Health Burden of VPI in younger adults – the HPV example

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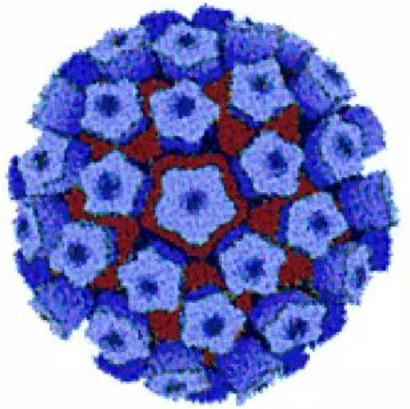
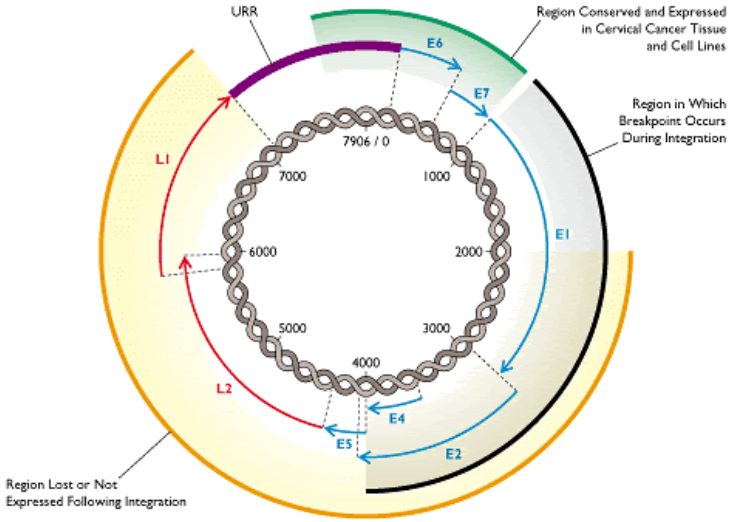
UNIVERSITÀ DEGLI STUDI FIRENZE

DSS DIPARTIMENTO DI SCIENZE DELLA SALUTE

The Human Papilloma Virus (HPV)

- **>100 different genotypes**
- **Small, non-enveloped, icosahedral DNA viruses**, diameter 52-55 nm
- **Circular double-stranded DNA molecule** of about 8000 base-pairs (bp)
- Non-enveloped capsid composed of 72 **pentameric capsomers**
- Capsid contains two structural proteins **(Late 1 and Late 2)**





Syrjänen and Syrjänen. Papillomavirus infections in human pathology. Wiley & Sons 2000, Chichester:11–46.

Modes of Transmission of HPV

Sexual contact

- Through sexual intercourses[1]
- Genital-genital, manual-genital, oral-genital[2–4]
- HPV genital infection in virginal subjects is rare, but can occur following a non-penetrative sexual intercourse[2]
- The use of condom can reduce transmission, but it is not completely protective[2]

Non-sexual modes

- Mother-newborn (vertical transmission; infrequent)[5]
- Contaminated objects (e.g. surgical gloves, biopsy forceps)[6, 7] Hypothetical but not well documented

1. Kjaer SK, Chackerian B, van den Brule AJC et al. High-risk human papillomavirus is sexually transmitted: Evidence from a follow-up study of virgins starting sexual activity (intercourse). *Cancer Epidemiol Biomarkers Prev* 2001;10:101–106. 2. Winer RL, Lee S-K, Hughes JP et al. Genital human papillomavirus infection: Incidence and risk factors in a cohort of female University students. *Am J Epidemiol* 2003;157:218–226. 3. Sonnex C, Strauss S and Gray JJ. Detection of human papillomavirus DNA on the fingers of patients with genital warts. *Sex Transm Inf* 1999;75:317–319. 4. Herrero R, Castellsague X, Pawlita M et al. Human papillomavirus and oral cancer: The International Agency for Research on Cancer multicenter study. *J Natl Cancer Inst* 2003;95:1772–1783. 5. Smith EM, Rithie JM, Yankowitz J et al. Human papillomavirus prevalence and types in newborns and parents: Concordance and modes of transmission. *Sex Transm Dis* 2004;31:57–62. 6. Ferenczy A, Bergeron C and Richart RM. Human papillomavirus DNA in fomites on objects used for the management of patients with genital human papillomavirus infections. *Obstet Gynecol* 1989;74:950–954. 7. Roden RB, Lowy DR and Schiller JT. Papillomavirus is resistant to dessication. *J Infect Dis* 1997;176:1076–1079.

HPV-related diseases

- Overall, cervical cancer is a rare outcome of HPV infection (extremely frequent). However, it is the **fourth most common cancer in females**, with an estimated **604,237 new cases** per year and **341,831 deaths** worldwide in 2020 (most of which occur in LMIC).

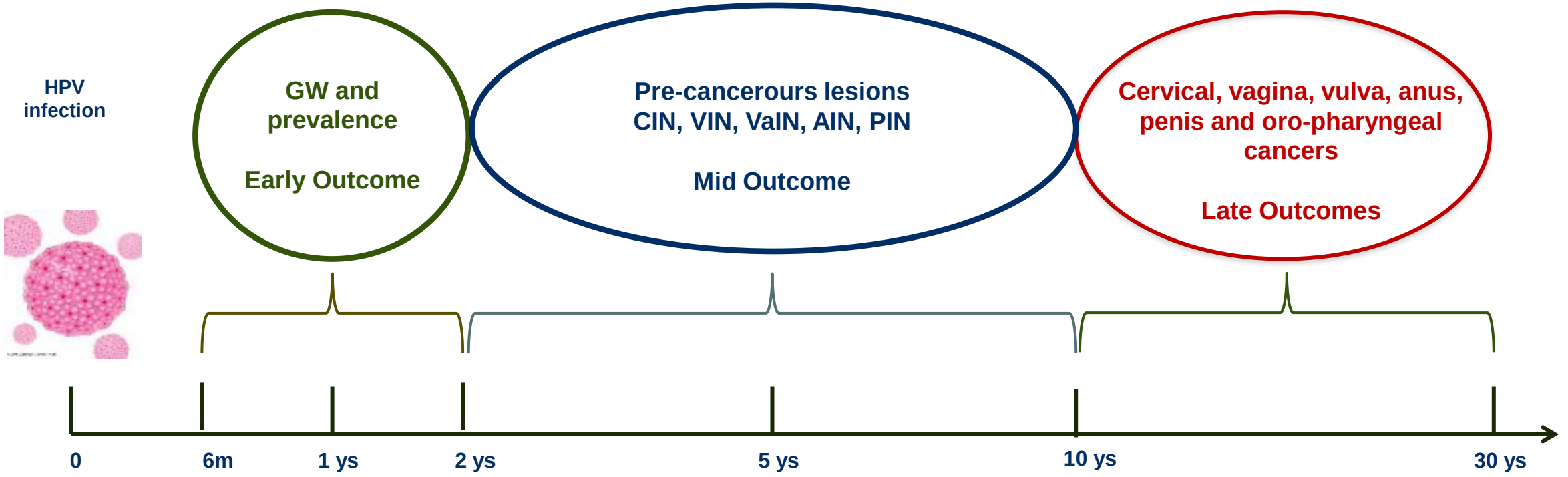
- Oncogenic types of HPV are also responsible for around:
- **90% of anal cancers**
- **70% of vaginal cancers**
- **50% of penile cancers**
- **40% of vulvar cancers**

- HPV is also responsible for **26% of oropharyngeal cancers** (including cancers of the tonsils and base of the tongue).

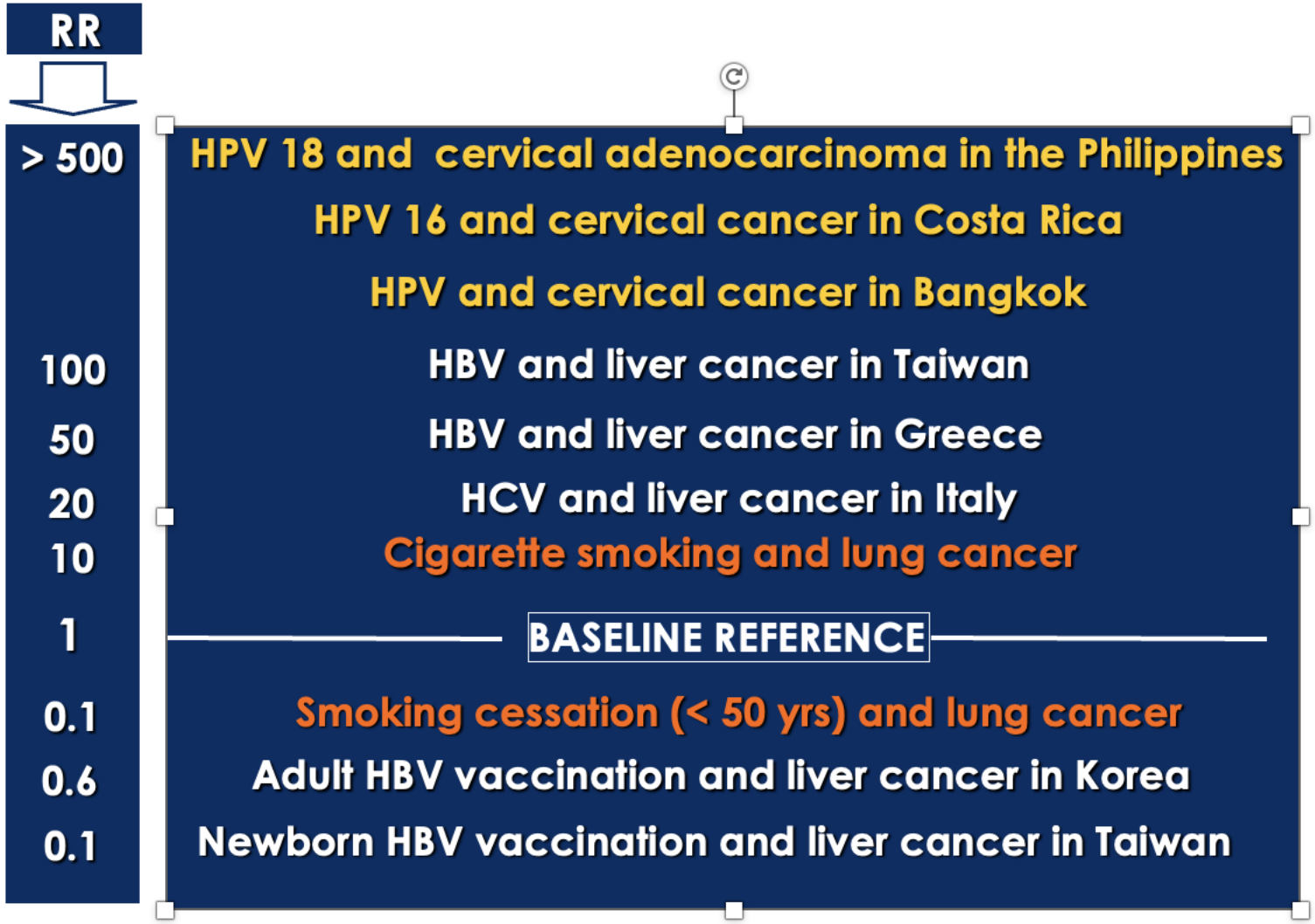
- Moreover, epidemiological studies have detected low-risk HPV DNA in **100% of anogenital warts**, which can mostly be attributed to HPV 6 and HPV 11. Similarly, **almost all cases of Juvenile Onset Recurrent Respiratory Papillomatosis (JORRP)** are attributed to HPV 6 and 11.

Walboomers JM, Jacobs MV, Manos MM, Bosch FX, Kummer JA, Shah KV, Snijders PJ, Peto J, Meijer CJ, Muñoz N. Human papillomavirus is a necessary cause of invasive cervical cancer worldwide. J Pathol. 1999 Sep;189(1):12-9.

Time evolution of HPV diseases



HPV and magnitude of the associations in cancer epidemiology



Data source and methods

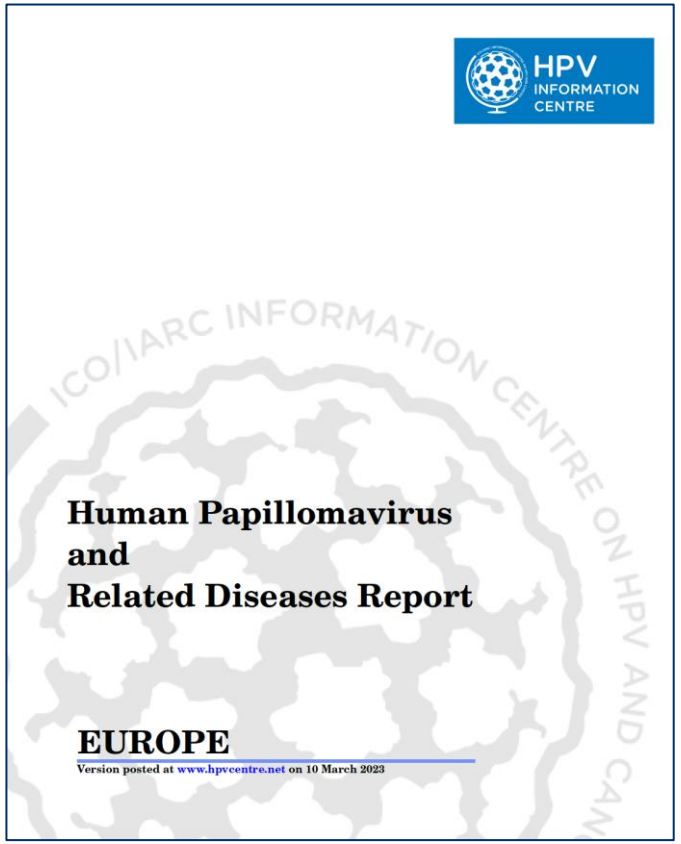
Information presented here is mainly taken from the **"Human Papillomavirus and Related Disease Report".**

All data on cancer-specific incidence and mortality are derived from the **IARC Global Cancer Observatory (GCO)**.

The methods of **estimation are:**

- **country-specific**
- **the quality of the national estimates depends on:**
  - **coverage**
  - **accuracy**
  - **timeliness of the recorded incidence and mortality data in a given country**

Caution must be exercised when interpreting these estimates, given the limited quality and coverage of cancer data worldwide at present, particularly in low- and middle-income countries.



Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, Muñoz J, Bosch FX, de Sanjosé S. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Europe. Summary Report 10 March 2023

Data source and methods

Incidence rates

The methods used to estimate the sex- and age-specific incidence rates of cancer in a specific country fall into the following broad categories, in order of priority:

1 **Observed national incidence rates** were projected to 2020 (45 countries).

2 The **most recently observed incidence rates** (national (2a) or regional (2b)) were applied to the 2020 population (54 countries).

3a Rates were **estimated from national mortality data by modelling**, using mortality-to-incidence ratios derived from cancer registries in that country (14 countries).

3b Rates were **estimated from national mortality estimates by modelling**, using mortality-to-incidence ratios derived from cancer registries in neighbouring countries (37 countries).

4 Age- and sex-specific national incidence rates for all cancers combined were obtained by **averaging overall rates from neighbouring countries**. These rates were then partitioned to obtain the national incidence for specific sites using available cancer-specific relative frequency data (5 countries).

5 Rates were **estimated as an average of those from selected neighbouring countries** (30 countries).

Ferlay J, Colombet M, Soerjomataram I, Mathers C, Parkin DM, Piñeros M, Znaor A, Bray F (2019). Estimating the global cancer incidence and mortality in 2020: GLOBOCAN sources and methods. Int J Cancer. 144(8):1941–1953.

Data source and methods

Mortality rates

The methods used to estimate the sex- and age-specific mortality rates of cancer in a specific country fall into the following broad categories, in order of priority:

- 1 **Observed national mortality rates** were projected to 2020 (80 countries).
- 2 The **most recently observed mortality rates** (national (2a) or regional (2b)) were applied to the 2020 population (21 countries).
- 3 Rates **were estimated from the corresponding national incidence estimates** by modelling, using incidence-to-mortality ratios derived from cancer registries in neighbouring countries (81 countries).
- 4 Rates were **estimated as an average of those from selected neighbouring countries** (3 countries).

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Ferlay J, Colombet M, Soerjomataram I, Mathers C, Parkin DM, Piñeros M, Znaor A, Bray F (2019). Estimating the global cancer incidence and mortality in 2020: GLOBOCAN sources and methods. Int J Cancer. 144(8):1941–1953.

