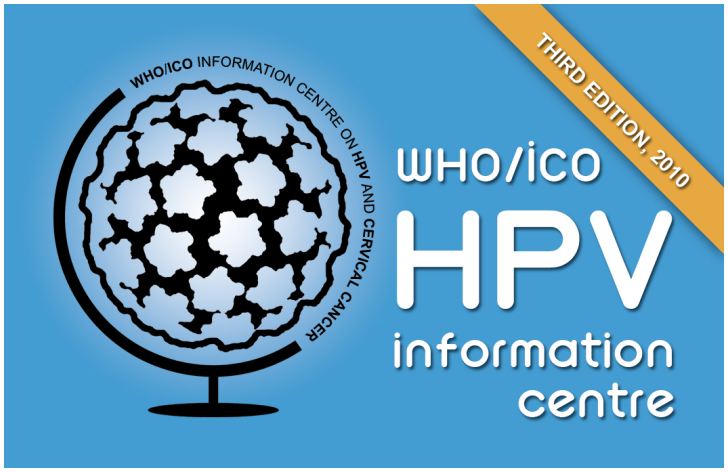

Human Papillomavirus and Related Cancers

Summary Report Update. November 15, 2010.

WORLD

World Health Organization

ICO
Institut Català d'Oncologia

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Available at www.who.int/hpvcentre

Preface

Preface to the third edition

Since the first edition of the HPV Information Centre, GLOBOCAN, one of the landmark products of the International Agency for Research on Cancer (IARC), serves as the reference source of cancer statistics. GLOBOCAN is a resource that provides on a regular basis the most accurate assessment of global cancer burden in the world. On June 1st 2010, the new edition of GLOBOCAN, GLOBOCAN 2008, was launched and new cancer estimates for 2008 are currently available.
This third edition of the HPV Information Centre incorporates the new burden estimates for all HPV-related cancers. In addition to the publicly available GLOBOCAN 2008, IARC has kindly provided the HPV Information Centre with age-specific estimates for HPV-related cancers which are also presented in this report.

Preface to the second edition

The available data on the epidemiology and prevention of HPV infection and HPV-related cancers at the country-specific level has grown substantially since the first edition of the HPV Information Centre in 2007.
This second edition reflects the continuous efforts to update our previous data and to expand the information to include new statistics. Thus, the user of the website (www.who.int/hpvcentre) will be able to find and manage new indicators on the burden of other HPV-related cancers (such as that of the vulva, vagina, anus, penis, oral cavity and pharynx), HPV in anogenital cancers, HPV in men, sexual and reproductive behaviour practices, HPV preventive strategies of cervical screening, HPV vaccine licensure and introduction, and male circumcision.
The HPV Information Centre team hopes that this update will be a useful resource to help formulate recommendations and public health interventions towards the prevention of cervical cancer and HPV-related diseases in each country.

Preface to the first edition

The main aim of this report is to summarize the information available on human papillomavirus (HPV) and cervical cancer at the country-specific level. The World Health Organization (WHO) in collaboration with the Institut Català d'Oncologia (ICO) have developed the WHO/ICO Information Centre on HPV and Cervical Cancer (HPV Information Centre) to evaluate the burden of disease in the country and to help facilitate stakeholders and relevant bodies of decision makers to formulate recommendations on cervical cancer prevention, including the implementation of the newly developed HPV vaccines.
Data aggregated are derived from data and official reports produced by the World Health Organization (WHO), International Agency for Research on Cancer (IARC), United Nations, The World Bank, and published literature. Indicators include relevant statistics on cancer, epidemiological determinants of cervical cancer such as demographics, socioeconomic factors and other risk factors, estimates on the burden of HPV infection, data on immunization and cervical cancer screening. These statistics are essential when planning and implementing cervical cancer prevention strategies. Therefore, we have integrated the most important information for each country into a report and on a website (www.who.int/hpvcentre) to provide a user-friendly tool to assess the best available information in each country.
The information presented here is intended as a resource for all who are working towards the prevention of cervical cancer.

Executive summary

Human papillomavirus (HPV) infection is now a well-established cause of cervical cancer and there is growing evidence of HPV being a relevant factor in other anogenital cancers (anus, vulva, vagina and penis) and head and neck cancers. HPV types 16 and 18 are responsible for about 70% of all cervical cancer cases worldwide. HPV vaccines that prevent against HPV 16 and 18 infection are now available and have the potential to reduce the incidence of cervical and other anogenital cancers.

This summary report on the World provides key information on cervical cancer, other anogenital cancers and head and neck cancers, HPV-related statistics, factors contributing to cervical cancer, cervical cancer screening practices, HPV vaccine introduction, and other relevant immunization indicators. The report is intended to strengthen the guidance for health policy implementation of primary and secondary cervical cancer prevention strategies.

The World has a population of 2,337 million women ages 15 years and older who are at risk of developing cervical cancer. Current estimates indicate that every year 529,828 women are diagnosed with cervical cancer and 275,128 die from the disease. Using crude incidence rates, cervical cancer ranks as the 3rd most frequent cancer in women in the World, and the 2nd most frequent cancer among women between 15 and 44 years of age. After age-standardization, cervical cancer ranks as the 2nd most frequent cancer in women in the World.

About 11.4% of women in the general population are estimated to harbour cervical HPV infection at a given time, and 70.9% of invasive cervical cancers in the World are attributed to HPV types 16 and/or 18.

Table 1: Key statistics in the World

Population	World	Developing regions	Developed regions
Women at risk for cervical cancer (Female population aged >=15 yrs) in thousands	2,336,986	1,811,867	525,120
Burden of Cervical cancer			
Annual number of new cases of cervical cancer	529,828	453,321	76,507
Annual number of cervical cancer deaths	275,128	241,969	33,159
Projected number of new cervical cancer cases in 2025*	720,060	668,875	81,868
Projected number of cervical cancer deaths in 2025*	395,095	380,653	38,291
Burden of cervical HPV infection			
HPV prevalence (%) in the general population (women with normal cytology)	11.4	14.3	10.3
Prevalence (%) of HPV 16 and/or HPV 18 among women with:			
Normal cytology	3.8	4.6	3.6
Low-grade cervical lesions (LSIL/CIN-1)	24.3	25.7	24.0
High-grade cervical lesions (HSIL/ CIN-2 / CIN-3 / CIS)	51.1	46.8	52.4
Cervical cancer	70.9	71.0	70.8

LSIL, low-grade intraepithelial lesions; HSIL, high-grade intraepithelial lesions; CIN-2/3, cervical intraepithelial neoplasia grade 2 or 3; CIS, carcinoma in-situ.
∗Projected burden in 2025 is estimated by applying current population forecasts for the country and assuming that current incidence/mortality rates of cervical cancer are constant over time.

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1 Introduction

Figure 1: World's geographical regions

Data sources: United Nations Statistics Division- Standard Country and Area Codes Classifications. (http://unstats.un.org/unsd/methods/m49/m49regin.htm, accessed July 2009)

The WHO/ICO Information Centre on HPV and Cervical Cancer (HPV Information Centre) aims to compile and centralize updated data and statistics on human papillomavirus (HPV) and HPV-related cancers. This report aims to summarize the data available to fully evaluate the burden of disease in the World and to facilitate stakeholders and relevant bodies of decision makers to formulate recommendations on the prevention of cervical cancer and other HPV-related cancers. Data include relevant cancer statistic estimates, epidemiological determinants of cervical cancer such as demographics, socioeconomic factors, risk factors, burden of HPV infection in women and men, and cervical screening and immunization practices. The report is structured into the following sections:

Section 2 summarizes the socio-demographic profile of each region. For analytical purposes, the World is divided into either developed and developing regions or five continents (Africa, Americas, Asia, Europe, and Oceania). (Figure 1). The ***developed regions*** are composed of Northern America, Europe, Japan, Australia and New Zealand, and the ***developing regions*** are composed of Africa, Americas (excluding Northern America), Caribbean, Central America, South America, Asia excluding Japan, and Oceania excluding Australia and New Zealand. Each continent is composed of a number of regions that are grouped geographically. Africa is composed of five regions: Eastern Africa, Middle Africa, Northern Africa, Southern Africa, and Western Africa. The ***Americas*** is composed of four regions: the Caribbean, Central America, South America and Northern America. ***Asia*** is composed of five regions: Western, Southern Asia, Eastern Asia, South-Eastern Asia and Western Asia. ***Europe*** is composed of four regions: Eastern Europe, Western Europe, Southern Europe and Northern Europe. And ***Oceania*** is composed of four regions: Australia and New Zealand, Melanesia, Micronesia, and Polynesia.

Section 3 describes the current burden of invasive cervical cancer and other HPV-related cancers in the continents with estimates of prevalence, incidence and mortality rates.

Section 4 reports on prevalence of HPV and HPV type-specific distribution in women with normal cytology, women with precancerous lesions and invasive cervical cancer. In addition, the burden of HPV in other anogential cancers (anus, vulva, vagina, and penis) are presented.

Section 5 describes factors that can modify the natural history of HPV and cervical carcinogene-

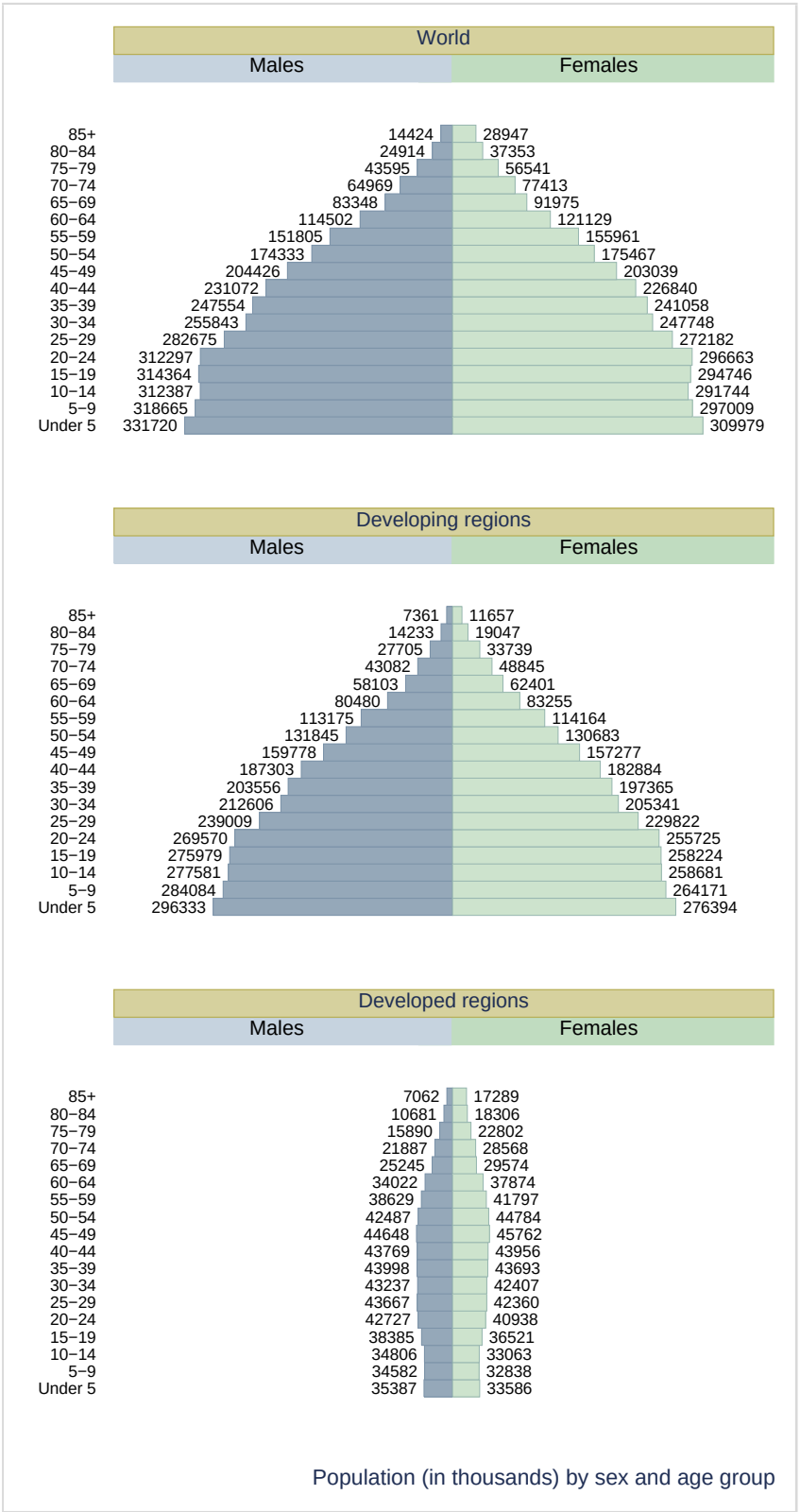
sis such as the use of smoking, parity, oral contraceptive use and co-infection with HIV.

Section 6 presents sexual and reproductive behaviour indicators that may be used as proxy measures of risk for HPV infection and anogenital cancers.

Section 7 presents preventive strategies that include basic characteristics and performance of cervical cancer screening status, status of HPV vaccine licensure introduction, and recommendations in national immunization programs and the prevalence of male circumcision and condom use.

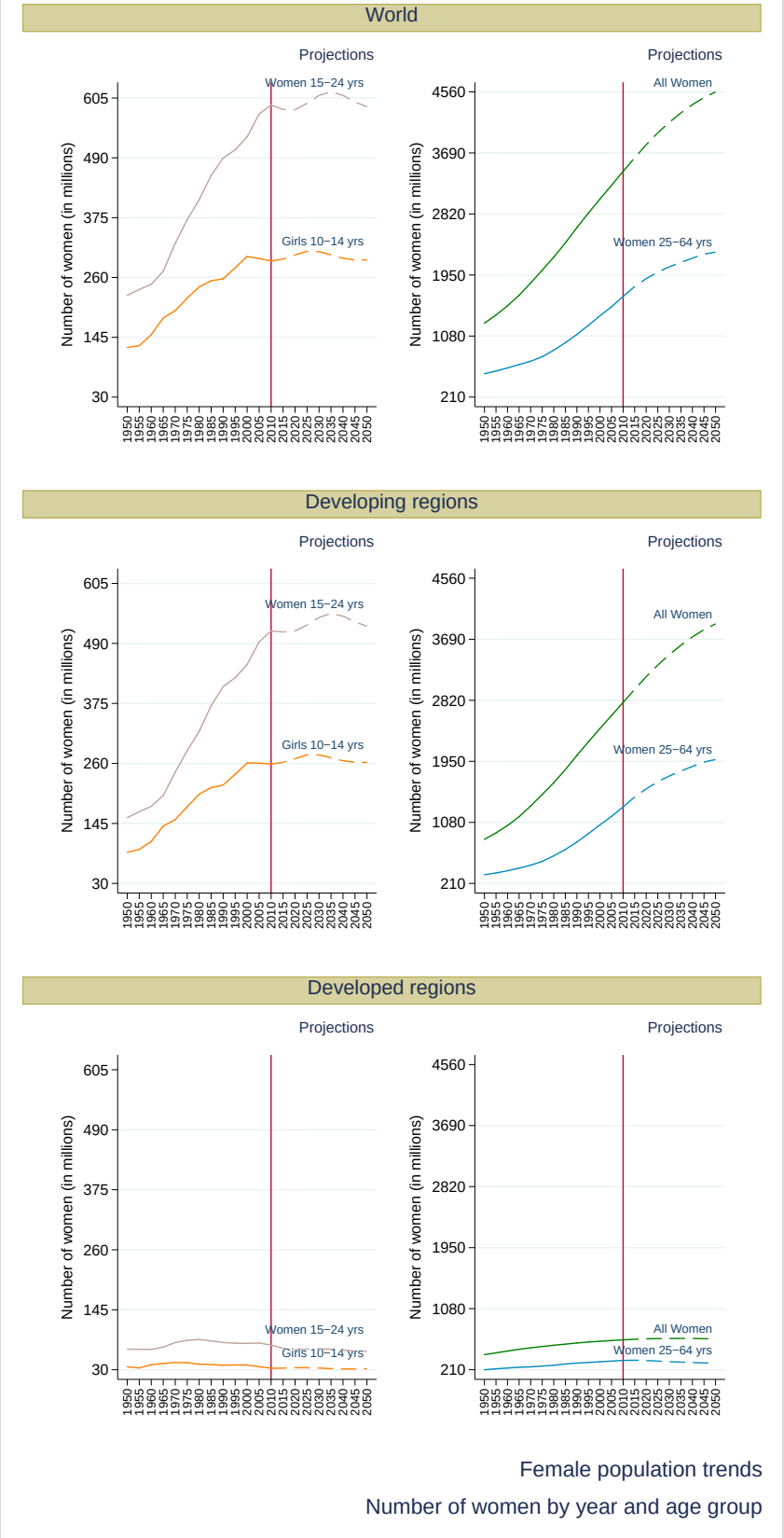
2 Demographic and socioeconomic factors

Figure 2: Population pyramid estimates of the World compared to developing and developed regions for 2010



Population in thousands.
Data sources:
World population prospects: the 2008 revision. New York, Population Division, Department of Economic and Social Affairs, United Nations Secretariat, 2009.

Figure 3: Estimated population trends of four selected age groups in the World compared to developing and developed regions in 2010



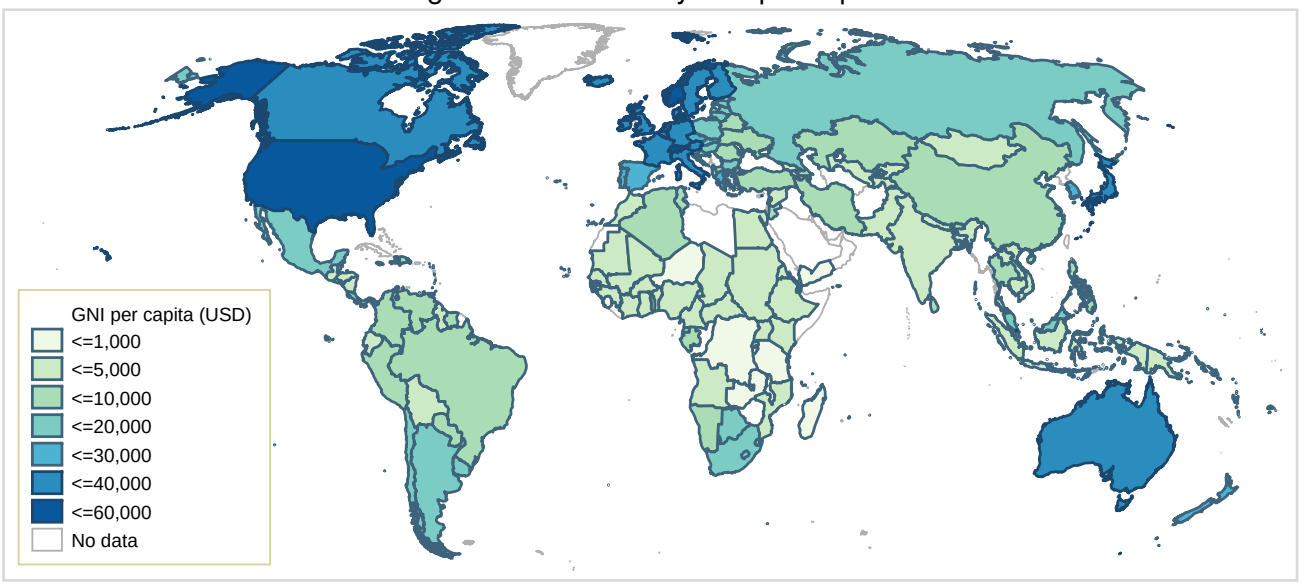
Population in thousands. Data sources:
World population prospects: the 2008 revision. New York, Population Division, Department of Economic and Social Affairs, United Nations Secretariat, 2009.

Table 2: Population (in millions) estimates for 2010 of the World, by region and sub-regions

Region / Country	Female			Male		
	10-14 years	15+ years	Total	10-14 years	15+ years	Total
World	291.74	2527.06	3425.79	312.39	2520.12	3482.89
Developing regions	258.68	1990.43	2789.68	277.58	2023.79	2881.78
Developed regions	33.06	536.63	636.12	34.81	496.33	601.11
Africa	60.30	311.97	517.78	61.42	305.20	515.27
Eastern Africa	20.45	93.63	164.76	20.61	90.49	162.43
Middle Africa	8.17	36.25	64.96	8.17	35.13	63.95
Northern Africa	10.37	73.26	106.04	10.80	72.69	106.88
Southern Africa	2.92	20.45	29.41	2.95	19.49	28.56
Western Africa	18.39	88.39	152.61	18.89	87.41	153.45
Americas	38.25	362.14	476.03	39.74	345.62	464.28
Latin America & Caribbean	27.03	218.15	298.01	27.94	207.73	290.64
Caribbean	1.86	15.86	21.36	1.92	15.23	20.95
Central America	7.58	55.17	77.75	7.78	52.00	75.36
South America	17.59	147.13	198.90	18.24	140.50	194.32
Northern America	11.22	143.99	178.01	11.80	137.88	173.65
Asia	173.66	1514.18	2034.12	190.63	1560.93	2132.63
Central Asia	-	-	-	-	-	-
Eastern Asia	48.79	621.29	758.46	57.33	641.98	805.49
Southern Asia	-	-	-	-	-	-
South-Eastern Asia	26.08	217.69	296.24	27.21	211.44	293.37
Western Asia	11.49	77.28	113.11	11.98	82.12	119.59
Europe	18.15	325.05	379.95	19.13	294.92	352.81
Eastern Europe	6.77	133.93	154.84	7.11	114.61	136.65
Northern Europe	2.77	42.03	50.37	2.92	39.76	48.54
Southern Europe	3.65	67.27	78.45	3.87	63.47	75.33
Western Europe	4.96	81.81	96.29	5.22	77.09	92.29
Oceania	1.38	13.72	17.93	1.46	13.45	17.91
Australia & New Zealand	0.81	10.59	12.99	0.86	10.29	12.82
Melanesia	0.51	2.70	4.31	0.54	2.73	4.46
Micronesia	0.03	0.20	0.29	0.03	0.19	0.28
Polynesia	0.04	0.22	0.33	0.04	0.23	0.34

Data sources:
World population prospects: the 2008 revision. New York, Population Division, Department of Economic and Social Affairs, United Nations Secretariat, 2009.

Figure 4: Countries by GNI per capita



PPP int. $, purchasing power parity at international dollar rate.
Data sources:
GNI per capita 2007, atlas method and PPP. Washington, DC, World Bank, 2007.

