

Utilization of BRCA Testing in Older Women with Breast and Ovarian Cancer in Texas

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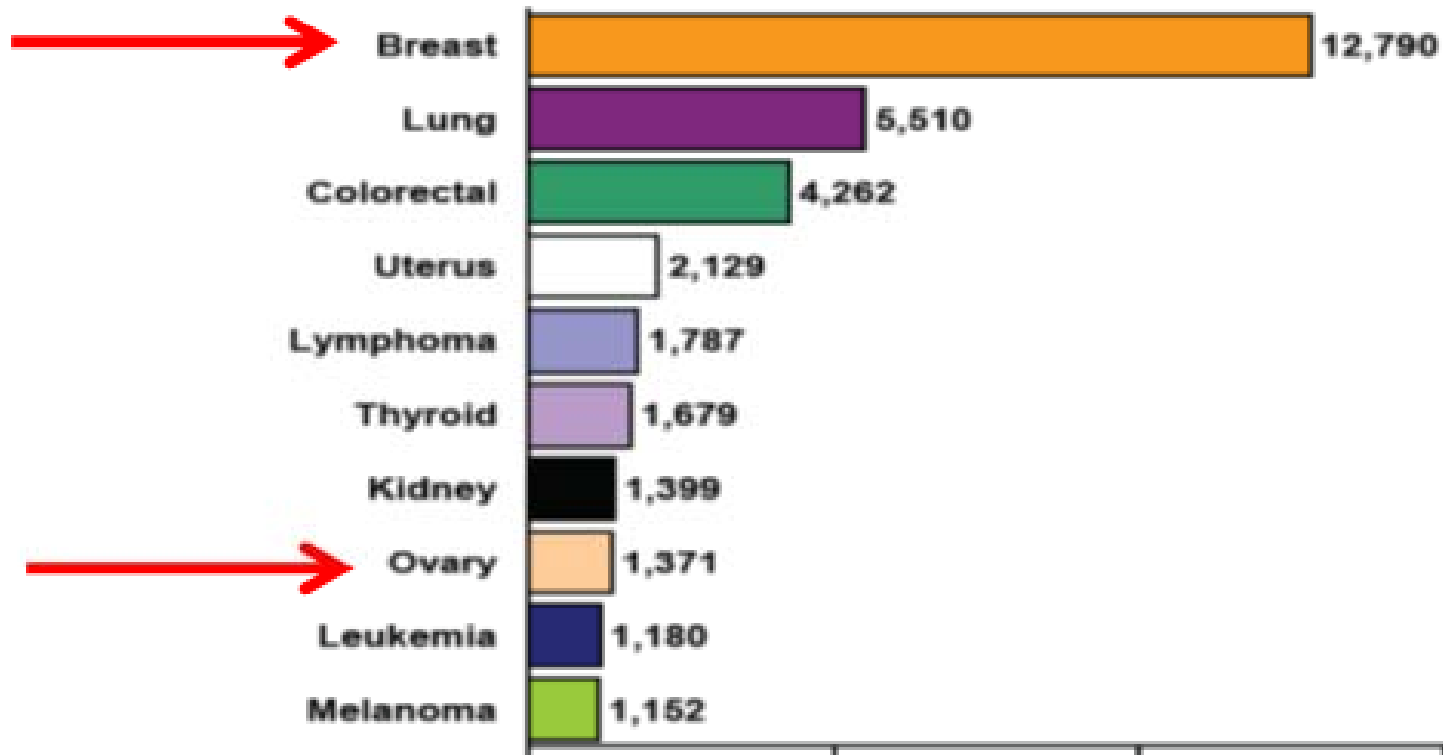
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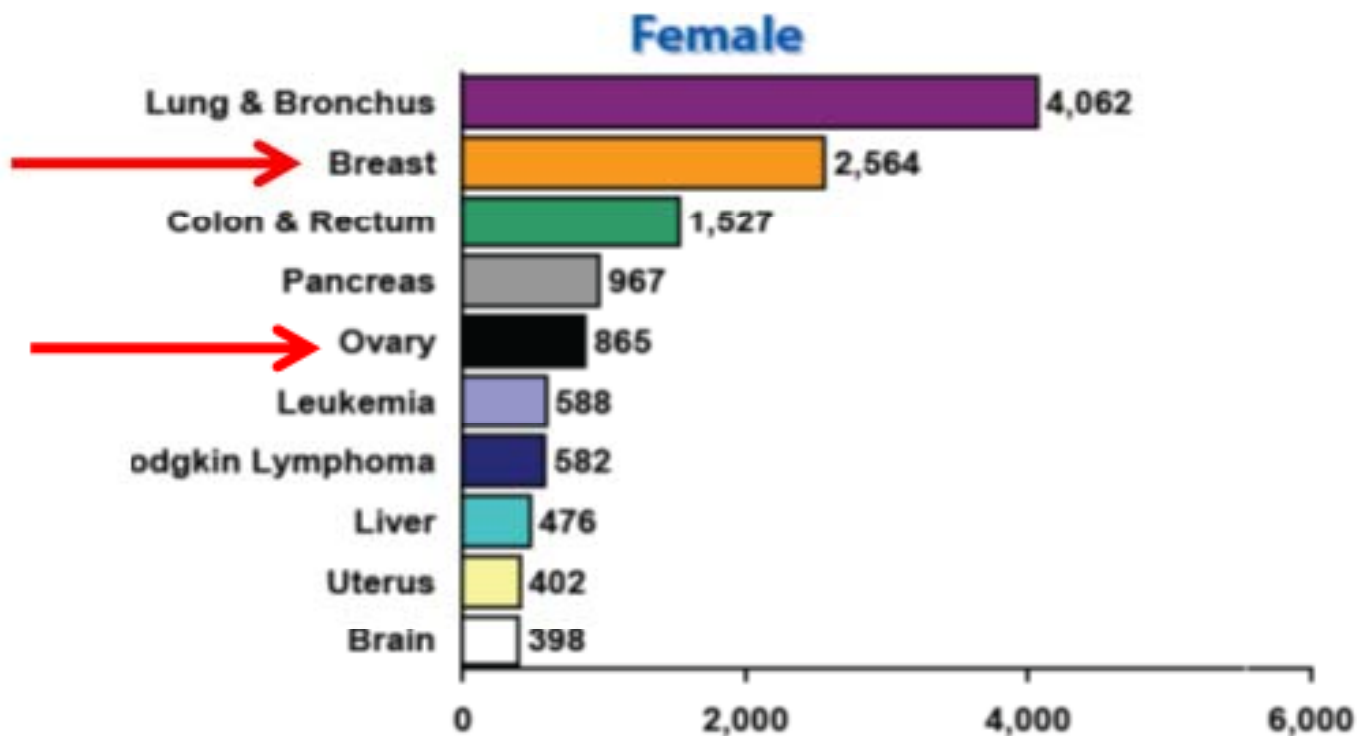
Breast / Ovarian Cancer Incidence TEXAS