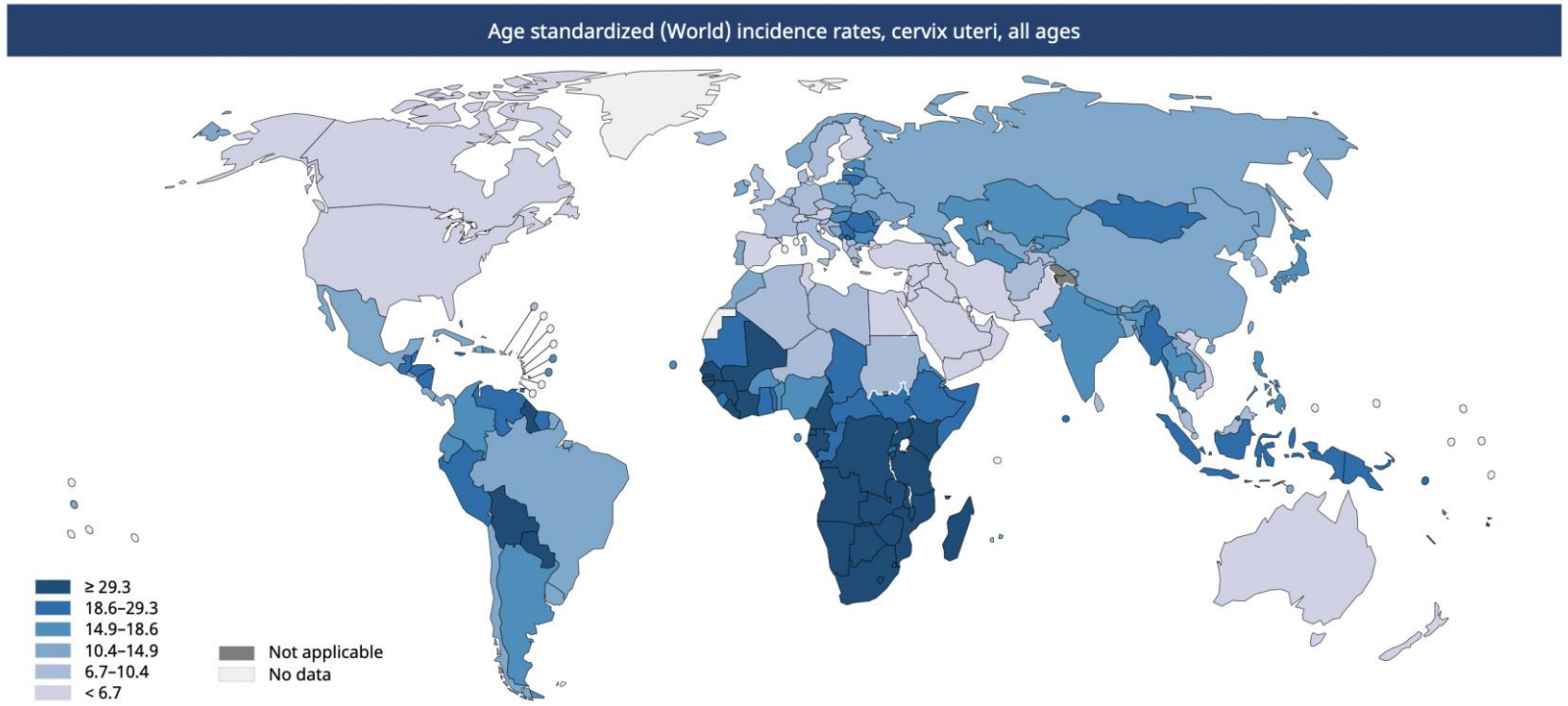
Data source and methods

Disclaimer

*"We would caution against comparison of estimates compiled in this and previous versions of GLOBOCAN; there is a **major inequity in the availability of high-quality**, local data in many transitioning countries at present that has direct consequences for the corresponding robustness of the estimates presented herein. The fact remains that **only 1 in 3 PBCRs report high-quality cancer data to the IARC, and 1 in 5 countries report equivalent mortality data to the WHO**. Although the GLOBOCAN estimates provide a valuable global assessment of the magnitude and distribution of cancer, they are not intended as a substitute to the continuous approaches to data recording from high-quality PBCRs and vital registration systems".*

Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 68(6):394-424.

Cervical cancer and other HPV-related cancers: the size of the problem worldwide

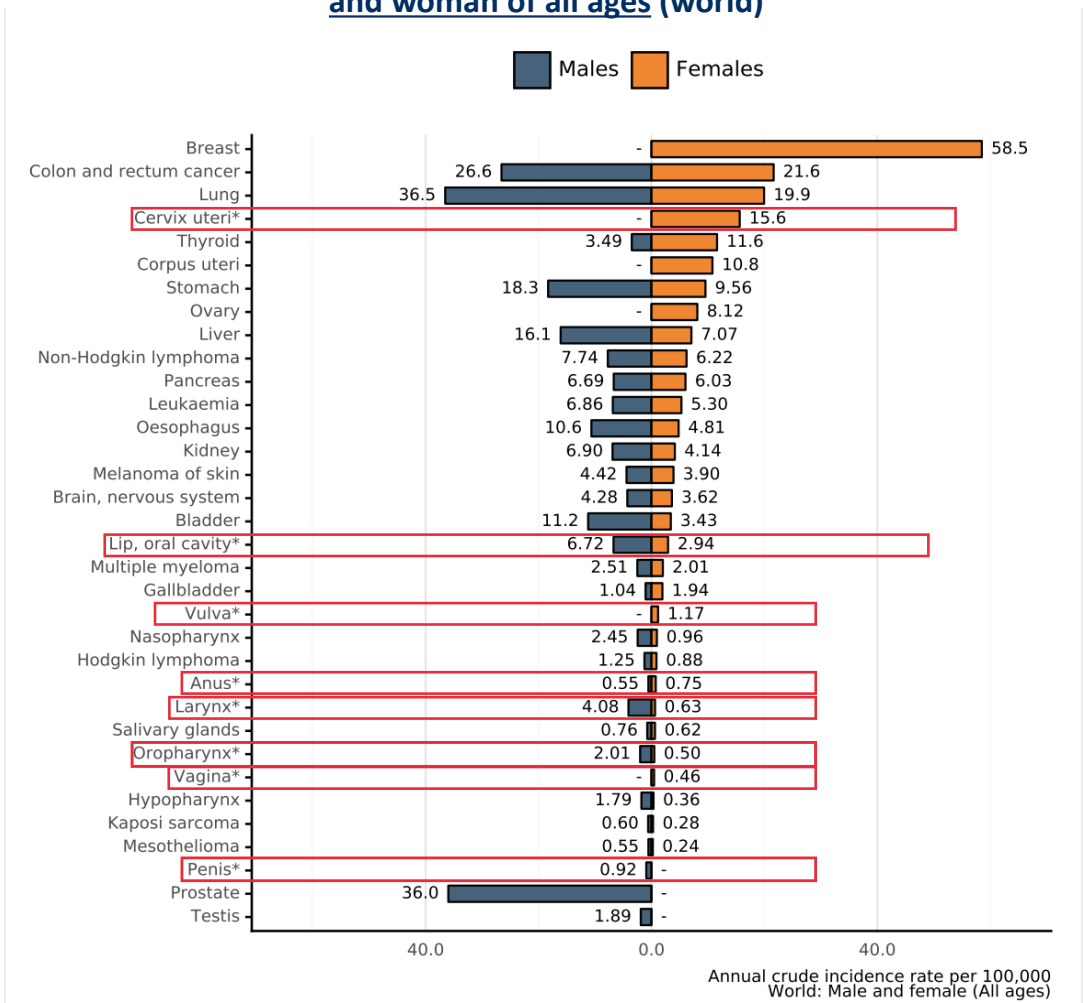


Population	World
Women at risk for cervical cancer (Female population aged >=15 yrs) in millions	2,972.8
Burden of cervical cancer and other HPV-related cancers	
Annual number of new cervical cancer cases	604,127
Annual number of cervical cancer deaths	341,831
Standardized incidence rates per 100,000 population:	
Cervical cancer	13.3
Anal cancer	
Men	0.49
Women	0.58
Vulva cancer	0.85
Vaginal cancer	0.36
Penile cancer	0.80
Oropharyngeal cancer	
Men	1.79
Women	0.40
Oral cavity cancer	
Men	5.96
Women	2.28
Laryngeal cancer	
Men	3.59
Women	0.49

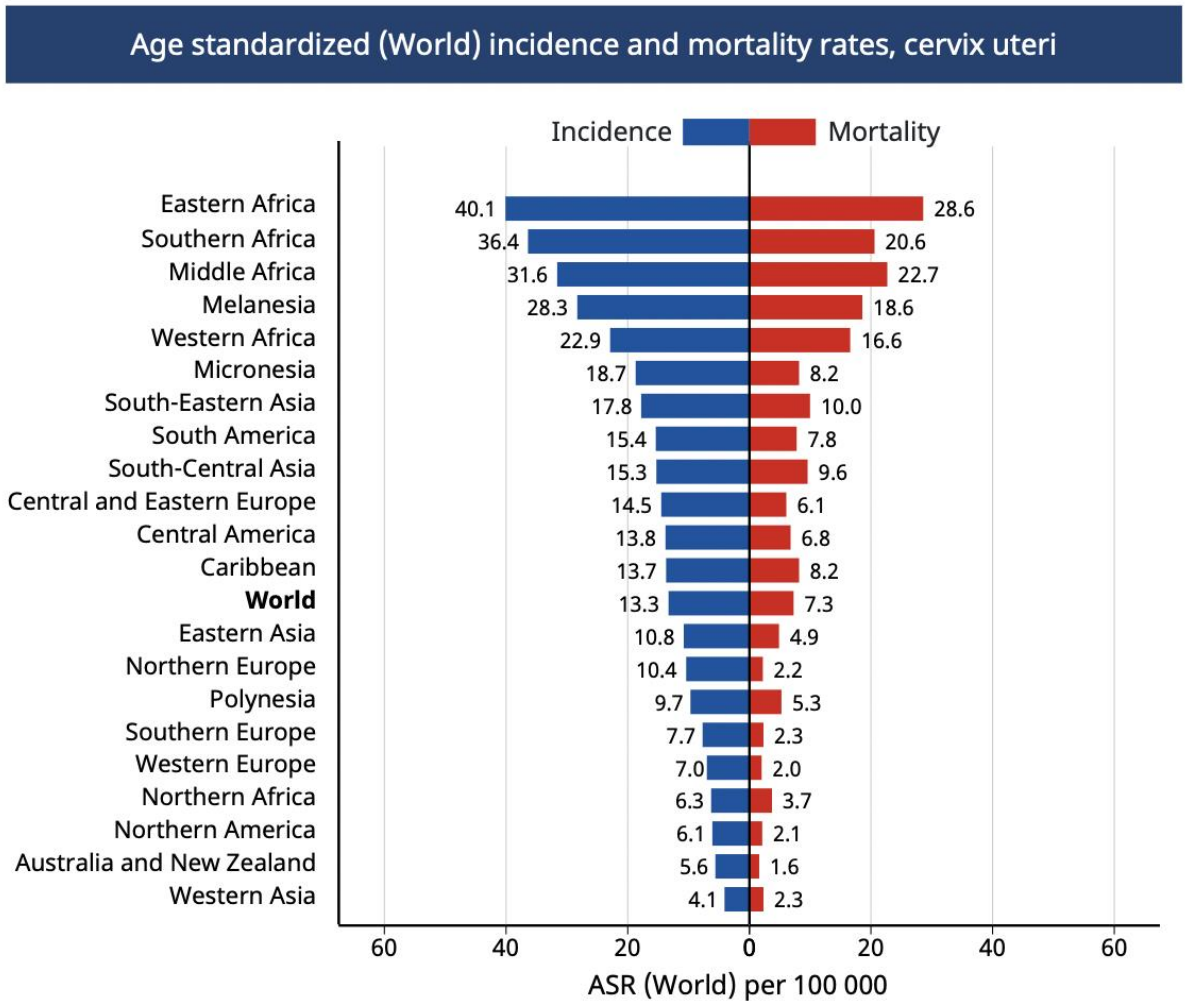
In 2020, **an estimated 604,237 women were diagnosed** with cervical cancer globally, representing 6.5% of all female cancers. Cervical cancer is the most common cancer among women in 36 low-and middle-income countries, mainly in sub-Saharan Africa.

Human Papilloma Virus (HPV) related cancers: the size of the problem worldwide

Comparison of HPV related cancers incidence to other cancers in men and woman of all ages (world)



Age standardised (world) incidence and mortality rates, cervix uteri



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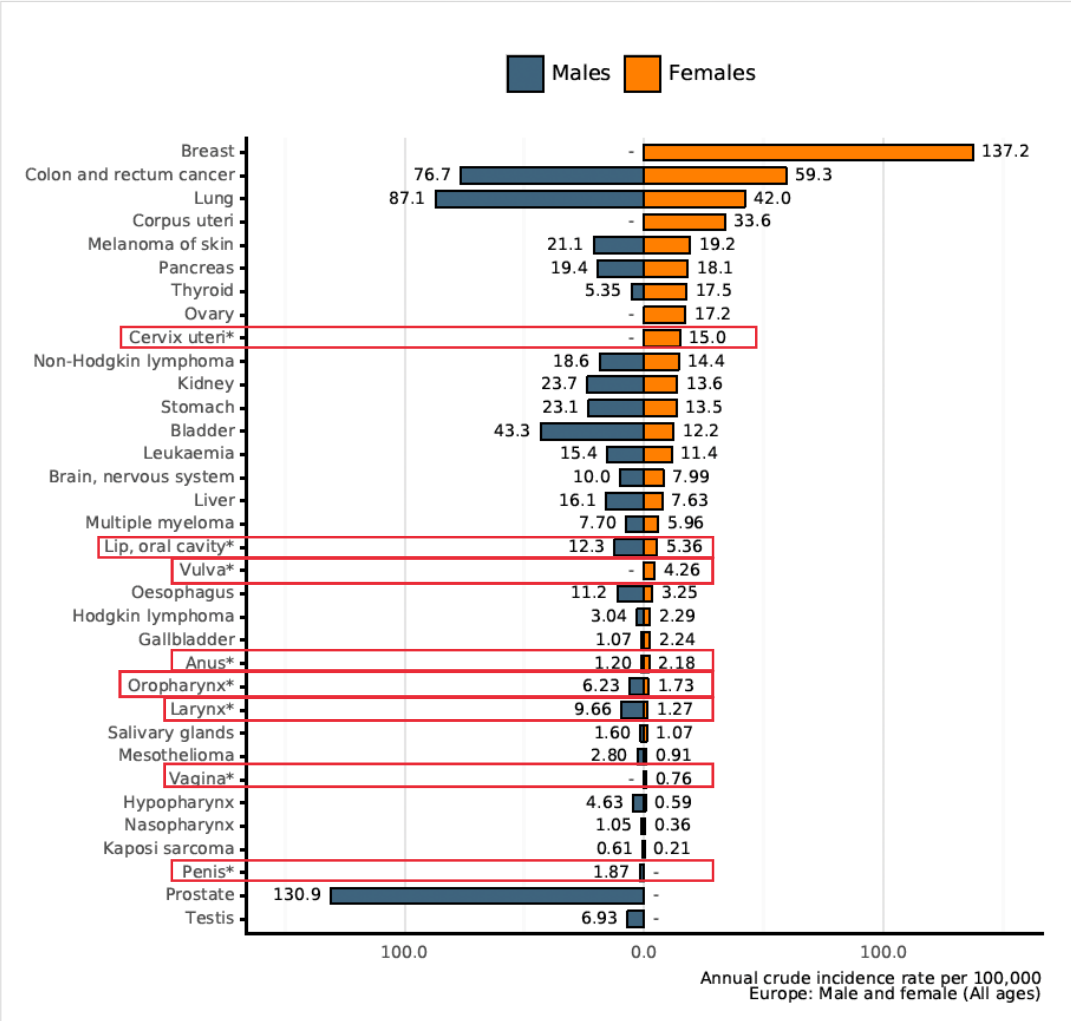
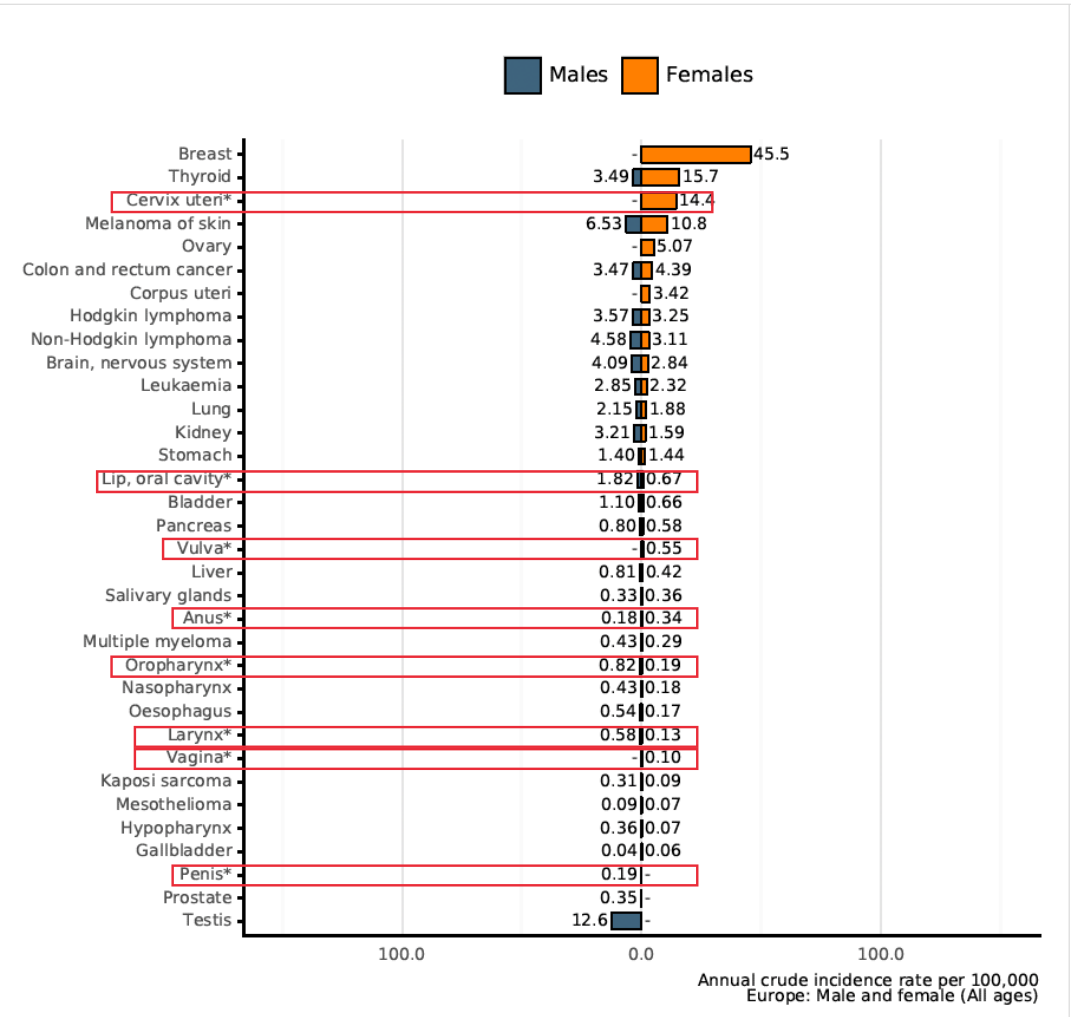
HPV-related cancers – incidence (Europe)