Table 3: Sociodemographic indicators in the World

Indicator	Male	Female	Total
Population in 1000s[1]	3282865[a]	3229412[a]	6512276[a]
Population growth rate (%)[1]	-	-	1.18[b]
Median age (years)[1]	-	-	27.9[a]
Population living in urban areas (%)[2]	-	-	50[c]
Crude birth rate (births per 1000 population)[1]	-	-	20.3[b]
Crude death rate (deaths per 1000 population)[1]	-	-	8.5[b]
Life expectancy at birth (years):[3]	65[c]	69[c]	67[c]
Adult mortaliy rate:[3]	226[c]	155[c]	191[c]
Infant mortality rate (per 1000 live births):[3]	51[c]	47[c]	49[c]
Maternal mortality ratio (per 100,000 live births)[4]	-	-	400[a]
Neonatal mortality rate (per 1000 live births)[5]	-	-	28[d]
Under 5 mortality rate (per 1000 live births):[3]	72[c]	71[c]	71[c]
Gross national income per capita (PPP int $)[6]	-	-	10223[c]
Population living <$1 a day (%: PPP int $)[7]	-	-	-
General government expenditure on health as % of total government expenditure[8]	-	-	8.3[a]
General government expenditure on health as % of total expenditure on health[8]	-	-	56.0[a]
Total expenditure on health as % of gross domestic product[8]	-	-	8.6[a]
Per capita total expenditure on health at average exchange rate (US$)[8]	-	-	681.0[a]
Per capita government expenditure on health at average exchange rate (US$)[8]	-	-	405.0[a]
Private expenditure on health as % of total expenditure on health[8]	-	-	44.0[a]
Density of physicians (per 10,000 population)[9]	-	-	13[e]
Number of physicians[9]	-	-	8413147[e]
Adult (15 years and over) literacy rate (%)[10]	-	-	78.4[f]
Youth (15-24 years) literacy rate (%):[10]	-	-	-
Net primary school enrollment ratio:[10]	88[e]	85[e]	-
Net secondary school enrollment ratio:[10]	-	-	-

Year of estimation: [a] 2005; [b] 2005-2010; [c] 2006; [d] 2004; [e] 2000-2006; [f] 2000-2005;

Data notes and sources:

[1] World population prospects: the 2008 revision. New York, Population Division, Department of Economic and Social Affairs, United Nations Secretariat, 2009.

[2] World population prospects: the 2006 revision. New York, Population Division, Department of Economic and Social Affairs, United Nations Secretariat, 2007.

[3] Life tables for WHO Member States. Geneva, World Health Organization, 2006 (http://www.who.int/whosis/database/life_tables/life_tables.cfm, accessed 18 March 2008).

[4] Maternal mortality in 2005: estimates developed by WHO, UNICEF, UNFPA and the World Bank. Geneva, World Health Organization, 2007 (http://www.who.int/reproductive-health/publications/maternal_mortality_2005/mme_2005.pdf, accessed 18 March 2008).

[5] Neonatal and perinatal mortality: country, regional and global estimates 2004. Geneva, World Health Organization, 2007. (http://whqlibdoc.who.int/publications/2007/9789241596145_eng.pdf, accessed 18 March 2008).

[6] PPP int. $, purchasing power parity at international dollar rate.
GNI per capita 2007, atlas method and PPP. Washington, DC, World Bank, 2007.

[7] PPP int. $, purchasing power parity at international dollar rate.
World development indicators 2007. Washington, DC, International Bank for Reconstruction World Bank, 2007.

[8] National health accounts: country information. Geneva, World Health Organization, 2007 (http://www.who.int/nha/country/en/index.html, accessed 17 March 2008).

[9] Global atlas of the health workforce [online database]. Geneva, World Health Organization, 2008 (http://www.who.int/globalatlas/autologin/hrh_login.asp, accessed 17 March 2008).

[10] UNESCO Institute for Statistics Data Centre [online database]. Montreal, UNESCO Institute for Statistics, 2007 (http://stats.uis.unesco.org, accessed 16 March 2008).

3 Burden of HPV related cancers

3.1 Cervical cancer

Cancer of the cervix uteri is the second most common cancer among women worldwide, with an estimated 529,409 new cases and 274,883 deaths in 2008. About 86% of the cases occur in developing countries, representing 13% of female cancers. Worldwide, mortality rates of cervical cancer are substantially lower than incidence with a ratio of mortality to incidence to 52% (*IARC, GLOBOCAN 2008*). The majority of cases are squamous cell carcinoma and adenocarcinomas are less common. (*Vaccine 2006, Vol. 24, Supl 3; Vaccine 2008, Vol. 26, Supl 10; IARC Monographs 2007, Vol. 90*)

This section describes the current burden of invasive cervical cancer in the World with estimates of annual number of new cases, deaths, and incidence and mortality rates.

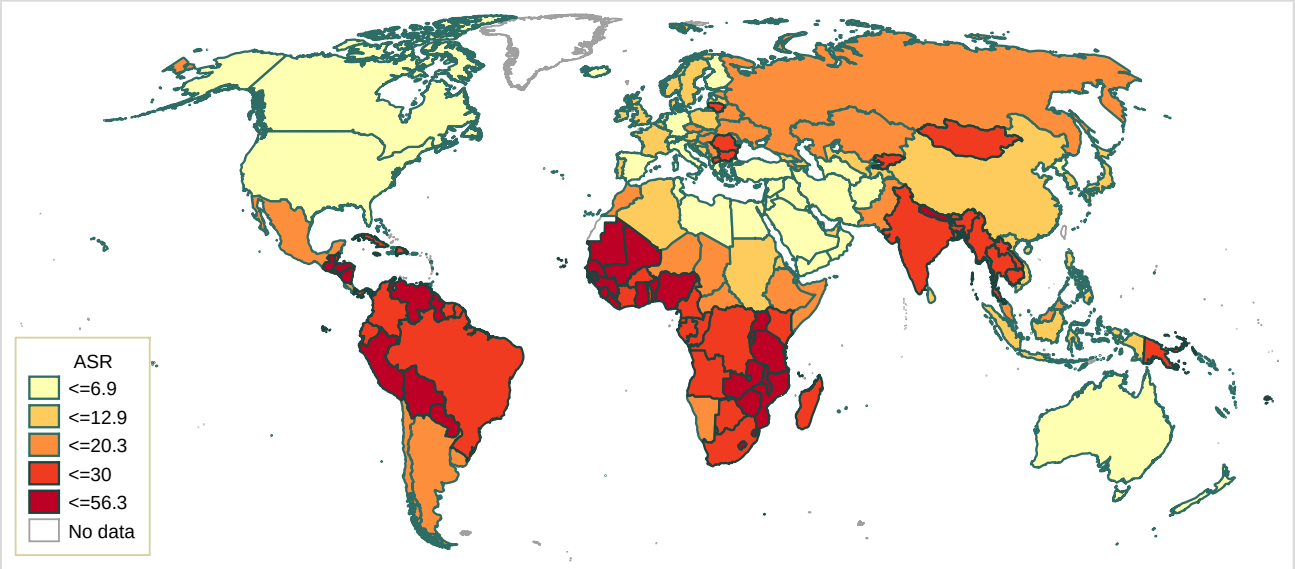
3.1.1 Incidence

Table 4: Incidence of cervical cancer by regions and sub-regions in the World

Region / Country	Crude rate	ASR*	Cum. risk*	N cases	Ranking of cervical cancer†	
					All women	Women 15-44 years
World	15.8	15.3	1.6	529828	3rd	2nd
Developing regions	16.7	17.8	1.9	453321	2nd	2nd
Developed regions	12.1	9.0	0.8	76507	10th	3rd
Africa	16.2	25.2	2.8	80419	2nd	2nd
Eastern Africa	20.1	34.5	3.8	31516	1st	1st
Middle Africa	13.3	23.0	2.5	8222	2nd	2nd
Northern Africa	5.2	6.6	0.7	5278	2nd	6th
Southern Africa	22.5	26.8	2.9	6500	2nd	1st
Western Africa	19.9	33.7	3.8	28903	2nd	2nd
Americas	17.3	15.3	1.6	80711	4th	2nd
Latin America & Caribbean	23.4	23.5	2.4	68220	2nd	2nd
Caribbean	22.5	20.8	2.1	4733	2nd	1st
Central America	20.6	22.2	2.2	15606	2nd	1st
South America	24.6	24.1	2.5	47881	2nd	2nd
Northern America	7.1	5.7	0.5	12491	13th	4th
Asia	15.6	15.3	1.6	312752	2nd	2nd
Central Asia	12.4	13.4	1.4	3798	2nd	2nd
Eastern Asia	11.9	9.6	0.9	90768	7th	2nd
Southern Asia	21.0	25.0	2.7	169854	1st	2nd
South-Eastern Asia	15.4	15.8	1.7	44404	2nd	2nd
Western Asia	3.6	4.5	0.5	3931	9th	6th
Europe	14.3	10.5	1.0	54323	7th	2nd
Eastern Europe	19.9	14.5	1.4	31013	4th	2nd
Northern Europe	10.7	8.3	0.7	5341	9th	3rd
Southern Europe	11.1	8.0	0.8	8651	10th	3rd
Western Europe	9.7	6.9	0.6	9318	14th	4th
Oceania	9.1	8.0	0.7	1595	10th	4th
Australia & New Zealand	6.3	5.0	0.4	799	14th	5th
Melanesia	17.5	23.7	2.3	724	1st	1st
Micronesia	8.5	9.5	1.0	24	4th	2nd
Polynesia	14.9	16.7	1.8	48	3rd	3rd

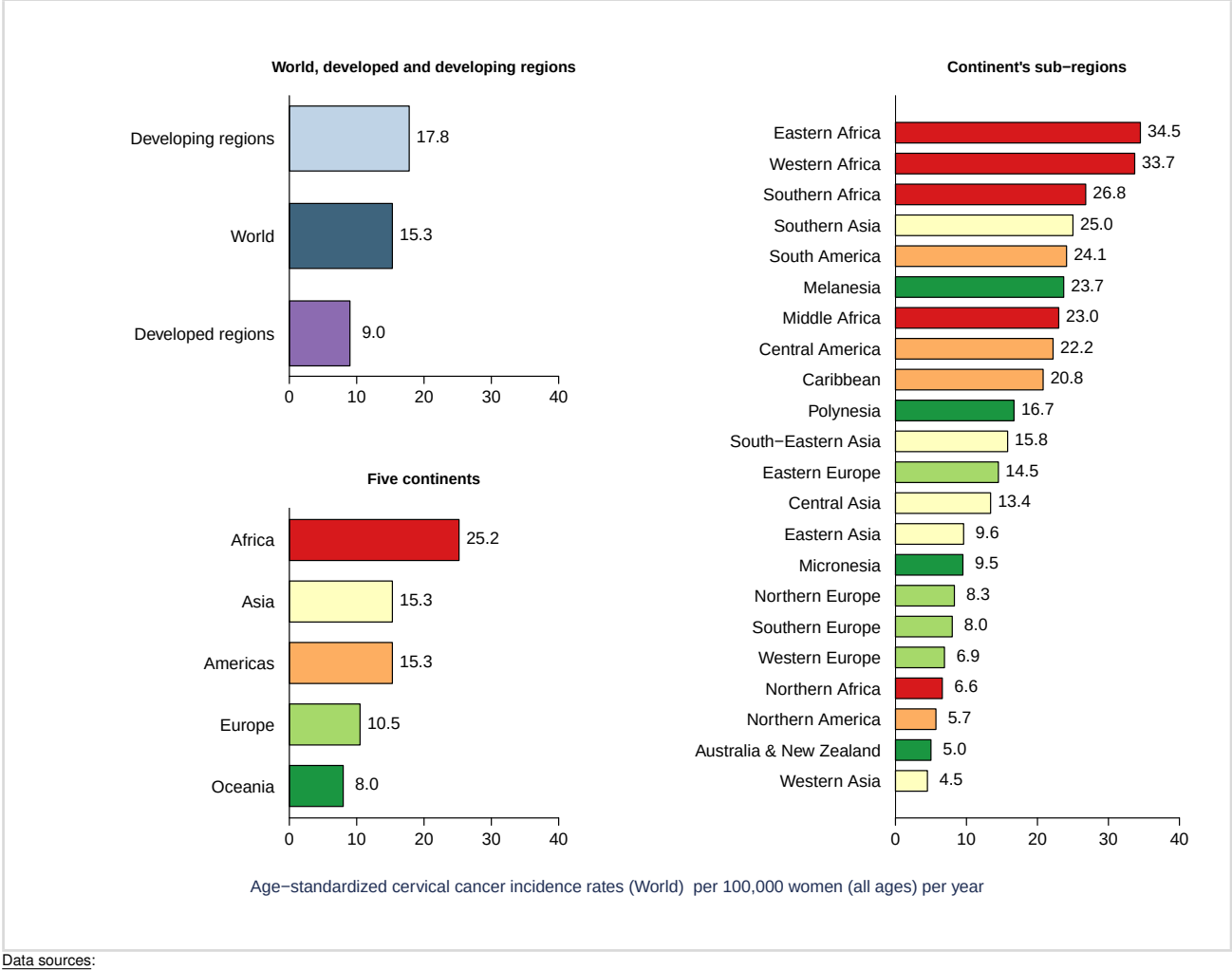
*ASR: Age-standardised rate; Cum. risk: Cumulative risk.
Rates per 100,000 women per year. Standardised rates have been estimated using the direct method and the World population as the reference.
†Ranking of cervical cancer incidence to other cancers among all women and women ages 15-44 years according to highest incidence rates (ranking 1st). Ranking is based on crude incidence rates (actual number of cervical cancer cases) in the country/region. Ranking using ASR may differ.
Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

Figure 5: World age-standardized incidence rates of cervical cancer



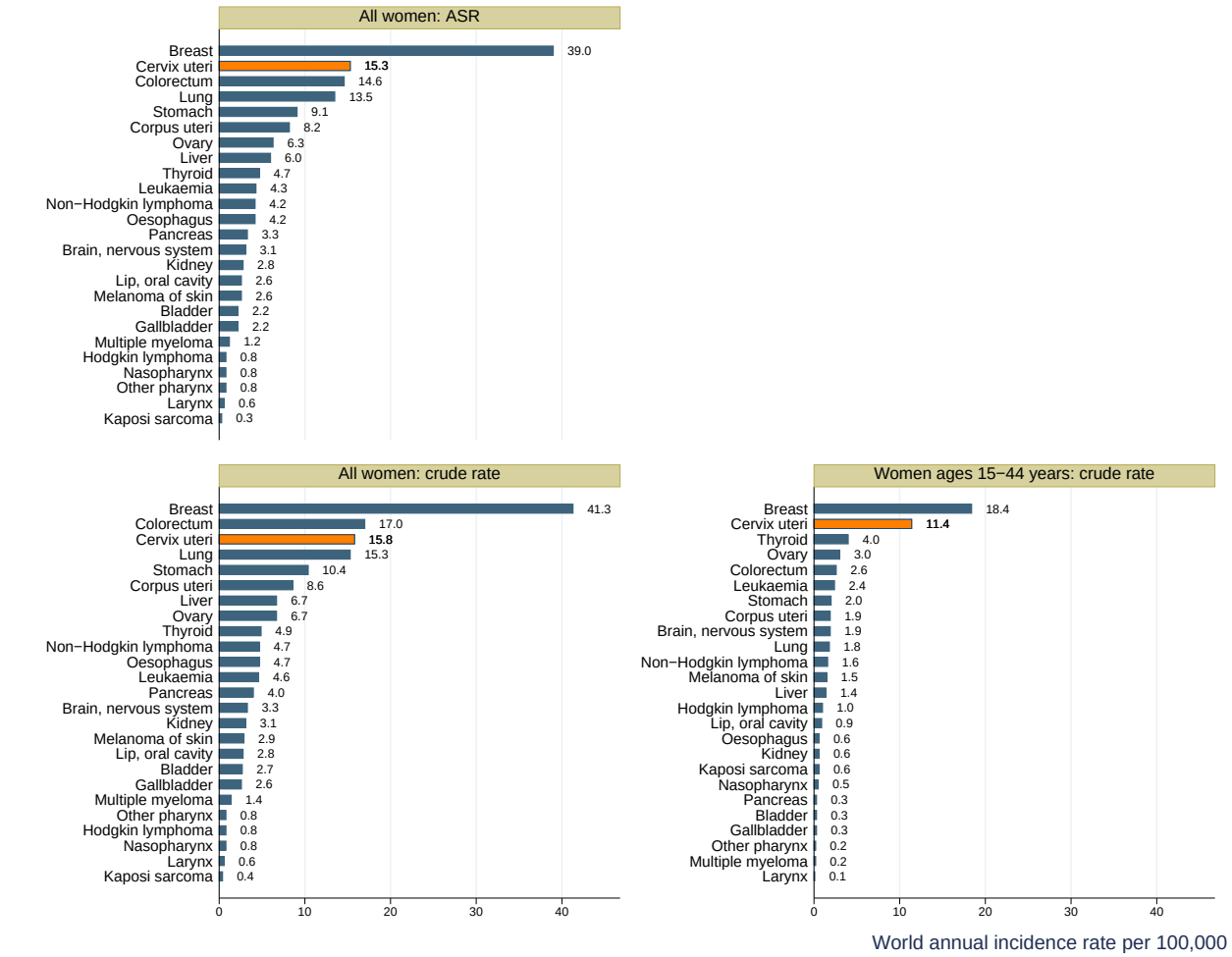
ASR, age-standardized incidence rate; Rates per 100,000 women per year.
Data sources:
IARC, Globocan 2008.

Figure 6: World age-standardized incidence rates of cervical cancer by region



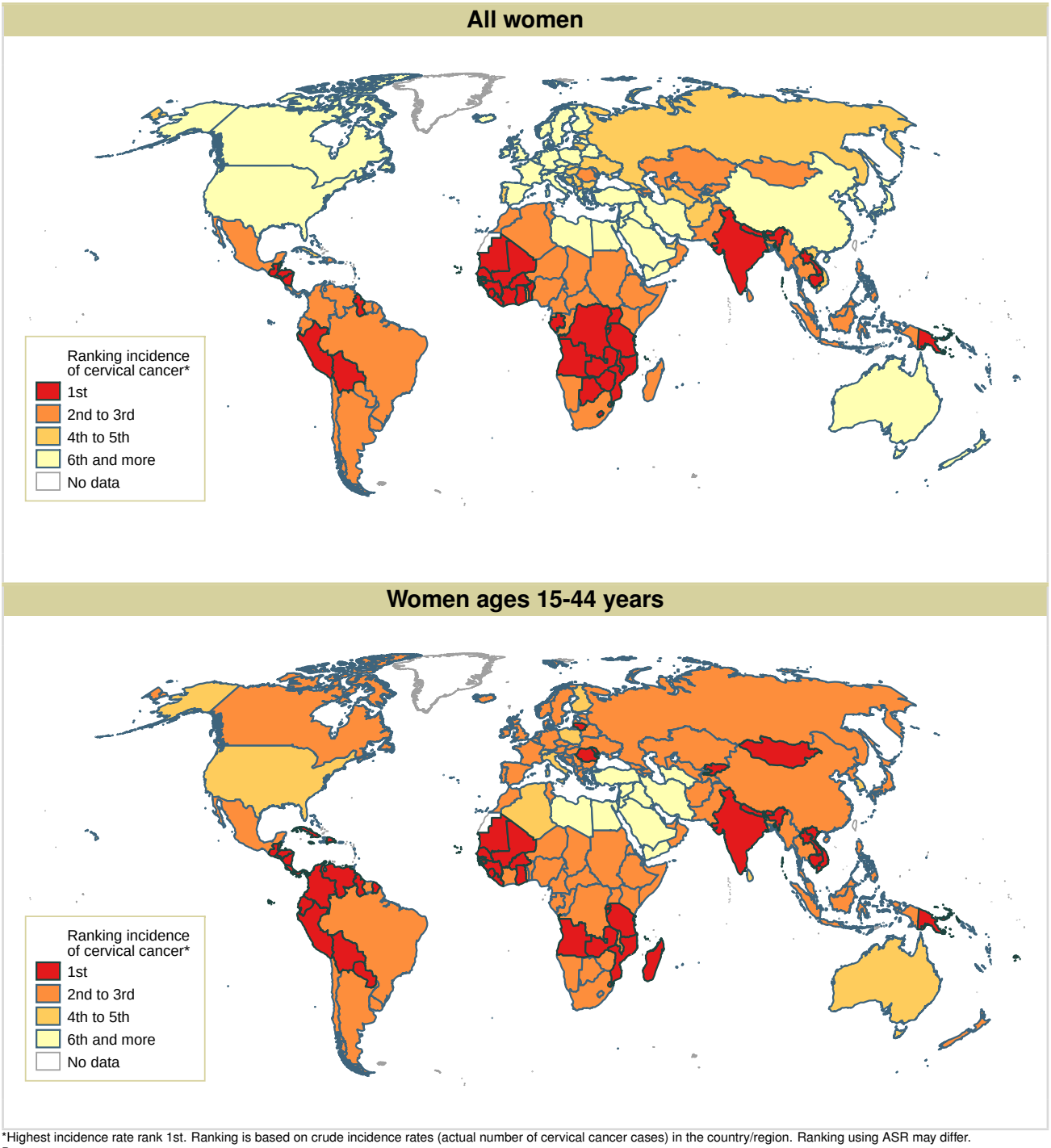
Data sources:
IARC, Globocan 2008.