Female



Texas Cancer Registry, 2004-2008
Publication Date 4/11

Breast / Ovarian Cancer Mortality TEXAS



Texas Cancer Registry, 2004-2008
Publication Date 4/11

BRCA1 and BRCA2 Facts

- Function: DNA repair
- BRCA1 or BRCA2 mutation: 65–74% risk of breast cancer
- BRCA1 mutation- 39–46% ovarian cancer
- BRCA2 mutation- 12–20% ovarian cancer
- Women with breast cancer:
 - BRCA1 mutation: 12.7% risk of ovarian cancer
 - BRCA2 mutation: 6.8%

Screening for Hereditary Breast and Ovarian Cancer Syndrome (HBOC) is a two-step process

1. Clinic assessment of risk for significant BRCA mutations
2. Genetic testing of high-risk individuals

Criteria for Genetic Risk Assessment

Medicare Coverage Policy

BRCA1 and BRCA2 genetic testing Medicare Coverage Policy

- Only blood relatives. Non-genetic relations, such as through marriage or adoption are not relevant to coverage
- A close relative means a first degree (parents, full siblings, offspring)
- Second degree (grandparents, grandchildren, aunts, uncles, nephews, nieces, half-siblings)
- Third degree (great-grandparents, great-aunts, great-uncles, first cousins)
- Invasive and ductal carcinoma in situ (DCIS) breast cancers should be included
- If the individual is of Ashkenazi Jewish descent, test the three common mutations first. Then if negative, consider full sequence ("Reflex") testing based on assessment of individual and family history as if the individual is of non-Ashkenazi Jewish descent

