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
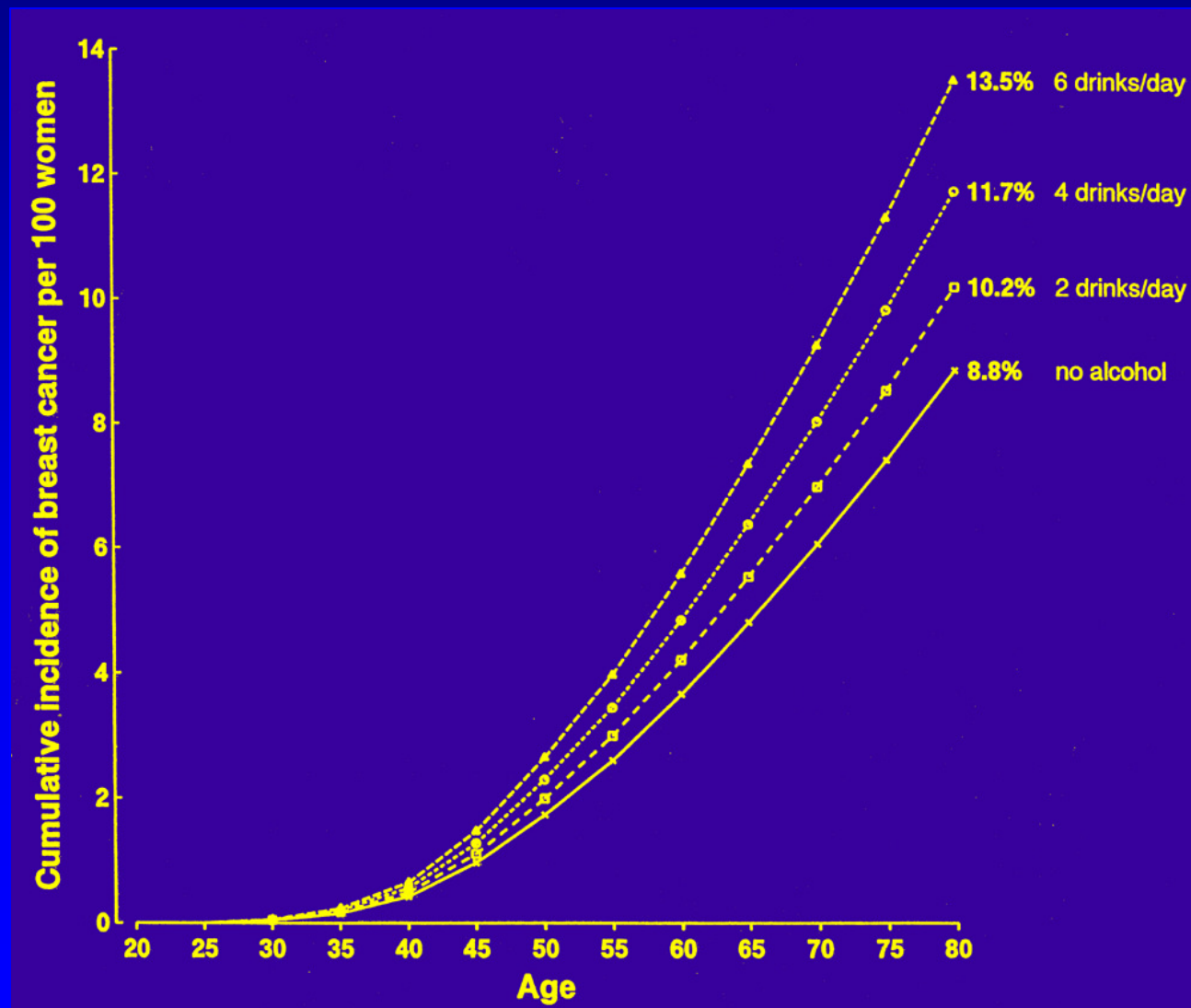
Reproductive/ Childbirth