Figure 7: Incidence of cervical cancer compared to other cancers in the World using crude and age-standardized rates (ASR) and by age



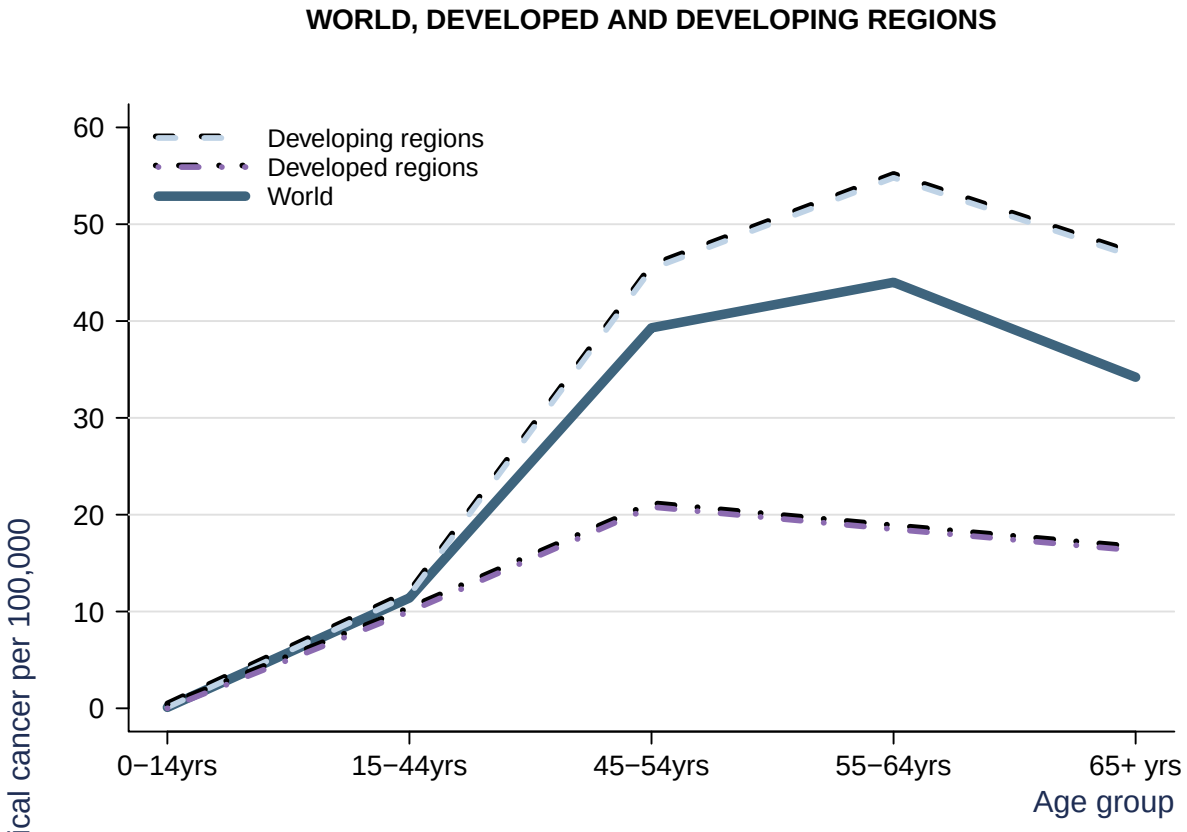
Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

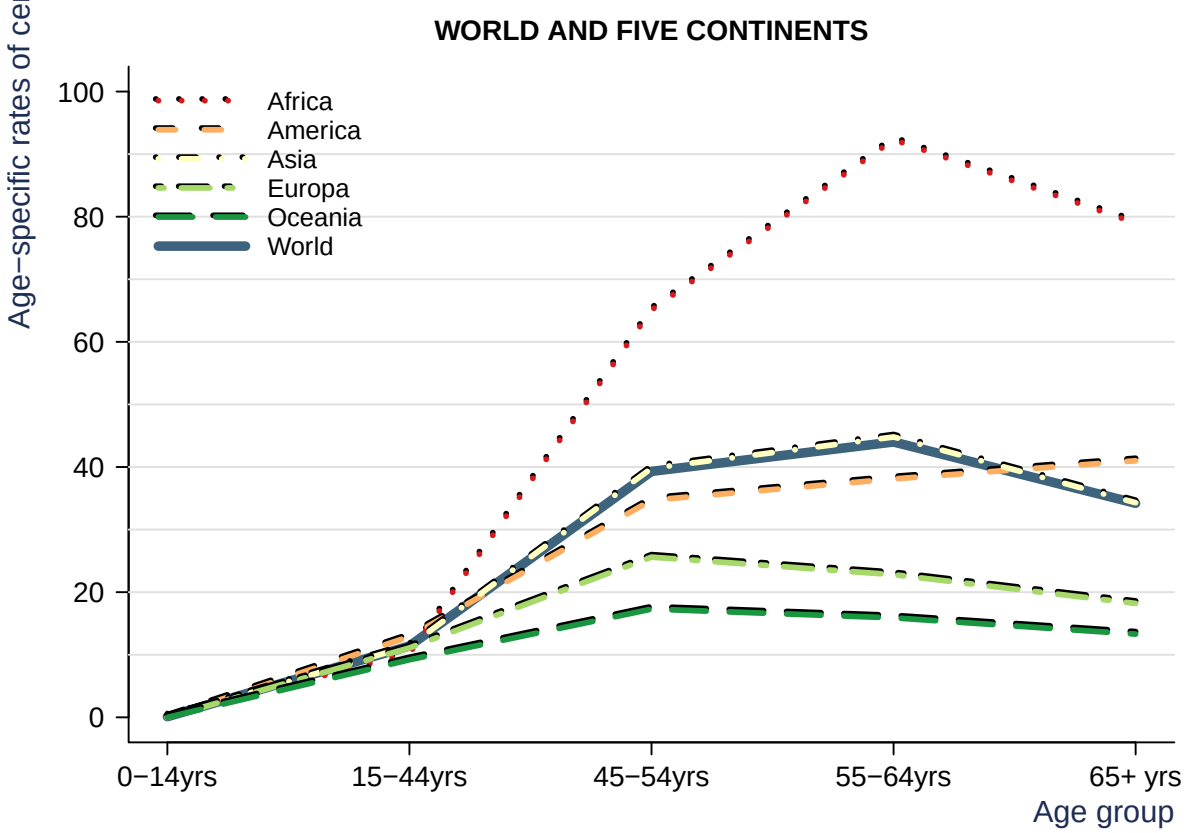
Figure 8: Ranking of cervical cancer to others cancers among all women and women ages 15-44 years, according to incidence rates in the World.



*Highest incidence rate rank 1st. Ranking is based on crude incidence rates (actual number of cervical cancer cases) in the country/region. Ranking using ASR may differ.
Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

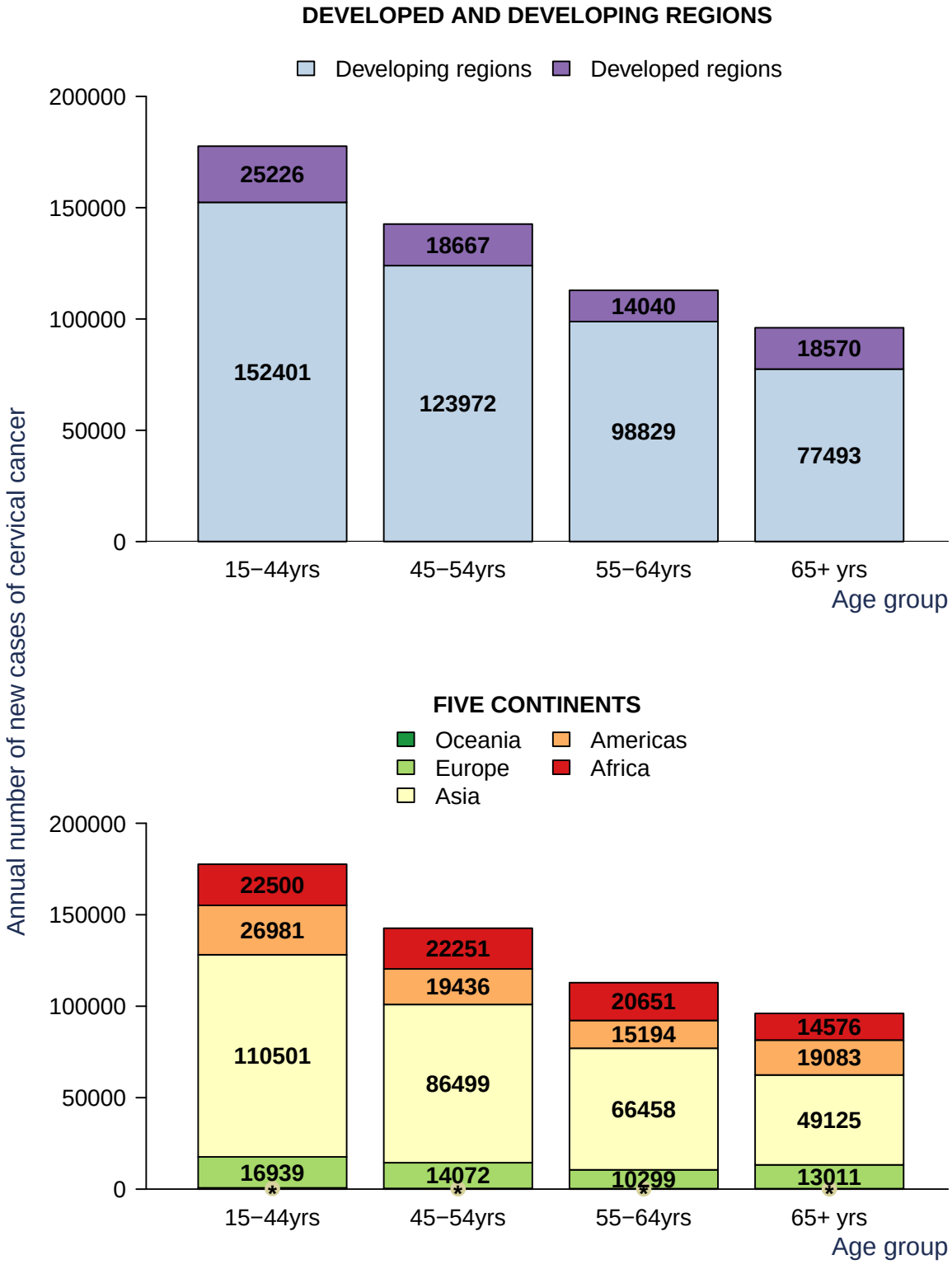
Figure 9: World age-specific incidence of cervical cancer compared to developed and developing regions and five continents





Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

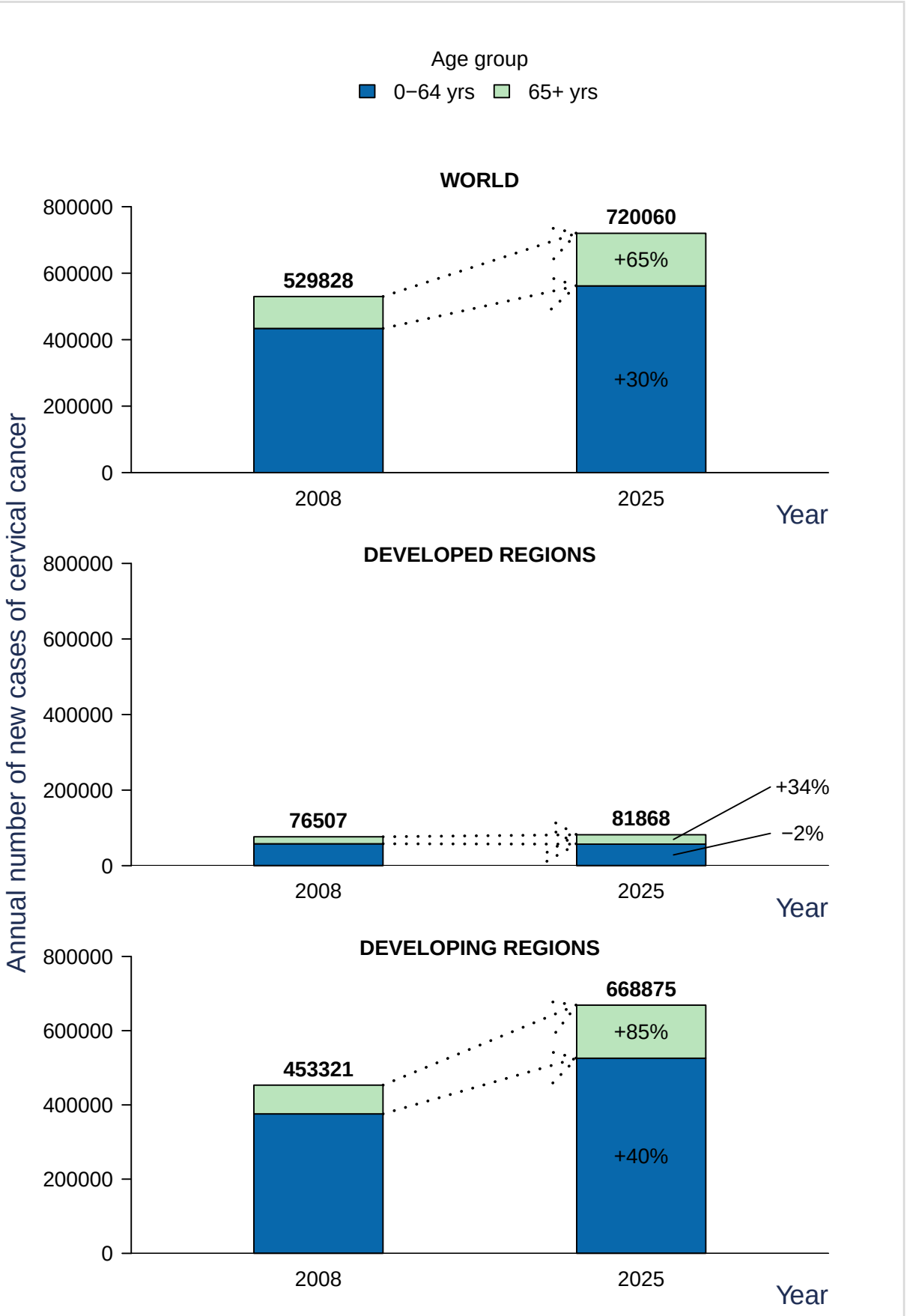
Figure 10: Annual number of new cases of cervical cancer by age group in developed and developing regions and five continents



** Oceania estimates: 689 cases(15−44yrs), 376 cases(45−54yrs), 264 cases(55−64yrs), 266 cases(65+ yrs)*

Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

Figure 11: Global estimated number of new cases of cervical cancer by age group compared to regions, in 2008 and projected in 2025



Projected burden in 2025 is estimated by applying current population forecasts for the country and assuming that current incidence rates of cervical cancer are constant over time.
Data sources:
IARC, Globocan 2008.

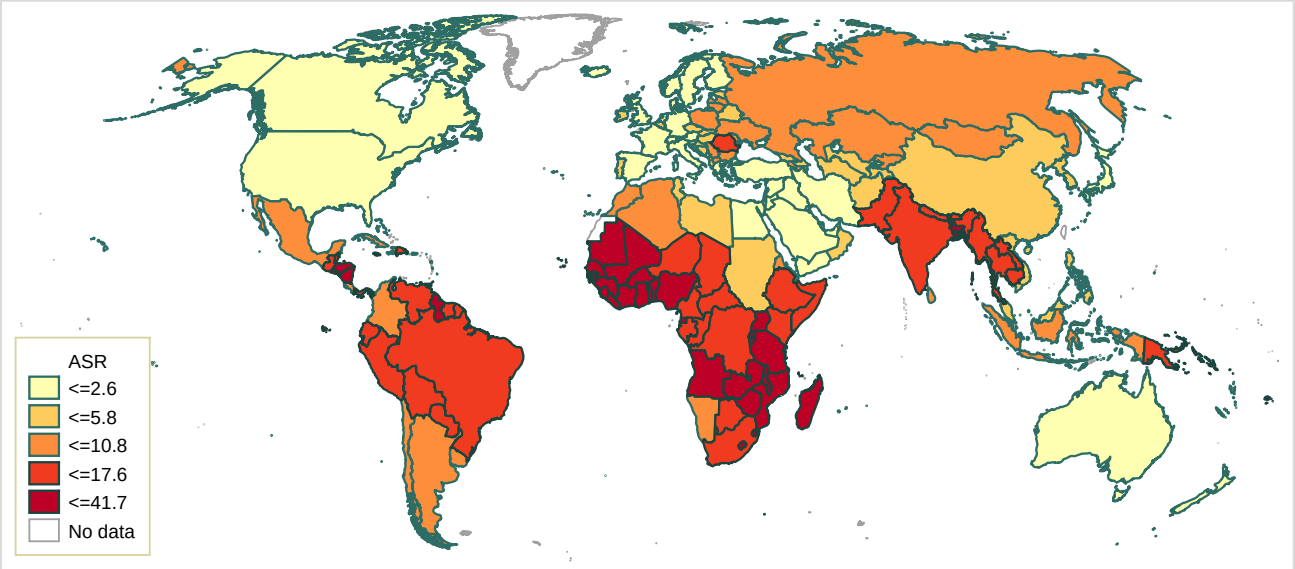
3.1.2 Mortality

Table 5: Mortality of cervical cancer by regions and sub-regions in the World

Region / Country	Crude rate	ASR*	Cum. risk*	N Deaths	Ranking of cervical cancer†	
					All women	Women 15-44 years
World	8.2	7.8	0.9	275128	4th	2nd
Developing regions	8.9	9.8	1.1	241969	2nd	2nd
Developed regions	5.2	3.2	0.3	33159	10th	2nd
Africa	10.8	17.6	2.1	53334	1st	2nd
Eastern Africa	13.8	25.3	3.0	21649	1st	2nd
Middle Africa	9.2	17.0	1.9	5705	1st	3rd
Northern Africa	3.0	4.0	0.5	3101	4th	8th
Southern Africa	12.0	14.8	1.7	3467	2nd	2nd
Western Africa	13.4	24.0	2.9	19412	1st	2nd
Americas	7.7	6.5	0.7	36125	4th	2nd
Latin America & Caribbean	10.9	10.8	1.2	31712	2nd	1st
Caribbean	10.7	9.4	1.0	2245	4th	2nd
Central America	10.1	11.1	1.2	7631	1st	1st
South America	11.2	10.8	1.2	21836	2nd	1st
Northern America	2.5	1.7	0.2	4413	15th	3rd
Asia	8.0	7.9	0.9	159774	4th	2nd
Central Asia	6.3	6.8	0.8	1927	3rd	2nd
Eastern Asia	5.2	3.9	0.4	39728	7th	6th
Southern Asia	11.6	14.4	1.6	93818	1st	1st
South-Eastern Asia	7.8	8.3	0.9	22497	3rd	2nd
Western Asia	1.7	2.1	0.2	1801	12th	10th
Europe	6.6	3.9	0.4	25102	7th	2nd
Eastern Europe	10.2	6.3	0.7	15817	6th	2nd
Northern Europe	4.2	2.4	0.2	2094	16th	3rd
Southern Europe	4.3	2.5	0.3	3397	13th	3rd
Western Europe	4.0	2.0	0.2	3794	15th	4th
Oceania	4.5	3.6	0.4	781	8th	2nd
Australia & New Zealand	2.3	1.4	0.1	294	17th	7th
Melanesia	11.2	16.6	1.6	463	1st	1st
Micronesia	2.8	3.4	0.4	8	7th	2nd
Polynesia	5.0	6.0	0.8	16	3rd	-

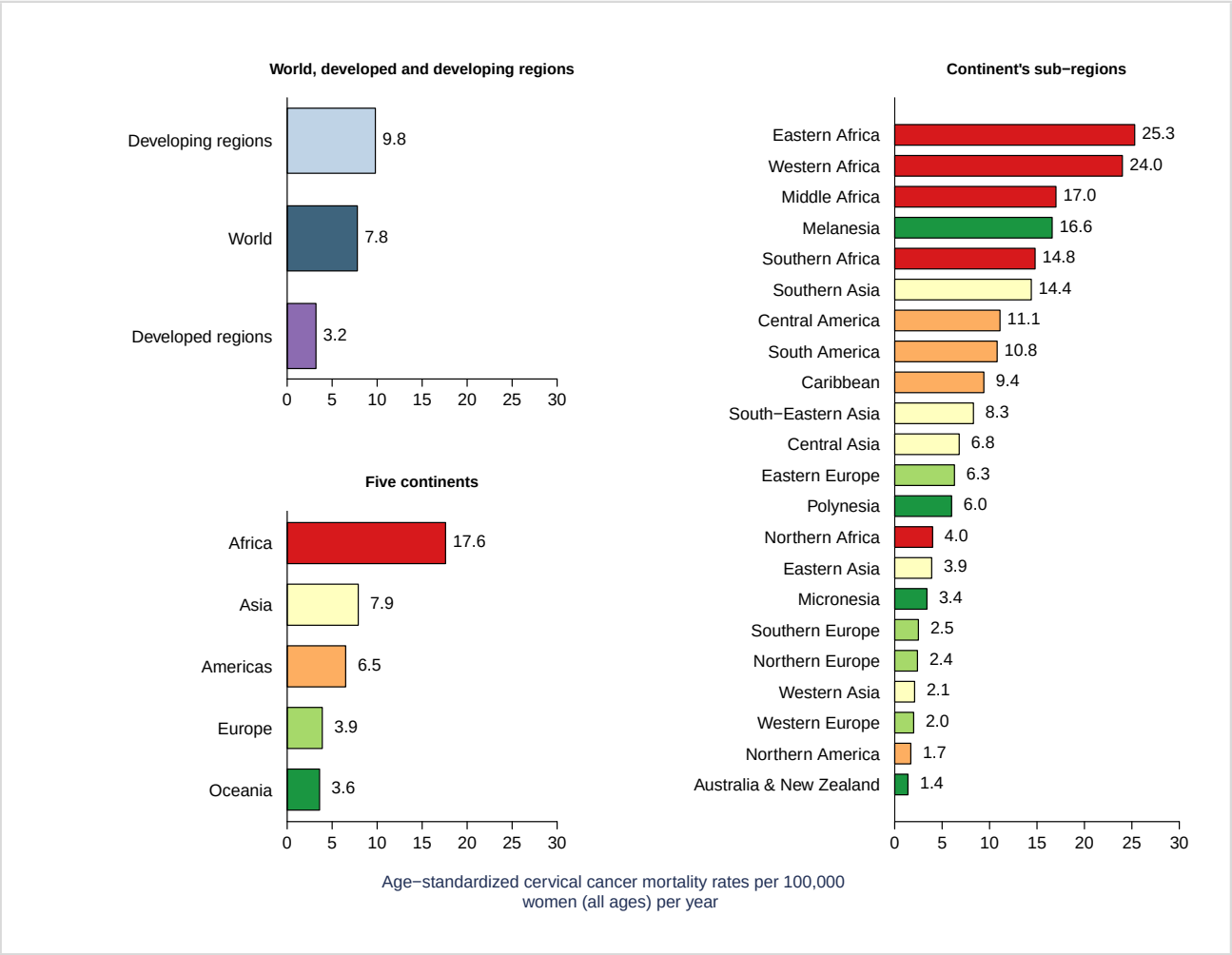
*ASR: Age-standardised rate; Cum. risk: Cumulative risk.
Rates per 100,000 women per year. Standardised rates have been estimated using the direct method and the World population as the reference.
†Ranking of cervical cancer mortality to other cancers among all women and women ages 15-44 years according to highest mortality rates (ranking 1st). Ranking is based on crude mortality rates (actual number of cervical cancer deaths) in the country/region. Ranking using ASR may differ.
Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

Figure 12: World age-standardized mortality rates of cervical cancer



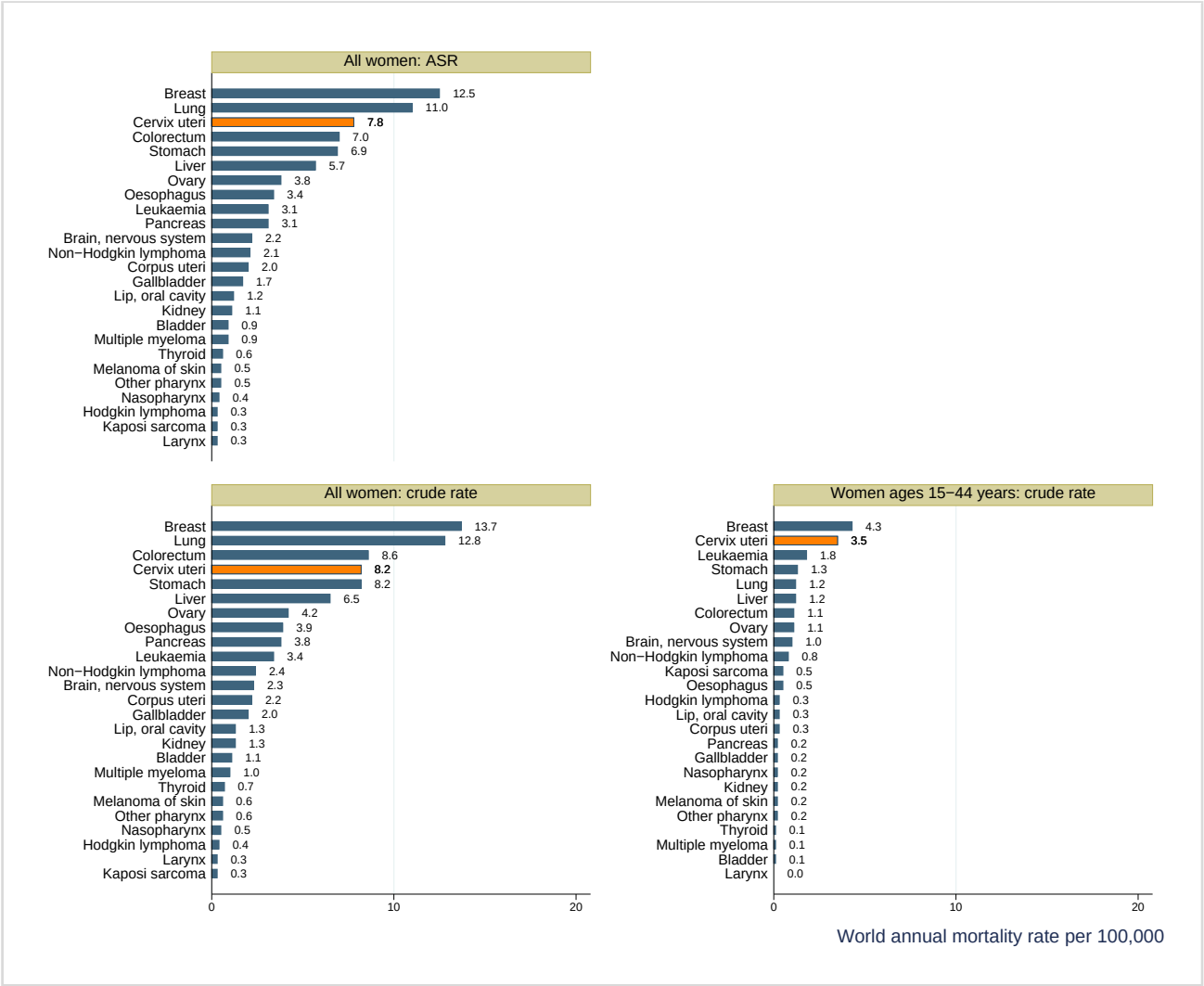
ASR, age-standardized rate; Rates per 100,000 women per year.
Data sources:
IARC, Globocan 2008.