Europe: HPV-related cancers incidence in men and women of all ages



Europe: HPV-related cancers incidence in men and women (15-44)



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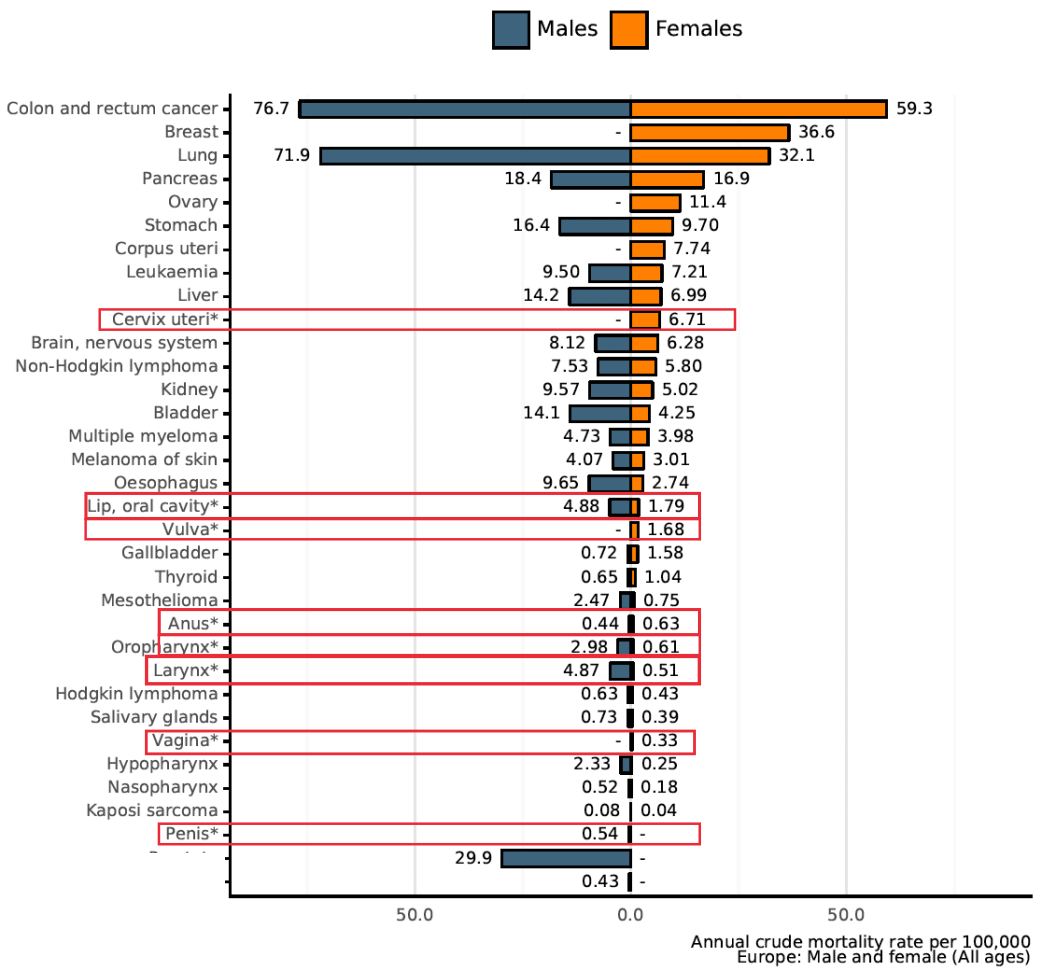
HPV-related cancers – mortality (Europe)

Europe: HPV-related cancers mortality in men and women of all ages



Europe: HPV-related cancers mortality in men and women (15-44)

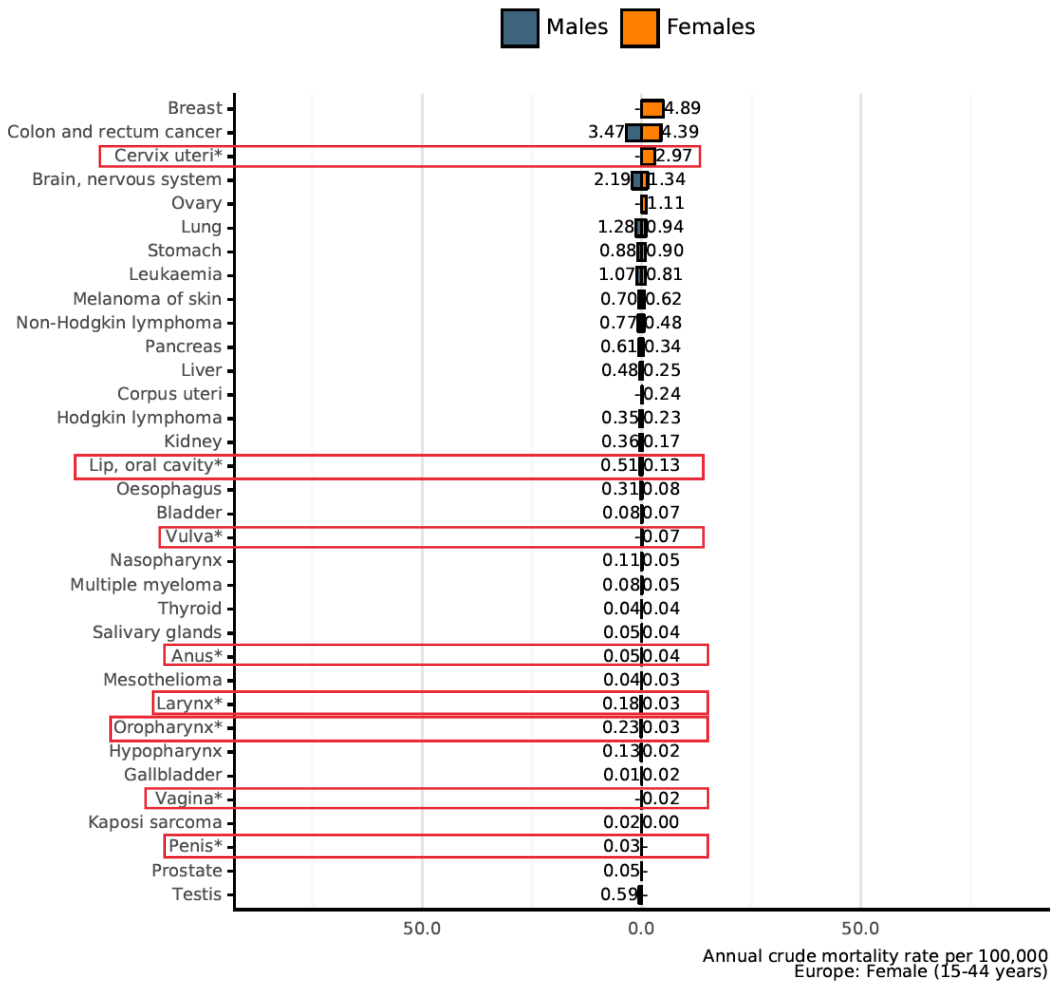


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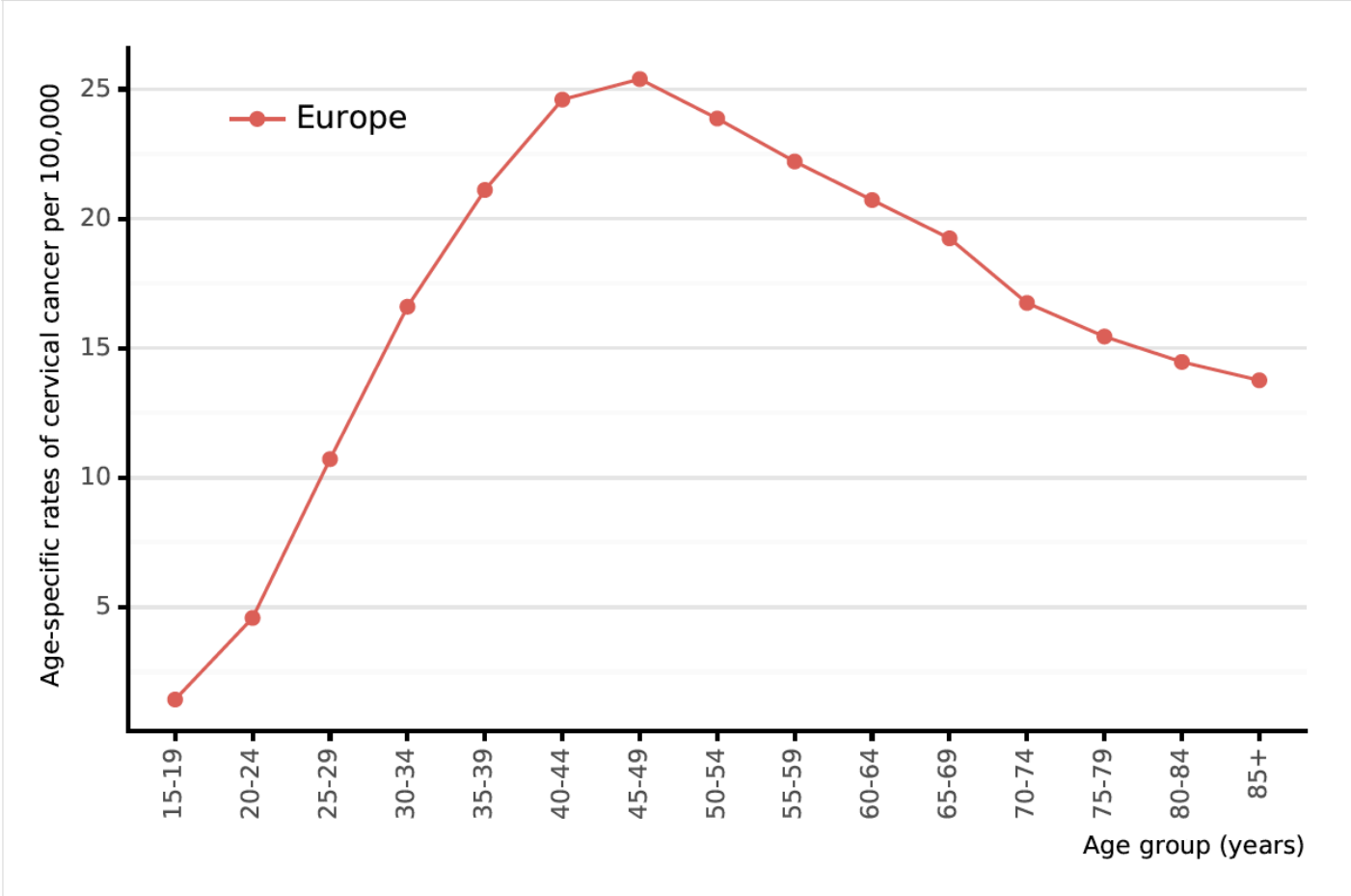
Figure 11: Age-specific incidence rates of cervical cancer in Europe (estimates for 2020)



Data accessed on 27 Jan 2021

For more detailed methods of estimation please refer to http://gco.iarc.fr/today/data-sources-methods

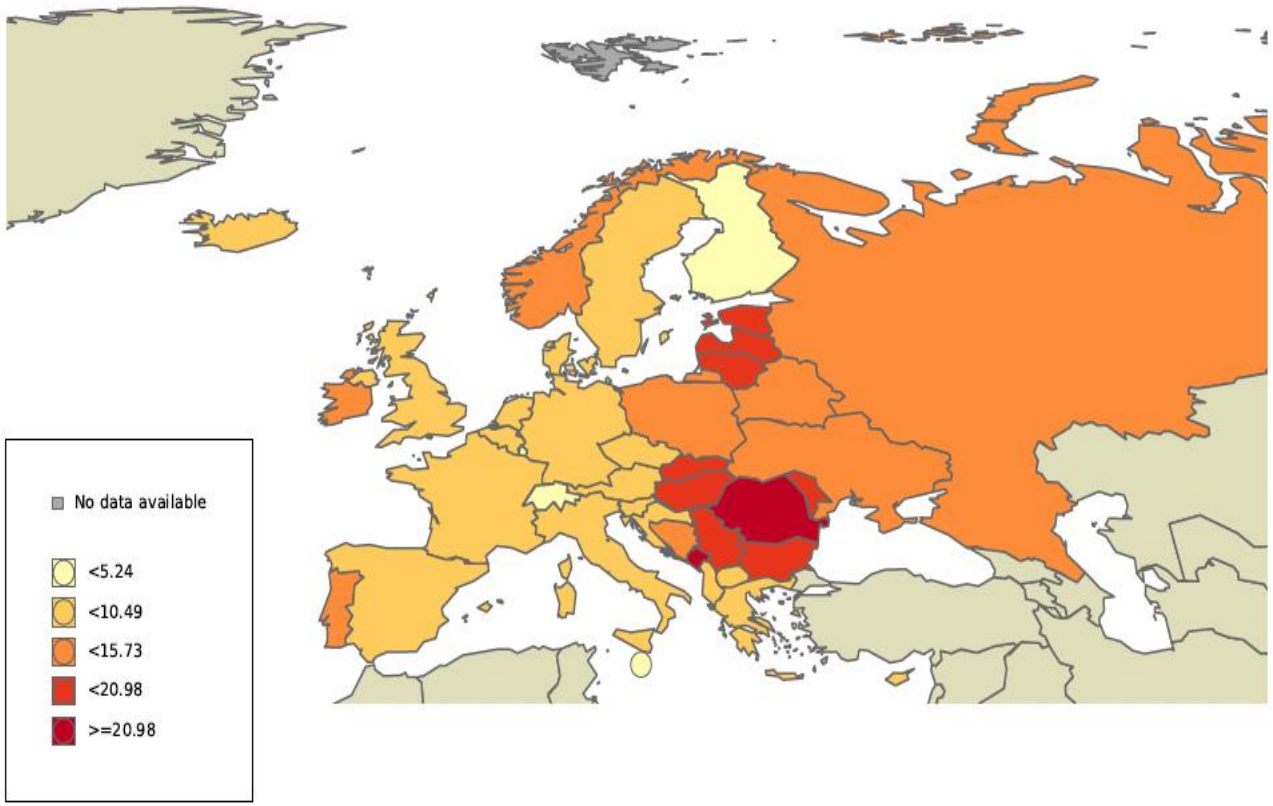
[a] Rates per 100,000 women per year.

