



# **Genome-wide Study of Head and Neck Cancer**

**International Agency for Research on Cancer**

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Postdoctoral Fellow

Genetic Epidemiology Group

# Oral Cavity and Oropharynx Cancer

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- 442,000 new cases
- 240,000 deaths
- Squamous cell carcinomas
- Risk factors
  - Tobacco
  - Alcohol

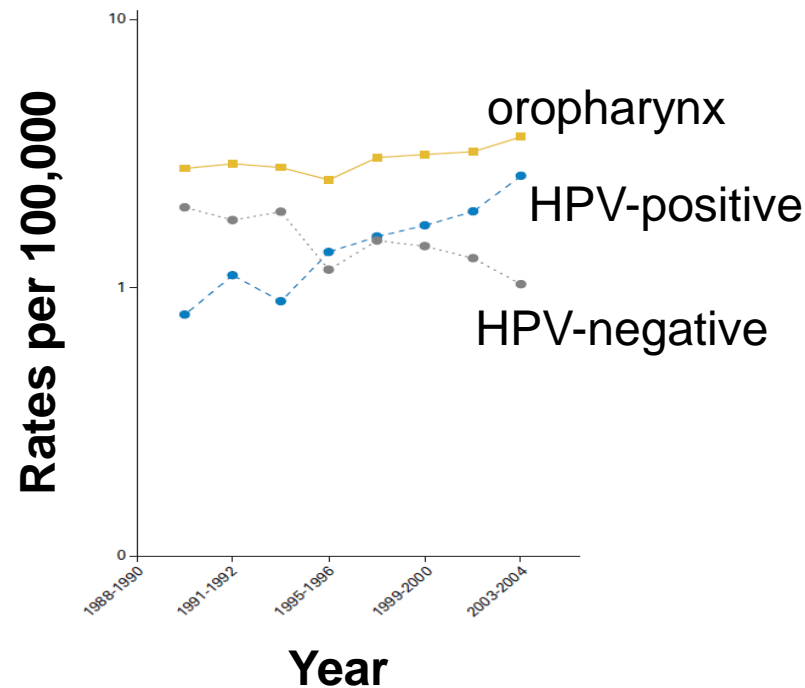
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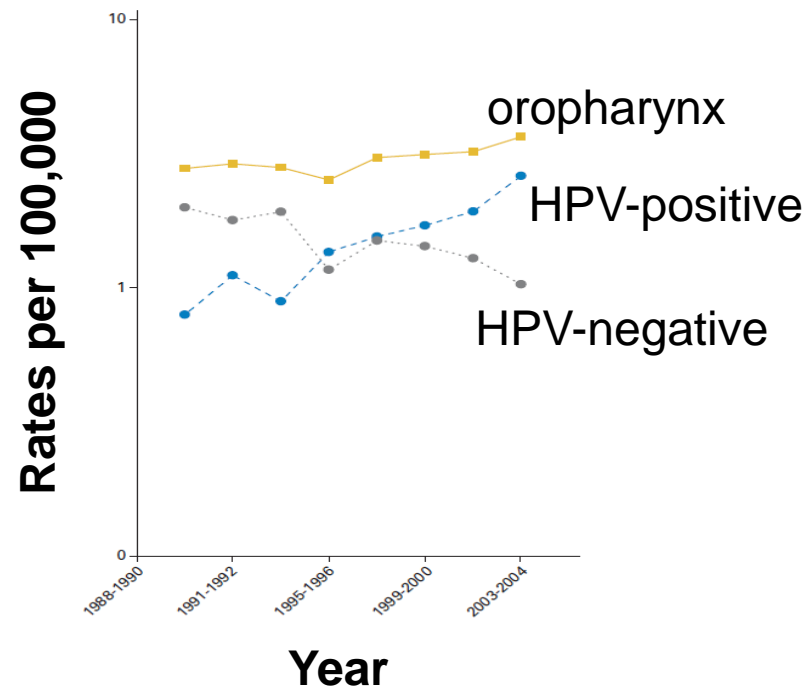
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Modified from Chaturvedi et al 2013