Figure 13: World age-standardized mortality rates of cervical cancer by region



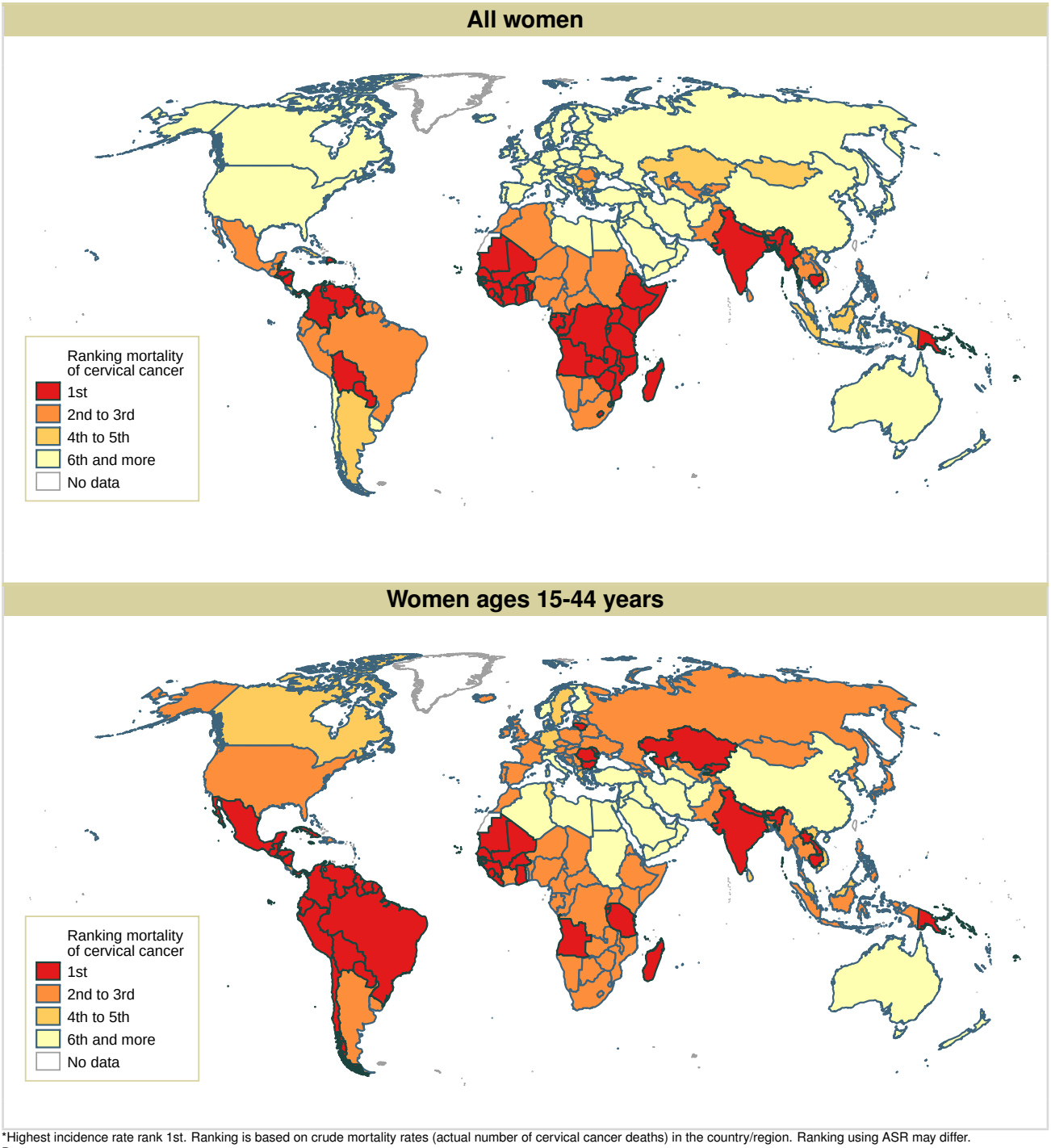
Data sources:
IARC, Globocan 2008.

Figure 14: Mortality of cervical cancer compared to other cancers in the World using crude and age-standardized rates (ASR) and by age



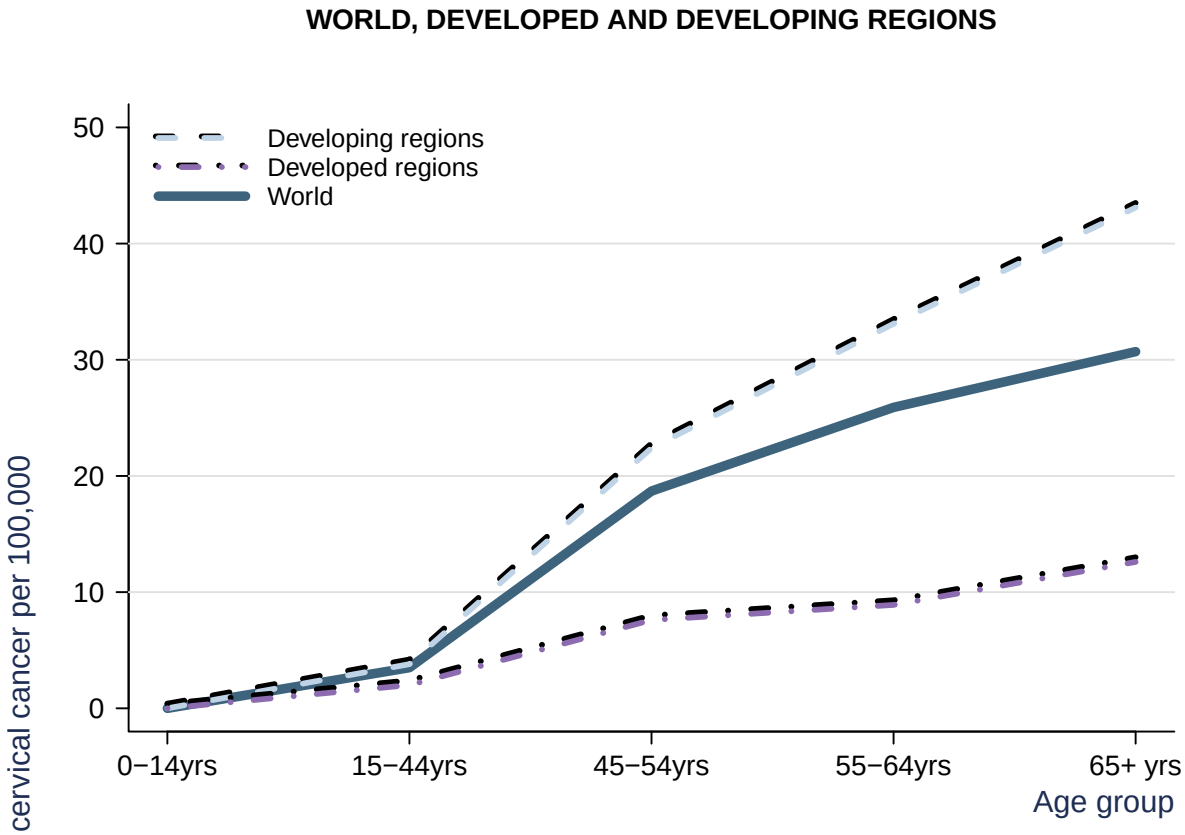
Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

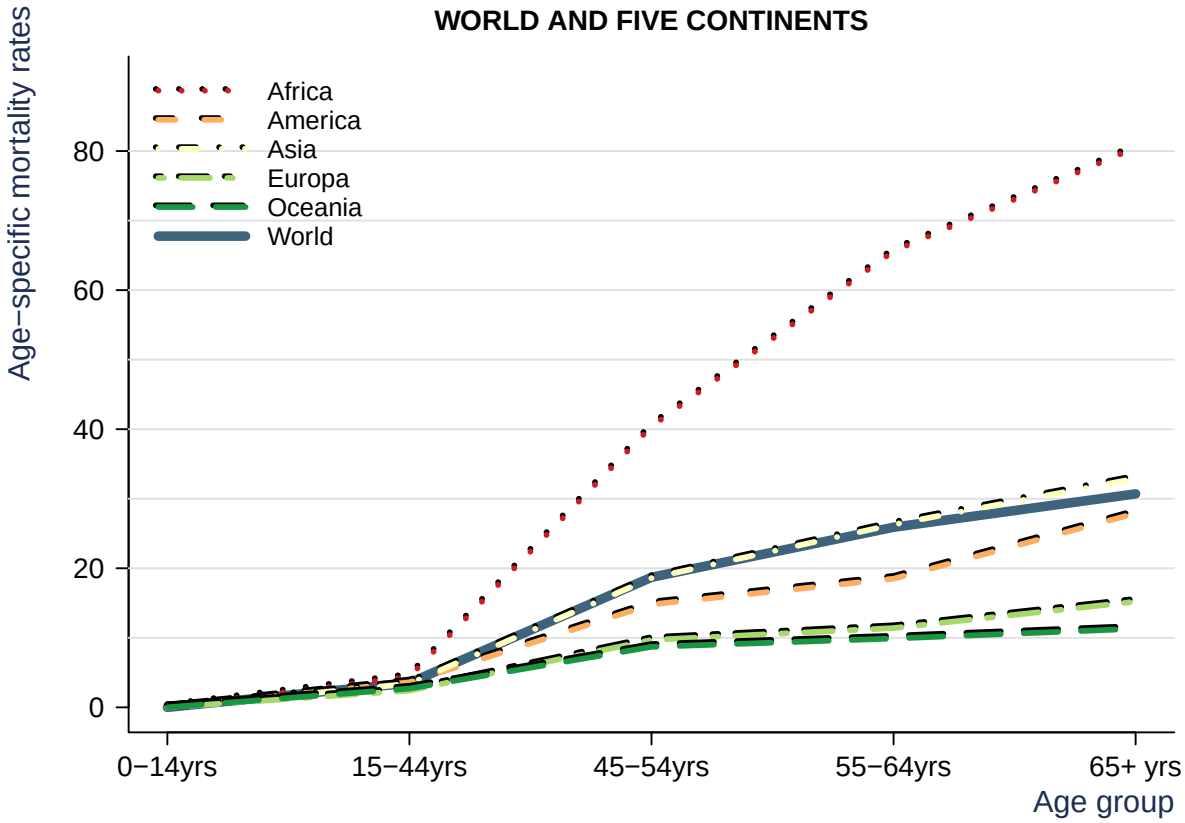
Figure 15: Ranking of cervical cancer to others cancers among all women and women ages 15-44 years according to mortality rates



*Highest incidence rate rank 1st. Ranking is based on crude mortality rates (actual number of cervical cancer deaths) in the country/region. Ranking using ASR may differ.
Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

Figure 16: World age-specific mortality of cervical cancer in the World compared to developed and developing regions and five continents

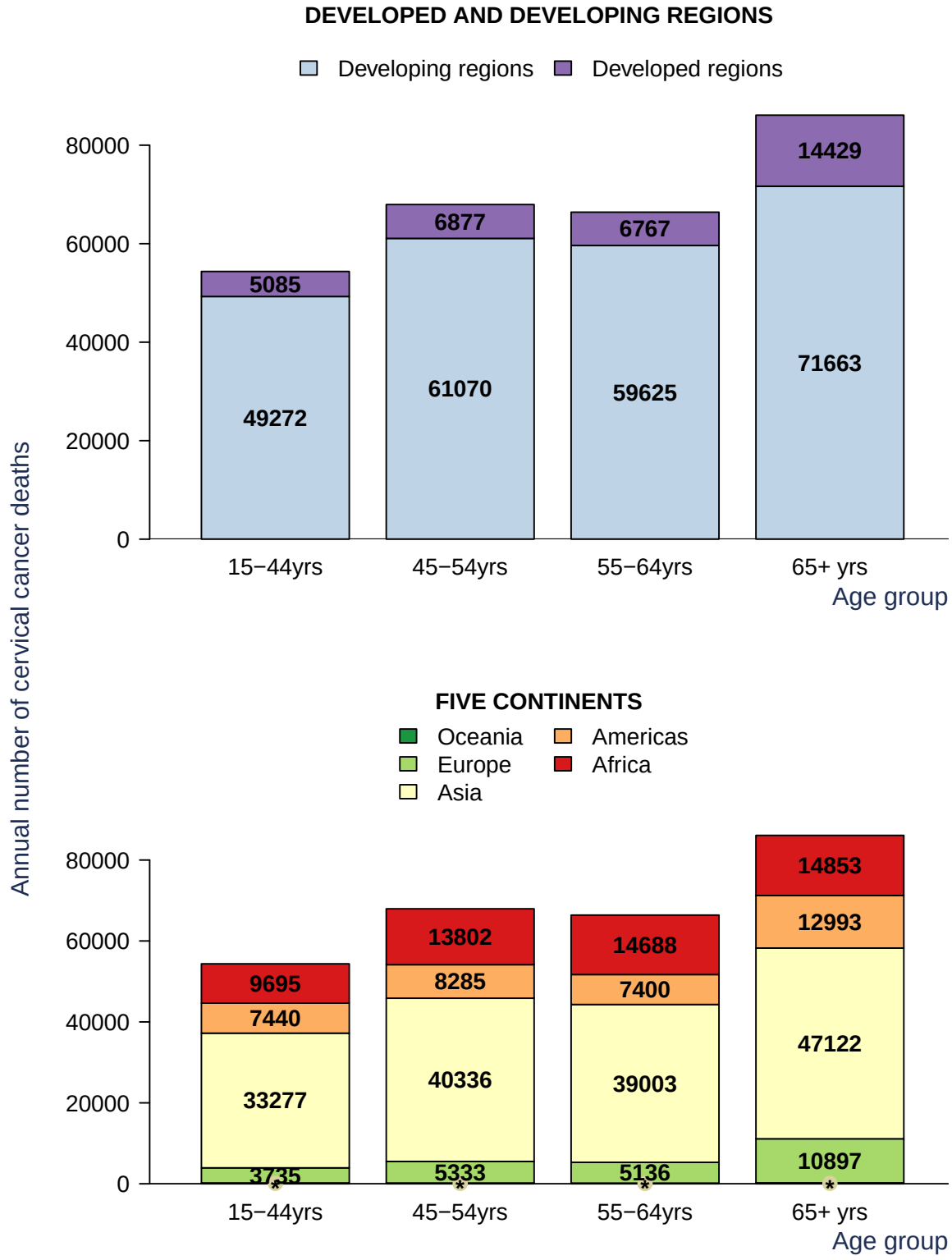




Age−specific mortality rates of cervical cancer per 100,000

Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

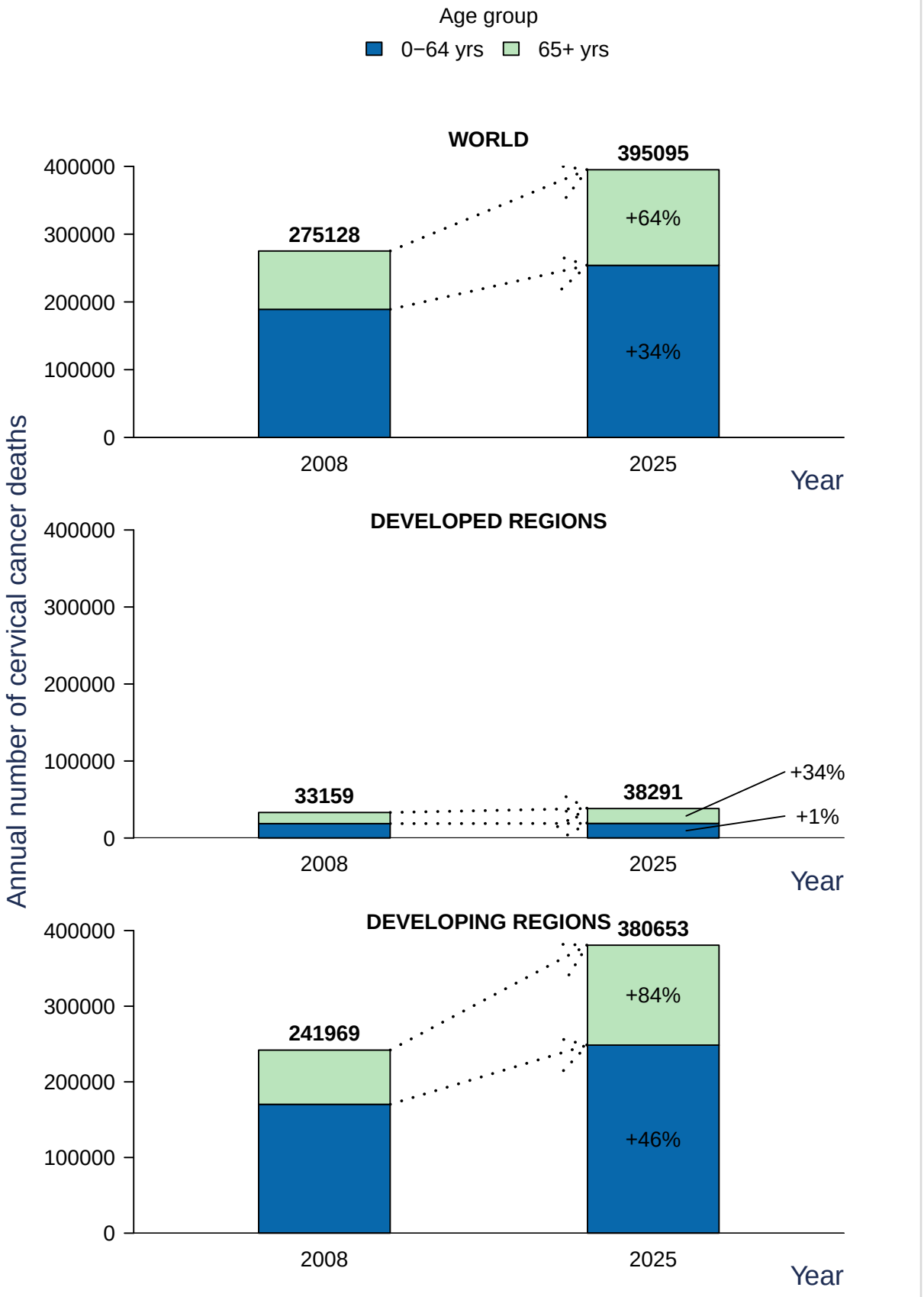
Figure 17: Annual number of deaths of cervical cancer by age group in developed and developing regions and five continents



** Oceania estimates: 203 cases(15−44yrs), 189 cases(45−54yrs), 164 cases(55−64yrs), 225 cases(65+ yrs)*

Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.

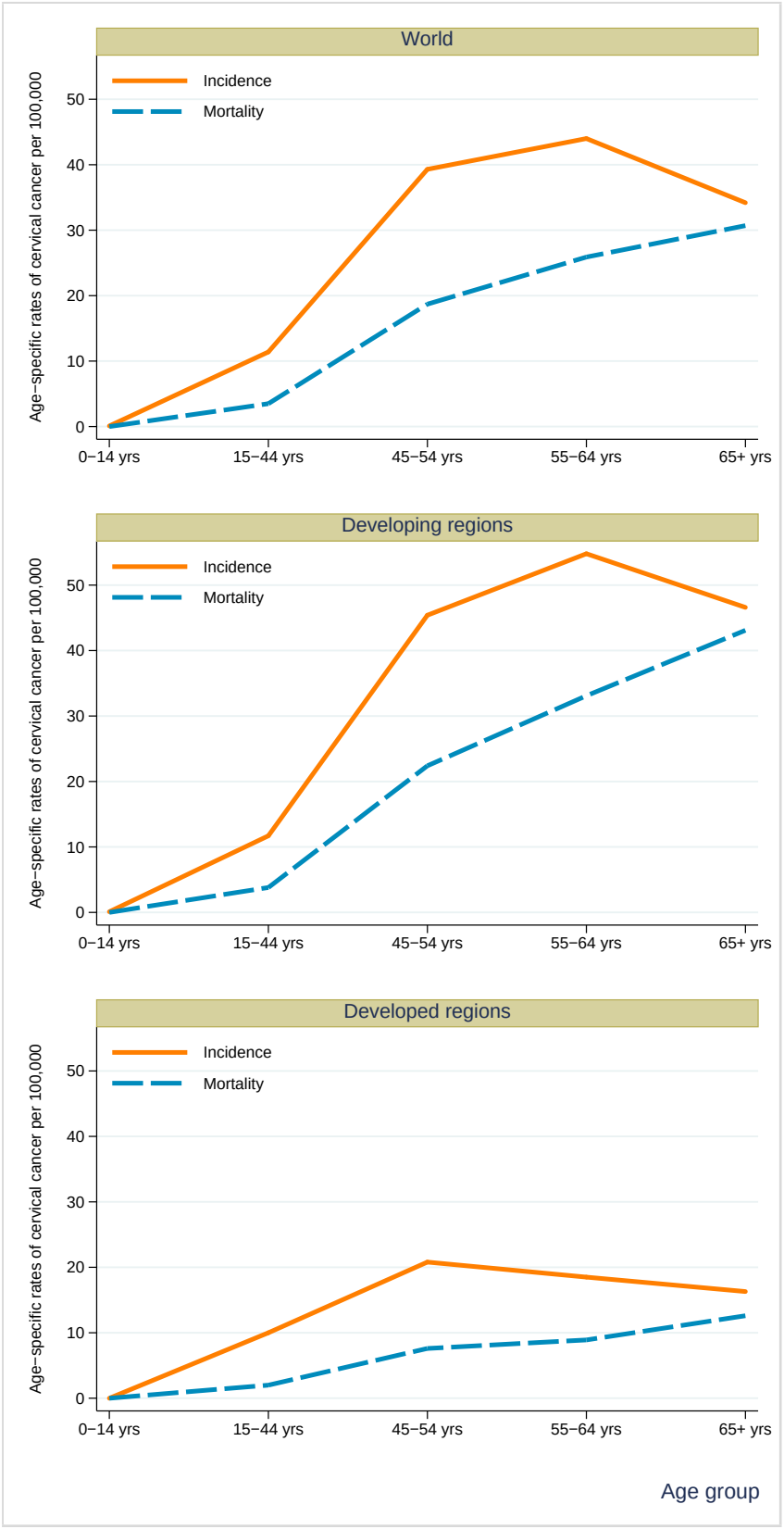
Figure 18: Global estimated number of deaths of cervical cancer by age group compared to regions, in 2008 and projected in 2025



Projected burden in 2025 is estimated by applying current population forecasts for the country and assuming that current mortality rates of cervical cancer are constant over time.
Data sources:
IARC, Globocan 2008.

