

The fraction of Breast Cancer (BC) Attributable to Smoking. The Norwegian women and cancer (NOWAC) study

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Smoking and Breast Cancer (BC)

Consensus about biologic mechanisms

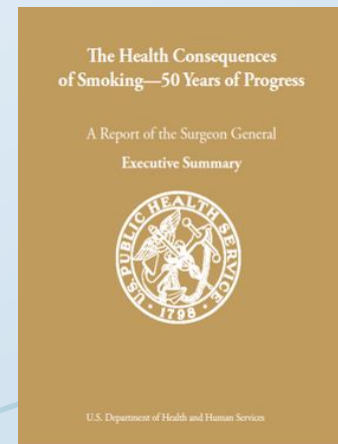
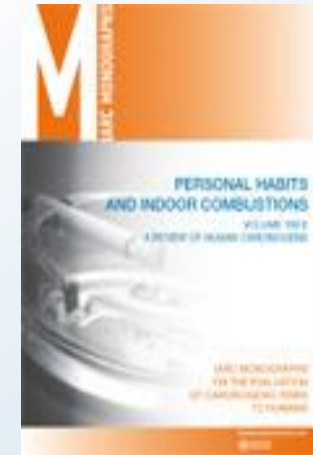
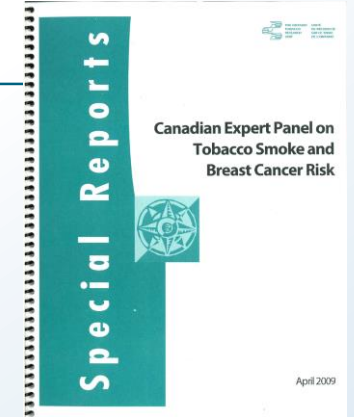
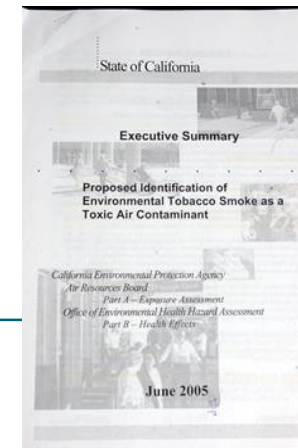
- 2005 California Environmental Protection Agency
- 2009 Canadian Expert Report , 2012 IARC
- 2014 The report of the SG

Disagreement on causality

- Yes : CAL EPA , Canadian Report
- Maybe : IARC - possibly, SG - suggestive

9 Large Cohort studies – BC Incidence (7) /Mortality (2):

- Burden of smoking on society is underestimated



Materials NOWAC

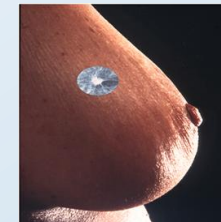
Random sample:

- 30 – 70 years

Mailed questionnaires:

- 1991- 2007

- 130,053 Norwegian women
- Linkages with National Registries 2012
- Follow-up time 13.4 years
- 4, 132 Incident Breast Cancer (BC) cases

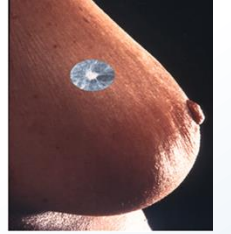


Methods NOWAC

- Hazard ratios(HRs);
- 95% confidence intervals(CIs)
- Adjusting for relevant confounders
- Ever (Current and Former) vs Never
- Never active/passive smokers as reference group
- Population attributable fraction (PAF)

$$PAF = \frac{Pe * (RRe - 1)}{Pe * RRe + (1 - Pe)}$$

Age and Multivariate adjusted HR 's for BC according to Smoking Status, NOWAC 1991-2012



Smoking Status	Cases 4132	HR Age Adjusted	HR * Multi-Variate Adjusted	95% CI		
Never	411	1.00	1.00	Ref.		
Passive	908	1.19	1.18	1.05-1.33		
Ever	2813	1.22	1.21	1.08-1.34		

Adjusted for age, education, age at menarche, family history of breast cancer, age at first birth, number of children, BMI, menopausal status, hormonal contraceptive and hormone therapy use, alcohol consumption,

- all at enrollment*

HR 's for BC according to number of Pack-Years of smoking at enrollment, NOWAC 1991-2012

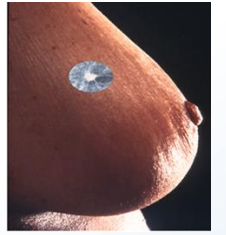
Number of Pack-years	Cases (n)	HR *	95% CI
Never	411	1.00	Ref.
0-5	1008	1.15	1.02-1.29
6-10	612	1.18	1.04-1.34
11-15	519	1.31	1.14-1.49
> 15	674	1.29	1.14-1.47
<i>P-trend **</i>		<i>0.004</i>	