BRCA1 and BRCA2 genetic testing Medicare Coverage Policy

1. Personal history of breast cancer + one or more of the following:

- Diagnosed age ≤ 45 y, with or without family history
- Diagnosed age ≤ 50 y or two breast primaries, with ≥ 1 close blood relative(s) with breast cancer ≤ 50 y and/or ≥ 1 close blood relative(s) with epithelial ovarian/fallopian tube/primary peritoneal cancer
- Two breast primaries when first breast cancer diagnosis occurred prior to age 50
- Diagnosed at any age, with ≥ 2 close blood relatives with breast and/or epithelial ovarian/fallopian tube/primary peritoneal cancer, at any age
- Close male blood relative with breast cancer
- Personal history of epithelial ovarian/fallopian tube/primary peritoneal cancer
- If of certain ethnicity associated with higher mutation frequency, (Ashkenazi Jewish, Icelandic, Swedish, Hungarian or other) no additional family history required
- Close relative with a known BRCA1 or BRCA2 gene mutation

BRCA1 and BRCA2 genetic testing Medicare Coverage Policy

- 2. Personal history of epithelial ovarian/fallopian tube/primary peritoneal cancer**
- 3. Personal history of male breast cancer**

Codes Covered under the Medicare Policy

- HCPCS

- S3818: Complete gene sequence analysis; BRCA1 gene
- S3819: Complete gene sequence analysis; BRCA2 gene
- S3820: Completed BRCA1 and BRCA2 gene sequence analysis for susceptibility to breast and ovarian cancer
- S3822: Single-mutation analysis(in individual with a known BRCA1 or BRCA2 mutation in the family) for susceptibility to breast and ovarian cancer
- S3823: Three-mutation BRCA1 and BRCA2 analysis for susceptibility to breast and ovarian cancer in Ashkenazi individuals

Codes

- CPT

- 83890, 83891, 83892, 83893, 83894, 83896, 83897, 83898, 83900, 83901, 83902, 83903, 83904, 83905, 83906, 83907, 83908, 83909, 83912, 83913:
Molecular diagnostics
- 83914: Mutation identification
- 88271-88275: Molecular cytogenetics
- 88291: Cytogenetics and molecular cytogenetics
- 96040: Medical genetics and genetic counseling

Codes

- ICD-9
 - V26.31: Testing of female for genetic disease carrier status
 - V10.3: Personal history of malignant neoplasm, breast
 - V10.43: Personal history of malignant neoplasm, ovary
 - V16.3: Family history of malignant neoplasm, breast
 - V16.41: Family history of malignant neoplasm, ovary
 - V16.8: Family history of malignant neoplasm, other specified (breast, male)
 - 99.99: Other miscellaneous procedures

Positive Patients Mutation Present

- V84.01: Genetic susceptibility to malignant neoplasm of breast (BRCA1 or BRCA2 mutations confirmed by molecular susceptibility testing for breast cancer)
- V84.02: Genetic susceptibility to malignant neoplasm of ovary (BRCA1 or BRCA2 mutations confirmed by molecular susceptibility testing for ovarian cancer)

Criteria for Genetic Risk Assessment

**Recommendations by the American
Congress of Obstetricians and
Gynecologists**

Patients with greater than an approximate 20–25% chance of having an inherited predisposition to breast cancer and ovarian cancer

1. Women with a personal history of both breast cancer and ovarian cancer
2. Women with ovarian cancer and a close relative with ovarian cancer or premenopausal breast cancer or both
3. Women with ovarian cancer who are of Ashkenazi Jewish ancestry
4. Women with breast cancer at age 50 years or younger and a close relative with ovarian cancer or male breast cancer at any age
5. Women of Ashkenazi Jewish ancestry in whom breast cancer was diagnosed at age 40 years or younger
6. Women with a close relative with a known BRCA1 or BRCA2 mutation

Patients with greater than an approximate 5–10% chance of having an inherited predisposition to breast cancer and ovarian cancer

1. Women with breast cancer at age 40 years or younger
2. Women with ovarian cancer, primary peritoneal cancer, or fallopian tube cancer of high grade, serous histology at any age
3. Women with bilateral breast cancer
4. Women with breast cancer at age 50 years or younger and a close relative with breast cancer at age 50 years or younger
5. Women of Ashkenazi Jewish ancestry with breast cancer at age 50 years or younger
6. Women with breast cancer at any age and two or more close relatives with breast cancer at any age
7. Unaffected women with a close relative that meets one of the previous criteria