3.1.3 Comparison of incidence and mortality

Figure 19: Global age-specific incidence and mortality rates of cervical cancer compared to developing and developed regions



Rates per 100,000 women per year.
Data sources:
IARC, Globocan 2008. Age-specific data from GLOBOCAN 2008 were obtained from IARC, personal communication.
For specific estimation methodology refer to http://globocan.iarc.fr/DataSource_and_methods.asp.

3.2 Anogenital cancers other than the cervix

Data on the role of HPV in anogenital cancers other than the cervix are limited, but there is an increasing body of evidence strongly linking HPV DNA with cancers of the anus, vulva, vagina, and penis. Although these cancers are much less frequent compared to cancer of the cervix, their association with HPV make them potentially preventable and subject to similar preventative strategies as those for cervical cancer.
(*Vaccine 2006, Vol. 24, Supl 3; Vaccine 2008, Vol. 26, Supl 10; IARC Monographs 2007, Vol. 90*)

3.2.1 Anal cancer

Cancer of the anus is rare, with an estimated 99,000 new cases in 2002, 40% of cases in men and 60% in women. Incidence has been increasing in both men and women over the last five decades, and incidence is particularly high among populations of men who have sex with men (MSM) and those who are HIV-infected. These cancers are predominantly squamous cell carcinoma, adenocarcinomas, or basaloid and cloacogenic carcinomas.

3.2.2 Vulvar cancer

Cancer of the vulva is rare among women worldwide, with an estimated 26,800 new cases in 2002, representing 3% of all gynaecologic cancers. Worldwide, about 60% of all vulvar cancer cases occur in developed countries, indicating the limited impact of cervical screening programmes to prevent vulvar and vaginal cancers. Vulvar cancer is common in older women with approximately 66% of cases diagnosed at >=70 years. The majority of vulvar cancer cases are squamous cell carcinoma (90%), followed by melanoma, Bartholin gland carcinoma, basal cell carcinoma, verrucous carcinoma, and Paget's disease.

3.2.3 Vaginal cancer

Cancer of the vagina is a rare cancer, with an estimated 13,200 of new cases in 2002, representing 2% of all gynaecologic cancers. Similar to cervical cancer, the majority of vaginal cancer cases (68%) occur in developing countries. Most vaginal cancers are squamous cell carcinoma (90%), followed by clear cell adenocarcinomas and melanoma. There are few data available on vaginal cancers, which are primarily reported in developed countries, and in some settings, metastatic cervical cancer can be misclassified as cancer of the vagina. Vaginal cancer is diagnosed primarily in older women (>=65 years) with a median age at diagnosis of 69 years, and the incidence of carcinoma in situ is diagnosed between the ages of 55 and 70 years.

3.2.4 Penile cancer

Cancer of the penis represents less than 0.5% of cancers in men. Incidence rates are less than 1 per 100,000 in Western countries, with higher rates found in Latin America such as Brazil, Colombia, and Peru, Uganda, and specific regions in India and Thailand. A geographical correlation between the incidence of cancer of the penis and cervix and the concordance of these two cancers in married couples suggested the common aetiology of HPV. Cancers of the penis are primarily of the squamous cell histological type.

3.3 Head and neck cancers

About 400,000 new cases of the oral cavity and the pharynx (excluding nasopharynx) and 223,000 deaths occurred worldwide in 2008. Two-thirds of cases occurred in developing countries. The majority of head and neck cancers is associated with high tobacco and alcohol consumption. However, there are about 15-20% of head and neck cancer cases that are associated with HPV and there is

growing evidence that these HPV-related cases, particularly oral pharyngeal cancers, are associated with sexual behaviour including the practice of oral sex.

4 HPV related statistics

Human papillomavirus infection is commonly found in the anogenital tract of men and women with and without clinical lesions. The aetiological role of HPV infection among women with cervical cancer is well-established, and there is growing evidence of its central role in other anogenital sites. This section presents the HPV burden at each of the anogenital tract sites. The methodologies used to compile the information on HPV burden are derived from systematic reviews and meta-analyses of the literature. Due to the limitations of HPV DNA detection methods and study designs used, these data should be interpreted cautiously and used only as a guidance to assess the burden of HPV infection in the population. (*Vaccine 2006, Vol. 24, Supl 3; Vaccine 2008, Vol. 26, Supl 10; IARC Monographs 2007, Vol. 90*)

4.1 HPV burden in women with normal cytology, precancerous cervical lesions or invasive cervical cancer

The statistics shown in this section focus on HPV infection in the cervix uteri. HPV cervical infection results in cervical morphological lesions ranging from normalcy (cytologically normal women) to different stages of precancerous lesions (CIN-1, CIN-2, CIN-3/CIS) and invasive cervical cancer. HPV infection is measured by means of HPV DNA detection in cervical cells (fresh tissue, paraffin embedded or exfoliated cells).

The prevalence of HPV increases with severity of the lesion. HPV causes virtually 100% of cases of cervical cancer, and an underestimation of HPV prevalence in cervical cancer is most likely due to the limitations of study methodologies. Worldwide, HPV-16 and 18, the two vaccine-preventable types. contribute to over 70% of all cervical cancer cases, between 41%-67% of high-grade cervical lesions and 16-32% of low-grade cervical lesions. After HPV-16/18, the six most common HPV types are the same in all world regions, namely 31, 33, 35, 45, 52 and 58; these account for an additional 20% of cervical cancers worldwide (*Clifford G et al. Vaccine 2006;24(S3):26-34*).

HPV is also responsible for other benign genital infections such as recurrent juvenile respiratory papillomatosis and genital warts, both mainly caused by HPV types 6 and 11 (*Lacey CJ et al. Vaccine 2006; 24(S3):35-41*).

4.1.1 Terminology

Cytologically normal women

No abnormal cells are observed on the surface of their cervix upon cytology.

Cervical Intraepithelial Neoplasia (CIN) / Squamous Intraepithelial Lesions (SIL)

SIL and CIN are two commonly used terms to describe precancerous lesions or the abnormal growth of squamous cells observed in the cervix. SIL is an abnormal result derived from cervical cytological screening or Pap smear testing. CIN is a histological diagnosis made upon analysis of cervical tissue obtained by biopsy or surgical excision.

Low-grade cervical lesions (LSIL/CIN-1)

Low-grade cervical lesions are defined by early changes in size, shape, and number of abnormal cells formed on the surface of the cervix and may be referred to as mild dysplasia, LSIL, or CIN-1.

High-grade cervical lesions (HSIL/ CIN-2 / CIN-3 / CIS)

High-grade cervical lesions are defined by a large number of precancerous cells on the surface of the cervix that are distinctly different from normal cells. They have the potential to become cancerous cells and invade deeper tissues of the cervix. These lesions may be referred to as moderate or severe dysplasia, HSIL, CIN-2, CIN-3, or cervical carcinoma in situ (CIS).

Carcinoma in situ (CIS)

Cancerous cells are confined to the cervix and have not spread to other parts of the body.

Invasive cervical cancer (ICC) / Cervical cancer

If the high-grade precancerous cells invade deeper tissues of the cervix or to other tissues or organs, then the disease is called invasive cervical cancer or cervical cancer.

Invasive squamous cell carcinoma

Invasive carcinoma composed of cells resembling those of squamous epithelium.

Adenocarcinoma

Invasive tumour with glandular and squamous elements intermingled.

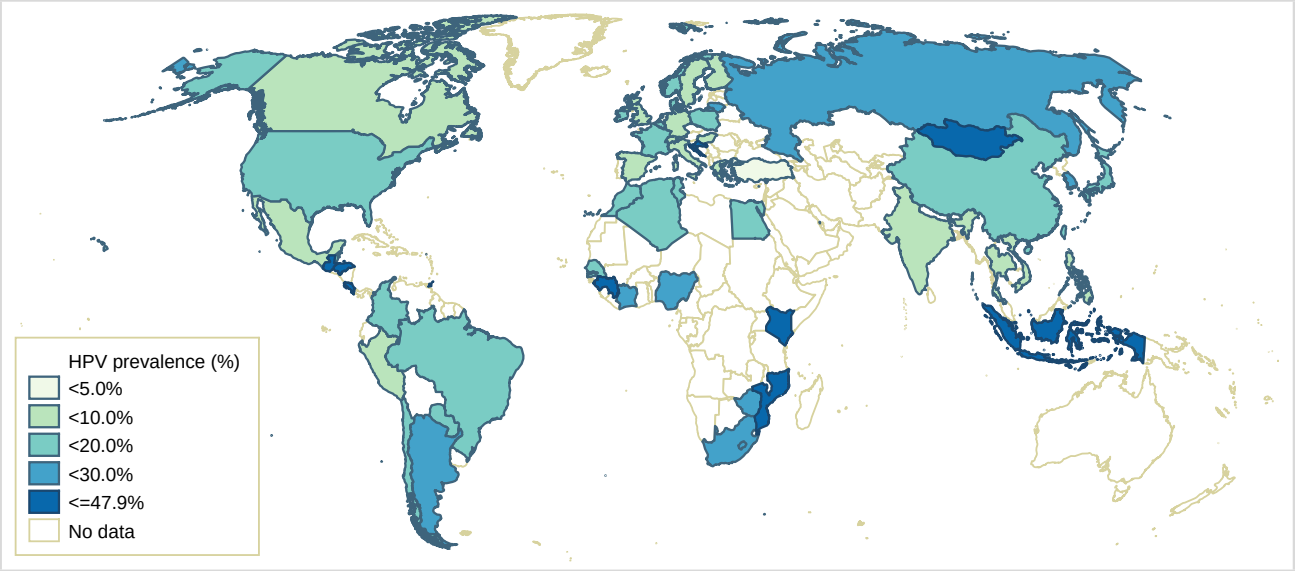
4.1.2 HPV prevalence in women with normal cytology

Table 6: Prevalence of HPV among women with normal cytology by regions and sub-regions in the World

Region	Number of women tested	HPV prevalence %	(95% CI)
World	436430	11.4	(11.3-11.5)
Developing regions	120008	14.3	(14.1-14.5)
Developed regions	315573	10.3	(10.2-10.4)
Africa	8568	21.3	(20.5-22.2)
Eastern Africa	751	33.6	(30.2-37.1)
Middle Africa	-	-	-
Northern Africa	863	10.9	(8.9-13.2)
Southern Africa	2485	21.0	(19.4-22.6)
Western Africa	4469	21.5	(20.3-22.8)
Americas	112675	14.5	(14.3-14.7)
Latin America & Caribbean	42495	17.6	(17.3-18.0)
Caribbean	212	35.4	(29.0-42.2)
Central America	24783	20.6	(20.1-21.1)
South America	17500	13.2	(12.7-13.7)
Northern America	64504	12.5	(12.3-12.8)
Asia	84710	10.9	(10.7-11.1)
Central Asia	-	-	-
Eastern Asia	55365	12.6	(12.3-12.9)
Southern Asia	23061	7.9	(7.5-8.2)
South-Eastern Asia	4849	8.4	(7.6-9.2)
Western Asia	1435	2.2	(1.5-3.1)
Europe	229628	9.7	(9.6-9.9)
Eastern Europe	4053	22.3	(21.0-23.6)
Northern Europe	97242	10.8	(10.6-11.0)
Southern Europe	41726	9.2	(8.9-9.4)
Western Europe	77445	7.3	(7.1-7.5)
Oceania	-	-	-
Australia & New Zealand	-	-	-
Melanesia	-	-	-
Micronesia	-	-	-
Polynesia	-	-	-

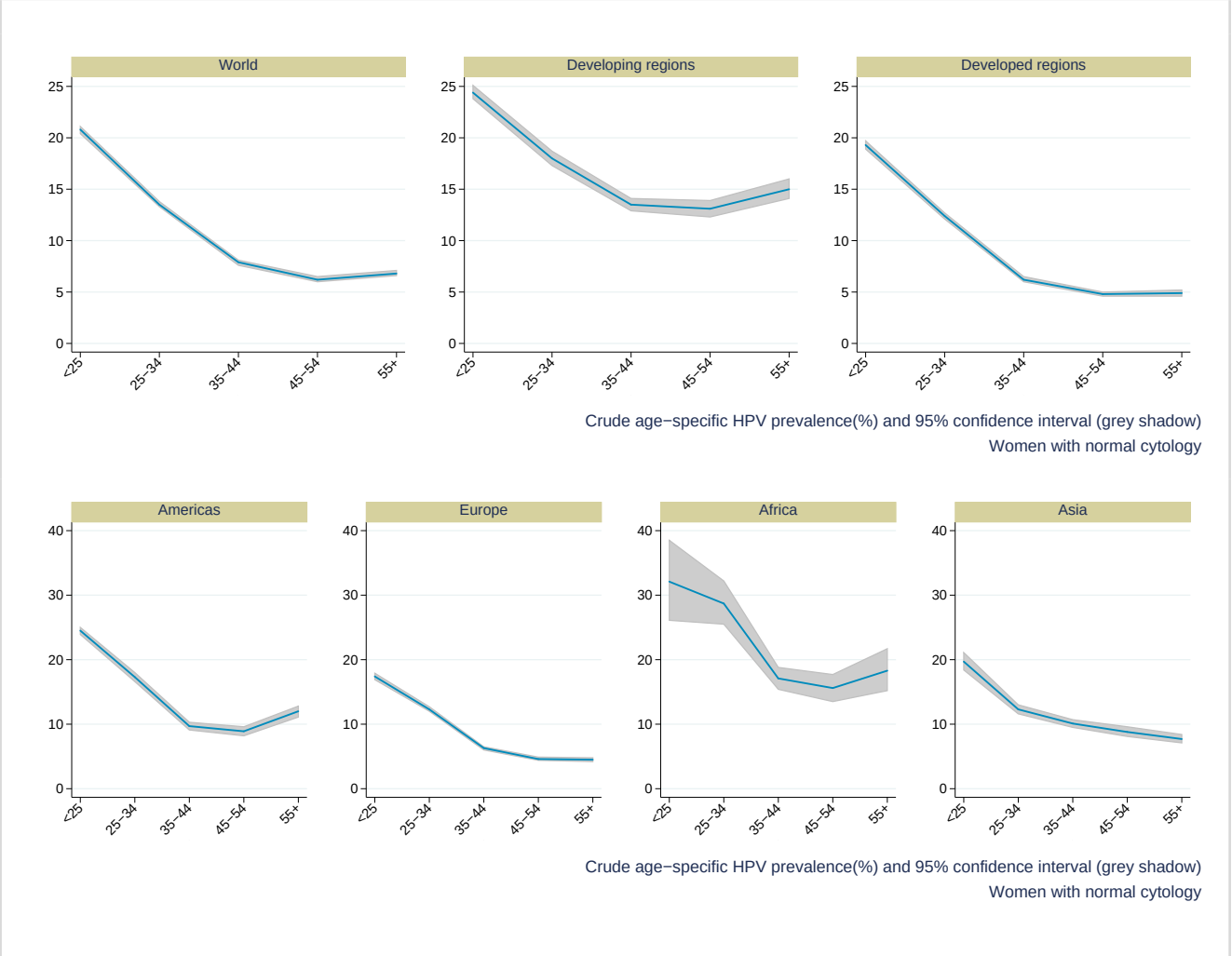
The samples for HPV testing come from cervical specimens (fresh / fixed biopsies or exfoliated cells).
95% CI: 95% Confidence Interval
Data sources:
See references in Section 8.

Figure 20: World prevalence of HPV among women with normal cytology



Data sources:
See references in Section 8.

Figure 21: Crude age-specific HPV prevalence in women with normal cytology in the World compared to developing and developed regions and five continents



Data sources:
See references in Section 8.

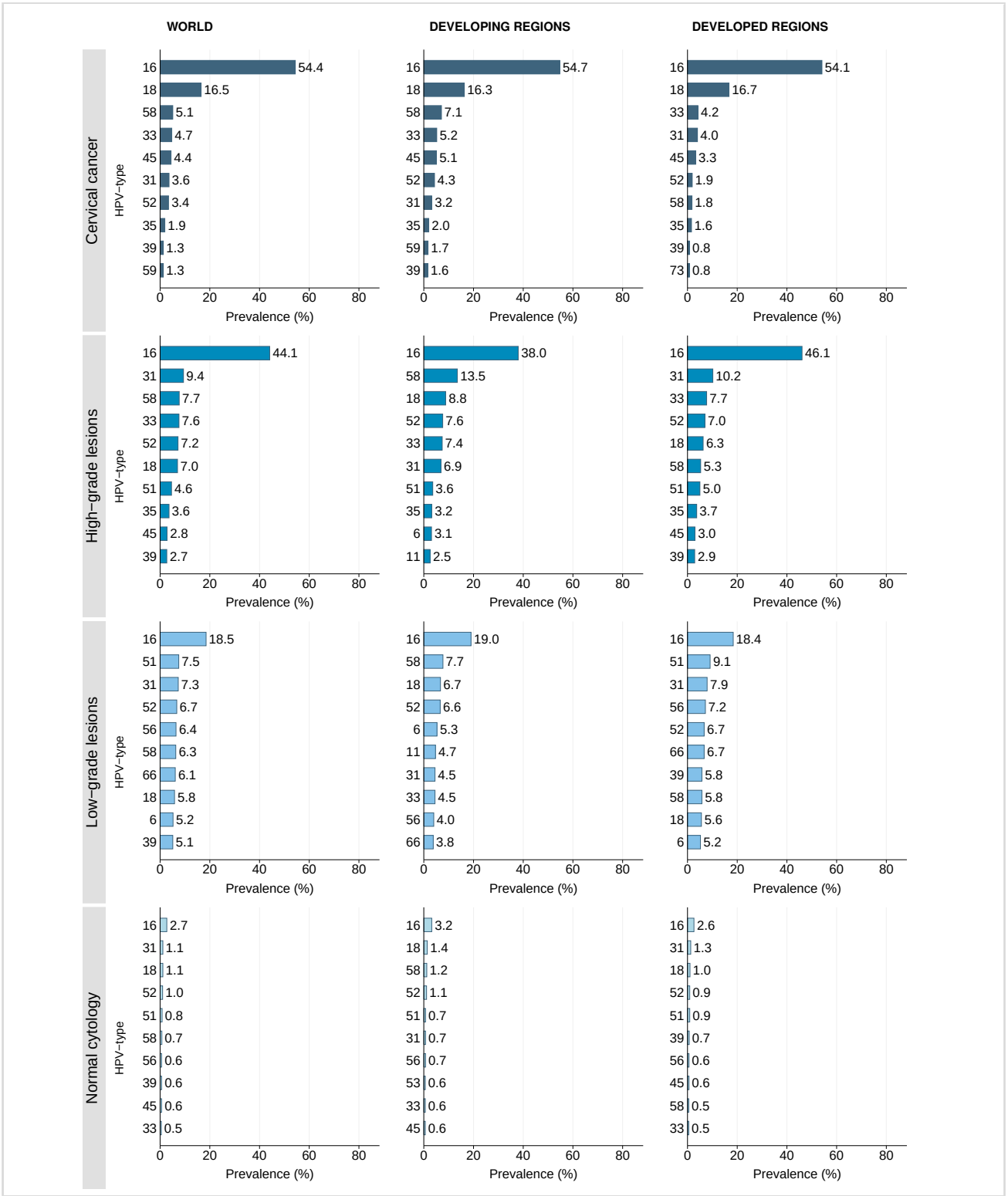
4.1.3 HPV type distribution among women with normal cytology, precancerous cervical lesions and cervical cancer

Table 7: Prevalence of HPV 16/18 in women with normal cytology, precancerous cervical lesions and invasive cervical cancer by regions and sub-regions in the World