# Oral Cavity and Oropharynx Cancer

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  - **HPV**
- **Genetic Factors**



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# Population Characteristics

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		<b>Cases N=6034</b>	<b>Controls N=6585</b>
<b>Sex</b>	Male	75%	65.7%
	Female	25%	34.3%

# Population Characteristics

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<b>Sex</b>	Male	75%	65.7%
	Female	25%	34.3%
<b>Smoking Status</b>	Never	17.5%	38.1%
	Former	29.7%	34.4%
	Current	43.5%	22.3%
	Unknown	9.3%	5.3%

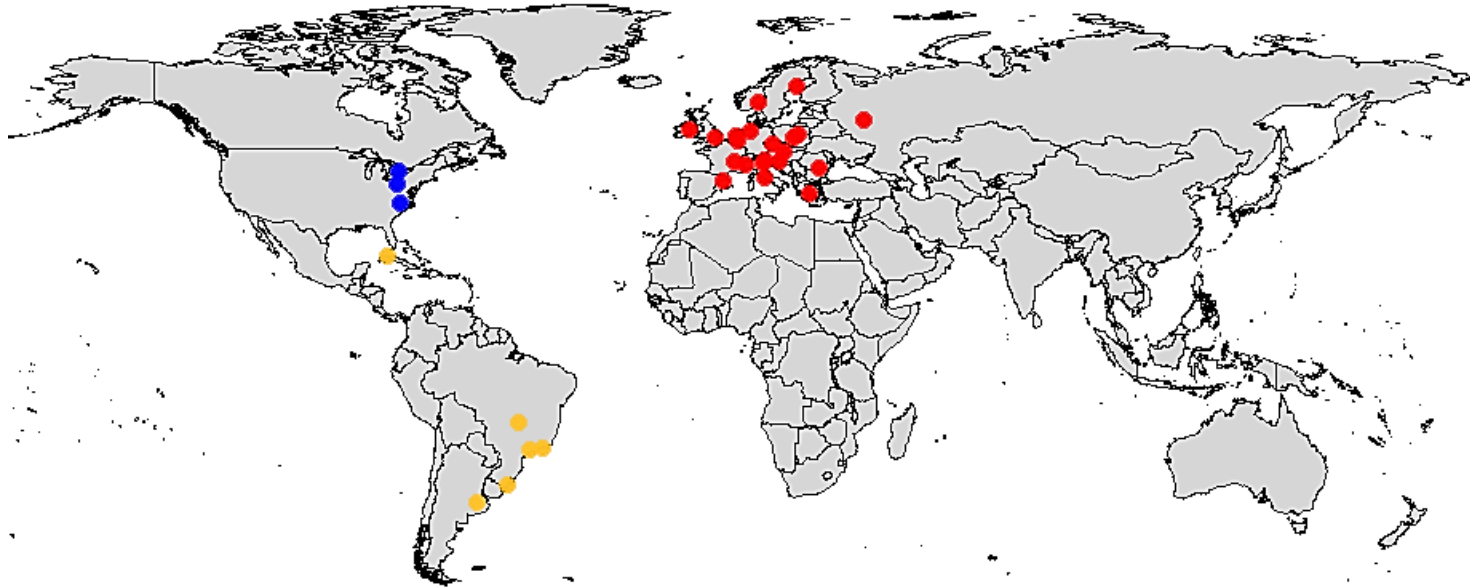
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Drinking Status	Never	13.6%	18.2%
	Ever	80.2%	73.5%
	Unknown	6.2%	8.3%