Criteria that can be assessed in our population aged 66 and older

1. Women with a personal history of both breast cancer and ovarian cancer
2. Women with ovarian cancer and (a close relative with ovarian cancer or premenopausal breast cancer or both)**
3. Women with ovarian cancer (who are of Ashkenazi Jewish ancestry) **
4. Women with ovarian cancer, (primary peritoneal cancer, or fallopian tube cancer of high grade, serous histology at any age) **
5. Women with bilateral breast cancer
6. Women with a close relative with a known BRCA1 or BRCA2 mutation **
7. Family history of male breast cancer

Prevalence of BRCA1/BRCA2 Mutations, from Population-Based Studies

Estimated q (95% CI)	Estimated Carrier Prevalence in Population (95% CI)	Population	Reference
.0014 (.0002-.011)	$\frac{1}{345} \left(\frac{1}{2,596} - \frac{1}{46} \right)$	Families of U.S ovarian cancer cases and controls	Whittemore et al. (1997)
.0006 (.0002-.001)	$\frac{1}{833} \left(\frac{1}{2,500} - \frac{1}{500} \right)$	Families of women with incident breast cancer or ovarian cancer, in England and Wales	Ford et al. (1995)
.0033 (...)	$\frac{1}{152} (...)$	Families of U.S. breast cancer cases and controls	Claus et al. (1991)

Whittemore AS, Gong G, Itnyre J. Prevalence and contribution of BRCA1 mutations in breast cancer and ovarian cancer: results from three U.S. population-based case-control studies of ovarian cancer. *Am J Hum Genet.* 1997 Mar;60(3):496-504

Proportion of Cancers Due to BRCA1/BRCA2 Mutations, Estimated from Population-Based Studies

PROPORTION (95% CI) OF CANCERS DUE TO BRCA1/BRCA2 MUTATION (%)

AGE AT DIAGNOSIS (Years)	Breast		Ovarian	
	Whittemore et al. (1997)	Ford et al. (1995)	Whittemore et al. (1997)	Ford et al. (1995)
15-29	11.2 (1.5-51.1)	7.5	17.8 (7.9-35.4)	5.9
30-39	10.7 (1.4-49.9)	5.1	17.5 (7.7-35.2)	5.6
40-49	8.6 (1.1-43.7)	2.2	6.8 (2.7-15.8)	4.6
50-59	5.8 (.7-36.1)	1.4	6.4 (2.5-15.4)	2.6
60-69	.7 (.1-8.7)	.8	3.1 (.6-13.8)	1.8
70-79	.6 (0-7.6)	...	2.8 (.6-12.4)	...
15-69	4.2 (.6-24.7)	1.7	5.3 (2.1-12.7)	2.8
15-79	3.0 (.4-18.8)	...	4.4 (1.6-11.9)	...

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U.S. Preventive Services Task Force

Screening for HBOC

- Agree with ACOG recommendations for testing
- Additional research on interventions is needed to improve patient decision making and health outcomes
 - Chemoprevention
 - Long-term outcomes
 - Factors related to acceptance of preventive interventions

Utilization of BRCA Testing

- Genetic testing for HBOC susceptibility (BRCA1, BRCA2) became commercially available in USA at the end of 1996
- Testing provides
 - Identification of women susceptible to HBOC
 - An opportunity to develop new strategies for early detection and prevention

Brody LC, Biesecker BB. Breast cancer susceptibility genes. BRCA1 and BRCA2. *Medicine (Baltimore)*. 1998 May;77(3):208-26.

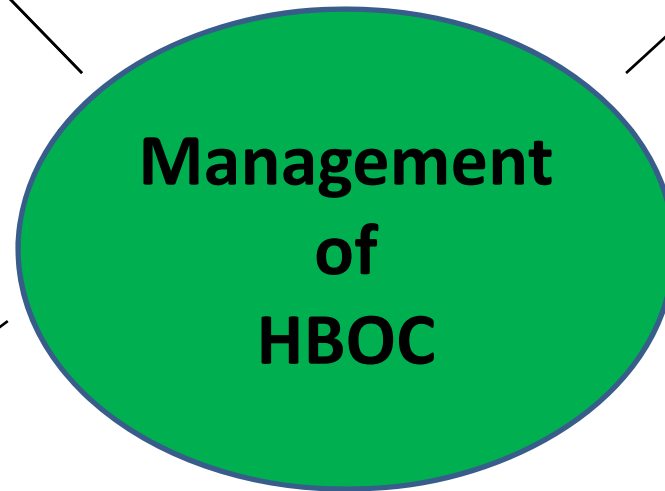
Olopade OI. Genetics in clinical cancer care--the future is now. *N Engl J Med*. 1996 Nov 7;335(19):1455-6.