Country /Region		Normal cytology		Low-grade lesions[a]		High-grade lesions[b]		Cervical cancer	
		No. tested	HPV Prev % (95%CI)	No. tested	HPV Prev % (95%CI)	No. tested	HPV Prev % (95%CI)	No. tested	HPV Prev % (95%CI)
World		218339	3.8 (3.7-3.9)	14762	24.3 (23.6-25.0)	14901	51.1 (50.3-51.9)	22826	70.9 (70.3-71.5)
Developing regions		55381	4.6 (4.4-4.8)	3048	25.7 (24.1-27.3)	3801	46.8 (45.2-48.4)	12500	71.0 (70.2-71.8)
Developed regions		162958	3.6 (3.5-3.7)	11754	24.0 (23.2-24.8)	11100	52.4 (51.5-53.3)	10326	70.8 (69.9-71.7)
Africa		5872	4.5 (4.0-5.1)	358	22.3 (18.1-27.0)	335	49.6 (44.1-55.0)	1940	69.7 (67.6-71.7)
	Eastern Africa	556	6.7 (4.7-9.1)	30	20.0 (7.7-38.6)	29	37.9 (20.7-57.7)	1080	74.8 (72.1-77.4)
	Middle Africa	-	- -	-	- -	-	- -	-	- -
	Northern Africa	707	4.3 (2.9-6.0)	-	- -	-	- -	335	72.5 (67.4-77.2)
	Southern Africa	1216	3.6 (2.6-4.8)	15	26.6 (7.8-55.1)	168	58.4 (50.5-65.9)	307	62.8 (57.2-68.3)
	Western Africa	3393	4.6 (3.9-5.4)	313	22.3 (17.9-27.4)	138	41.3 (33.0-50.0)	218	50.0 (43.2-56.8)
Americas		30439	6.3 (6.0-6.6)	5405	24.8 (23.6-26.0)	3839	52.4 (50.8-54.0)	3634	70.7 (69.2-72.2)
	Latin America & Caribbean	18447	4.4 (4.1-4.7)	1404	22.3 (20.1-24.6)	1313	46.7 (44.0-49.4)	2042	66.4 (64.3-68.5)
	Caribbean	212	3.3 (1.3-6.7)	263	8.7 (5.6-12.8)	294	33.6 (28.3-39.4)	59	61.1 (47.4-73.5)
	Central America	12381	4.1 (3.8-4.5)	571	16.7 (13.7-20.0)	447	44.3 (39.6-49.0)	463	62.9 (58.3-67.3)
	South America	5854	5.2 (4.6-5.8)	570	34.3 (30.5-38.4)	572	55.3 (51.1-59.4)	1520	67.7 (65.3-70.0)
	Northern America	11992	9.2 (8.7-9.7)	4041	25.6 (24.2-27.0)	2526	55.2 (53.2-57.1)	1592	76.5 (74.3-78.6)
Asia		49928	3.5 (3.3-3.7)	1851	25.7 (23.7-27.8)	2647	44.8 (42.9-46.7)	10068	68.5 (67.6-69.4)
	Central Asia	-	- -	-	- -	-	- -	-	- -
	Eastern Asia	39292	3.2 (3.0-3.4)	1576	26.9 (24.7-29.2)	2408	45.6 (43.6-47.6)	7870	66.3 (65.2-67.3)
	Southern Asia	5696	6.0 (5.4-6.7)	63	33.3 (22.0-46.3)	32	59.3 (40.6-76.3)	925	82.3 (79.7-84.7)
	South-Eastern Asia	4849	3.2 (2.7-3.7)	212	14.2 (9.8-19.6)	207	33.3 (27.0-40.2)	1273	72.6 (70.0-75.0)
	Western Asia	91	2.2 (0.3-7.7)	-	- -	-	- -	-	- -
Europe		132100	3.3 (3.2-3.4)	7148	23.9 (22.9-24.9)	7730	53.0 (51.9-54.1)	6674	74.5 (73.4-75.5)
	Eastern Europe	3562	9.7 (8.8-10.7)	241	32.6 (26.9-39.1)	254	56.9 (50.8-63.3)	652	74.5 (71.0-77.8)
	Northern Europe	66151	3.8 (3.7-3.9)	1099	30.3 (27.6-33.1)	3202	57.0 (55.3-58.7)	2517	76.3 (74.6-77.9)
	Southern Europe	15592	4.0 (3.7-4.3)	4626	23.2 (22.0-24.4)	1943	38.4 (36.2-40.6)	1179	62.1 (59.2-64.9)
	Western Europe	46795	2.0 (1.9-2.1)	1276	20.8 (18.6-23.1)	2422	59.3 (57.3-61.3)	2352	78.7 (77.0-80.3)
Oceania		-	- -	-	- -	350	44.6 (39.3-49.9)	625	76.2 (72.6-79.5)
	Australia & New Zealand	-	- -	-	- -	350	44.6 (39.3-49.9)	625	76.2 (72.6-79.5)
	Melanesia	-	- -	-	- -	-	- -	-	- -
	Micronesia	-	- -	-	- -	-	- -	-	- -
	Polynesia	-	- -	-	- -	-	- -	-	- -

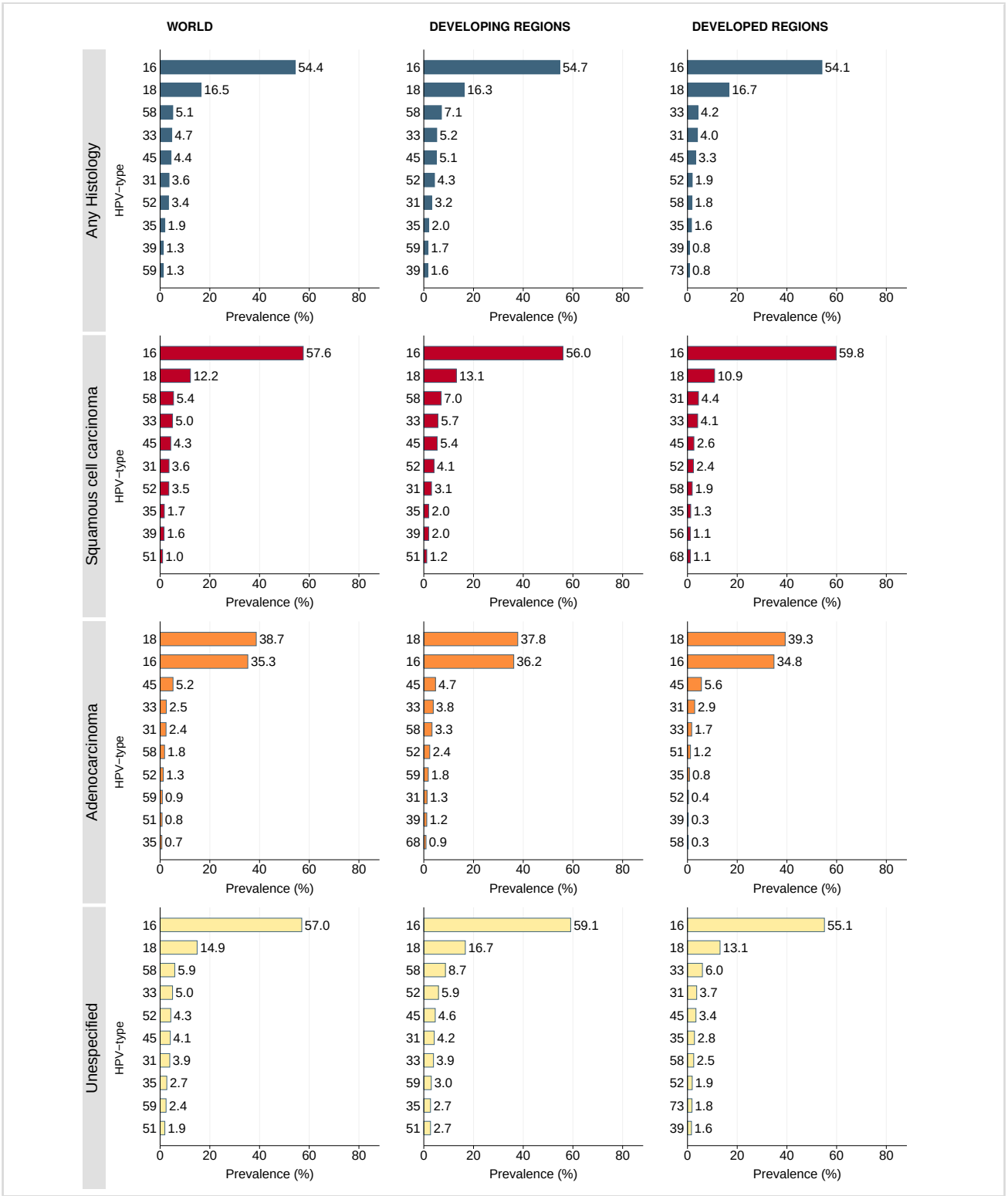
The samples for HPV testing come from cervical specimens (fresh / fixed biopsies or exfoliated cells).
95% CI: 95% Confidence Interval
[a] Low-grade lesions: LSIL or CIN-1
[b] High-grade lesions: CIN-2, CIN-3, CIS or HSIL
Data sources:
See references in Section 8

Figure 22: Ten most frequent HPV types among women with and without cervical lesions in the World compared to developing and developed regions



The samples for HPV testing come from cervical specimens (fresh / fixed biopsies or exfoliated cells).
Data sources:
See references in Section 8.

Figure 23: Ten most frequent HPV types among women with invasive cervical cancer in the World compared to developing and developed regions



The samples for HPV testing come from cervical specimens (fresh / fixed biopsies or exfoliated cells).
Data sources:
See references in Section 8.

Table 8: Type-specific HPV prevalence in women with normal cytology, precancerous cervical lesions and invasive cervical cancer in the World

HPV Type	Normal cytology		Low-grade lesions†		High-grade lesions‡		Cervical cancer	
	No. tested	HPV Prev % (95%CI)	No. tested	HPV Prev % (95%CI)	No. tested	HPV Prev % (95%CI)	No. tested	HPV Prev % (95%CI)
6	107702	0.4 (0.4-0.5)	8439	5.2 (4.8-5.7)	8206	2.0 (1.8-2.4)	14650	0.5 (0.4-0.6)
11	98776	0.2 (0.2-0.2)	7684	2.6 (2.2-2.9)	8043	1.2 (1.0-1.5)	13930	0.3 (0.2-0.4)
13	10288	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
16	218339	2.7 (2.7-2.8)	14762	18.5 (17.9-19.2)	14901	44.1 (43.3-44.9)	22826	54.4 (53.8-55.1)
18	215093	1.1 (1.0-1.1)	14150	5.8 (5.5-6.2)	14014	7.0 (6.6-7.4)	22514	16.5 (16.0-17.0)
26	68688	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
30	14061	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
31	208818	1.1 (1.1-1.2)	13233	7.3 (6.8-7.7)	13290	9.4 (8.9-9.9)	18248	3.6 (3.3-3.8)
32	32384	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
33	207376	0.5 (0.5-0.6)	13118	4.3 (3.9-4.6)	13278	7.6 (7.2-8.1)	20138	4.7 (4.4-5.0)
34	51389	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
35	198540	0.4 (0.3-0.4)	10698	3.8 (3.5-4.2)	10356	3.6 (3.2-3.9)	15718	1.9 (1.7-2.1)
39	191492	0.6 (0.6-0.7)	8211	5.1 (4.7-5.6)	8576	2.7 (2.4-3.1)	12657	1.3 (1.1-1.5)
40	66155	0.1 (0.1-0.1)	-	- -	-	- -	-	- -
42	91858	0.3 (0.2-0.3)	-	- -	-	- -	-	- -
43	65760	0.1 (0.1-0.1)	-	- -	-	- -	-	- -
44	91858	0.2 (0.2-0.3)	-	- -	-	- -	-	- -
45	194232	0.6 (0.5-0.6)	8985	3.0 (2.6-3.4)	9573	2.8 (2.5-3.2)	15440	4.4 (4.1-4.7)
51	191886	0.8 (0.8-0.9)	8667	7.5 (7.0-8.1)	9028	4.6 (4.2-5.1)	12795	1.2 (1.0-1.4)
52	193577	1.0 (0.9-1.0)	8536	6.7 (6.1-7.2)	9885	7.2 (6.7-7.7)	16560	3.4 (3.1-3.7)
53	90652	0.4 (0.4-0.5)	-	- -	-	- -	-	- -
54	71036	0.2 (0.1-0.2)	-	- -	-	- -	-	- -
55	9211	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
56	192557	0.6 (0.6-0.7)	8379	6.4 (5.9-7.0)	8946	2.5 (2.2-2.9)	12985	0.8 (0.6-1.0)
57	51750	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
58	196908	0.7 (0.7-0.7)	8954	6.3 (5.8-6.9)	10113	7.7 (7.2-8.3)	16764	5.1 (4.8-5.5)
59	188738	0.4 (0.4-0.5)	8071	3.4 (3.1-3.9)	8311	1.5 (1.3-1.8)	12758	1.3 (1.1-1.5)
61	59070	0.2 (0.1-0.2)	-	- -	-	- -	-	- -
62	31041	0.1 (0.1-0.2)	-	- -	-	- -	-	- -
64	7564	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
66	135892	0.4 (0.4-0.4)	7447	6.1 (5.6-6.6)	7324	2.1 (1.8-2.5)	11856	0.4 (0.3-0.5)
67	42667	0.1 (0.0-0.1)	-	- -	-	- -	-	- -
68	187400	0.4 (0.4-0.4)	7562	2.2 (1.9-2.5)	7541	1.7 (1.4-2.0)	11720	0.6 (0.5-0.8)
69	46819	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
70	59439	0.2 (0.2-0.2)	3741	1.6 (1.2-2.0)	3523	1.3 (1.0-1.7)	10241	0.3 (0.2-0.5)
71	56832	0.1 (0.1-0.1)	-	- -	-	- -	-	- -
72	58738	0.1 (0.1-0.1)	-	- -	-	- -	-	- -
73	60259	0.1 (0.1-0.1)	5399	2.3 (1.9-2.7)	4485	1.3 (1.0-1.7)	9137	0.4 (0.3-0.6)
74	25581	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
81	51822	0.2 (0.2-0.2)	-	- -	-	- -	-	- -
82	68773	0.1 (0.1-0.1)	4687	1.7 (1.4-2.1)	3747	1.0 (0.7-1.4)	8914	0.2 (0.2-0.4)
83	63577	0.1 (0.1-0.2)	-	- -	-	- -	-	- -
84	66867	0.1 (0.1-0.2)	-	- -	-	- -	-	- -
85	12971	0.0 (0.0-0.1)	-	- -	-	- -	-	- -
86	12207	0.0 (0.0-0.0)	-	- -	-	- -	-	- -
89	42327	0.1 (0.0-0.1)	-	- -	-	- -	-	- -
90	12207	0.0 (0.0-0.1)	-	- -	-	- -	-	- -
91	4896	0.0 (0.0-0.0)	-	- -	-	- -	-	- -

The samples for HPV testing come from cervical specimens (fresh / fixed biopsies or exfoliated cells).
Abbreviations used:
95% CI: 95% Confidence Interval
†Low-grade lesions: LSIL or CIN-1
‡High-grade lesions: CIN-2, CIN-3, CIS or HSIL
Data sources:
See references in Section 8.

Table 9: Type-specific HPV prevalence among invasive cervical cancer cases in the World, by histology

HPV Type	Any Histology		Squamous cell carcinoma		Adenocarcinoma		Unespecified	
	No. tested	HPV Prev % (95%CI)	No. tested	HPV Prev % (95%CI)	No. tested	HPV Prev % (95%CI)	No. tested	HPV Prev % (95%CI)
6	14650	0.5 (0.4-0.6)	10290	0.4 (0.3-0.6)	1618	0.1 (0.0-0.3)	2742	0.9 (0.6-1.3)
11	13930	0.3 (0.2-0.4)	9705	0.3 (0.2-0.4)	1407	0.1 (0.0-0.4)	2818	0.7 (0.4-1.1)
16	22826	54.4 (53.8-55.1)	14441	57.6 (56.7-58.4)	3109	35.3 (33.7-37.1)	5276	57.0 (55.7-58.4)
18	22514	16.5 (16.0-17.0)	14242	12.2 (11.7-12.8)	3100	38.7 (37.0-40.4)	5172	14.9 (13.9-15.9)
31	18248	3.6 (3.3-3.8)	11519	3.6 (3.3-4.0)	2027	2.4 (1.8-3.1)	4702	3.9 (3.4-4.5)
33	20138	4.7 (4.4-5.0)	12829	5.0 (4.7-5.4)	2421	2.5 (1.9-3.2)	4888	5.0 (4.4-5.7)
35	15718	1.9 (1.7-2.1)	10138	1.7 (1.5-2.0)	1786	0.7 (0.3-1.2)	3794	2.7 (2.2-3.3)
39	12657	1.3 (1.1-1.5)	8637	1.6 (1.3-1.8)	1541	0.7 (0.4-1.3)	2479	0.8 (0.5-1.2)
45	15440	4.4 (4.1-4.7)	10090	4.3 (3.9-4.7)	1992	5.2 (4.3-6.3)	3358	4.1 (3.5-4.9)
51	12795	1.2 (1.0-1.4)	8797	1.0 (0.8-1.3)	1538	0.8 (0.5-1.4)	2460	1.9 (1.4-2.5)
52	16560	3.4 (3.1-3.7)	11097	3.5 (3.2-3.9)	1985	1.3 (0.9-1.9)	3478	4.3 (3.6-5.0)
56	12985	0.8 (0.6-1.0)	8754	1.0 (0.8-1.3)	1663	0.2 (0.0-0.5)	2568	0.4 (0.2-0.7)
58	16764	5.1 (4.8-5.5)	10895	5.4 (5.0-5.9)	1867	1.8 (1.2-2.5)	4002	5.9 (5.2-6.7)
59	12758	1.3 (1.1-1.5)	8301	1.0 (0.8-1.2)	1704	0.9 (0.5-1.4)	2753	2.4 (1.8-3.0)
66	11856	0.4 (0.3-0.5)	8345	0.4 (0.3-0.5)	1272	0.2 (0.0-0.7)	2239	0.4 (0.2-0.8)
68	11720	0.6 (0.5-0.8)	8170	0.7 (0.6-0.9)	1498	0.5 (0.2-1.0)	2052	0.4 (0.2-0.8)
70	10241	0.3 (0.2-0.5)	7556	0.4 (0.2-0.5)	1067	0.3 (0.1-0.8)	1618	0.2 (0.1-0.6)
73	9137	0.4 (0.3-0.6)	6537	0.3 (0.2-0.5)	865	0.0 (0.0-0.4)	1735	1.0 (0.6-1.6)
82	8914	0.2 (0.2-0.4)	6142	0.2 (0.1-0.4)	824	0.0 (0.0-0.4)	1948	0.4 (0.2-0.8)

The samples for HPV testing come from cervical specimens (fresh / fixed biopsies or exfoliated cells).
Abbreviations used:
95% CI: 95% Confidence Interval
Data sources:
See references in Section 8.

4.2 HPV burden in anogenital cancers other than cervix

Table 10: Prevalence of HPV in anogenital cancers other than the cervix

	HPV prevalence		HPV 16/18 prevalence	
	No. tested	% (95% CI)	No. tested	% (95% CI)
Anal cancer	1197	75.8 (73.2-78.2)	1164	73.3 (70.6-75.8)
Vulvar cancer	1664	40.5 (38.1-42.9)	1604	36.1 (33.7-38.5)
Vaginal cancer	172	73.3 (66.0-79.7)	172	57.6 (49.8-65.0)
Penile cancer	1669	49.1 (46.7-51.5)	1669	37.5 (35.2-39.9)

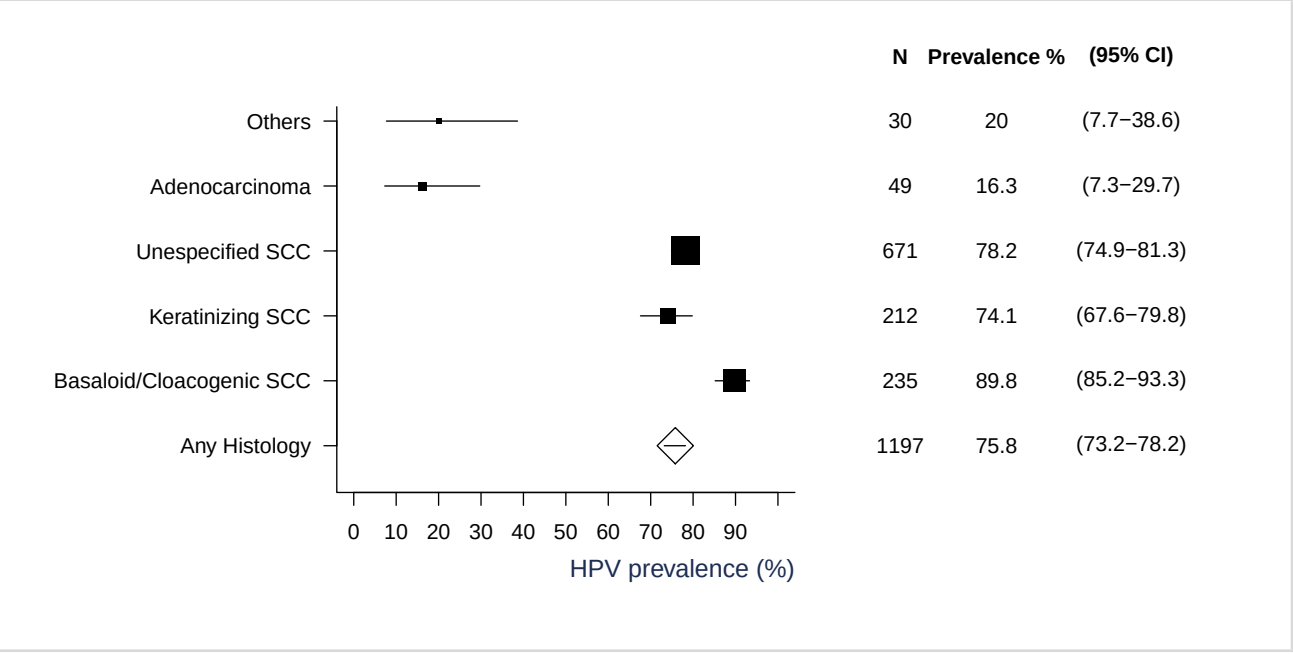
Note: HPV prevalence is highly variable according to the histology, refer to specific sections in 4.2 for details
Data sources: See references in Section 8.

4.2.1 Anal cancer

Anal cancer is similar to cervical cancer with respect to overall HPV DNA positivity, with approximately 85% of cases associated with HPV infection worldwide. HPV-16 is the most common detected type, representing 87% of all HPV-positive tumours. HPV-18 is the second most common type detected and is found in approximately 9% of cases. HPV DNA is also detected in the majority of precancerous anal lesions (AIN) and the prevalence of HPV increases with the severity of the lesion, 75% in AIN1, 86% in AIN2, and 94% in AIN3.
(*Vaccine 2006, Vol. 24, Supl 3; Vaccine 2008, Vol. 26, Supl 10; IARC Monographs 2007, Vol. 90*)

In this section, the burden of HPV among cases of anal cancers in the World is presented.

Figure 24: HPV prevalence among cases of anal cancer in the World, by histology



SCC, squamous cell carcinoma
Data sources: See references in Section 8.

Table 11: Pooled estimate of HPV prevalence among anal cancer cases, by sex

Sex	No. tested	HPV prevalence % (95% CI)
Female	584	85.6 (82.5-88.4)
Male	255	74.1 (68.3-79.4)
Unespecified	358	60.9 (55.6-66.0)

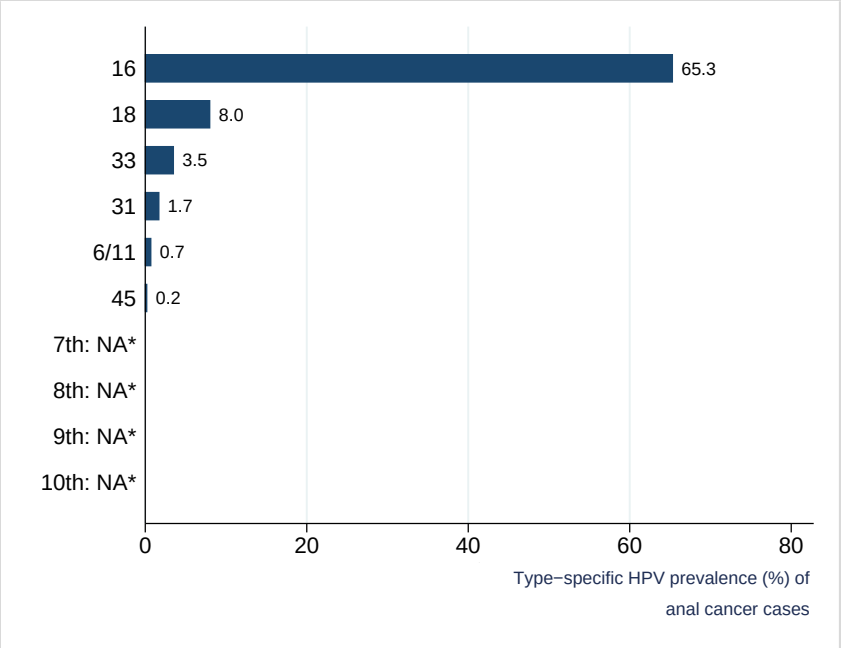
Data sources:
See references in Section 8.