Data Sources:

Ferlay J, Ervik M, Lam F, Colombet M, Mery L, Piñeros M, Znaor A, Soerjomataram I, Bray F (2020). Global Cancer Observatory: Cancer Today. Lyon, France: International Agency for Research on Cancer. Available from: https://gco.iarc.fr/today, accessed [27 January 2021].

Cervical cancer – incidence

Age-standardised incidence rates of cervical cancer in Europe (estimates for 2020)



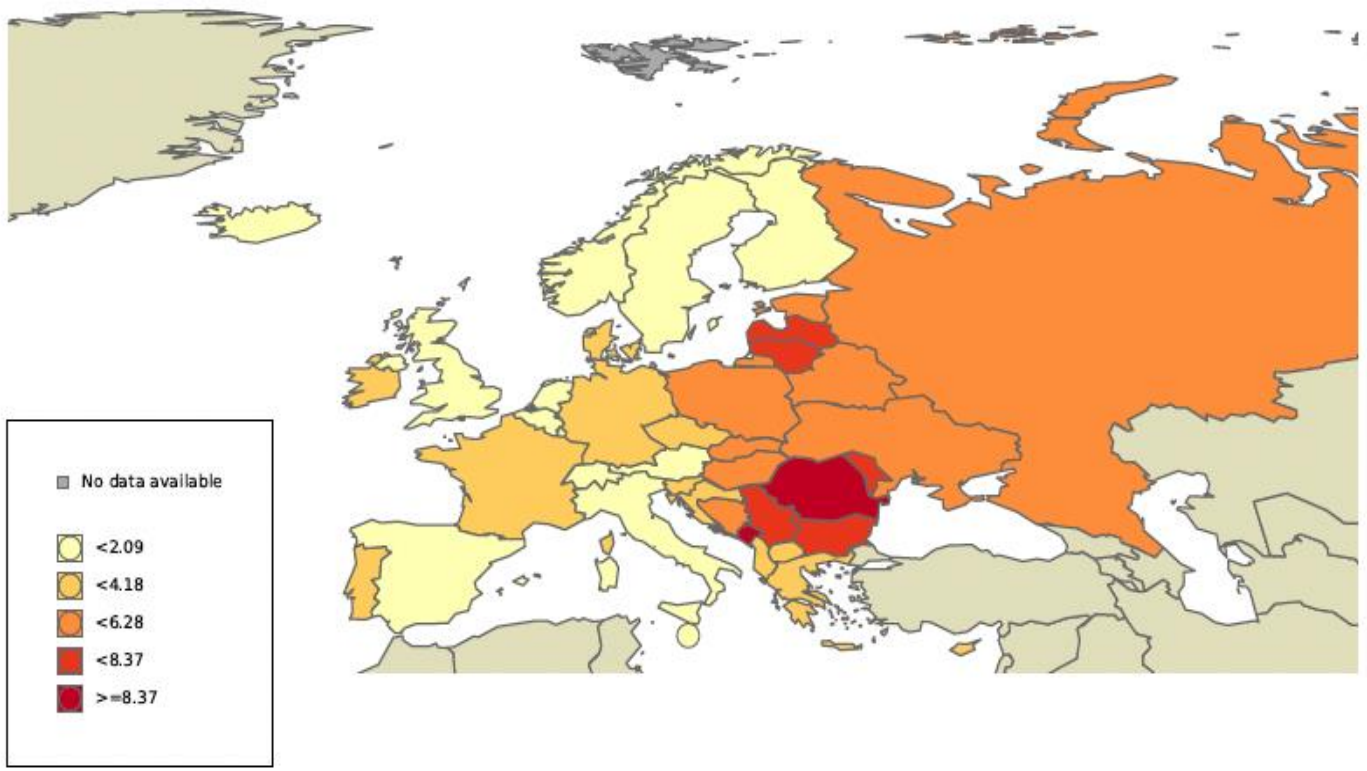
- About 58,000 new cervical cancer cases are diagnosed annually in Europe (estimate for 2020).
- Cervical cancer ranks* as the 9th leading cause of female cancer in Europe.
- Cervical cancer is the 3rd most common female cancer in women aged 15 to 44 years in Europe.

* Ranking of cervical cancer incidence to other cancers among all women according to highest incidence rates (ranking 1st) excluding non-melanoma skin cancer. Ranking is based on crude incidence rates (actual number of cervical cancer cases). Ranking using age-standardized rate (ASR) may differ.

Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, Muñoz J, Bosch FX, de Sanjosé S. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Europe. Summary Report 10 March 2023.

Cervical cancer – mortality

Age-standardised mortality rates of cervical cancer in Europe (estimates for 2020)



- About 25,989 deaths due to cervical cancer occur annually in Europe (estimate for 2020).
- Cervical cancer ranks* as the 10th leading cause of female cancer mortality in Europe.
- Cervical cancer ranks as the 3rd most common cause of cancer death in women aged 15 to 44 years in Europe.

* Ranking of cervical cancer mortality to other cancers among all women according to highest mortality rates (ranking 1st) excluding non-melanoma skin cancer. Ranking is based on crude mortality rates (actual number of cervical cancer deaths). Ranking using age-standardized rate (ASR) may differ.

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Anal cancer - incidence

Incidence of anal cancer in women by Europe and sub regions (estimates for 2020)

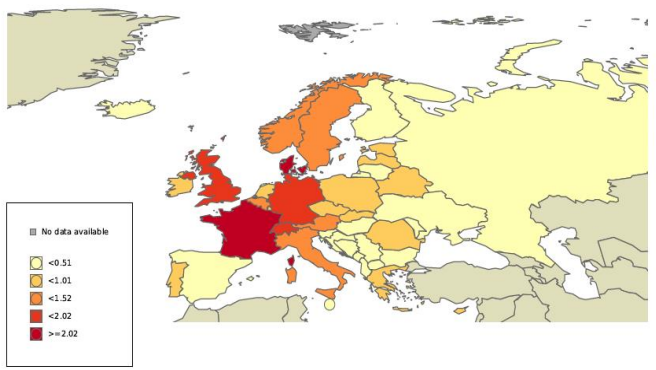
Area	N Cases	Uncertainty intervals of new cancer cases [95% UI]	Crude rate[b]	ASR[b]	Cumulative risk (%) ages 0-74 years[a]	Ranking	
						All women	Women 15-44 years
Europe	8,449	[7,571.8-9,427.8]	2.18	1.05	0.12	23	21
Eastern Europe	1,558	[1,227.7-1,977.1]	1.00	0.50	0.06	24	26
Hungary	30	[13.2-68.3]	0.59	0.33	0.04	29	27
Republic of Moldova	9	[1.90-42.5]	0.43	0.22	0.03	25	25
Poland	280	[192.4-407.5]	1.44	0.59	0.07	24	24
Romania	135	[94.1-193.8]	1.37	0.64	0.08	22	26
Russian Federation	636	[488.8-827.6]	0.81	0.44	0.05	25	26
Slovakia	28	[17.8-44]	1.00	0.51	0.07	25	23
Bulgaria	30	[20.2-44.6]	0.84	0.41	0.05	26	22
Ukraine	242	[192.1-304.9]	1.03	0.50	0.06	23	25
Belarus	58	[41-82]	1.15	0.61	0.07	22	18
Czechia	110	[59.1-204.8]	2.02	0.97	0.12	24	18
Northern Europe	1,557	[1,449.8-1,672.1]	2.90	1.57	0.19	21	20
Ireland	34	[22.3-51.8]	1.37	0.79	0.09	23	20
Iceland	1	[0.20-5.20]	0.59	0.29	0.07	26	24
Lithuania	17	[9.60-30.1]	1.16	0.42	0.04	24	24
Latvia	19	[11.5-31.3]	1.87	0.70	0.07	22	21
Norway	59	[44.6-78.1]	2.20	1.20	0.14	22	21
Sweden	114	[86.9-149.6]	2.26	1.11	0.13	22	22
Finland	27	[17.9-40.8]	0.96	0.48	0.06	25	21
Estonia	16	[9-28.3]	2.29	0.92	0.10	21	21
United Kingdom	1,141	[1,048.4-1,241.7]	3.32	1.85	0.22	21	18
Denmark	124	[89.6-171.7]	4.26	2.24	0.27	22	21
Southern Europe	1,385	[1,081.9-1,773.1]	1.77	0.70	0.08	23	25
Spain	242	[168.6-347.4]	1.02	0.40	0.04	24	23
Serbia	41	[21.4-78.7]	0.92	0.36	0.05	24	27
Portugal	89	[52.3-151.3]	1.66	0.56	0.06	21	23
Cyprus	6	[2-17.8]	0.99	0.58	0.09	22	22
Slovenia	10	[4.80-20.9]	0.96	0.33	0.04	27	24
Bosnia & Herzegovina	6	[1.20-31.1]	0.36	0.19	0.02	29	24
Albania	1	[0.70-1.50]	0.07	0.04	0.00	30	31
Croatia	15	[8.40-26.9]	0.71	0.27	0.03	26	27
Greece	84	[46.3-152.5]	1.58	0.72	0.07	21	31
Italy	887	[656.4-1,198.6]	2.86	1.10	0.13	21	25
North Macedonia	2	[1.30-3]	0.19	0.09	0.01	27	23
Montenegro	2	[0.40-9.60]	0.63	0.38	0.02	28	17
Malta	0	[0-7.20]	0	0	0	30	16
Western Europe	3,949	[3,658.6-4,262.4]	3.96	1.95	0.22	21	18
Luxembourg	3	[0.20-42.8]	0.97	0.69	0.09	25	11
Switzerland	173	[111.4-268.6]	3.97	1.89	0.22	19	16
Belgium	154	[101.4-234]	2.63	1.28	0.15	21	22
Austria	115	[64-206.5]	2.52	1.25	0.15	21	20
France	1,726	[1,377.6-2,162.5]	5.12	2.53	0.29	19	15
Germany	1,623	[1,320.1-1,995.4]	3.83	1.90	0.22	21	17
Netherlands	155	[93.4-257.2]	1.80	0.93	0.11	23	23

Incidence of anal cancer in man by Europe and sub regions (estimates for 2020)

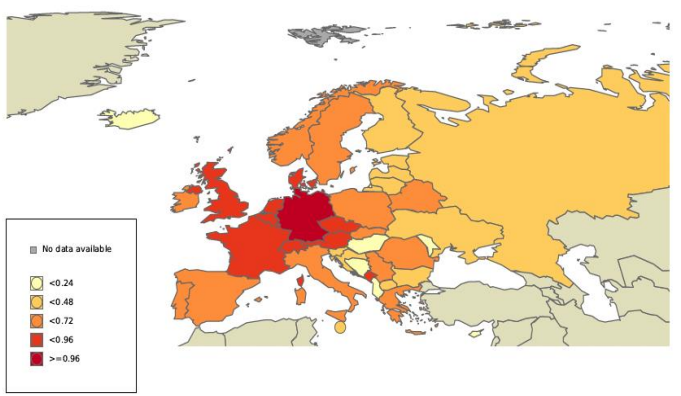
Area	N Cases	Uncertainty intervals of new cancer cases [95% UI]	Crude rate[b]	ASR[b]	Cumulative risk (%) ages 0-74 years[a]	Ranking	
						All men	Men 15-44 years
Europe	4,327	[3,714.5-5,040.4]	1.20	0.66	0.08	25	26
Eastern Europe	900	[648-1,250.1]	0.65	0.41	0.05	27	27
Hungary	12	[5.40-26.7]	0.26	0.14	0.02	27	27
Republic of Moldova	4	[0.80-18.9]	0.21	0.15	0.03	28	24
Poland	216	[154.1-302.8]	1.18	0.65	0.08	26	22
Romania	106	[67.8-165.7]	1.13	0.62	0.07	25	25
Russian Federation	276	[189.1-402.8]	0.41	0.28	0.03	27	27
Slovakia	26	[16.2-41.8]	0.98	0.57	0.06	27	26
Bulgaria	23	[14.6-36.3]	0.68	0.35	0.04	27	27
Ukraine	126	[94.5-167.9]	0.62	0.39	0.05	25	26
Belarus	35	[20-61.2]	0.80	0.51	0.05	24	26
Czechia	76	[55.9-103.3]	1.44	0.73	0.08	25	28
Northern Europe	750	[675.8-832.3]	1.43	0.79	0.09	25	25
Lithuania	12	[6.10-23.6]	0.95	0.45	0.05	25	27
Ireland	28	[17.4-45.2]	1.14	0.64	0.06	24	25
Iceland	0	[0-8.60]	0	0	0	28	18
Latvia	6	[2.40-15.2]	0.69	0.32	0.04	25	28
Norway	28	[18-43.5]	1.02	0.55	0.06	24	23
Sweden	58	[43.3-77.8]	1.15	0.61	0.08	25	23
Estonia	5	[1.60-15.4]	0.80	0.33	0.03	26	22
Finland	21	[13.3-33.1]	0.77	0.40	0.05	26	20
United Kingdom	544	[434.2-681.5]	1.62	0.93	0.11	24	23
Denmark	48	[35.1-65.7]	1.67	0.77	0.09	25	21
Southern Europe	966	[704.1-1,325.3]	1.29	0.62	0.07	28	26
Serbia	45	[25.8-78.5]	1.05	0.55	0.07	26	27
Croatia	13	[7.30-23]	0.66	0.34	0.04	27	27
Portugal	91	[48.6-170.5]	1.89	0.70	0.08	23	28
Spain	320	[232.4-440.6]	1.39	0.71	0.08	26	25
Slovenia	7	[2.70-18.3]	0.68	0.37	0.04	27	26
Cyprus	2	[0.40-9.60]	0.33	0.24	0.03	26	22
Bosnia & Herzegovina	6	[1.60-22.3]	0.37	0.20	0.03	27	27
Albania	3	[1.90-4.70]	0.20	0.13	0.02	27	20
Greece	62	[32.9-116.8]	1.21	0.59	0.07	24	22
Italy	406	[282.5-583.4]	1.38	0.62	0.07	27	23
North Macedonia	5	[3.20-7.80]	0.48	0.28	0.04	26	26
Montenegro	4	[1.30-12.3]	1.29	0.77	0.12	24	21
Malta	2	[0.60-6.50]	0.90	0.37	0.07	26	28
Western Europe	1,711	[1,532.8-1,909.9]	1.78	0.96	0.11	24	22
Luxembourg	4	[0.90-18.6]	1.26	0.74	0.09	25	20
Switzerland	75	[36.9-152.6]	1.75	0.87	0.10	24	21
Belgium	78	[60.7-100.3]	1.36	0.75	0.09	25	25
Austria	66	[47.8-91.1]	1.49	0.74	0.09	24	21
France	413	[287.1-594.2]	1.31	0.75	0.08	26	24
Germany	947	[718.2-1,248.7]	2.29	1.20	0.14	24	15
Netherlands	128	[77-212.8]	1.50	0.80	0.09	24	21

Age-standardised incidence rates of anal cancer among women and men in Europe (2020)

