BRCA2* mutations.
Some percentages add up to greater than 100% due to rounding.
Abbreviations: ABC, advanced breast cancer; *BRCA1/2, breast cancer susceptibility gene 1 or 2*; HER2-negative, human epidermal growth factor receptor 2-negative; HR, hormone receptor; HR+ hormone receptor-positive; TNBC, triple-negative breast cancer.

- Compared with patients who received *BRCA1/2* testing, patients who did not receive a *BRCA1/2* test were significantly
  - Older
  - More likely to have HR+/HER2-negative ABC
  - Less likely to be currently employed
  - Less likely to be premenopausal
  - Less likely to have a known family history of BC or OC (**Table 1**).

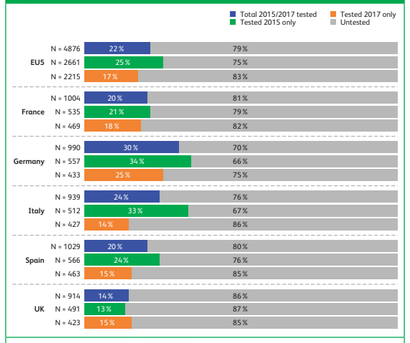
Table 1. EU5 Baseline Demographics and Clinical Characteristics Among Adult Women With HER2-Negative ABC

	Overall N=4876	*BRCA1/2* tested N=1048	Not *BRCA1/2* tested N=3828	*P* value*
Age, mean, years	63.6	57.7	65.2	<0.0001
Hormone receptor status, no. (%)				
HR+/HER2-negative	3648 (75)	651 (62)	2997 (78)	<0.0001
TNBC	1120 (23)	366 (35)	754 (20)	<0.0001
Unknown	108 (2)	31 (3)	77 (2)	0.075
Currently employed, no. (%)	818 (18)	244 (24)	574 (16)	<0.0001
Premenopausal, no. (%)	483 (110)	248 (24)	235 (6)	<0.0001
Family history of BC / OC, no. (%)				
Yes	513 (11)	217 (21)	296 (8)	<0.0001
No	3802 (78)	731 (70)	3071 (80)	<0.0001
Unknown	561 (12)	100 (10)	461 (12)	0.0250

*Based on t-test (for age only) or Fisher Exact test (for all other values).
Abbreviations: ABC, advanced breast cancer; BC, breast cancer; *BRCA1/2, breast cancer susceptibility gene 1 or 2*; HER2-negative, human epidermal growth factor receptor 2-negative; HR+, hormone receptor-positive; OC, ovarian cancer; TNBC, triple-negative breast cancer.

- Differences in *BRCA1/2* testing rates were observed between EU5 countries (**Figure 2**).

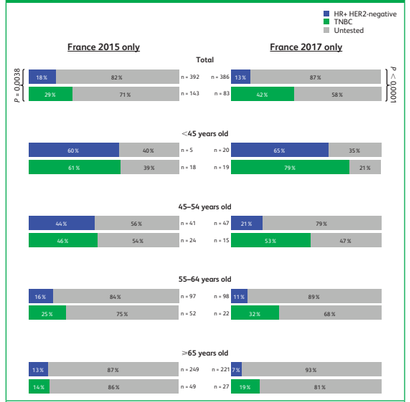
Figure 2. *BRCA1/2* Testing Rates by Year and Country Among Adult Women With HER2-Negative ABC



Some percentages add up to greater than 100% due to rounding.
Abbreviations: ABC, advanced breast cancer; *BRCA1/2, breast cancer susceptibility gene 1 or 2*; EU5, Germany, France, Italy, Spain and the UK; HER2-negative, human epidermal growth factor receptor 2-negative.

- Significantly lower *BRCA1/2* testing rates were observed among patients with HR+/HER2-negative vs TNBC for France, Spain, Germany (2015 only) and the UK (**Figures 3-5** and **7**).
- No significant differences in *BRCA1/2* testing rates were observed among patients with HR+/HER2- negative vs TNBC in Italy (**Figure 6**).

Figure 3. France *BRCA1/2* Testing by Age and HR Status Among Adult Women With HER2-Negative ABC

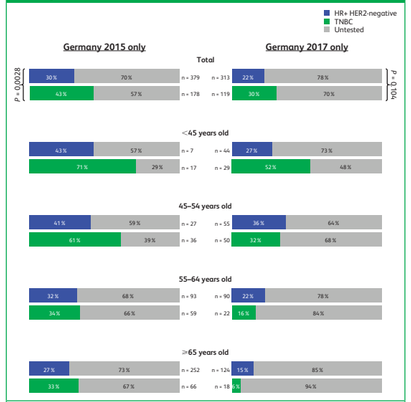


Base represents those who are known to be either HR+/HER2-negative or TNBC only.
Abbreviations: ABC, advanced breast cancer; *BRCA1/2, breast cancer susceptibility gene 1 or 2*; HER2-negative, human epidermal growth factor receptor 2-negative; HR, hormone receptor; HR+, hormone receptor-positive; TNBC, triple-negative breast cancer.