* Multivariate adjusted ** Excluding never smokers

Gram et al., 2016 in press

HR 's for BC among parous women according to smoking initiation in relation to first birth



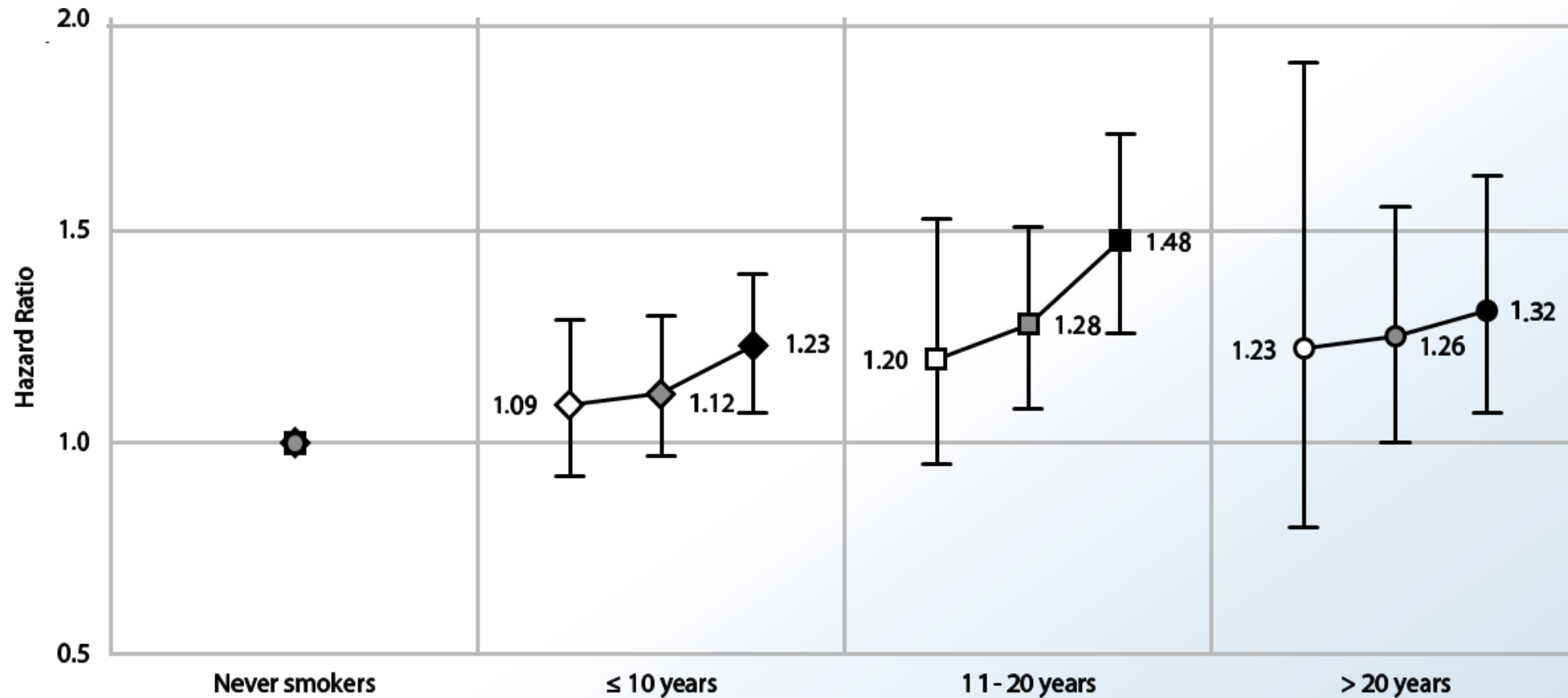
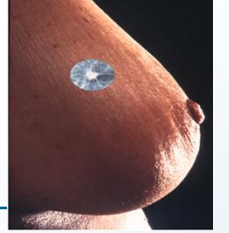
Smoking Duration Before First Birth	Cases (n)	HR *	95% CI
Never	411	1.00	Ref.
After first birth	372	1.10	0.95-1.29
Around or < 5 yrs before	948	1.17	1.03-1.33
≥5 years before	1205	1.29	1.14-1.46
<i>P-Trend **</i>		<i>0.01</i>	