Table 12: Pooled estimate of HPV prevalence among men who have sex with men (MSM) and non-MSM with anal cancer

MSM	No. tested	HPV prevalence % (95% CI)
MSM	59	98.3 (90.9-99.9)
Non-MSM	135	68.9 (60.4-76.6)
Unespecified	61	62.3 (49.0-74.4)

Data sources:
See references in Section 8.

Figure 25: Ten most frequent HPV types among anal cancer cases in the World



∗NA=Not available. No more types than shown were tested or were positive

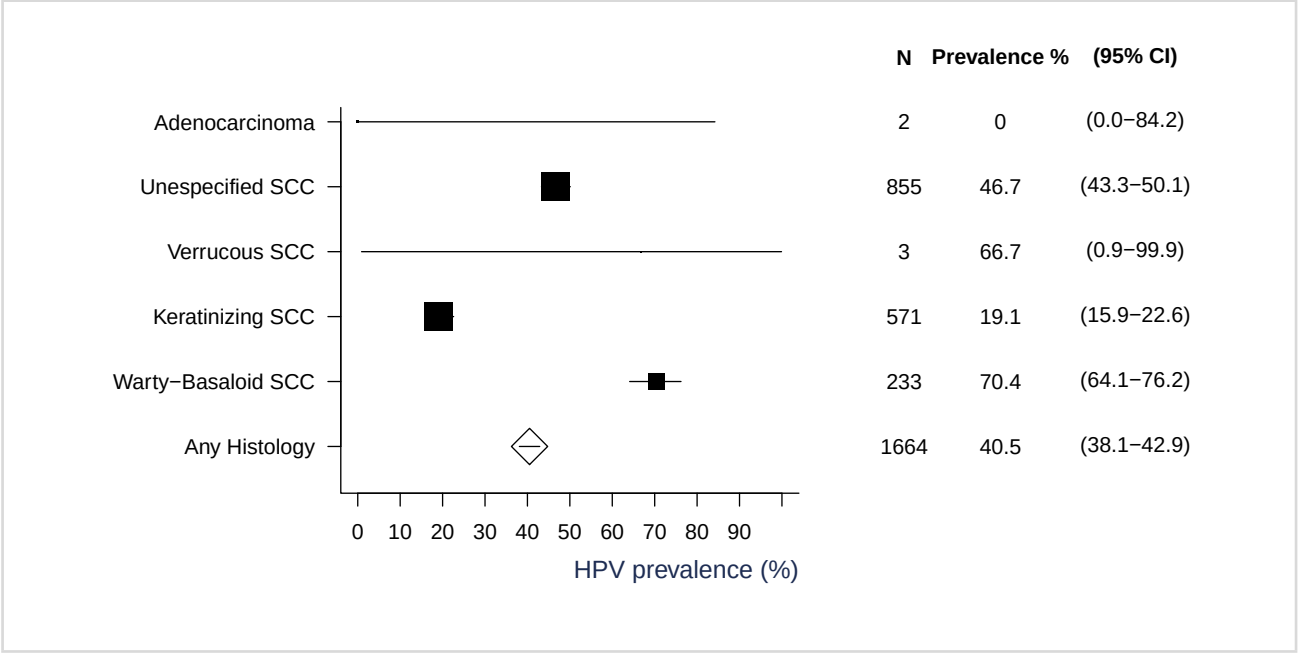
Data sources:
See references in Section 8.

4.2.2 Vulvar cancer

Vulvar cancer has two distinct histological patterns with two different risk factor profiles: (1) basaloid/warty types (2) keratanizing types. The majority of vulvar carcinomas are of the basaloid warty type (>55%), which occur mainly in younger women compared to the keratanizing types, and are associated with similar risk factors for HPV infection in the cervix. In contrast, keratanizing vulvar carcinomas are associated with a low prevalence of HPV DNA (<=10%) that occur mainly in older women and are associated with lichen planus. In a case series, HPV DNA prevalence ranged from 72-100% among cases of high-grade vulvar neoplasias (VIN3) and 27.3-100% among vulvar carcinomas (3.9-6.3% in keratinzing types). Similarly, a meta-analysis estimated a HPV prevalence of 76% for VIN and 36% for vulvar carcinomas. HPV-16 is the most common detected type (65-93% in VIN and 71% for vulvar cancer) followed by HPV-18.
(*Vaccine 2006, Vol. 24, Supl 3; Vaccine 2008, Vol. 26, Supl 10; IARC Monographs 2007, Vol. 90*)

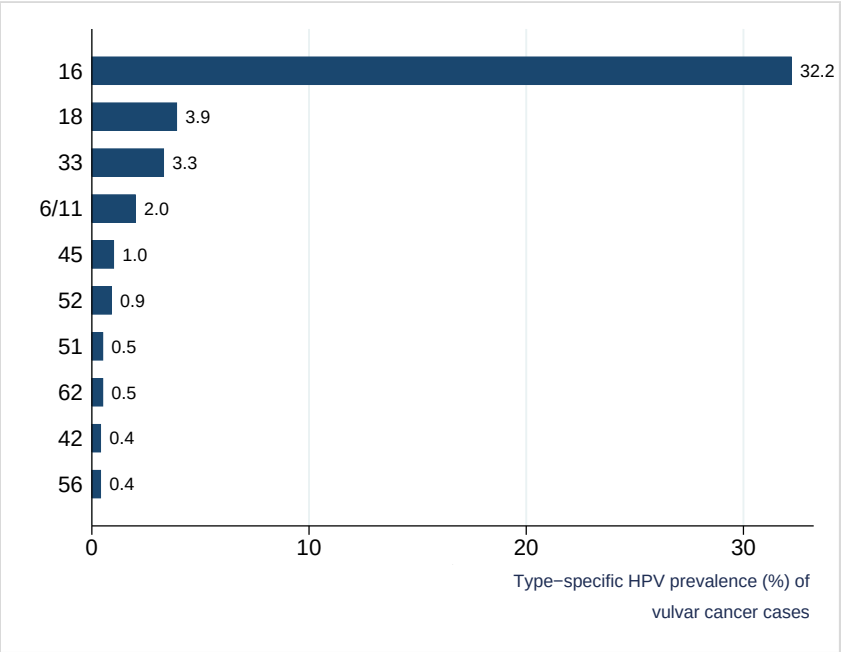
In this section, the HPV burden among cases of vulvar cancers in the World is presented.

Figure 26: HPV prevalence among cases of vulvar cancer in the World, by histology



SCC, squamous cell carcinoma
Data sources: See references in Section 8.

Figure 27: Ten most frequent HPV types among vulvar cancer cases in the World



Data sources:
See references in Section 8.

4.2.3 Vaginal cancer

Vaginal and cervical cancers share similar risk factors and it is generally accepted that both carcinomas share the same aetiology of HPV infection although there is limited evidence available. Women with vaginal cancer are more likely to have a history of other ano-genital cancers, particularly of the cervix, and these two carcinomas are frequently diagnosed simultaneously. HPV DNA is detected among 91% of invasive vaginal carcinomas and 82% of high-grade vaginal neoplasias (VAIN3).In a case series of vaginal cancers, HPV-16 is the most common type in at least 70% of HPV-positive carcinomas.
(*Vaccine 2006, Vol. 24, Supl 3; Vaccine 2008, Vol. 26, Supl 10; IARC Monographs 2007, Vol. 90*)

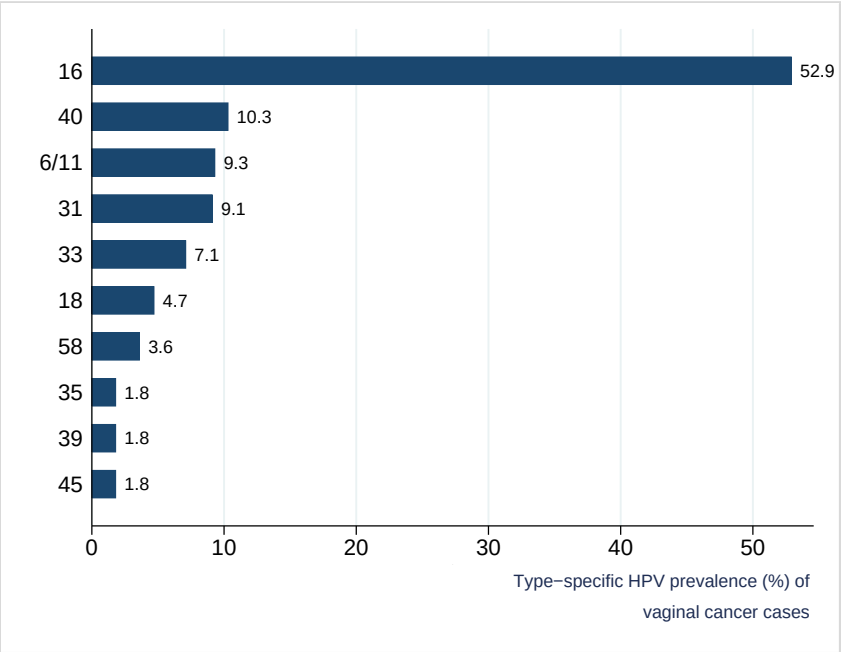
In this section, the HPV burden among cases of vaginal cancers in the World is presented.

Table 13: Studies on HPV prevalence among cases of vaginal cancer in the World

Study	HPV detection method	Histology	No. tested	HPV prevalence % (95% CI)
Ferreira 2008 (Portugal)	INNO-LiPA.	SCC	21	80.9 (58.1-94.6)
Madsen 2008 (Denmark)	GP5+/6+ PCR-EIA assay and type-specific for HPV16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66 & 68 and other 23 low risk HPV.	SCC	27	88.9 (70.9-97.7)
Habermann 2004 (Sweden)	PGMY09/11.	SCC	8	25.0 (3.2-65.1)
Koyamatsu 2003 (Japan)	E7 (115-158 bp) for HPV16, HPV 18, L1 (250bp) for HPV 6,11,16,18,31,33,42,52,58.	SCC	16	43.8 (19.8-70.1)
Daling 2002 (United States of America)	MY09/11 for 6/11, 16, 18/45, 31.	SCC	25	64.0 (42.5-82.0)
Carter 2001 (United States of America)	MY09/11 and RFLP; type-specific for 16, 18.	SCC	54	90.7 (79.7-96.9)
Waggoner 1994 (United States of America)	L1 primers & E6/E/7.	Adenocarcinoma	7	28.6 (3.7-71.0)
Kiyabu 1989 (United States of America)	E6 for HPV16 and HPV18.	SCC	14	64.3 (35.1-87.2)

SCC, squamous cell carcinoma
Data sources:
See references in Section 8.

Figure 28: Ten most frequent HPV types among vaginal cancer cases in the World



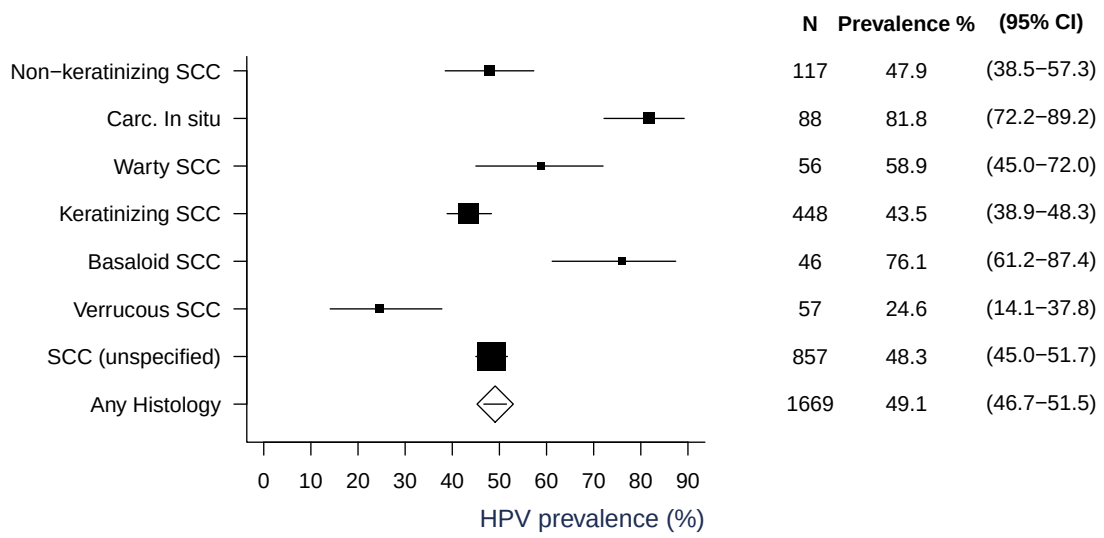
Data sources:
See references in Section 8.

4.2.4 Penile cancer

The geographical correlation between the incidence of penile and cervical cancers and the concordance of these two cancers among married couples suggested the common aetiology of HPV infection. HPV DNA is detectable in approximately 40-50% of all penile cancers. HPV DNA is detectable among penile intraepithelial neoplasias with the basoloid histological type, ranging from 75-80% of cases, and decreasing to 30-60% among invasive squamous cell carcinomas (SCC). The majority of penile carcinomas are squamous cell carcinomas (SCC), and it has been observed that some cases of penile SCC are HPV DNA negative. HPV DNA positvity among penile cancers varies with histopathological type, with a prevalence of 47% in basaloid/warty types, 75% in purely basaloid types, and 11% in keratinizing SCC. Among HPV-DNA positive cases, HPV-16 is the most common type.
(*Vaccine 2006, Vol. 24, Supl 3; Vaccine 2008, Vol. 26, Supl 10; IARC Monographs 2007, Vol. 90*)

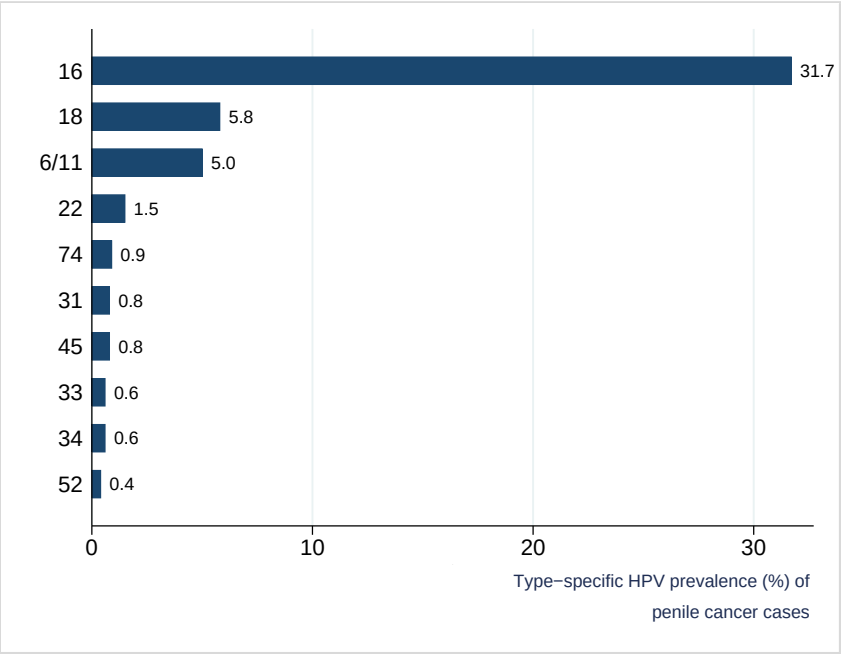
In this section, the HPV burden among cases of penile cancers in the World is presented.

Figure 29: HPV prevalence among cases of penile cancer in the World, by histology



SCC, squamous cell carcinoma
Data sources: See references in Section 8.

Figure 30: Ten most frequent HPV types among penile cancer cases in the World



Data sources:
See references in Section 8.

4.3 HPV burden in men

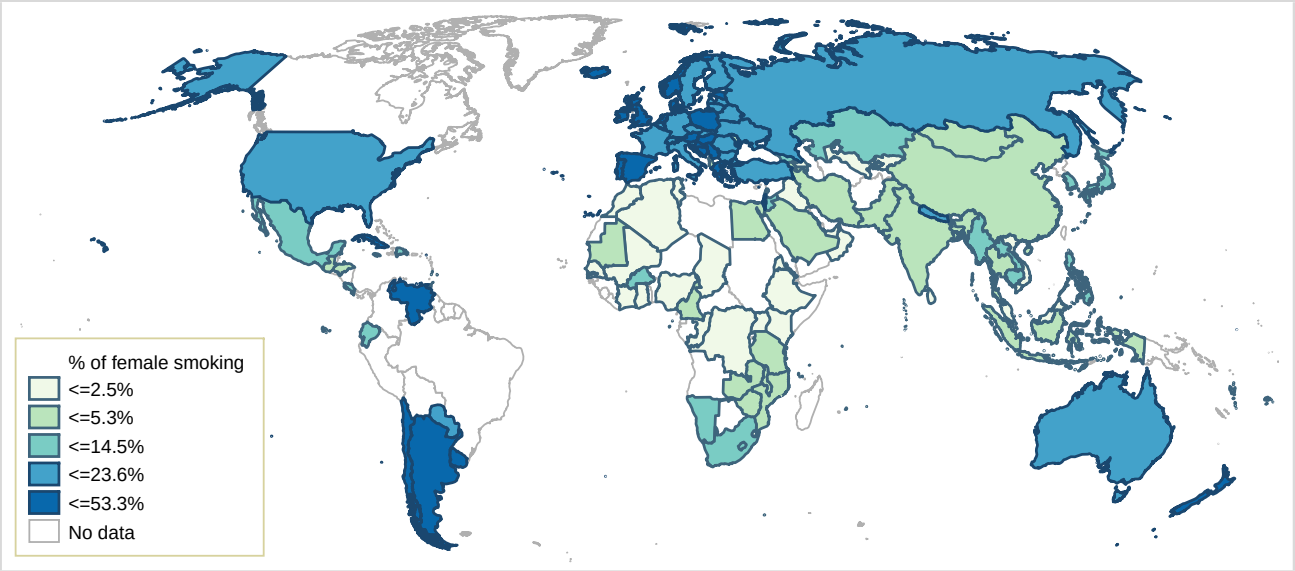
The information to date regarding penile HPV infection is primarily derived from studies that examined husbands of female cervical cancer cases, cross-sectional studies of selected populations such as individuals with sexually transmitted infections (STI) and military recruits, as well as from small prospective studies. HPV infection in the genital tract has been detected in up to 73% of healthy men. Like other STIs, HPV may be transmitted more readily from men to women than from women to men.
(*Vaccine 2008, Vol. 26, Supl 10*)
Refer to country- and continent-specific report for study details and estimates of penile HPV infection.

5 Factors contributing to cervical cancer

HPV is a necessary cause of cervical cancer, but it is not a sufficient cause. Other cofactors are necessary for progression from cervical HPV infection to cancer. Tobacco smoking, parity, oral contraceptive use, and co-infection with HIV have been identified as established cofactors. Co-infection with Chlamydia trachomatis and herpes simplex virus type-2, immunosuppression, and certain dietary deficiencies are other probable cofactors. Genetic and immunological host factors and viral factors other than type, such as variants of type, viral load and viral integration, are likely to be important but have not been clearly identified *(Muñoz N, Vaccine 2006; 24S3: S3-1)*.

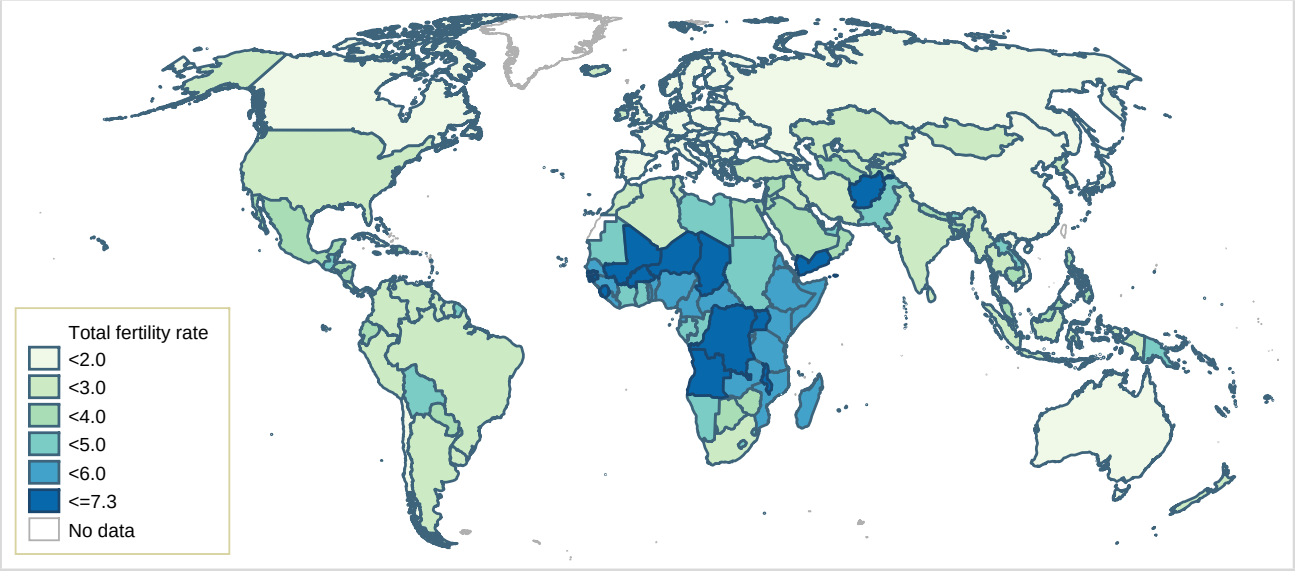
In this section, the prevalence of smoking, parity (fertility), oral contraceptive use, and HIV in the World are presented.

