

Epidemiology of Breast Cancer

Selected Highlights

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Major Factors

- **Family history**
- **Reproductive/ Hormonal**
- **Benign Pathology**
- **Mammographic Density**

Family History

- **BRCA 1/2**

- Accounts for <5% of breast cancer.
Important in some populations with founder mutations.

- Askenazi Jews

- Penetrance 50-80%

- **Low penetrance genes – specific genes unknown**

- Age at onset

- Multiple family members

- Bilaterality

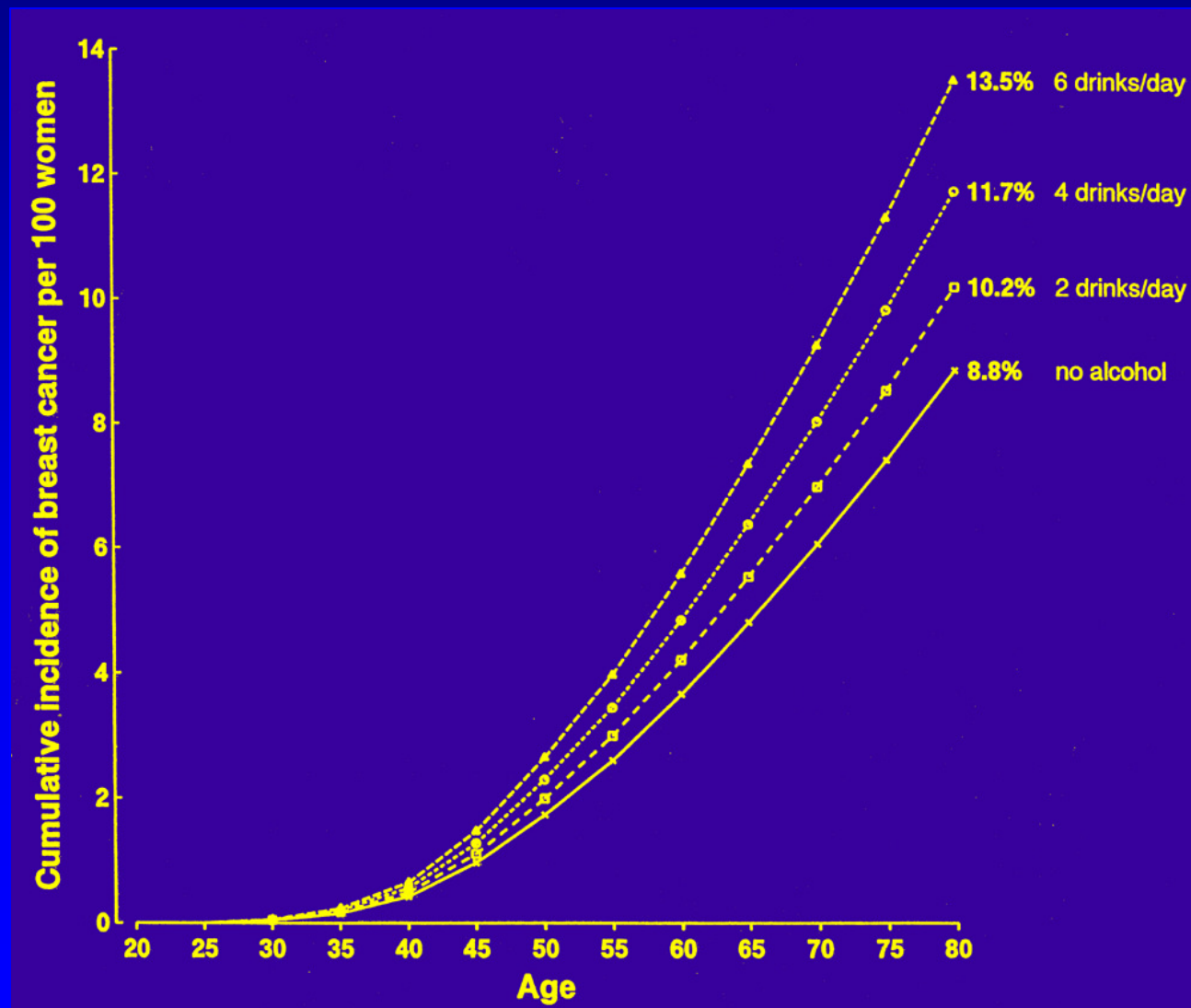
Number of Relatives with Breast Cancer

Number of first-degree relatives with breast cancer	Cases (n=58 209)	Controls (n=101 986)	Risk ratio
None	50 713	94 548	1.00
1	6810	6998	1.80
2	603	404	2.93
3 or more	83	36	3.90

Age at Diagnosis - Relative Risk

Woman's age (years)	Relative's age at diagnosis of breast cancer			
	<40 years	40-49 years	50-59 years	>60 years
<40	5.7	2.9	2.8	2.0
40-49	3.0	2.0	2.3	1.7
50-59	2.0	2.2	1.6	1.6
>60	1.4	1.4	1.5	1.4

Alcohol – Cumulative Risk of Breast Cancer



Reproductive/ Childbirth

- **Age 1st childbirth –**
 - Nulliparous \cong First birth age = 30 years**
 - RR \cong 3% / year**
- **Parity**
 - RR \cong - 7% / birth**
- **Breast Feeding \cong - 4.3% / year**

Reproductive- Menstrual Factors

- **Age at Menopause**
~ 3% / year
- **Age at Menarche**
~ - 4% / year
- **Oral Contraceptives**
24% increase in current users only
- **Hormonal Replacement Therapy**