Women



Men



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Anal cancer - mortality

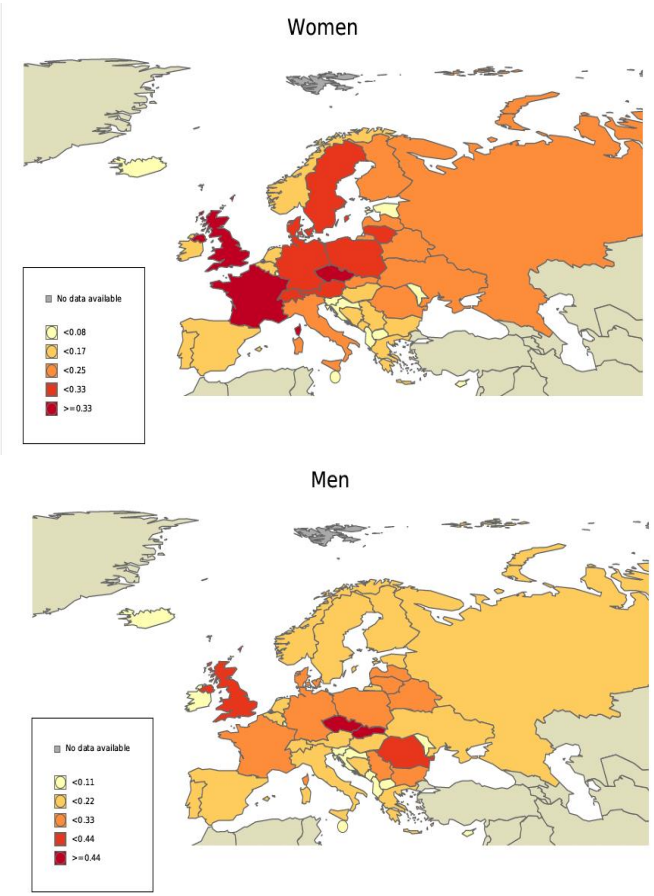
Anal cancer mortality in women by Europe and sub regions (estimates for 2020)

Area	N Cases	Uncertainty intervals of new cancer cases [95% UI]	Crude rate[b]	ASR[b]	Cumulative risk (%) ages 0-74 years[a]	Ranking	
						All women	Women 15-44 years
Europe	2,427	[2,042.4-2,884]	0.63	0.24	0.03	23	23
Eastern Europe	715	[514.6-993.4]	0.46	0.20	0.02	25	29
Hungary	12	[6.30-22.8]	0.24	0.10	0.01	30	31
Republic of Moldova	3	[0.90-10.4]	0.14	0.06	0.00	26	31
Poland	148	[110.3-198.6]	0.76	0.26	0.03	24	27
Romania	57	[42.8-76]	0.58	0.22	0.03	24	23
Russian Federation	284	[166.4-484.7]	0.36	0.17	0.02	25	28
Slovakia	14	[7.60-25.7]	0.50	0.21	0.02	24	19
Czechia	59	[43.9-79.3]	1.09	0.42	0.05	21	19
Bulgaria	12	[6.20-23.2]	0.34	0.11	0.01	27	18
Ukraine	96	[72.9-126.4]	0.41	0.19	0.02	23	29
Belarus	30	[19.7-45.6]	0.59	0.24	0.03	21	27
Northern Europe	452	[394.7-517.6]	0.84	0.33	0.04	23	18
Ireland	8	[3.40-18.9]	0.32	0.16	0.02	25	18
Iceland	0	[0-8.60]	0	0	0	29	23
Lithuania	13	[7.30-23.2]	0.89	0.31	0.03	22	23
Latvia	6	[2.60-13.9]	0.59	0.21	0.03	25	19
Norway	11	[5.50-21.9]	0.41	0.16	0.02	22	27
Sweden	34	[23.4-49.3]	0.67	0.27	0.03	22	19
Finland	11	[5.70-21.1]	0.39	0.17	0.02	25	26
Estonia	2	[0.80-5.30]	0.29	0.03	0	25	12
United Kingdom	344	[289.4-408.9]	1.00	0.41	0.04	22	17
Denmark	23	[14.3-36.9]	0.79	0.27	0.03	22	13
Southern Europe	376	[307.3-460.1]	0.48	0.16	0.02	26	23
Serbia	18	[10.6-30.6]	0.40	0.14	0.02	26	22
Portugal	27	[17.6-41.4]	0.50	0.16	0.02	22	18
Spain	64	[48-85.3]	0.27	0.09	0.01	27	28
Cyprus	1	[0.10-9.50]	0.17	0.05	0	24	16
Slovenia	2	[0.50-7.60]	0.19	0.03	0	28	9
Bosnia & Herzegovina	3	[0.70-12.2]	0.18	0.08	0.01	29	28
Albania	0	[0-17.8]	0	0	0	31	25
Croatia	8	[3.80-17]	0.38	0.08	0.00	28	18
Greece	22	[13.3-36.3]	0.41	0.15	0.01	26	25
Italy	230	[183.4-288.4]	0.74	0.23	0.03	23	20
North Macedonia	0	[0-9.90]	0	0	0	31	21
Montenegro	1	[0.20-4.90]	0.31	0.14	0.04	26	29
Malta	0	[0-9]	0	0	0	24	6
Western Europe	884	[781.9-999.4]	0.89	0.31	0.03	23	19
Luxembourg	0	[0-9.40]	0	0	0	27	18
Switzerland	38	[26.8-53.8]	0.87	0.27	0.02	22	30
France	348	[292.7-413.7]	1.03	0.39	0.04	21	17
Germany	417	[354.9-490]	0.98	0.33	0.04	23	18
Belgium	22	[13.7-35.3]	0.38	0.11	0.01	25	29
Austria	32	[21.7-47.2]	0.70	0.27	0.04	23	16
Netherlands	27	[17.6-41.4]	0.31	0.13	0.02	26	30

Anal cancer mortality in man by Europe and sub regions (estimates for 2020)

Area	N Cases	Uncertainty intervals of new cancer cases [95% UI]	Crude rate[b]	ASR[b]	Cumulative risk (%) ages 0-74 years[a]	Ranking	
						All men	Men 15-44 years
Europe	1,600	[1,287.9-1,987.7]	0.44	0.22	0.02	26	22
Eastern Europe	523	[355.7-769.1]	0.38	0.23	0.03	27	23
Hungary	10	[5.40-18.6]	0.22	0.11	0.01	27	27
Republic of Moldova	2	[0.60-7]	0.10	0.08	0.02	28	25
Poland	103	[79-134.2]	0.56	0.29	0.03	26	22
Romania	79	[56.3-110.9]	0.84	0.42	0.05	21	24
Russian Federation	138	[58.9-323.4]	0.20	0.14	0.02	27	20
Slovakia	25	[15.5-40.2]	0.94	0.52	0.06	21	27
Bulgaria	18	[10.6-30.5]	0.53	0.24	0.03	25	23
Belarus	19	[11.3-32]	0.43	0.28	0.03	23	27
Ukraine	66	[43.3-100.6]	0.33	0.20	0.03	27	25
Czechia	63	[47.8-83]	1.19	0.55	0.07	20	19
Northern Europe	301	[254.7-355.7]	0.57	0.27	0.03	21	19
Lithuania	6	[2.70-13.2]	0.48	0.24	0.03	25	21
Ireland	4	[1.40-11.6]	0.16	0.09	0.00	27	26
Iceland	0	[0-8.60]	0	0	0	22	10
Latvia	4	[1.30-12.3]	0.46	0.22	0.03	24	26
Norway	7	[2.90-16.8]	0.26	0.12	0.01	26	23
Sweden	18	[11-29.4]	0.36	0.15	0.02	25	18
Finland	11	[5.60-21.6]	0.40	0.19	0.03	24	23
Estonia	2	[0.60-7]	0.32	0.15	0.02	26	19
United Kingdom	231	[173.5-307.5]	0.69	0.34	0.04	20	18
Denmark	18	[10.4-31.3]	0.63	0.24	0.02	22	25
Southern Europe	266	[206.9-342]	0.35	0.15	0.02	27	26
Spain	75	[58.2-96.7]	0.33	0.16	0.02	26	26
Serbia	26	[16.6-40.8]	0.61	0.29	0.03	26	28
Portugal	18	[10.9-29.8]	0.37	0.14	0.02	27	25
Cyprus	1	[0.10-9.50]	0.17	0.07	0	23	19
Slovenia	1	[0.20-5.70]	0.10	0.04	0.01	26	27
Bosnia & Herzegovina	4	[1.30-12.1]	0.25	0.12	0.02	27	26
Albania	0	[0-17.8]	0	0	0	27	19
Croatia	4	[1.40-11.7]	0.20	0.07	0.01	27	18
Greece	18	[10.6-30.6]	0.35	0.14	0.02	26	22
Italy	118	[89.9-155]	0.40	0.15	0.02	26	23
North Macedonia	1	[0.10-9.90]	0.10	0.06	0.01	26	21
Montenegro	0	[0-9.90]	0	0	0	28	23
Malta	0	[0-9]	0	0	0	26	21
Western Europe	510	[433-600.7]	0.53	0.24	0.03	23	18
Luxembourg	0	[0-9.40]	0	0	0	27	22
Switzerland	17	[9.70-29.8]	0.40	0.18	0.02	25	20
France	152	[115-200.9]	0.48	0.23	0.02	23	18
Germany	265	[219.9-319.4]	0.64	0.28	0.03	24	17
Belgium	24	[14.4-40.1]	0.42	0.19	0.02	24	25
Austria	17	[9.90-29.2]	0.38	0.18	0.02	24	14
Netherlands	35	[24.2-50.6]	0.41	0.16	0.02	24	23

Age-standardized mortality rates of anal cancer among woman and men in Europe (2020)



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Oral cavity cancer - incidence

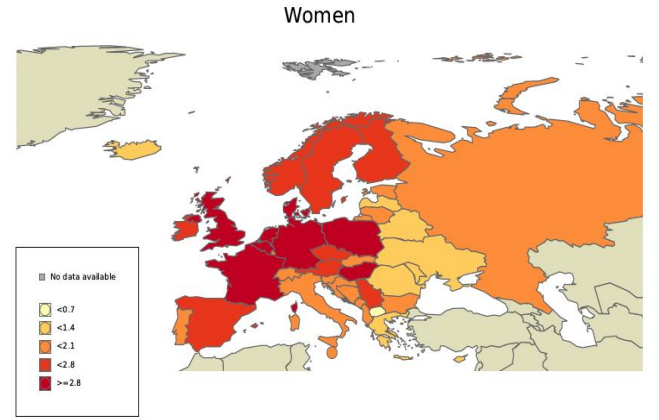
Incidence of oral cavity cancer in women by Europe and sub regions (estimates for 2020)

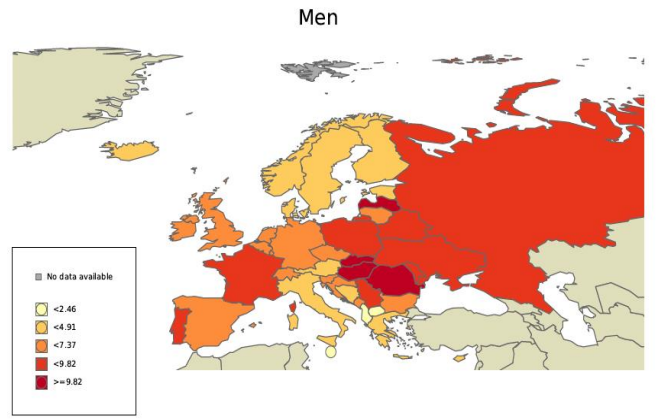
Area	N Cases	Uncertainty intervals of new cancer cases [95% UI]	Crude rate[b]	ASR[b]	Cumulative risk (%) ages 0-74 years[a]	Ranking	
						All women	Women 15-44 years
Europe	20,760	[19,532.1-22,065.1]	5.36	2.38	0.27	18	15
Eastern Europe	6,199	[5,864-6,553.2]	3.99	1.87	0.21	17	15
Hungary	361	[262.3-496.8]	7.13	3.33	0.39	15	17
Republic of Moldova	32	[14.9-68.8]	1.52	0.76	0.08	19	18
Poland	1,304	[1,063.4-1,599.1]	6.68	2.83	0.33	16	14
Romania	322	[222.9-465.1]	3.26	1.29	0.14	19	21
Russian Federation	2,820	[2,680.5-2,966.7]	3.60	1.83	0.21	18	15
Slovakia	113	[89.8-142.2]	4.03	1.88	0.21	19	17
Bulgaria	138	[100.8-188.9]	3.86	1.71	0.20	17	17
Ukraine	649	[545.1-772.6]	2.77	1.20	0.14	17	17
Belarus	141	[104-191.1]	2.79	1.15	0.13	19	21
Czechia	319	[250-407.1]	5.87	2.78	0.33	17	15
Northern Europe	3,457	[3,283.5-3,639.7]	6.43	3.10	0.36	19	15
Ireland	115	[76.1-173.8]	4.63	2.63	0.31	19	15
Iceland	5	[2-12.4]	2.94	1.12	0.13	19	17
Lithuania	49	[35.6-67.5]	3.35	1.42	0.16	19	17
Latvia	35	[24-51.1]	3.44	1.31	0.15	19	17
Norway	156	[107.5-226.4]	5.82	2.59	0.29	17	14
Sweden	331	[277.3-395.1]	6.57	2.76	0.31	15	14
Estonia	29	[18.6-45.3]	4.15	1.74	0.21	18	15
United Kingdom	2,386	[2,111.4-2,696.4]	6.95	3.50	0.41	18	14
Denmark	166	[128.4-214.6]	5.70	2.81	0.34	18	19
Finland	176	[141.9-218.3]	6.27	2.23	0.26	18	16
Southern Europe	4,461	[3,852.4-5,165.7]	5.69	2.08	0.23	18	17
Spain	1,779	[1,424.4-2,221.8]	7.48	2.65	0.29	16	17
Serbia	221	[156.8-311.5]	4.96	2.43	0.27	18	16
Portugal	299	[184-485.8]	5.57	1.87	0.19	18	15
Cyprus	13	[6.30-26.9]	2.15	1.03	0.10	20	17
Slovenia	44	[31.2-62]	4.22	1.90	0.21	20	16
Bosnia & Herzegovina	57	[28-116]	3.40	1.56	0.18	18	18
Albania	48	[23.5-98]	3.40	1.57	0.20	15	26
Croatia	89	[61.2-129.3]	4.19	1.72	0.20	20	18
Greece	202	[146.4-278.8]	3.81	1.15	0.11	18	18
Italy	1,669	[1,417.4-1,965.2]	5.38	1.98	0.23	18	18
North Macedonia	14	[4.40-44.1]	1.34	0.59	0.07	20	16
Montenegro	15	[7.40-30.5]	4.72	2.08	0.23	17	15
Malta	10	[5.20-19.4]	4.54	1.45	0.17	19	31
Western Europe	6,643	[6,249.6-7,061.2]	6.66	3.06	0.36	18	17
Luxembourg	10	[1.80-54.3]	3.23	1.68	0.18	20	13
Netherlands	673	[537.2-843.1]	7.83	3.40	0.40	15	16
Switzerland	224	[160.9-311.9]	5.14	2.08	0.26	18	31
France	2,333	[1,851.5-2,939.7]	6.93	3.40	0.38	18	14
Belgium	352	[291.9-424.5]	6.02	3.17	0.37	17	14
Austria	196	[150.2-255.8]	4.29	2.10	0.24	18	15
Germany	2,855	[2,363.1-3,449.3]	6.74	2.93	0.36	19	19

Incidence of oral cavity cancer in man by Europe and sub regions (estimates for 2020)