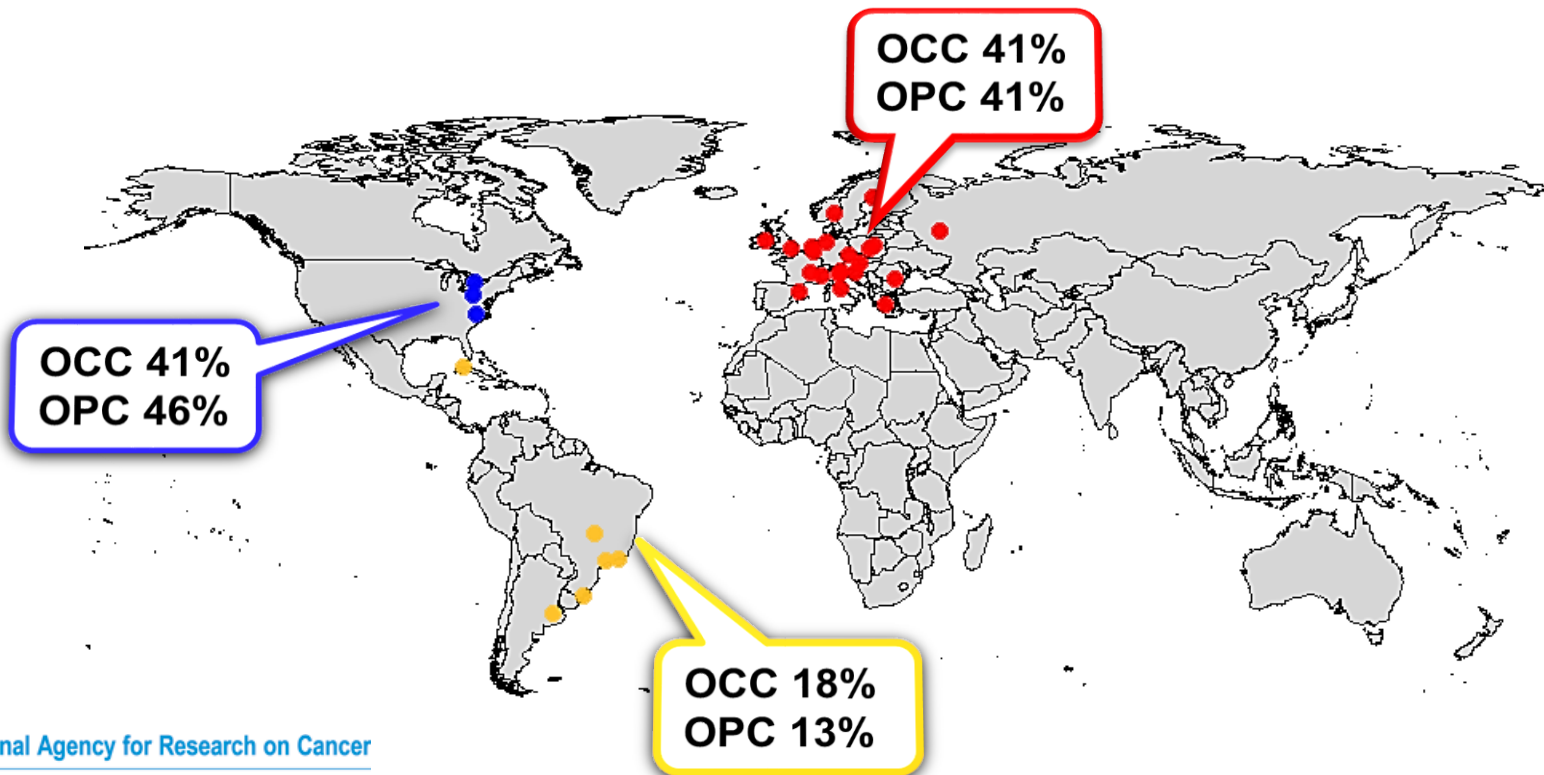


# Population Characteristics