- **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

Displaying the predictions
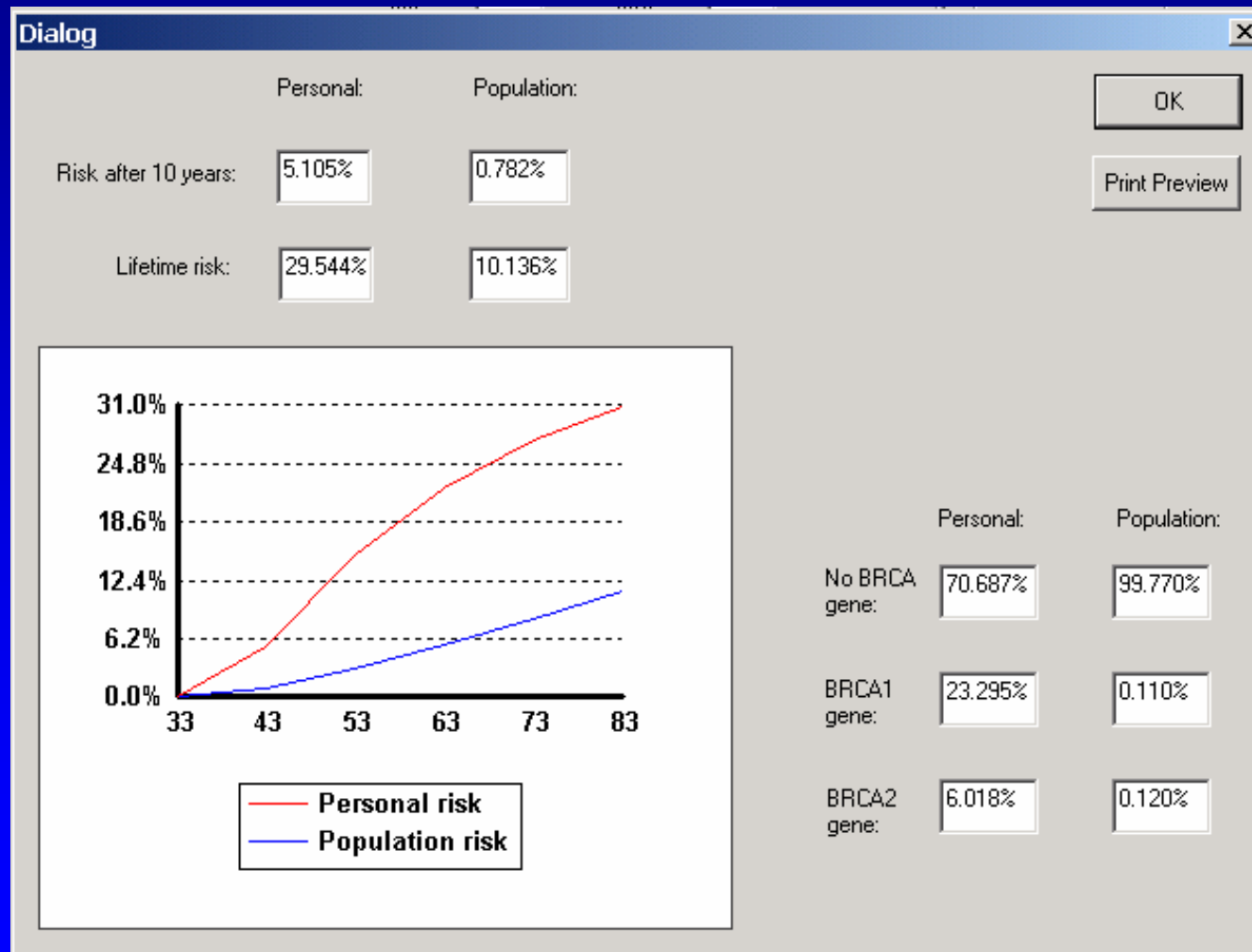
Summary output
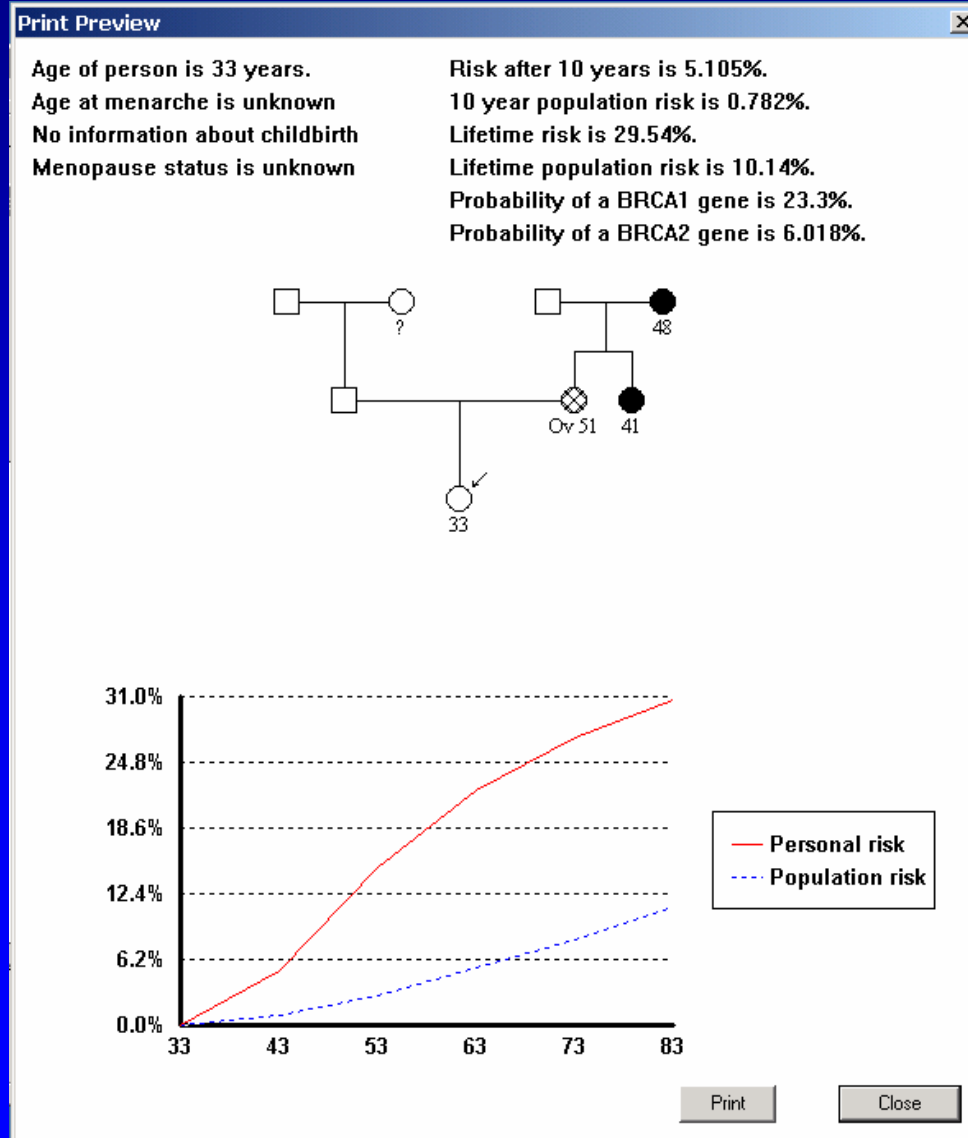
Which factors involve Hormonal Regulation?

- **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 ?**