2.3% / year in current users only
oestrogen + progestin twice as high
~ 5% /year.

Other Hormonal

- **Weight – postmenopausal**
1% increase / kg
- **Height**
1% increase / cm
- **Alcohol**
~ 7% per drink (10g) / day

Benign Breast Disease

- **Lobular Carcinoma-in-situ**
~ 10-fold risk
- **Atypical Hyperplasia**
4-fold risk
- **Proliferative lesion without atypia.**
2-fold risk

Mammographic Density

- Quantitative Effect

	None	<10%	10-25	25-50	50-75	>75
Rel. Risk	1.0	1.2	2.2	2.4	3.4	5.3
% of Controls	4.9	12.7	19.5	27.0	22.2	13.7

- High Attributable Risk

- > 50% density PAR = 33%

- > 75% density PAR = 15%

(Boyd, et al. 1995)

Estimating risks for individuals

The risk calculator program

Personal factors

Woman's age: Menarche: Height (m): Weight (kg):

Nulliparous: Parous: Age First Child: Unknown:

Benign: Atypical hyperplasia: LCIS: Ovarian cancer:

Premenopausal: Perimenopausal: Postmenopausal: No information: Age at menopause:

Measurements

Metric: Imperial:

HRT use

Never: 5 or more years ago: Less than 5 years ago: Current user: Length of use (years):

Calculate Risk

View Family History

Paternal Gran: Ovarian: Affected status: Age:

Maternal Gran: Ovarian: Affected status: Age:

Paternal aunts: Number: Ovarian: Affected status: Age:

Maternal aunts: Number: Ovarian: Affected status: Age:

Sisters: Number: Ovarian: Bilateral: Affected status: Age:

Mother: Ovarian: Bilateral: Affected status: Age:

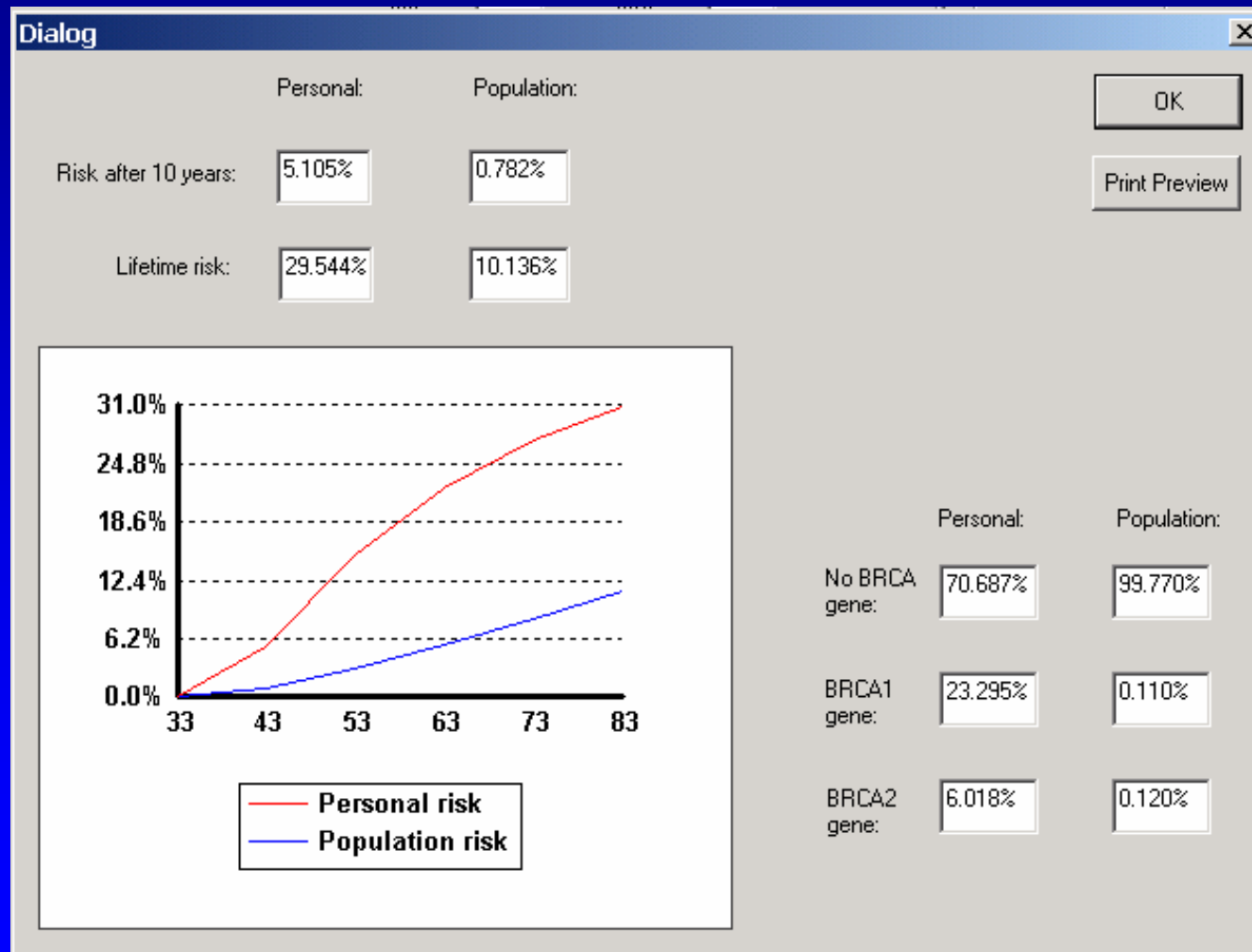
Daughters: Number: Ovarian: Affected status: Age:

Affected Nieces

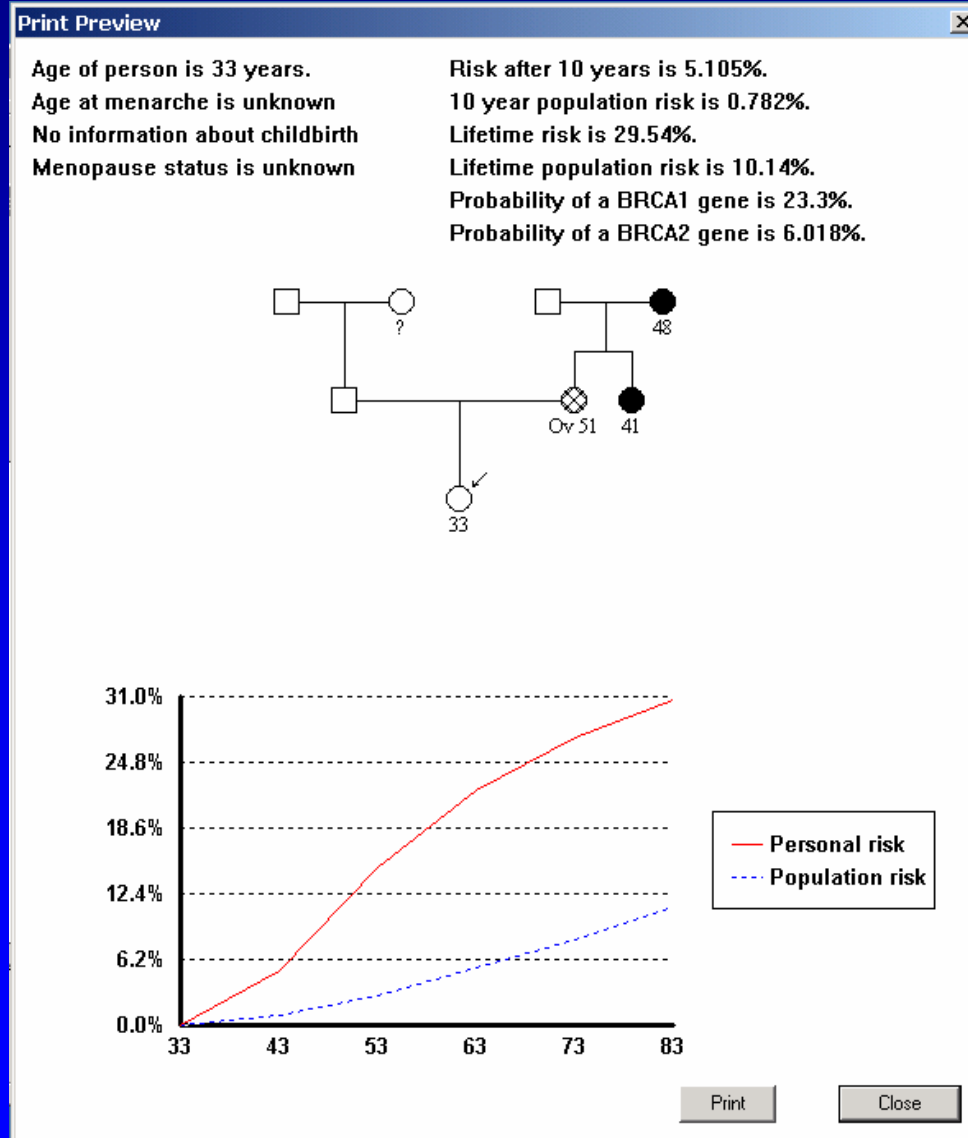
Genetic Testing

The pedigree chart shows a woman (age 33) with a question mark, indicating her status is unknown. She is the daughter of a man and a woman (age 48) who is affected (Ov 5141). The woman (age 48) is the daughter of a man and a woman (age 51) who is affected (Ov 5141). The woman (age 51) is the daughter of a man and a woman (age 41) who is affected (Ov 5141). The woman (age 41) is the daughter of a man and a woman (age 48) who is affected (Ov 5141).

Displaying the predictions



Summary output



Which factors involve Hormonal Regulation?

- Age at Menarche & Menopause
- Childbirth
- Weight
- Mammographic Density ?
 - At least partially
- Benign Breast Disease ?
 - Maybe
- Family History ?
 - Unclear

Which factors are associated with ER+ Cancers?

- Age at Menarche & Menopause ?
- Childbirth ?
- Weight ?
- Mammographic Density ?
- Benign Breast Disease ?
- Family History ?