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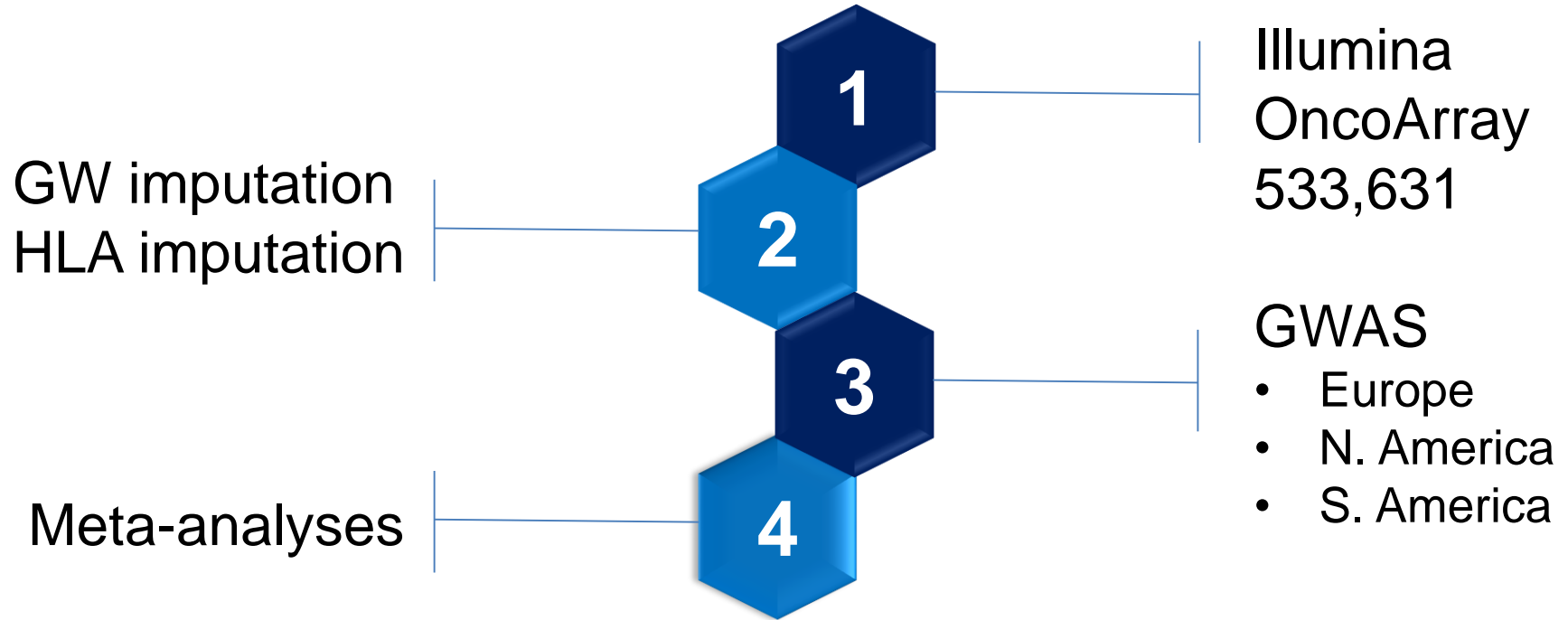