Increased Surveillance for Breast Cancer in Mutation Carriers

- Monthly breast self-exams starting at age 18
- Clinical breast exam, every 6-12 mo, starting at age 25 y.
- Annual MMG and breast MRI starting at age 25 y or individualized based on earliest case in the family

Increased Surveillance for Ovarian Cancer in Mutation Carriers

- Transvaginal USG + CA-125 every 6 mo starting at age 35 y or 5-10 y before the earliest age of first diagnosis of ovarian cancer in the family.



Risk Reducing Medications for Mutation Carriers

- Limited data are currently available regarding the efficacy of tamoxifen
- There are no data regarding the use of raloxifene or exemestane

Prophylactic Surgery in Mutation Carriers

- Recommend risk-reducing mastectomy on case-by-case basis
- Recommend risk reduction salpingo-oophorectomy, ideally between 35 and 40 y, and upon completion of child bearing, or individualized based on earliest age of onset of ovarian cancer in the family

Overall Aims

- **Assess the feasibility of using the Texas Cancer Registry (TCR) Linked Medicare Database to identify patients with breast or ovarian cancer who have been tested for the mutation**

Specific Aims

- Determine the rate of BRCA testing in the State of Texas among women 65 y with a diagnosis of breast and/or ovarian cancer
- Determine the proportion of women positive for BRCA mutations among the tested women 65 y and compare to current literature

Data Sources

- Linked Texas Cancer Registry-Medicare

Patient Cohort Definitions

- Texas residents
- Age 66+
- Year of diagnosis 2005-2007; claims through 2009
- Not diagnosed by autopsy or death certificate
- Continuous coverage A&B/no HMO +/-12 mo

Population

Race	Breast Only	Ovarian Only	Breast & Ovarian	Total
Non-Hispanic White	7270 (81.4%)	361 (86.7%)	22 (73.3%)	7653 (81.6%)
Black	616 (6.9%)	13 (3.1%)	2 (6.6%)	631 (6.7%)
Hispanic	864 (9.6%)	33 (7.9%)	5 (16.6%)	902 (9.6%)
Other	131 (1.4%)	7 (1.6%)	1 (3.3%)	139 (1.4%)
Unknown	45 (1%)	2 (0.4%)	0	47 (0.5%)
Total	8926	416	30	9372