Area	N Cases	Uncertainty intervals of new cancer cases [95% UI]	Crude rate[b]	ASR[b]	Cumulative risk (%) ages 0-74 years[a]	Ranking	
						All men	Men 15-44 years
Europe	44,519	[42,859.3-46,243]	12.3	7.03	0.85	12	11
Eastern Europe	19,884	[19,288.1-20,498.3]	14.4	9.22	1.12	8	11
Hungary	792	[667.3-940]	17.2	9.93	1.24	8	11
Republic of Moldova	245	[181.9-330.1]	12.7	9.18	1.11	9	13
Poland	2,985	[2,605.8-3,419.3]	16.3	9.57	1.14	7	6
Romania	1,607	[1,409.1-1,832.7]	17.2	10.0	1.21	10	9
Russian Federation	9,582	[9,340.7-9,829.6]	14.2	9.58	1.18	8	8
Slovakia	466	[415.6-522.6]	17.5	10.9	1.30	8	7
Bulgaria	317	[263.8-380.9]	9.40	5.01	0.60	12	11
Ukraine	2,773	[2,544.3-3,022.3]	13.7	8.90	1.08	8	10
Belarus	545	[457.6-649.2]	12.4	8.16	0.98	9	13
Czechia	572	[483-677.4]	10.8	5.98	0.73	12	10
Northern Europe	5,582	[5,371.5-5,800.8]	10.6	6.01	0.72	13	11
Ireland	202	[137.7-296.3]	8.24	5.32	0.63	15	11
Iceland	8	[3.80-16.7]	4.67	2.49	0.27	19	15
Lithuania	144	[97.6-212.4]	11.4	6.55	0.79	15	15
Latvia	183	[113.5-295.1]	21.1	12.3	1.54	8	8
Norway	235	[194.4-284.1]	8.58	4.48	0.54	16	14
Sweden	356	[303-418.3]	7.04	3.41	0.40	16	12
Estonia	53	[29.9-94.1]	8.43	4.76	0.58	15	16
United Kingdom	3,931	[3,724.9-4,148.5]	11.7	6.77	0.81	13	11
Denmark	238	[182.9-309.8]	8.27	4.33	0.55	17	14
Finland	214	[170.8-268.1]	7.83	3.76	0.44	15	11
Southern Europe	7,926	[7,158.6-8,775.6]	10.6	5.18	0.61	14	11
Serbia	642	[477.7-862.8]	15.0	7.90	0.93	9	12
Portugal	804	[590.8-1,094.2]	16.7	9.08	1.02	11	4
Spain	3,035	[2,574.3-3,578.2]	13.2	6.55	0.80	11	10
Cyprus	23	[13.2-40]	3.81	2.56	0.29	17	12
Slovenia	114	[84.6-153.6]	11.0	5.85	0.69	14	11
Bosnia & Herzegovina	141	[98.5-201.7]	8.78	4.78	0.57	12	14
Albania	58	[31.9-105.5]	3.96	2.11	0.22	13	15
Croatia	250	[188.2-332]	12.6	6.90	0.83	14	13
Greece	401	[280.6-573]	7.84	3.84	0.46	15	12
Italy	2,368	[2,051.8-2,733]	8.04	3.63	0.42	17	12
North Macedonia	38	[20.5-70.4]	3.65	2.15	0.26	15	16
Montenegro	35	[23.2-52.7]	11.3	6.91	0.81	11	17
Malta	9	[4.20-19.3]	4.06	1.80	0.29	19	20
Western Europe	11,127	[10,646.6-11,629.1]	11.5	6.20	0.76	13	12
Luxembourg	35	[10.9-112.1]	11.1	6.71	0.84	12	26
Netherlands	885	[788.3-993.6]	10.4	5.23	0.63	13	12
Switzerland	471	[318.6-696.3]	11.0	5.69	0.70	13	11
France	4,244	[3,724.8-4,835.5]	13.4	7.49	0.93	12	12
Germany	4,478	[4,183.1-4,793.7]	10.8	5.71	0.68	14	11
Belgium	640	[554.2-739]	11.1	6.16	0.80	14	14
Austria	369	[297.2-458.2]	8.31	4.72	0.56	14	11

Age-standardised incidence rates of oral cavity cancer among women and men in Europe (2020)





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Oral cavity cancer - mortality

Oral cavity cancer mortality in women by Europe and sub regions (estimates for 2020)

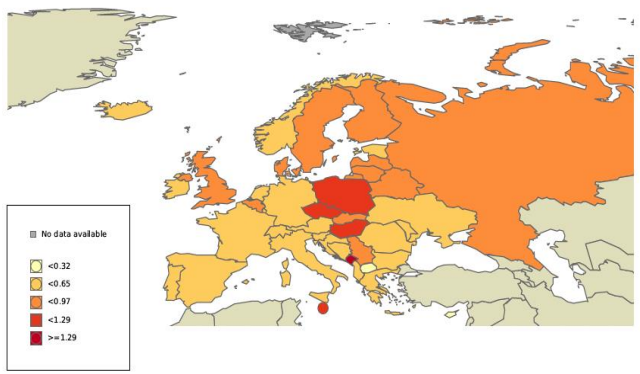
Area	N Cases	Uncertainty intervals of new cancer cases [95% UI]	Crude rate[b]	ASR[b]	Cumulative risk (%) ages 0-74 years[a]	Ranking	
						All women	Women 15-44 years
Europe	6,930	[6,194.8-7,752.4]	1.79	0.70	0.08	18	16
Eastern Europe	2,729	[2,286.3-3,257.5]	1.76	0.82	0.09	18	15
Hungary	134	[105.7-169.9]	2.65	1.26	0.15	18	17
Republic of Moldova	14	[7.70-25.6]	0.67	0.34	0.04	20	16
Poland	542	[461.9-636]	2.78	1.13	0.13	18	16
Romania	117	[88.5-154.7]	1.18	0.47	0.05	19	19
Russian Federation	1,352	[1,042.4-1,753.5]	1.73	0.86	0.10	17	15
Slovakia	46	[32.3-65.4]	1.64	0.80	0.09	19	12
Bulgaria	40	[27.9-57.3]	1.12	0.48	0.05	19	16
Ukraine	263	[215.8-320.6]	1.12	0.51	0.06	19	16
Belarus	87	[68.2-110.9]	1.72	0.78	0.09	17	14
Czechia	134	[97.2-184.7]	2.46	1.07	0.12	18	10
Northern Europe	1,004	[910.7-1,106.9]	1.87	0.72	0.08	18	14
Lithuania	28	[18.9-41.6]	1.91	0.76	0.09	18	18
Ireland	28	[18.5-42.4]	1.13	0.53	0.06	19	11
Iceland	2	[0.60-7]	1.18	0.32	0	18	17
Latvia	18	[11.1-29.1]	1.77	0.68	0.08	20	13
Norway	37	[25.9-52.9]	1.38	0.46	0.04	18	13
Sweden	107	[74.4-154]	2.12	0.72	0.09	18	15
Finland	68	[52-89]	2.42	0.80	0.08	16	8
Estonia	8	[4.30-14.9]	1.15	0.37	0.05	21	18
United Kingdom	656	[583.6-737.4]	1.91	0.76	0.08	18	14
Denmark	51	[37-70.2]	1.75	0.72	0.08	18	15
Southern Europe	1,483	[1,340.4-1,640.8]	1.89	0.56	0.06	17	16
Serbia	72	[54.5-95.1]	1.62	0.73	0.08	19	18
Croatia	31	[20.9-45.9]	1.46	0.55	0.06	20	14
Spain	479	[404.6-567.1]	2.01	0.64	0.07	17	16
Portugal	92	[63.4-133.5]	1.71	0.50	0.05	17	15
Slovenia	14	[7.60-25.8]	1.34	0.45	0.05	20	28
Cyprus	4	[1.10-14.2]	0.66	0.24	0.02	20	19
Bosnia & Herzegovina	16	[8.80-29]	0.96	0.37	0.04	22	20
Albania	18	[9.50-34.2]	1.27	0.57	0.06	14	23
Greece	76	[58-99.5]	1.43	0.37	0.03	18	17
Italy	653	[577.6-738.3]	2.10	0.55	0.06	17	15
North Macedonia	6	[2.30-15.6]	0.58	0.25	0.03	22	16
Montenegro	14	[7.30-26.7]	4.41	1.61	0.14	12	24
Malta	8	[3.50-18.2]	3.63	1.06	0.10	14	26
Western Europe	1,714	[1,563.2-1,879.3]	1.72	0.59	0.07	19	18
Luxembourg	2	[0.50-8.30]	0.65	0.41	0.07	18	31
Netherlands	156	[121.9-199.6]	1.81	0.61	0.07	18	27
Switzerland	71	[54.6-92.2]	1.63	0.57	0.07	18	31
France	534	[447.2-637.6]	1.59	0.58	0.07	18	15
Belgium	109	[79.2-150.1]	1.86	0.77	0.09	18	13
Austria	79	[53.4-116.9]	1.73	0.64	0.07	18	14
Germany	763	[689.3-844.6]	1.80	0.57	0.07	19	22

Oral cavity cancer mortality in man by Europe and sub regions (estimates for 2020)

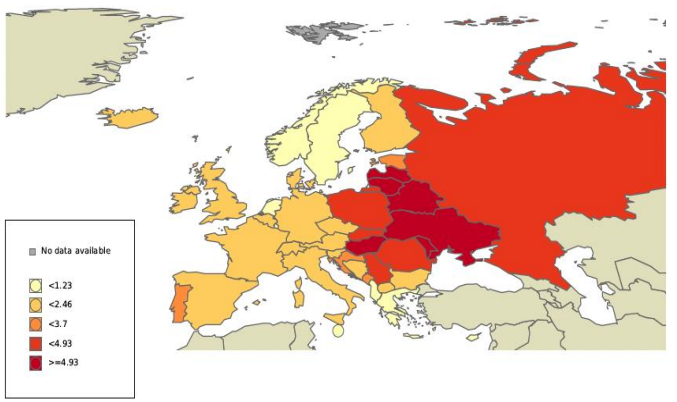
Area	N Cases	Uncertainty intervals of new cancer cases [95% UI]	Crude rate[b]	ASR[b]	Cumulative risk (%) ages 0-74 years[a]	Ranking	
						All men	Men 15-44 years
Europe	17,645	[16,366.6-19,023.3]	4.88	2.73	0.33	13	10
Eastern Europe	9,761	[8,900.6-10,704.5]	7.08	4.54	0.56	11	7
Hungary	430	[378.5-488.4]	9.35	5.49	0.69	11	11
Republic of Moldova	155	[124.5-193]	8.02	5.76	0.70	9	10
Poland	1,509	[1,356.6-1,678.5]	8.23	4.80	0.57	11	9
Romania	784	[709.5-866.3]	8.38	4.92	0.59	10	10
Russian Federation	4,385	[3,752-5,124.8]	6.48	4.38	0.55	10	8
Czechia	227	[181.1-284.6]	4.31	2.28	0.29	15	15
Slovakia	198	[144.6-271.1]	7.45	4.63	0.56	14	4
Bulgaria	124	[92.1-167]	3.68	2.00	0.24	15	12
Ukraine	1,543	[1,411.7-1,686.5]	7.61	4.99	0.62	9	7
Belarus	406	[361.5-456]	9.23	6.16	0.75	8	4
Northern Europe	1,714	[1,590.6-1,846.9]	3.27	1.67	0.20	16	12
Lithuania	118	[89.5-155.6]	9.37	5.38	0.68	13	5
Ireland	56	[41.4-75.7]	2.28	1.43	0.18	16	9
Iceland	4	[1.40-11.4]	2.33	1.42	0.17	16	27
Latvia	78	[53.5-113.8]	8.97	5.08	0.64	10	7
Norway	54	[39.7-73.4]	1.97	0.99	0.12	16	12
Sweden	124	[95.4-161.2]	2.45	1.02	0.12	16	12
Estonia	32	[22.3-46]	5.09	3.05	0.38	15	24
Finland	80	[62.7-102.1]	2.93	1.24	0.15	16	13
United Kingdom	1,074	[967.9-1,191.7]	3.20	1.63	0.19	16	12
Denmark	89	[62.4-127]	3.09	1.55	0.19	17	9
Southern Europe	2,751	[2,537.1-2,982.9]	3.67	1.67	0.20	16	13
Serbia	322	[257.3-403]	7.52	3.86	0.43	12	11
Spain	791	[698-896.3]	3.44	1.59	0.19	15	14
Portugal	290	[228.9-367.4]	6.01	3.09	0.35	15	7
Cyprus	9	[3.50-22.9]	1.49	0.89	0.10	16	12
Slovenia	26	[17.3-39.2]	2.51	1.30	0.15	19	8
Bosnia & Herzegovina	62	[45.9-83.7]	3.86	2.12	0.25	14	8
Albania	32	[18.7-54.8]	2.18	1.10	0.09	13	15
Croatia	100	[72.4-138.2]	5.05	2.67	0.32	16	9
Greece	141	[106.6-186.5]	2.76	1.23	0.15	16	15
Italy	932	[836.8-1,038]	3.17	1.30	0.15	17	13
North Macedonia	22	[13.2-36.7]	2.11	1.26	0.14	15	16
Montenegro	19	[10.6-34.1]	6.12	3.52	0.32	13	7
Malta	5	[2-12.7]	2.26	1.05	0.14	17	2
Western Europe	3,419	[3,207.7-3,644.2]	3.55	1.71	0.21	15	14
Luxembourg	4	[1.50-10.6]	1.26	0.75	0.07	18	6
Switzerland	148	[110.3-198.5]	3.45	1.64	0.20	16	11
France	1,131	[1,023.2-1,250.1]	3.58	1.86	0.23	15	13
Belgium	202	[164.3-248.3]	3.52	1.79	0.23	16	19
Austria	202	[156-261.5]	4.55	2.32	0.30	15	13
Germany	1,557	[1,422.1-1,704.7]	3.76	1.70	0.21	16	11
Netherlands	175	[142.4-215]	2.05	0.95	0.11	17	14

Age-standardised mortality rates of oral cavity cancer among women and men in Europe (2020)

Women



Men



Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, Muñoz J, Bosch FX, de Sanjosé S. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Europe. Summary Report 10 March 2023.

HPV preventive strategies in Europe

HPV vaccination

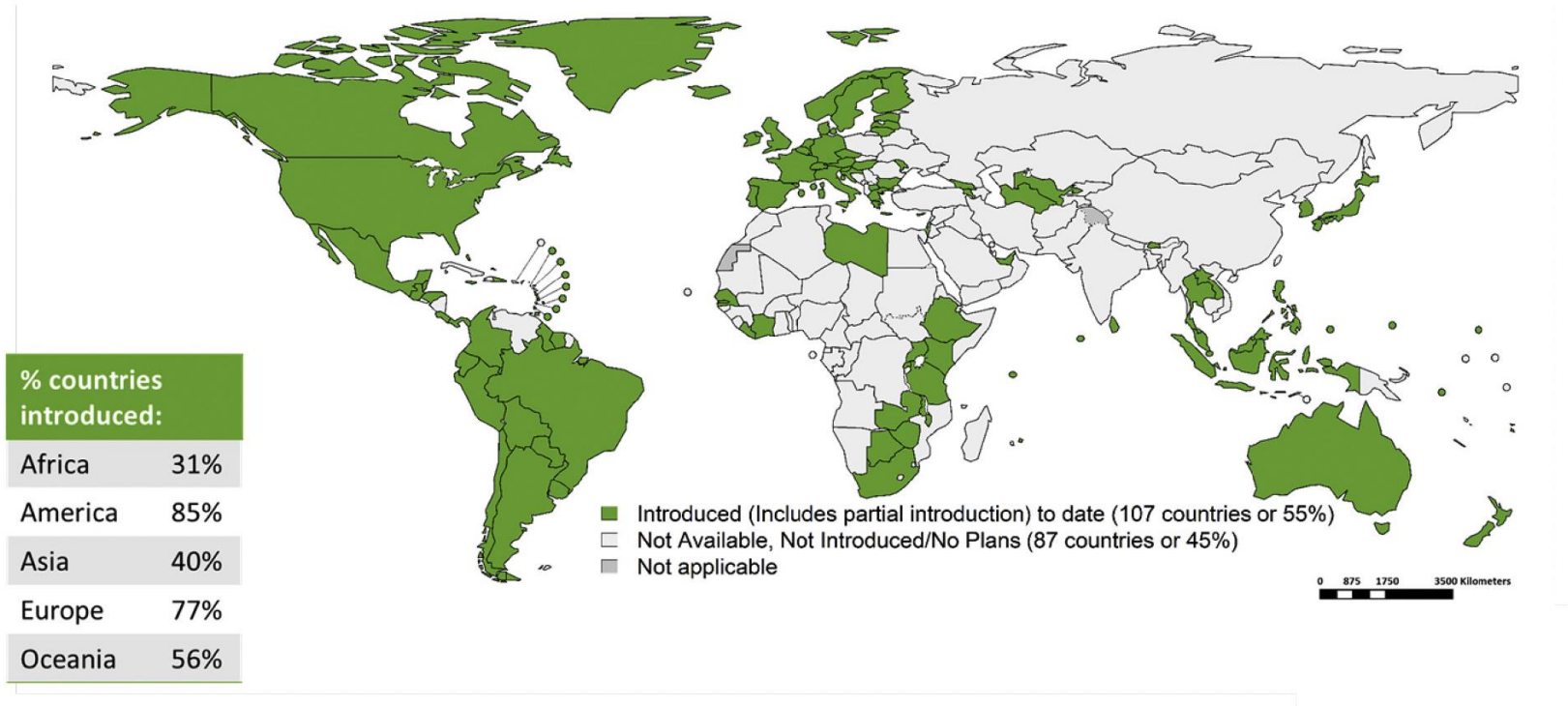


Fig. 1. WHO member states with HPV vaccination in their national immunization program, as of June 2020.
It does not include territories, state of free-association, or semi-autonomous regions. The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, Muñoz J, Bosch FX, de Sanjosé S. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Europe. Summary Report 10 March 2023.