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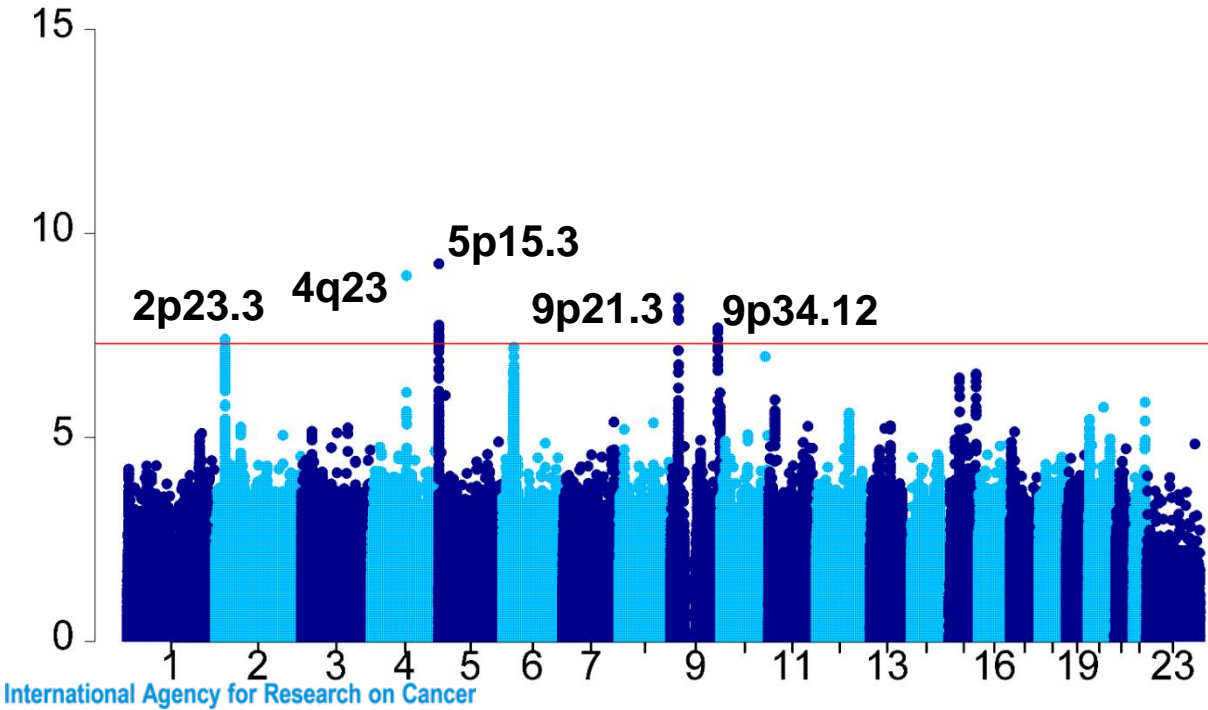


# Methods

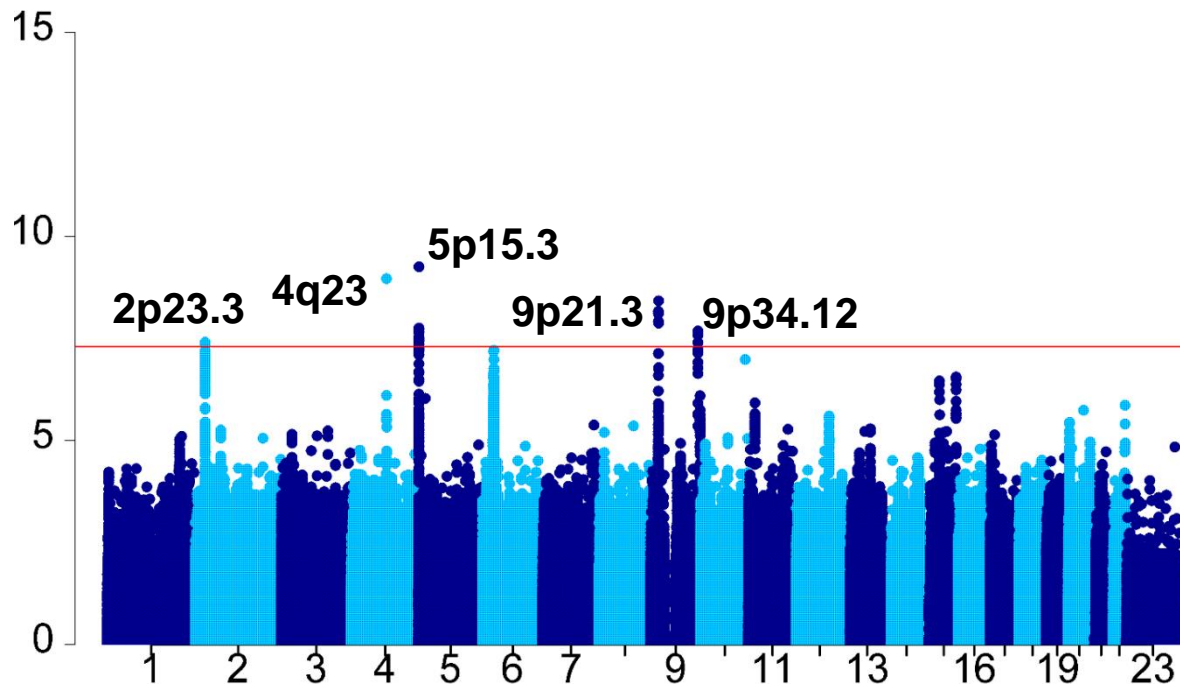
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# Oral Cancer