* *Multivariate adjusted*

** *Excluding never smokers*

Gram et al., 2016, in press

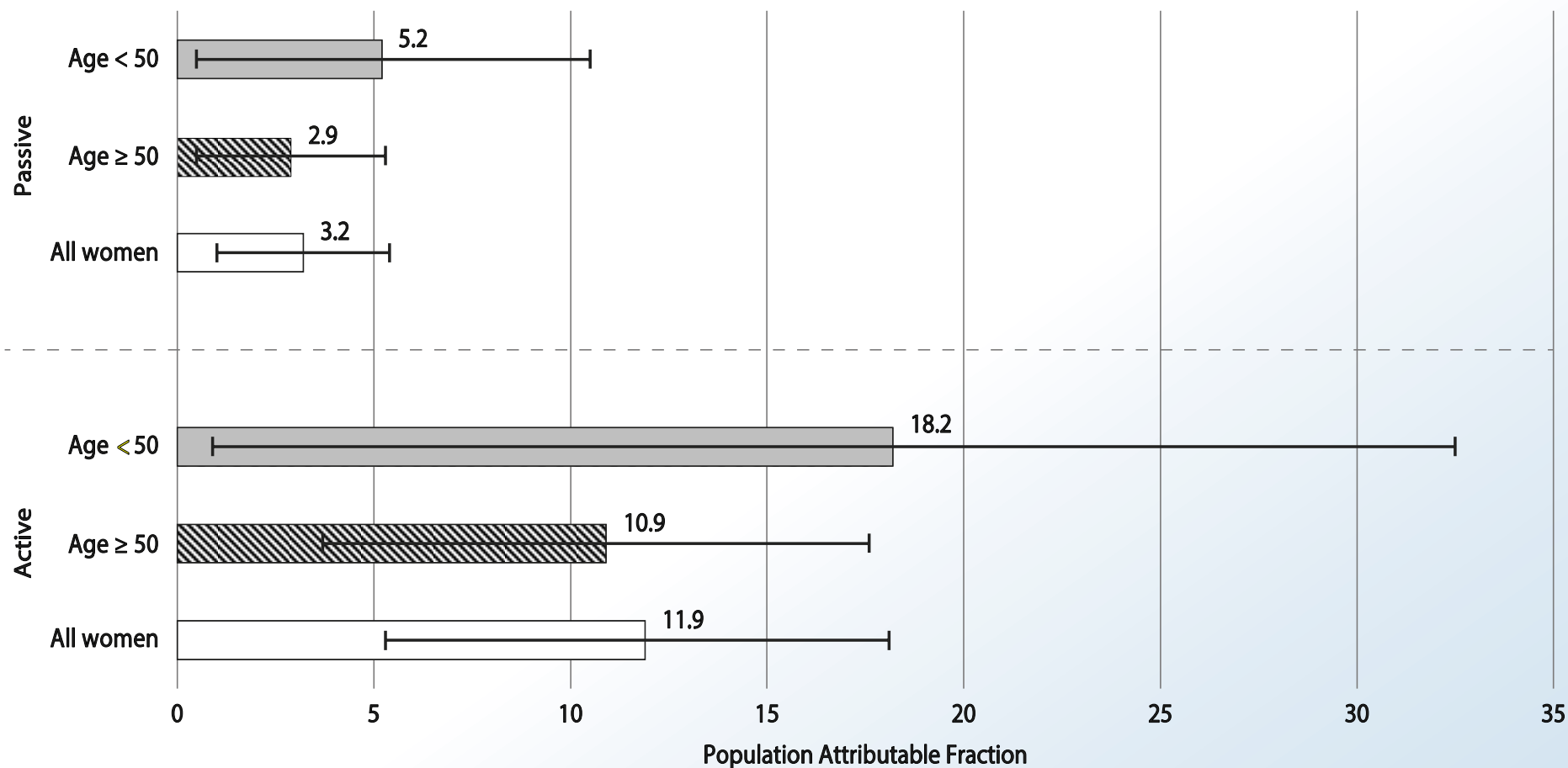
HR* for BC among parous smokers by total years of smoking, and initiation in relation to first birth compared with parous never smokers



* Multivariate adjusted

Gram et al., 2016 in press

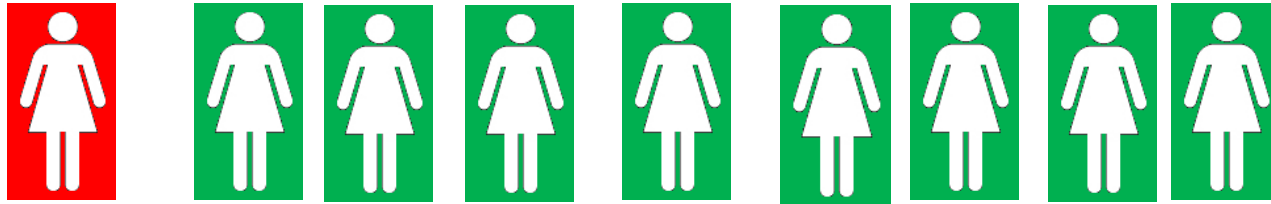
The fraction of BC (%) attributable to Passive and Active (ever) smoking in 2012, overall and by age at diagnosis < 50 years, or older



Gram et al., 2016 in press

Conclusions

- Breast cancers PAF : One in nine



- Cancer burden due to smoking is underestimated
- Primary prevention of BC can begin among teenagers



Thank you for your attention !



Tromsø, Norway NOWAC study



Honolulu, Hawaii MEC study