HPV vaccination

European countries with HPV vaccine in the national immunization programme (2022)

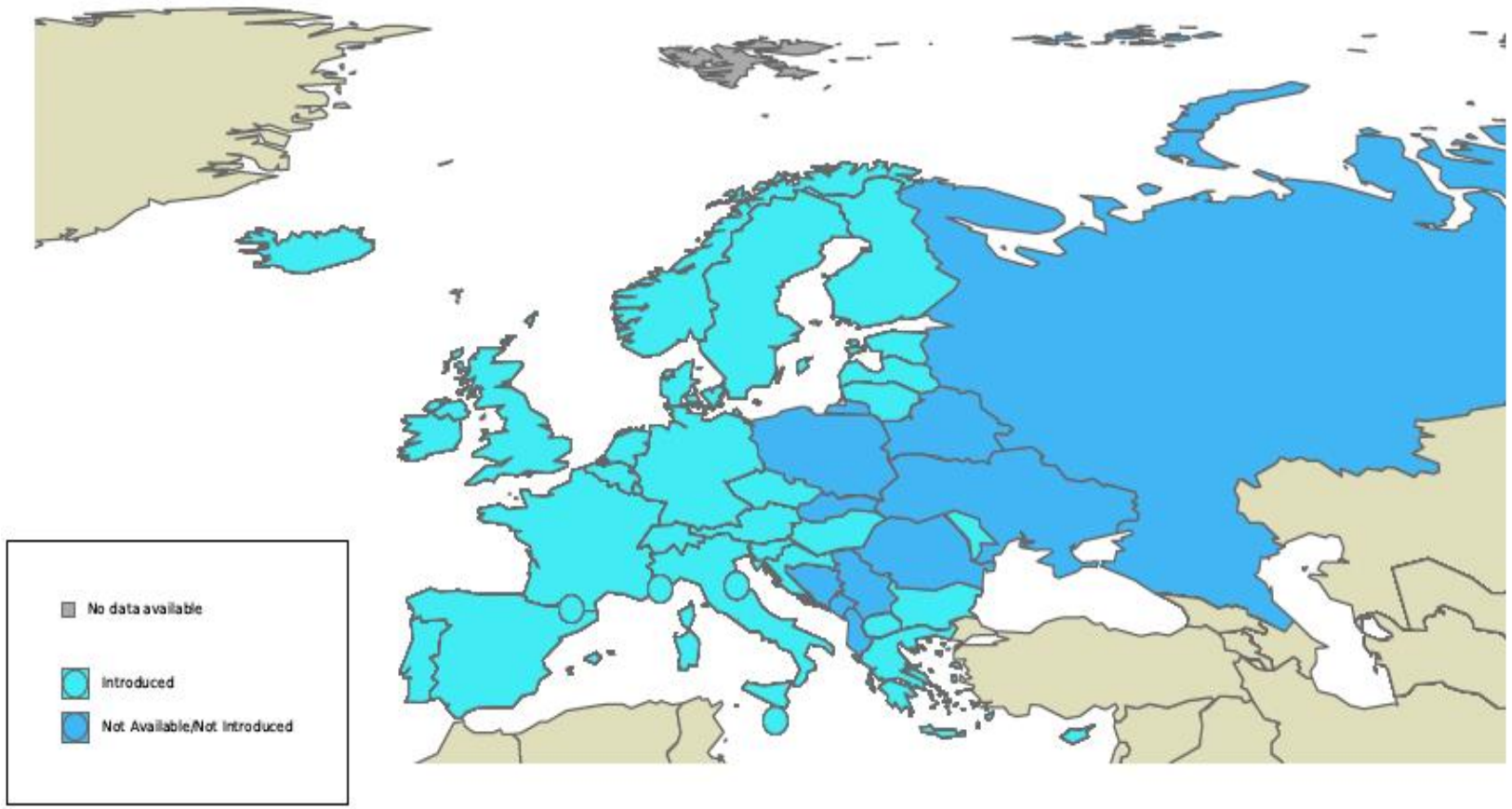


Table 50: HPV vaccination policies in Europe

Country	Sex	Programme	Introduction year	Year of estimation of HPV vaccination coverage	HPV coverage – first dose (%)	HPV coverage – last dose (%)
Andorra	Female	Introduced	2014	2021	83	83
Austria	Female	Introduced	2014	2021	-	-
Austria	Male	Introduced	2014	2021	-	-
Belgium	Female	Introduced	2007	2021	70	78
Belgium	Male	Introduced	2019	2021	64	71
Bulgaria	Female	Introduced	2012	2021	3	8
Croatia	Female	Introduced	2016	2021	-	-
Croatia	Male	Introduced	2016	2021	-	-
Cyprus	Female	Introduced	2016	2021	-	-
Czechia	Female	Introduced	2012	2021	-	-
Czechia	Male	Introduced	2018	2021	-	-
Denmark	Female	Introduced	2009	2021	80	92
Denmark	Male	Introduced	2019	2021	78	89
Estonia	Female	Introduced	2018	2021	57	64
Finland	Female	Introduced	2013	2021	-	71
Finland	Male	Introduced	2020	2021	-	62
France	Female	Introduced	2007	2021	37	46
Germany	Female	Introduced	2007	2021	47	63
Germany	Male	Introduced	2019	2021	5	20
Greece	Female	Introduced	2008	2021	-	-
Hungary	Female	Introduced	2014	2021	82	78
Hungary	Male	Introduced	2020	2021	69	64
Iceland	Female	Introduced	2011	2021	90	86
Ireland	Female	Introduced	2010	2021	71	74
Ireland	Male	Introduced	2019	2021	67	70
Italy	Female	Introduced	2008	2021	-	-
Italy	Male	Introduced	2018	2021	-	-
Latvia	Female	Introduced	2010	2021	42	43
Lithuania	Female	Introduced	2016	2021	66	61
Luxembourg	Female	Introduced	2008	2021	-	-
Luxembourg	Male	Introduced	2019	2021	-	-
Malta	Female	Introduced	2013	2021	99	94
Monaco	Female	Introduced	2011	2021	-	-
Netherlands	Female	Introduced	2010	2021	66	66
Norway	Female	Introduced	2009	2021	93	93
Norway	Male	Introduced	2018	2021	91	92
Portugal	Female	Introduced	2008	2021	76	91
Portugal	Male	Introduced	2020	2021	53	81
Republic of Moldova	Female	Introduced	2018	2021	35	39
Republic of North Macedonia	Female	Introduced	2009	2021	21	32
San Marino	Female	Introduced	2008	2021	23	46
Slovenia	Female	Introduced	2009	2021	50	50
Spain	Female	Introduced	2007	2021	77	83
Sweden	Female	Introduced	2010	2021	83	87
Sweden	Male	Introduced	2020	2021	77	83
Switzerland	Female	Introduced	2008	2021	71	74
Switzerland	Male	Introduced	2016	2021	49	52
United Kingdom of Great Britain and Northern Ireland	Female	Introduced	2008	2021	59	77
United Kingdom of Great Britain and Northern Ireland	Male	Introduced	2019	2021	48	71

Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, Muñoz J, Bosch FX, de Sanjosé S. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Europe. Summary Report 10 March 2023.

EXPERT REVIEW OF VACCINES
2020, VOL. 19, NO. 11, 1073–1083
https://doi.org/10.1080/14760584.2020.1858057

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REVIEW

OPEN ACCESS Check for updates

The status of human papillomavirus vaccination recommendation, funding, and coverage in WHO Europe countries (2018–2019)

Paolo Bonanni [a], Pascaline Faivre [b], Pier Luigi Lopalco [c], Elmar A. Joura [d], Tobias Bergroth [e], Stefan Varga [f], Nathalie Gemayel [g] and Rosybel Drury [h]

Among countries considered in the revision, **national recommendations for HPVv** exist in **46/53 (87%)** countries, of which 38 (83%), 2 (4%), and 6 (13%) countries provided full, partial, or no funding, respectively, for the primary cohort. Fully or partially funded HPVv was provided **for girls only in 25/53 (47%) countries and for both boys and girls in 15/53 (28%) countries.**

HPVv catch-up was fully or partially funded in **14/53 (26%) countries.**

In countries with a fully or partially funded vaccination program, administration occurrred **in health care centres** (n=15/38), **in schools**(n=16/38) or **in both schools and healthcare centres** (n=3/38).

Coverage was measured in 30 countries, and the definition of VCR varied across countries, with VCRs reported following at least one dose for 5 (17%) countries and following at least two doses for the remaining 25 (83%) countries. Monitored VCRs ranged from 4.3% to 99%

Of the 10 countries reporting VCR targets, **only Portugal exceeded its target.**

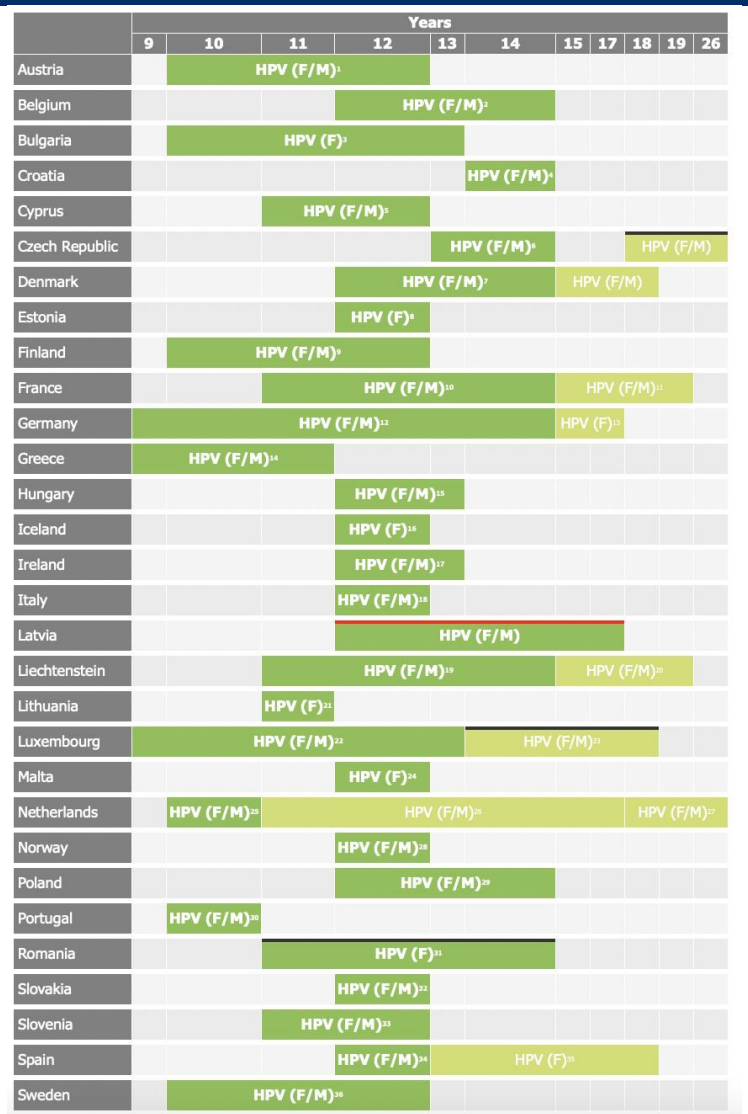
HPVv have been widely implemented in the W.H.O / E.R., but **17 countries in the region still have no national recommendations and/or full funding**.

HPV vaccination

Vaccine Scheduler

- General recommendation
- Recommendation for specific groups only
- Catch-up (e.g. if previous doses missed)

- Vaccination not funded by the National Health system
- Mandatory vaccination



ECDC Vaccine Scheduler: https://vaccine-schedule.ecdc.europa.eu/Scheduler/ByDisease?SelectedDiseaseId=38&SelectedCountryIdByDisease=-1

Incidence of cervical cancer following HPV vaccination

Sweden

1.7M girls (10-30 from 2006-17)
Risk of cervical cancer by vaccination status
Registry linkage