# Oral Cancer



	Gene	OR	P
2p23.3	<i>GPN1</i>	0.83	4x10 <sup>-8</sup>
4q23	<i>ADH1B</i>	0.57	1x10 <sup>-9</sup>
5p15.3	<i>CLPTM1L</i>	0.74	5x10 <sup>-10</sup>
9q34.12	<i>LAMC3</i>	1.33	2x10 <sup>-8</sup>
	<i>CDKN2B-</i>		
9p21.3	<i>AS1</i>	1.24	4x10 <sup>-9</sup>

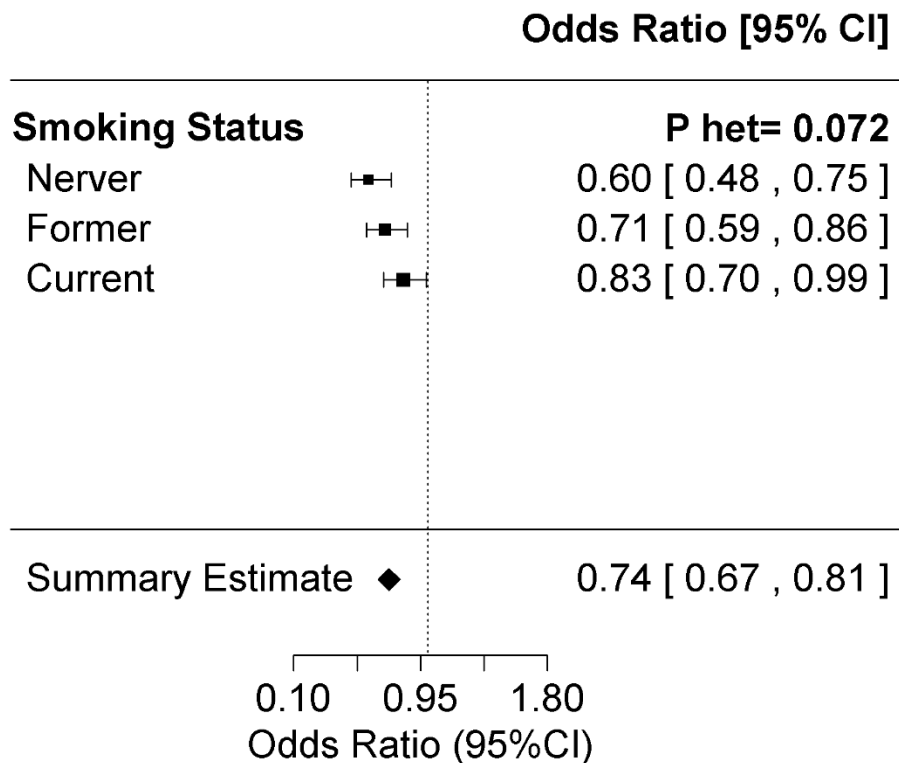
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# 5p15.3 Oral Cancer