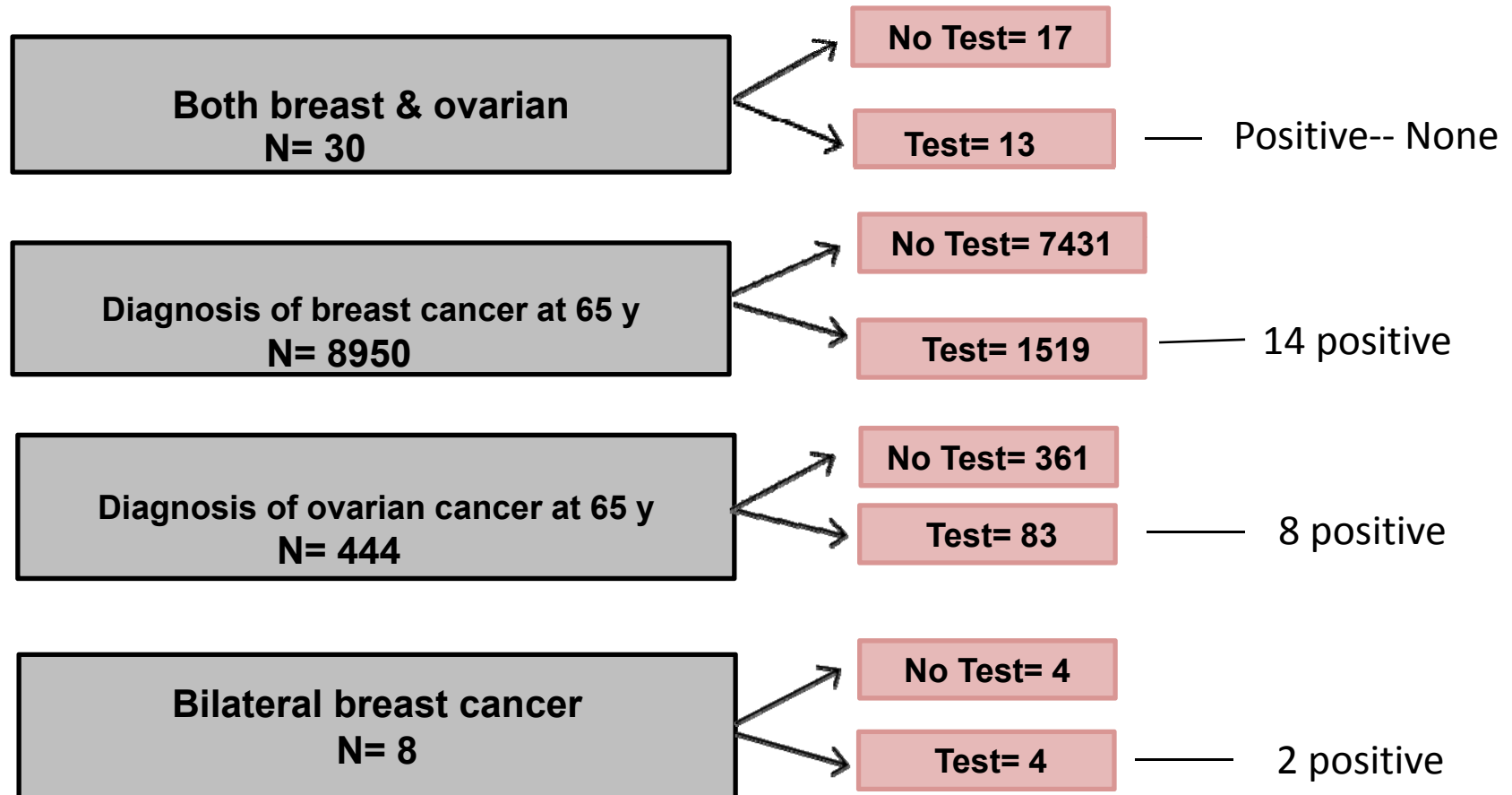
Preliminary Results- Cohort

Entire cohort	N= 9372
Tested	N= 1594
Positive patients Mutation present	N= 22

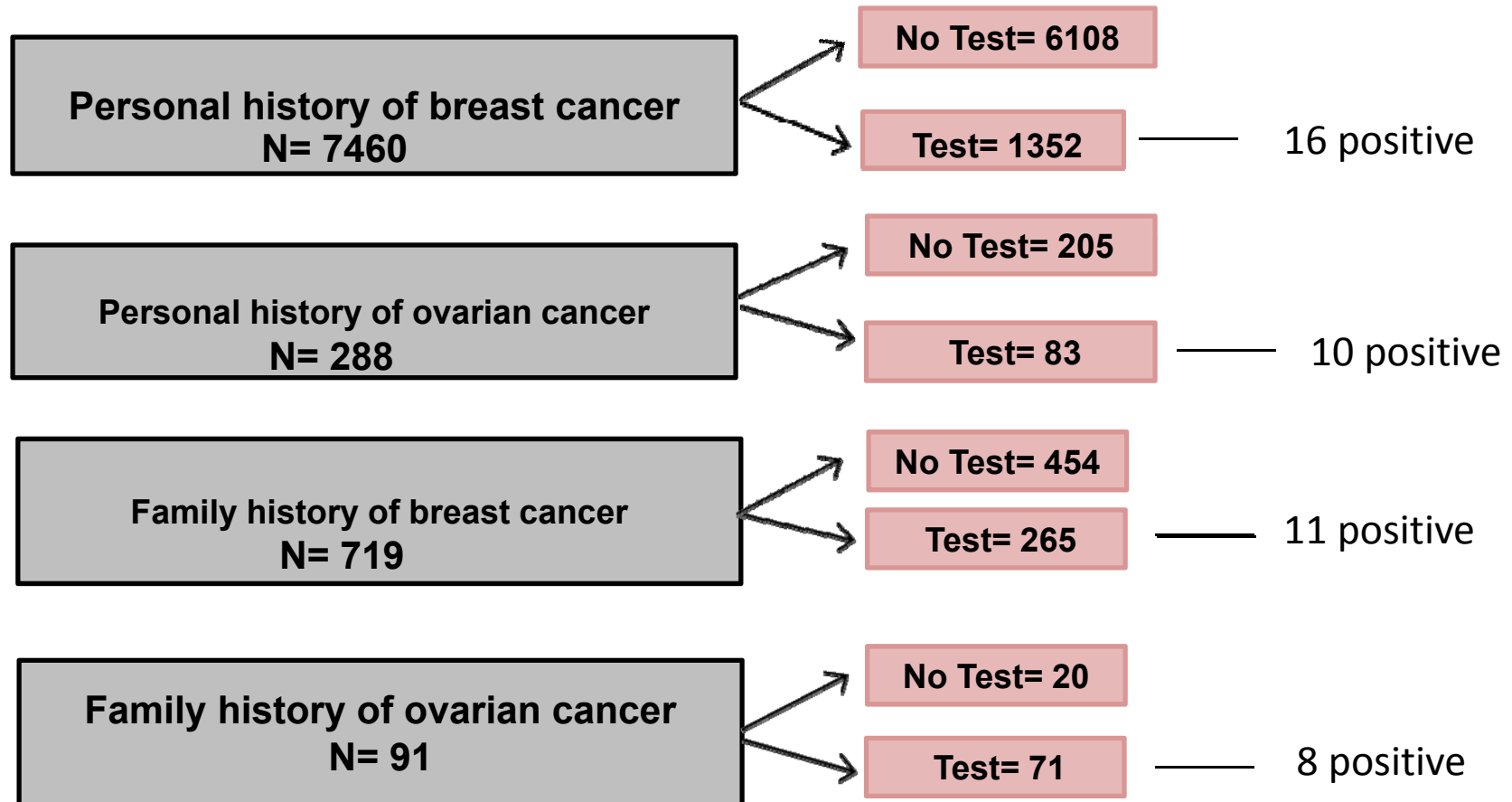
Preliminary Results- Cohort

Age at diagnosis for entire cohort N= 9372	Median 74
Age at diagnosis for women with only a breast primary N= 7447	Median 74
Age at diagnosis for women with only ovarian primary N= 382	Median 74
Age at diagnosis for women with both- breast and ovarian N= 30	Median 68

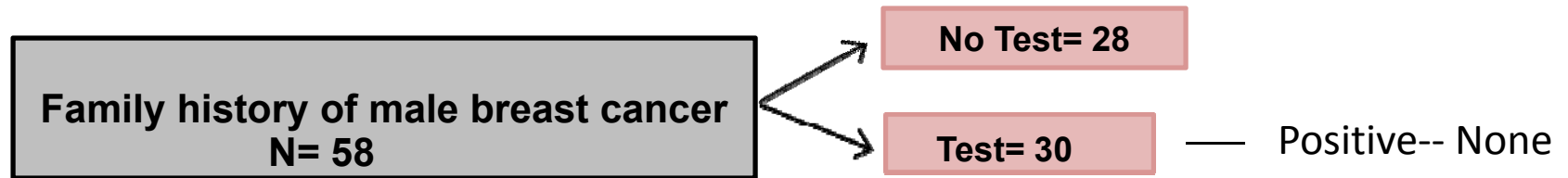
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Preliminary Results- Cohort



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OUR RESULTS

0.12% Breast
1.8% Ovarian

Whittemore AS, Gong G, Itnyre J. Prevalence and contribution of BRCA1 mutations in breast cancer and ovarian cancer: results from three U.S. population-based case-control studies of ovarian cancer. *Am J Hum Genet.* 1997 Mar;60(3):496-504

Next Steps

- Determine the type of surveillance chosen by patients with BRCA mutations
- Assess adherence to surveillance guidelines
- Determine the route of treatment chosen in the presence of BRCA mutations
 - Expectant management
 - Surgical management

Limitations

- **Available data is limited to what was coded**
- **Limited to ICD-9 codes documenting significant family history**
- **Unable to identify ethnicities associated with higher mutation frequency: Ashkenazi Jewish and others**
- **Unable to assess the exact age at which family members developed the disease**

Summary Statement

Despite limitations, the information we found describes the level of utilization of BRCA testing in the older population since Medicare started covering the test

Acknowledgments

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