Figure 4. Spain *BRCA1/2* Testing by Age and HR Status Among Adult Women With HER2-Negative ABC

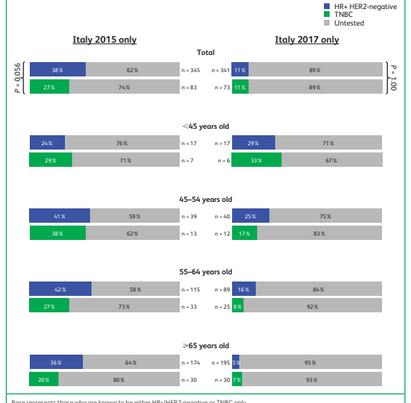
Base represents those who are known to be either HR+/HER2-negative or TNBC only.
Abbreviations: ABC, advanced breast cancer; *BRCA1/2, breast cancer susceptibility gene 1 or 2*; HER2-negative, human epidermal growth factor receptor 2-negative; HR, hormone receptor; HR+, hormone receptor-positive; TNBC, triple-negative breast cancer.

Figure 5. Germany *BRCA1/2* Testing by Age and HR Status Among Adult Women With HER2-Negative ABC



Base represents those who are known to be either HR+/HER2-negative or TNBC only.
Abbreviations: ABC, advanced breast cancer; *BRCA1/2, breast cancer susceptibility gene 1 or 2*; HER2-negative, human epidermal growth factor receptor 2-negative; HR, hormone receptor; HR+, hormone receptor-positive; TNBC, triple-negative breast cancer.

Figure 6. Italy *BRCA1/2* Testing by Age and HR Status Among Adult Women With HER2-Negative ABC



Base represents those who are known to be either HR+/HER2-negative or TNBC only.
Abbreviations: ABC, advanced breast cancer; *BRCA1/2, breast cancer susceptibility gene 1 or 2*; HER2-negative, human epidermal growth factor receptor 2-negative; HR, hormone receptor; HR+, hormone receptor-positive; TNBC, triple-negative breast cancer.

Figure 7. UK *BRCA1/2* Testing by Age and HR Status Among Adult Women With HER2-Negative ABC

Base represents those who are known to be either HR+/HER2-negative or TNBC only.
Some percentages add up to greater than 100% due to rounding.
Abbreviations: ABC, advanced breast cancer; *BRCA1/2, breast cancer susceptibility gene 1 or 2*; HER2-negative, human epidermal growth factor receptor 2-negative; HR, hormone receptor; HR+, hormone receptor-positive; TNBC, triple-negative breast cancer.

- Significantly lower *BRCA1/2* testing rates were observed among adult women without a known family history of BC or OC (**Table 2**).

Table 2. EU5 *BRCA1/2* Testing Rates by HR Status and Known Family History of BC or OC

		HR+/HER2-negative with FHx (n = 321)	HR+/HER2-negative without FHx (n = 2953)	TNBC with FHx (n = 178)	TNBC without FHx (n = 789)
EU5	Pts tested, N (%)	116 (36)	476 (16)	99 (56)	234 (30)
	P value	<0.0001		<0.0001	

Abbreviations: ABC, advanced breast cancer; BC, breast cancer; *BRCA1/2, breast cancer susceptibility gene 1 or 2*; EU5, Germany, France, Italy, Spain and the UK; FHx, family history; HER2-negative, human epidermal growth factor receptor 2-negative; HR+, hormone receptor-positive; OC, ovarian cancer; TNBC, triple-negative breast cancer.

Limitations

- Although patient charts were randomly sampled from oncology practices, this analysis likely represents *BRCA1/2* testing in a select patient population.
- The DSP is more likely to collect data on patients who consult their physician more frequently.
- All data collected rely on the accurate reporting of both the physician and the patient.
- Results should be interpreted with caution due to the small sample size.

CONCLUSIONS

- **In this analysis of EU5 adult women with HER2-negative ABC, significant differences were observed in demographics and clinical characteristics among *BRCA1/2* tested patients compared with *BRCA1/2* untested patients.**
- **Across all EU5 countries, *BRCA1/2* testing rates were generally low, primarily among HR+/HER2-negative patients.**
- **Across all EU5 countries, significantly lower *BRCA1/2* testing rates were observed among patients with no known family history of BC or OC.**
- **With the broadening of *BRCA1/2* testing eligibility criteria and new *BRCA1/2* targeted treatment approaches across European BC guidelines, opportunities should be developed to remove barriers and increase access to *BRCA1/2* testing in Europe.**

REFERENCES

1. National Comprehensive Cancer Network. https://www.nccn.org/professionals/physician_gls/pdf/genetics_screening.pdf. Accessed 4 September 2019.
2. National Comprehensive Cancer Network. https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf. Accessed 4 September 2019.
3. Cardoso F, et al. *Ann Oncol*. 2018;29:1634-1657.
4. Niyazov A, et al. Patient demographics and BRCA testing in HER2- breast cancer: Results from the US and EU5 countries. Poster session presented at Annual Miami Breast Cancer Conference (MBCC), March 7-10, 2019, Miami, FL, USA.

ACKNOWLEDGEMENTS AND DISCLOSURES

This study was sponsored by Pfizer. Editorial support was provided by Erin Bekes, PhD, at CMC AFFINITY, a division of McCann Health Medical Communications Inc., Hackensack, NJ, USA and was funded by Pfizer.

Michael Patrick Lux has received honoraria for lectures and advisory boards from Pfizer, Novartis, Lilly, AstraZeneca, Roche, Genomic Health, Medac, Grünenthal, Tesaro, and Eisai.

Katie Lewis is a a full-time employee of Adelphi Real World.

Alex Rider is a a full-time employee of Adelphi Real World.

Alexander Niyazov is an employee of Pfizer and reports ownership interest in Pfizer.

Please scan this QR code with your smartphone app to view an electronic version of this poster.

PLAIN LANGUAGE SUMMARY

Please scan this quick response (QR) code with your smartphone app to view a plain language summary.