rs10462706

*CLPTM1L*

MAF=0.15

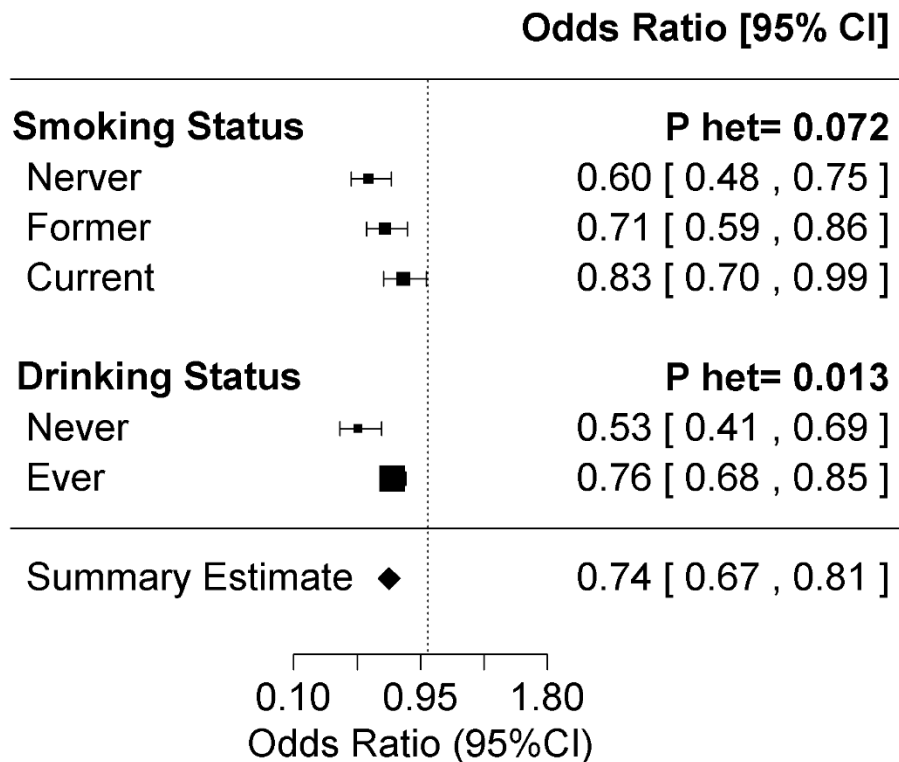


# 5p15.3 Oral Cancer

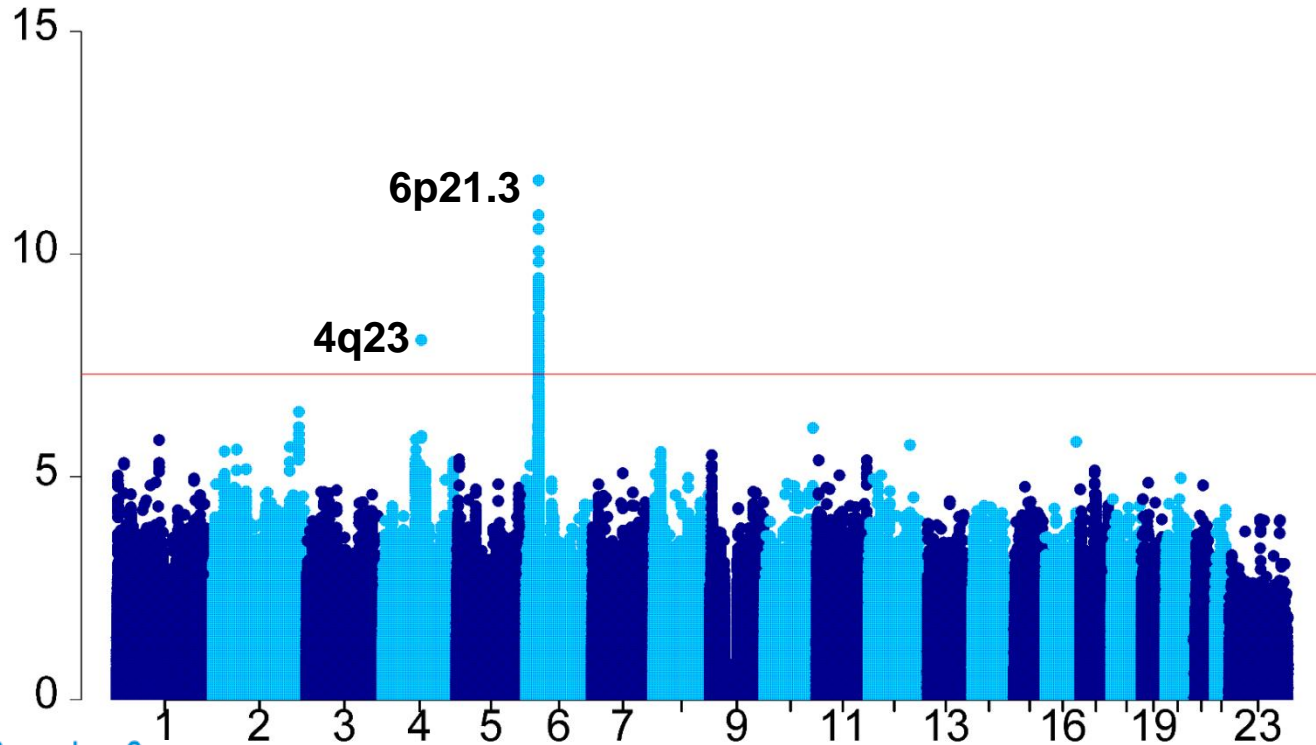
rs10462706

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# Oropharynx Cancer



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# 6p21.3 Oropharynx cancer

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**DRB1\*1301-DQA1\*0103-DQB1\*0603**

# 6p21.3 Oropharynx cancer

**DRB1\*1301-DQA1\*0103-DQB1\*0603**

	case	control	HF case	HF control	OR	P
<b>Meta-analysis</b>	2433	5984	0.05	0.07	0.59	$3 \times 10^{-9}$

HF=haplotype frequency

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Europe	1098	2928	0.04	0.07	0.57	$3 \times 10^{-5}$
North America	1119	2329	0.03	0.06	0.52	$4 \times 10^{-6}$
South America	216	727	0.07	0.07	1.05	0.8

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# 6p21.3 Oropharynx cancer

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Cervical Cancer OR=0.47 P= $8.8 \times 10^{-10}$

Chen et al (2013) JNCI

# 6p21.3 Oropharynx cancer by HPV

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**DRB1\*1301-DQA1\*0103-DQB1\*0603**

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HPV			HF	HF	OR	P
	case	control	case	control		
Negative	240	3686	0.05	0.07	0.75	0.16

HF=haplotype frequency

# 6p21.3 Oropharynx cancer by HPV

DRB1\*1301-DQA1\*0103-DQB1\*0603

HPV	case	control	HF case	HF control	OR	P
Negative	240	3686	0.05	0.07	0.75	0.16
Positive	336	3686	0.01	0.07	0.23	1.6x10 <sup>-6</sup>

HF=haplotype frequency

# Summary

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## Oral cavity cancer

- Novel loci 2p23 and 9q34.12
- 5p15.33 and 9p21.3

## Oropharyngeal cancer

- Large 6p21.32 association signal
- DRB1\*1301-DQA1\*0103-DQB1\*0603 class II haplotype is associated with a strong risk reduction of HPV positive OPC.

# Acknowledgments

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## **IARC Studies**

ARCAGE  
EPIC  
IARC Central Europe  
IARC Latin America  
IARC ORC



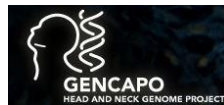
University of Pittsburgh



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