#cases in vaccinated *19*
#cases in non-vaccinated *538*

Incidence rates per 100 000
in vaccinated 47
in non-vaccinated 94

IRRa

I. vaccinated. *vs*. I. non vaccinated :
Total cohort : *0.37*
Vaccinated before 17: *0.12*
Vaccinated 17-30: *0.47*

Vaccinated before 20: *0.36*
Vaccinated 20 -30: *0.38*

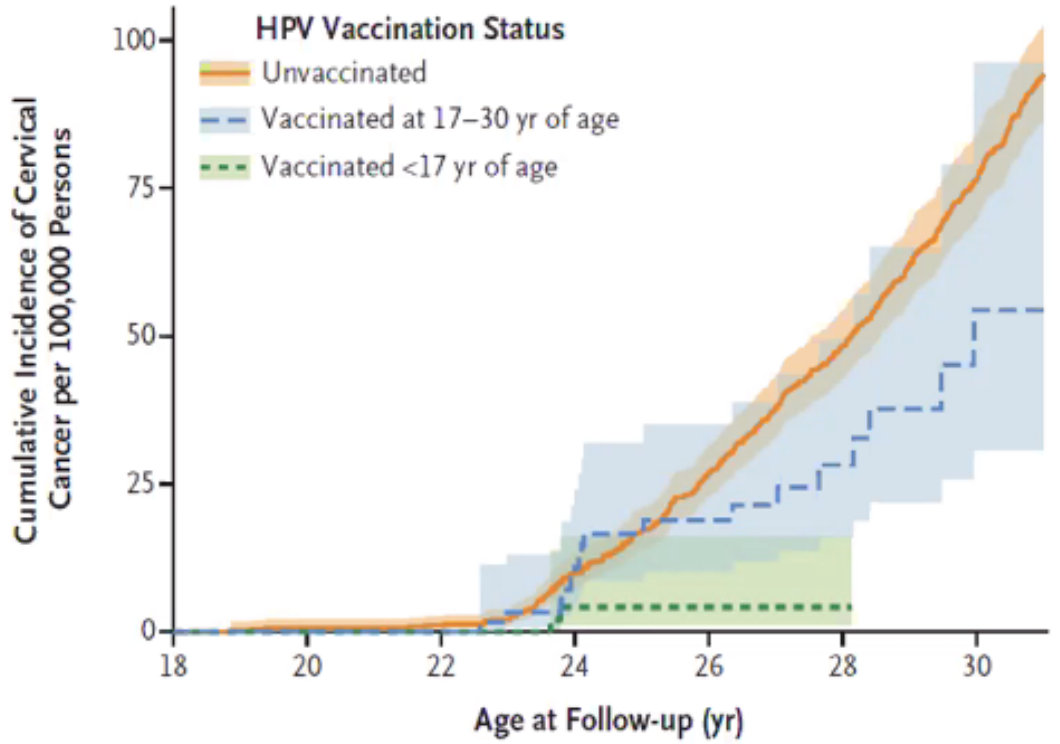


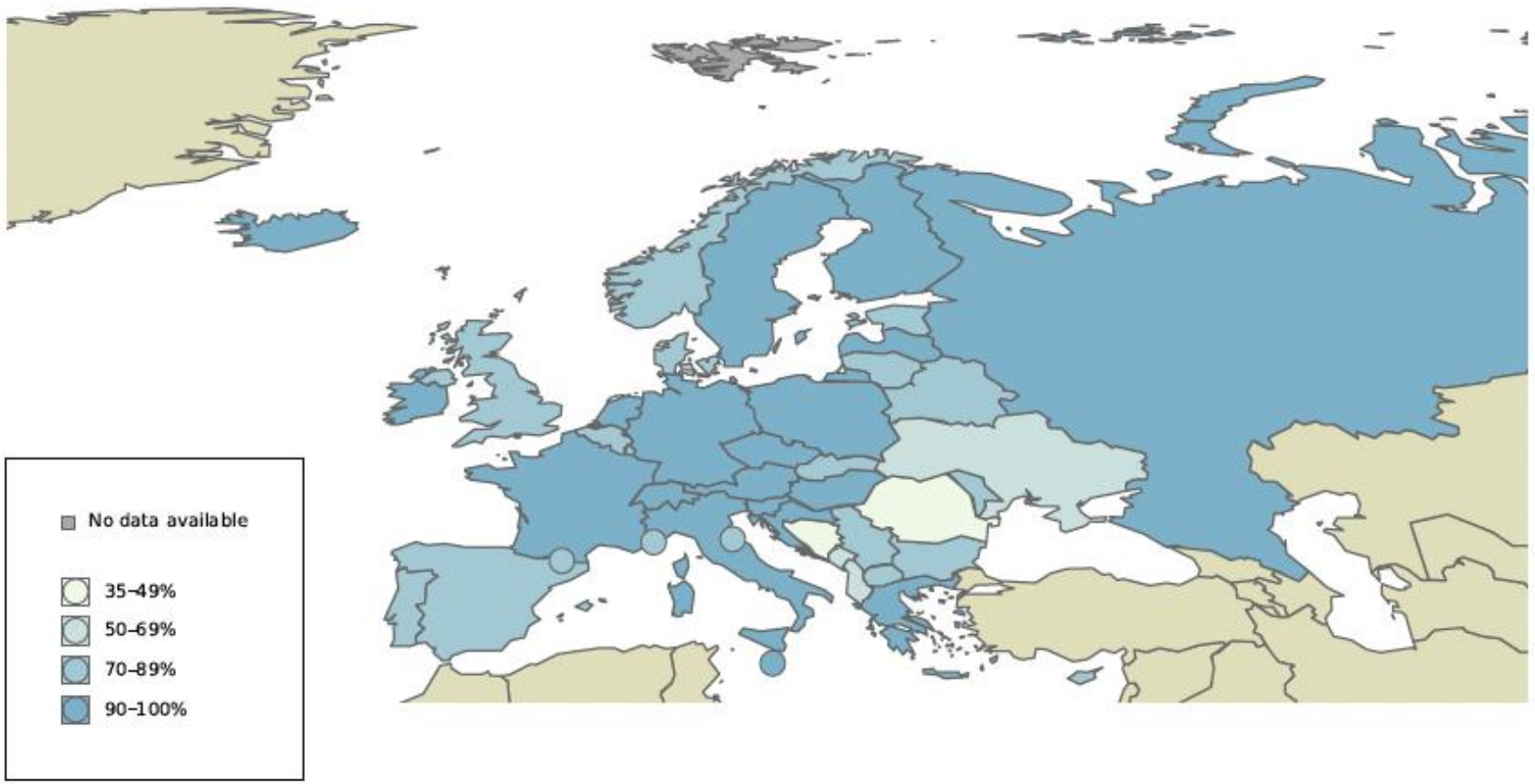
Figure 2. Cumulative Incidence of Invasive Cervical Cancer According to HPV Vaccination Status.

Age at follow-up is truncated in the graph because no cases of cervical cancer were observed in girls younger than 18 years of age.

Lei et al 2020 NEJM

Cervical cancer screening

Ever in lifetime cervical cancer screening coverage in women 25–65 years in 2019 by country in Europe



Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, Muñoz J, Bosch FX, de Sanjosé S. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Europe. Summary Report 10 March 2023.

Global Strategy towards the Elimination of Cervical Cancer

VISION: A world without cervical cancer

THRESHOLD: All countries to reach < 4 cases 100,000 women years

2030 CONTROL TARGETS

Timeline
Submitted to EB 2020 (Oct 2019) for discussion at WHA May 2020

90%
of girls fully vaccinated with HPV vaccine by 15 years of age

70%
of women screened with an high precision test at 35 and 45 years of age

90%
of women identified with cervical disease receive treatment and care

SDG 2030: Target 3.4 – 30% reduction in mortality from cervical cancer

World Health Organization

Potential Benefits of HPV HPV Vaccines In Sexually Active Women

- Primary protection from types not yet encountered.
- Secondary protection of transmission to partners.
- Increase herd immunity in the population.
- Reduce risk of progression by preventing auto-inoculation leading to TZ or endocervical infection.
- Neutralize shed virus, reducing transmission from infected women.

HPV Vaccine Information For Young Women

Español (Spanish) | Print

CDC recommends HPV vaccination at age 11 or 12 years (or can start at age 9 years) and for everyone through age 26 years, if not vaccinated already.

For more information on the updated recommendations, see Human Papillomavirus Vaccination for Adults: Updated Recommendations of the Advisory Committee on Immunization Practices.

Will sexually active females benefit from the vaccine?

Ideally females should get the vaccine before they become sexually active and exposed to HPV. Females who are sexually active may also benefit from vaccination, but they may get less benefit. This is because they may have already been exposed to one or more of the HPV types targeted by the vaccines. However, few sexually active young women are infected with all HPV types prevented by the vaccines, so most young women could still get protection by getting vaccinated.

Gynecologic Oncology 151 (2018) 229–234

Contents lists available at ScienceDirect

Gynecologic Oncology

journal homepage: www.elsevier.com/locate/ygyno

SPERANZA project: HPV vaccination after treatment for CIN2+

Alessandro Ghelardi [a,*], Fabio Parazzini [b], Francesca Martella [c], Annalisa Pieralli [d], Paola Bay [a], Arianna Tonetti [a], Alessandro Svelato [a], Gloria Bertacca [e], Stefania Lombardi [e], Elmar A. Joura [f]

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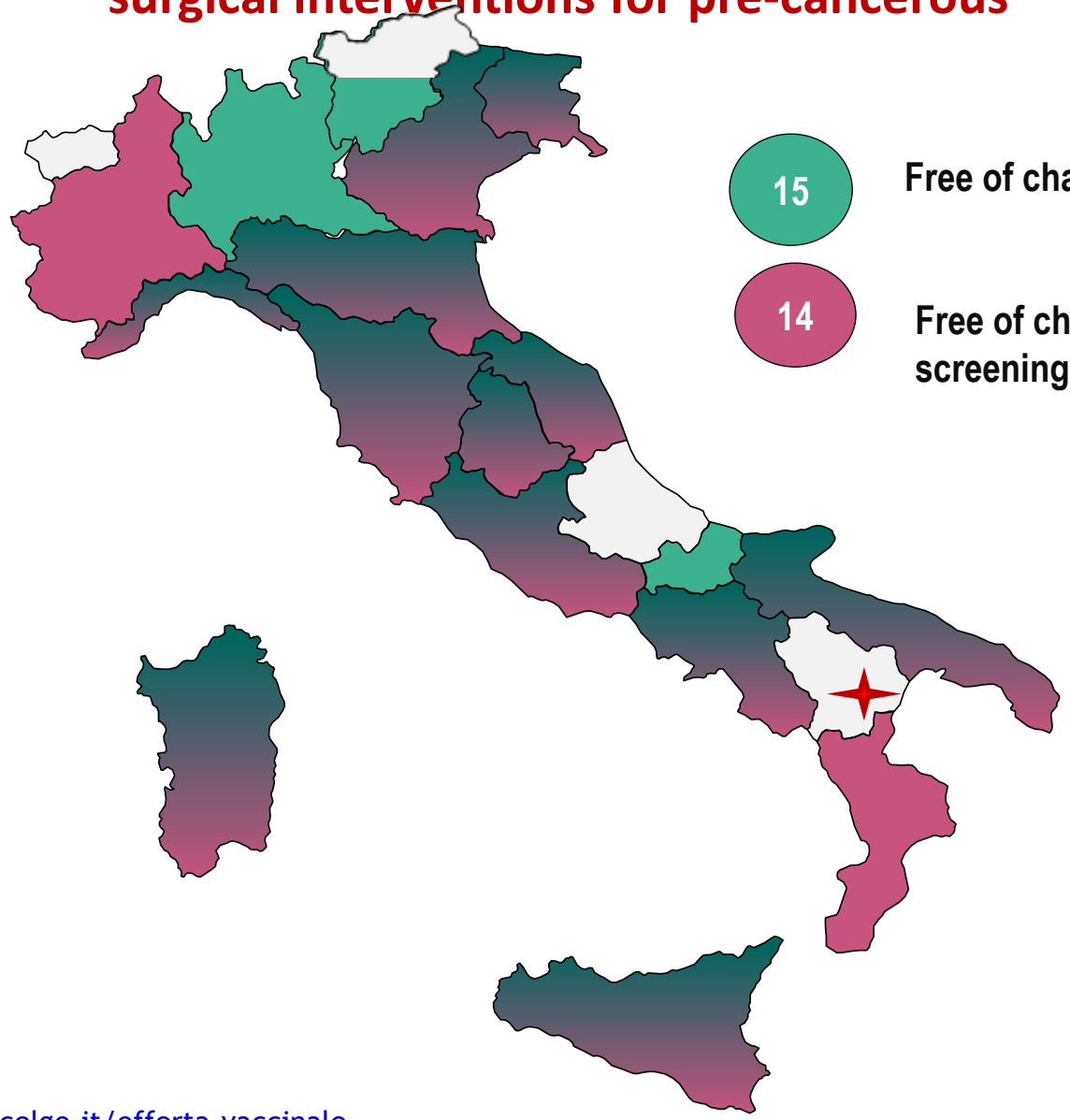
[e] Azienda USL Toscana Nord Ovest, SSD Analisi ChimicoCliniche ed ImmunoAllergologia, Ospedale Apuane, Massa, Italy
[f] Medical University of Vienna, AKH Department of Obstetrics and Gynecology, Comprehensive Cancer Center Vienna, Italy

HIGHLIGHTS

- After conization, HPV vaccine shows 80% *clinical effectiveness* in disease relapse prevention.
- Clinical benefits of vaccination are demonstrated up to 4 years.
- HPV vaccine has no therapeutic effect on prevalent HPV infection or disease.
- HPV vaccination is beneficial as an adjuvant additional to surgical treatment.

Regional active offer of HPV vaccination to 25 year-old women and to women undergoing surgical interventions for pre-cancerous



15 Free of charge for women with HPV-related lesions

14 Free of charge for 25 year-old women (first screening)

Ref. Disponibili al link: https://www.ioscelgo.it/offerta-vaccinale

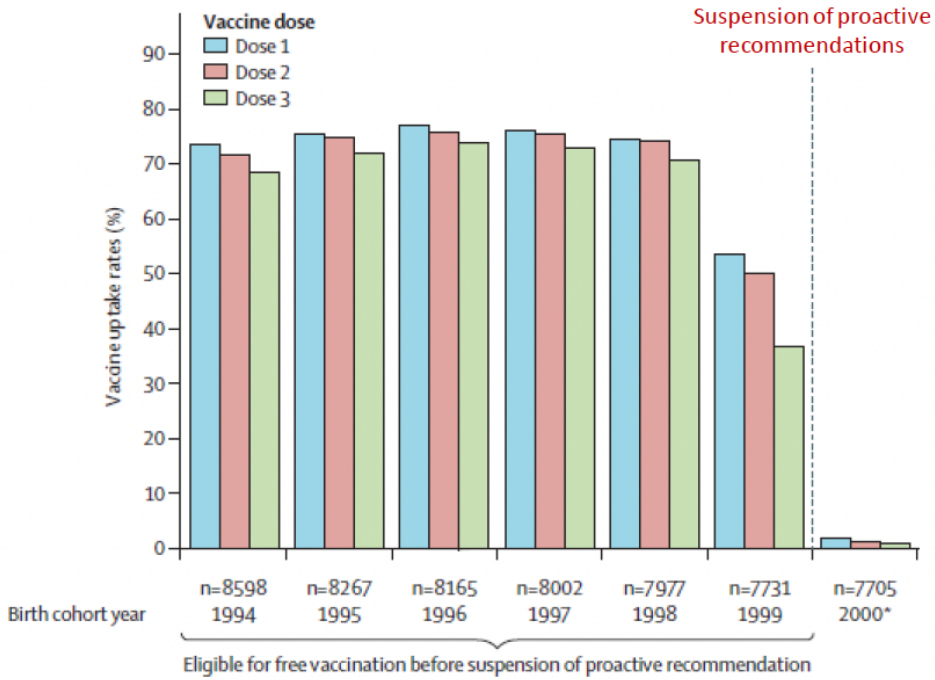
* In Basilicata il progetto multicoorte che ha incluso le donne 25enni si è concluso nel 2015.

Timeline of HPV Vaccine Recommendations in Japan

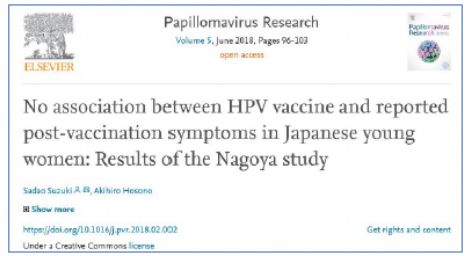
Oct 2009	• HPV 2 licensed (HPV 4 licensed in July 2011)
Nov 2010	• Temporary funding granted for girls 12-16yrs
April 2013	• HPV vaccines included in NIP for girls 12-16 years
June 2013	• Proactive recommendations suspended after unconfirmed reports of AEFI in the media (but still free for girls 12-16 years)
Dec 2015	• GACVS issues a statement about 'harms' of not recommending HPV vaccines
July 2017	• Class action lawsuits against GSK MSD and the MHLW commence

HPV Vaccine Crisis in Japan- Suspension of Proactive Recommendations

HPV vaccine uptake rates in Sapporo, Japan (at March 2014)[4]



- **Proactive recommendations suspended (June 2013)**
  - Uptake drops to **<1%**
  - International and domestic studies find **no relationship** between HPV vaccine and reported adverse events[1,2,3]


Papillomavirus Research
Volume 5, June 2018, Pages 96-103
open access

No association between HPV vaccine and reported post-vaccination symptoms in Japanese young women: Results of the Nagoya study

Sadao Suzuki, Akihiro Hosono

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https://doi.org/10.1016/j.pvr.2018.02.002

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  - **Suspension continued until Nov 26th 2021!**

[1]www.who.int/vaccine_safety/committee/topics/hpv/en
[2]Suzuki et al, Papillomavirus Research, 2018
[3]Philips et al, Vaccine, 2020
[4]Hanley et al, Lancet, 2015

The Cost of Inaction

-Compared to if coverage had remained at 70%

Among females born between 1994-2007

- **25,000** additional cervical cancer (CC) cases
- **>5,000** additional CC deaths

-If <1% coverage were to continue over next 50yrs

- **60,000** additional CC cases
- **10,000** additional CC deaths

-If 70% coverage could be restored in 12yr girls in 2020 with 50% catch-up in girls 13-20yr with HPV 9

- **70-80%** of cases and deaths could be prevented

Simms K, Hanley S, et al. ***Impact of HPV vaccine hesitancy on cervical cancer in Japan: a modelling study***. Lancet Public Health 2020

SCIENCEINSIDER | ASIA/PACIFIC

Japan relaunches its HPV vaccination drive. For thousands of women, it may be too late

Safety concerns led the government to stop recommending the shots in 2013

29 MAR 2022 · 2:05 PM · BY DENNIS NORMILE

HPV Vaccination in Japan: The Journey to Resuming a National Immunisation Programme

May 27, 2022 Jane Rigney Cervical Screening, COVID-19, HPV Screening, HPV Vaccination, Public Health and government 0

In November 2021, Japan's Ministry of Health, Labour and Welfare (MHLW) agreed it would resume active recommendation of the human papillomavirus (HPV) vaccine against cervical cancer. As of April 2022, the Japanese government did start proactively recommending HPV vaccination

Considering that in 2020 alone, Japan had an estimated 12,785 cervical cancer cases and over four thousand deaths, the resumption of a national HPV vaccination programme is a matter of urgency.

PERCH
PartnERship to Contrast HPV

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In 2020, in Europe, there were 58,169 cervical cancer cases and 25,989 deaths.

Incidence and mortality rates vary widely across Europe, with age-standardized incidence rates ranging from less than 5 cases per 100,000 women to above 25 cases per 100,000 women and age-standardised mortality rates from 1 death per 100,000 women to 10 deaths per 100,000 women.

About PERCH

Thank you for your attention

"More than any other cancer, cervical cancer reflects striking global health inequity."

AGOSTI & GOLDIE,
NEW ENGLAND JOURNAL OF MEDICINE, 2007