Figure 31: Global prevalence of female tobacco smoking



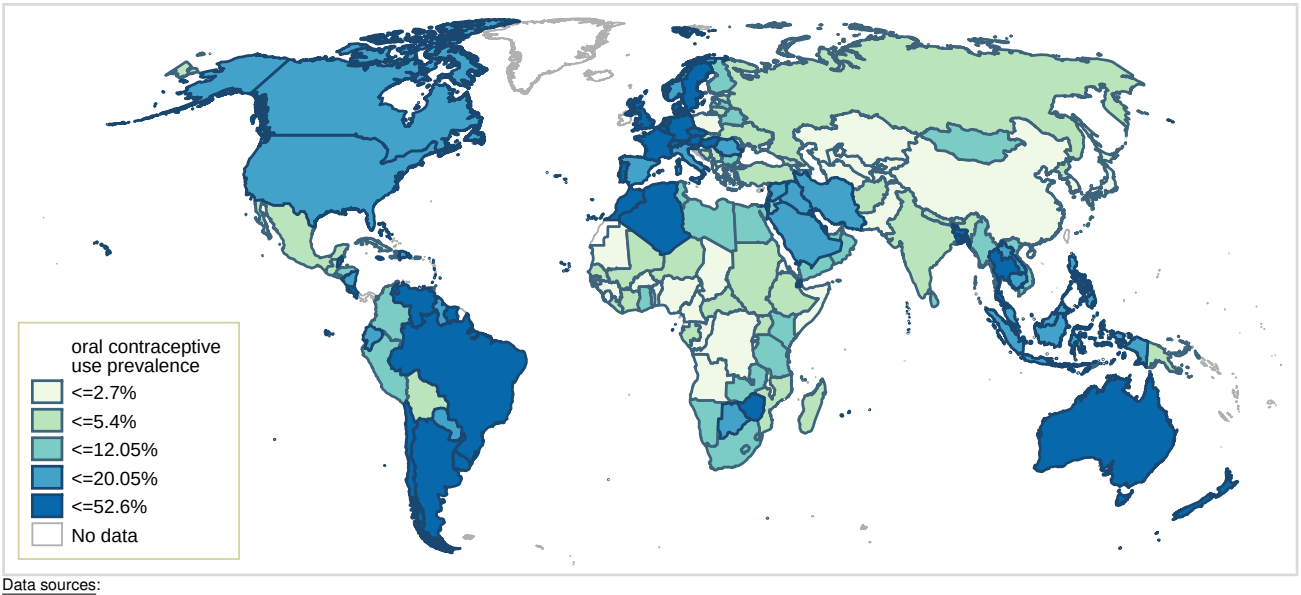
Data sources:
WHO Report on the Global Tobacco Epidemic, 2008 - The MPOWER package. Tobacco Free Initiative, World Health Organization, 2008 (http://www.who.int/tobacco/mpower/gtcr_download/en/index.html)

Figure 32: Global total fertility rates



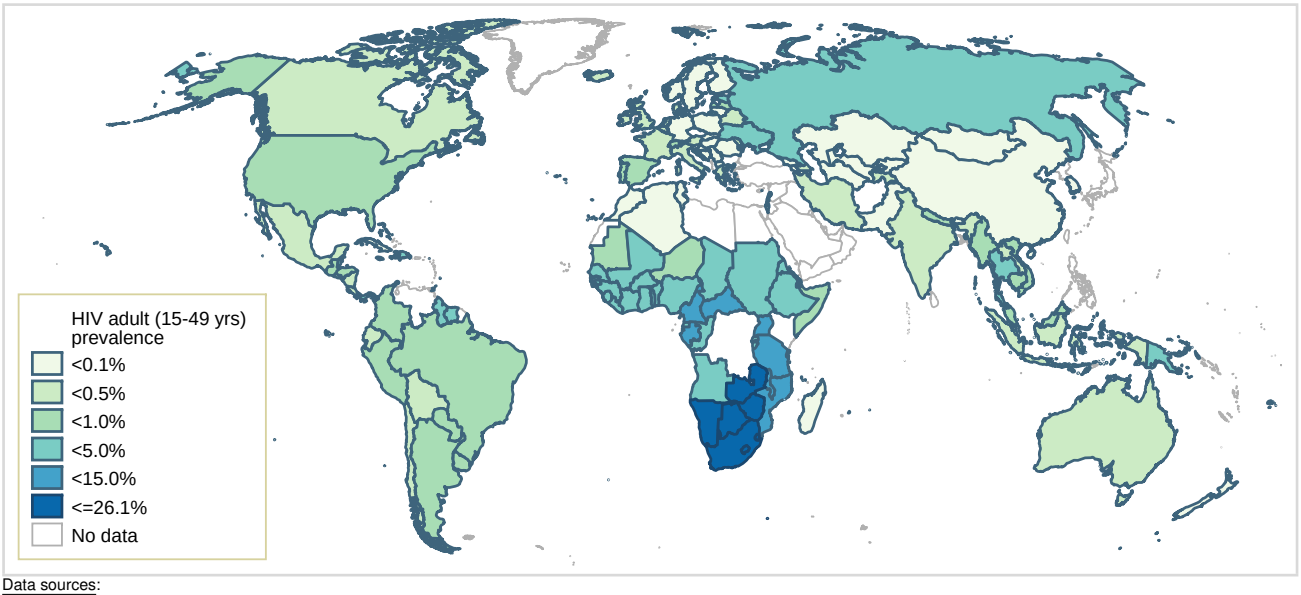
Fertility rate is a proxy measure of parity.
Data sources:
World fertility patterns 2007 [wall chart]. New York, Population Division, Department of Economic and Social Affairs, United Nations Secretariat, 2008.

Figure 33: Global prevalence of oral contraceptive use



Data sources:
United Nations, Department of Economic and Social Affairs, Population Division. World Contraceptive Use 2005 (http://www.un.org/esa/population/publications/contraceptive2005/WCU2005.htm)

Figure 34: Global prevalence of HIV

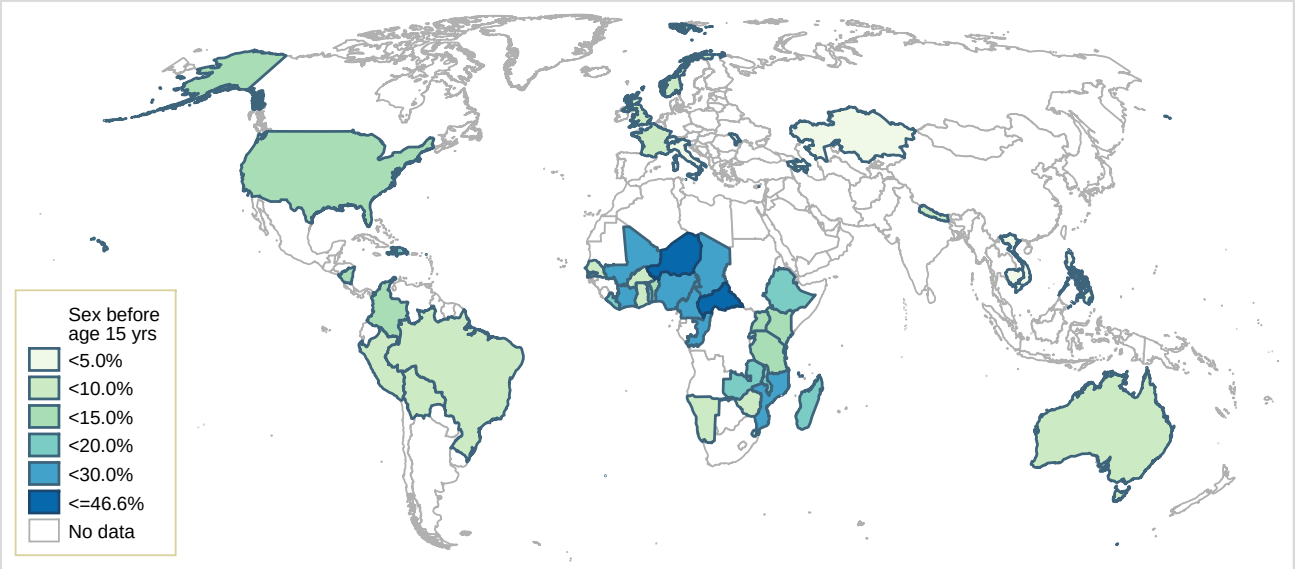


Data sources:
2008 Report on the global AIDS epidemic, UNAIDS/WHO, July 2008.

6 Sexual and reproductive health behaviour indicators

Sexual intercourse is the primary route of transmission of genital HPV infection. Information about sexual and reproductive health behaviours is essential to the design of effective preventive strategies against anogenital cancers. In this section, we describe sexual and reproductive health indicators that may be used as proxy measures of risk for HPV infection and anogenital cancers.

Figure 35: Global proportion of young women (15-24 years) who have had sex before the age of 15



Data sources:

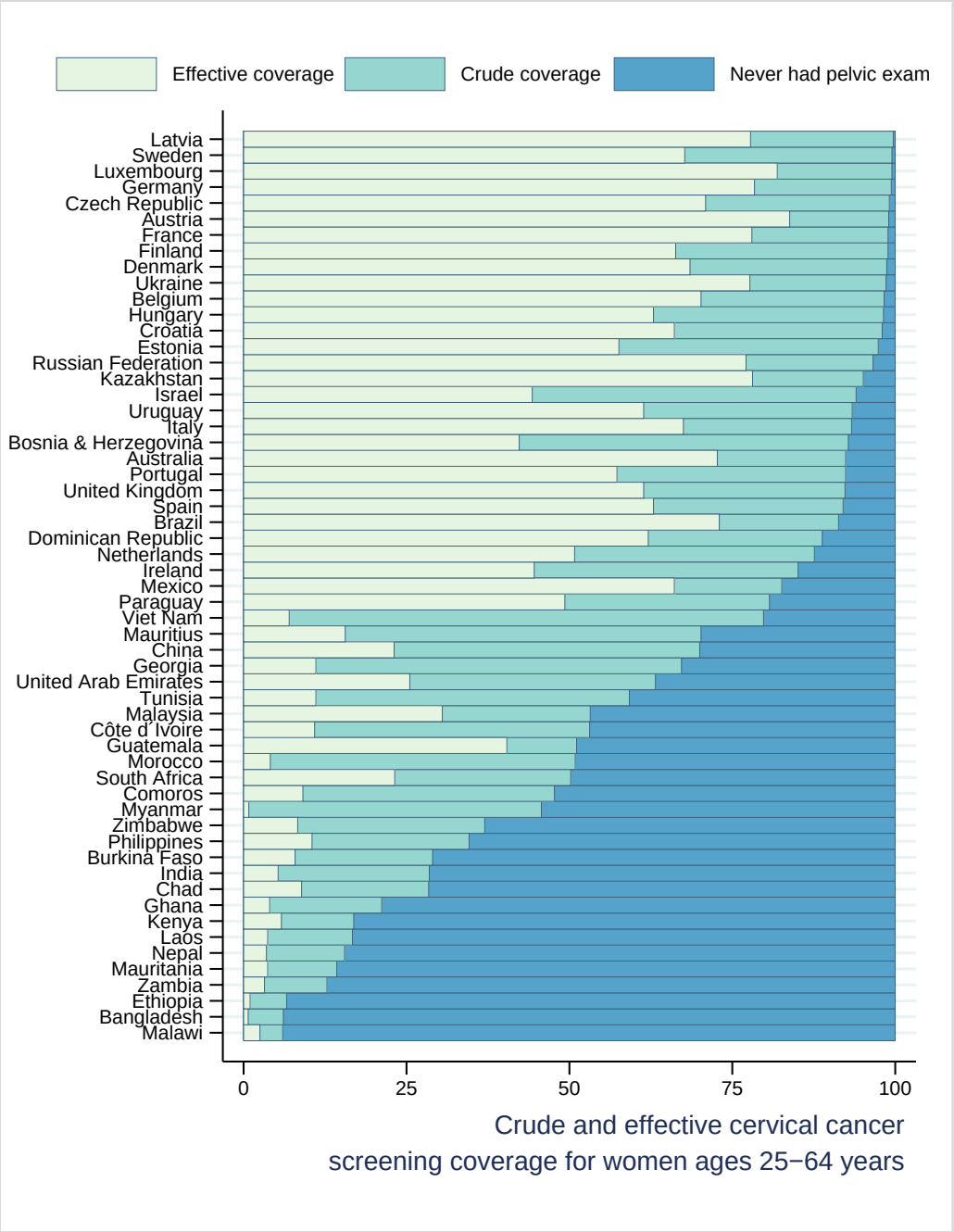
Armenia Demographic and Health Survey 2005; Azerbaijan Demographic and Health Survey 2006; Benin Enquete Demographique et de Sante 2006 : The HIV Test Data were not scrambled, and are therefore not available for analysis.; Bolivia Encuesta Nacional de Demografia y Salud 2003; Burkina Faso Demographic and Health Survey 2003; Cambodia Demographic and Health Survey 2005; Cameroon Demographic and Health Survey 2004; Congo Enquete Demographique et de Sante 2005; Cote d'Ivoire Demographic and Health Survey 1996; Dominican Republic Demographic and Health Survey 2007; Encuesta Nicaraguense de Demografia y Salud 2001; Enquete Demographique et de Sante 2003-2004, Madagascar; Ethiopia Demographic and Health Survey 2005; Ghana Demographic and Health Survey 2003; Haiti Demographic and Health Survey 1994; Kenya Demographic and Health Survey 2003; Liberia Demographic and Health Survey 2007; Malawi Demographic and Health Survey 2004; Mali Enquete Demographique et de Sante 2006, ENDSM-IV; Moldova Demographic and Health Survey 2005; Mozambique Demographic and Health Survey 2003; Namibia Demographic and Health Survey 2000; Nepal Demographic and Health Survey 2006; Nigeria Demographic and Health Survey 2003; Philippines Demographic and Health Survey 2003; Rwanda Demographic and Health Survey 2005; Salud Sexual Y Repoductiva en Colombia, Encuesta Nacional de demografia y Salud, Resultados 2005; Senegal Demographic and Health Survey 2005; Swaziland Demographic and Health Survey 2006-07; Tanzania Demographic and Health Survey 2004; Tchad Enquete Demographique et de Sante 2004; Uganda HIV/AIDS Sero-Behavioural Survey 2004-05; Vietnam Population and AIDS Indicator Survey; Wellings K, Lancet 2006; 369: 274; Wellings K, Lancet 2006; 369: 274; Wellings K, Lancet 2006; 369: 274; Wellings K, Lancet 2006; 369: 274; Wellings K, Lancet 2006; 369: 274; Wellings K, Lancet 2006; 369: 274; Wellings K, Lancet 2006; 369: 274; Wellings K, Lancet 2006; 369: 274; Wellings K, Lancet 2006; 369: 274; Wellings K, Lancet 2006; 369: 274: Data from Beltzer N, Lagarde M, Wu Zhou X, Vongmany N, Gremy I. Les Connaissances, Attitudes, Croyances et Comportements Face au VIH/sida en Ile de France - Evolutions 1992, 1994, 1998, 2001, 2004. Paris: Observatoire Régional de Santé d'Ile; Wellings K, Lancet 2006; 369: 274: Data from Groves RM, Benson G, Mosher WD, et al, for the US Centers for Disease Control. Plan and operation of cycle 6 of the National Survey of Family Growth. Vital Health Stat 2005; 42: 1-86.; Wellings K, Lancet 2006; 369: 274: Data from the Australian longitudinal study of health and relationships.; Wellings K, Lancet 2006; 369: 274: Data from the National Survey of Sexual Attitudes and Lifestyles (Natsal 2000); Zambia Demographic and Health Survey 2001-2002 : GPS dataset is incomplete; Zimbabwe Demographic and Health Survey 2005-06;

7 HPV preventive strategies

It is established that well-organised cervical screening programmes or widespread good quality cytology can reduce cervical cancer incidence and mortality. The introduction of HPV vaccination could also effectively reduce the burden of cervical cancer in the coming decades. In addition, male circumcision and the use of condoms have shown a significant protective effect against HPV transmission and may offer an alternative preventative strategy. This section presents indicators on basic characteristics and performance of cervical cancer screening, status of HPV vaccine licensure and introduction, and the prevalence of male circumcision and condom use in the World.

7.1 Cervical cancer screening practices

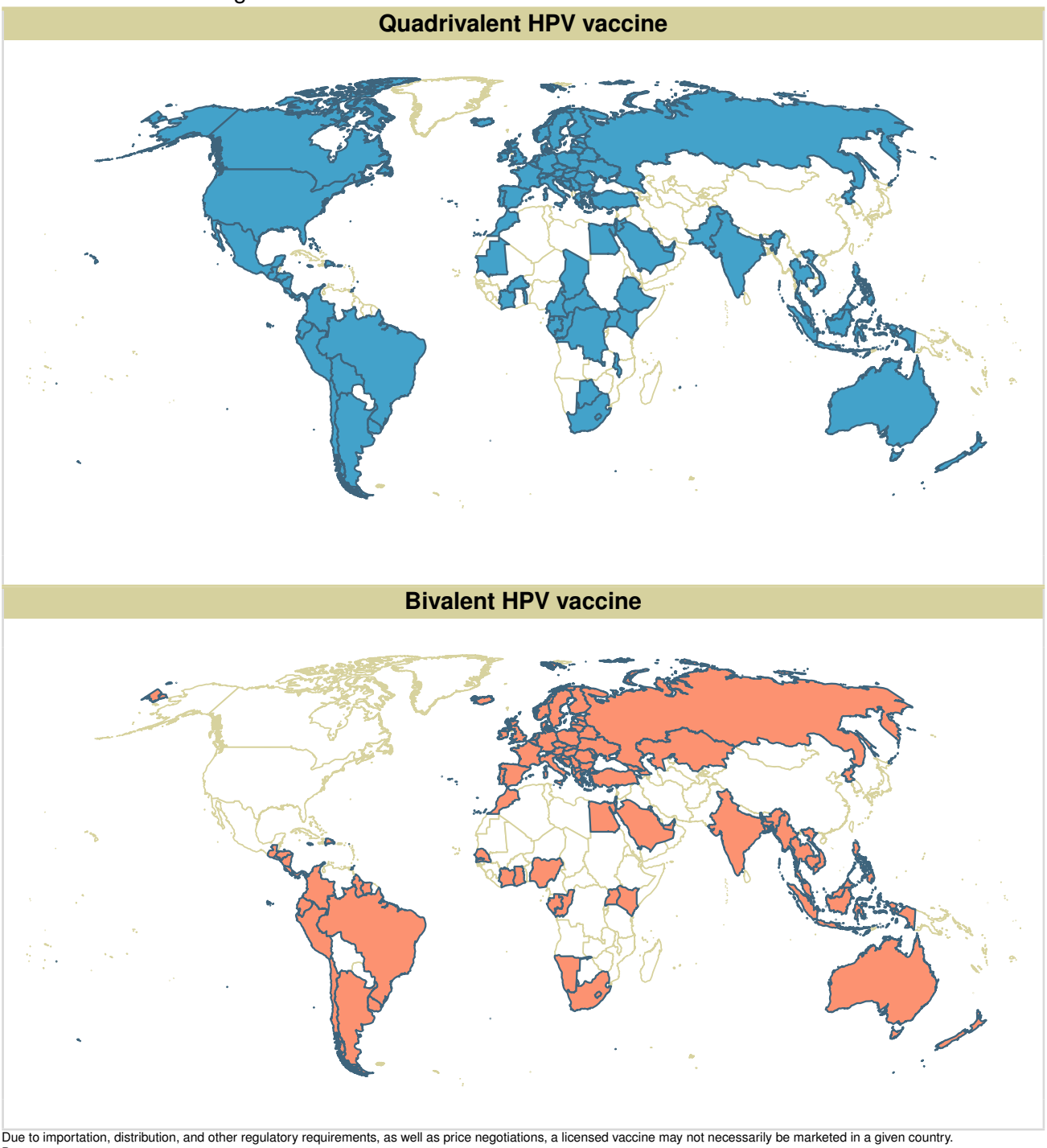
Figure 36: Global estimated coverage of cervical cancer screening.



Adapted from Gakidou E et al. PLoS Med 2008;5:e132
World Health Surveys. Geneva: World Health Organization (WHO); 2003.

7.2 HPV vaccination

Figure 37: Global HPV vaccine licensure as of March 2009



Due to importation, distribution, and other regulatory requirements, as well as price negotiations, a licensed vaccine may not necessarily be marketed in a given country.
Data sources:
Bivalent: GlaxoSmithKline Biologicals, Rixensart, Belgium, March 2009 | Quadrivalent: Merck & Co., Inc., Whitehouse Station, NJ, USA, March 2009

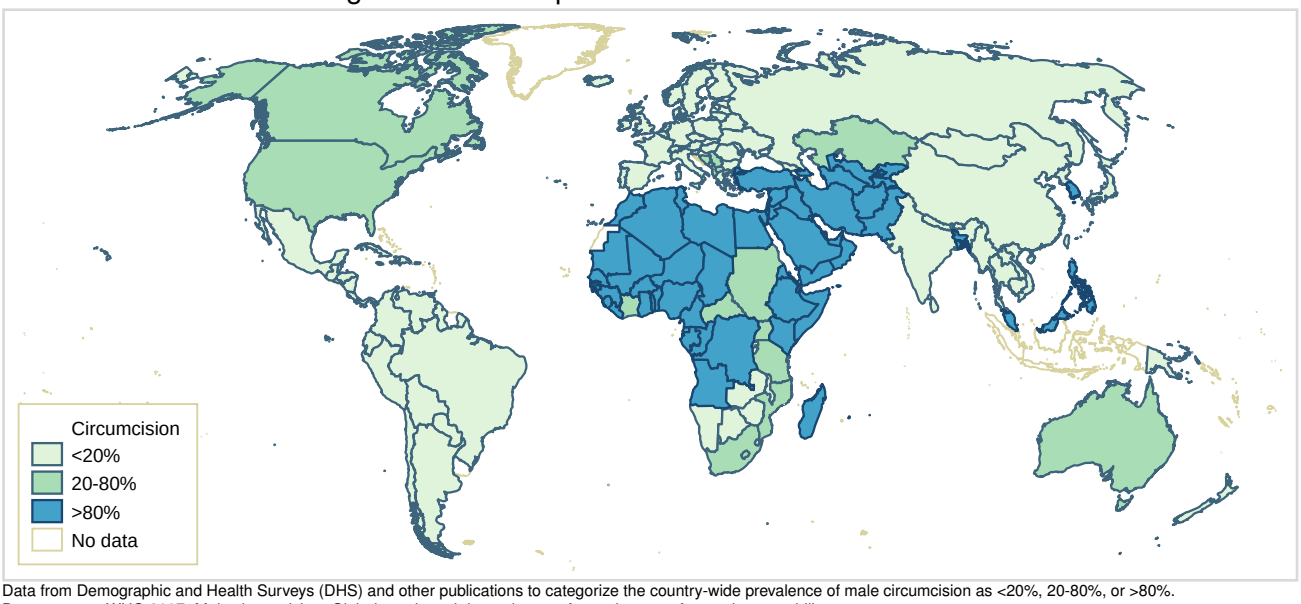
Table 14: HPV vaccine schedule

Country	Schedule	Coverage†	Comment
Australia	12-13 years;	entire	Female less than 27 years
Canada	1st contact; +2, +6 months;	entire	Female 9-26 years
Costa Rica	-	-	Some private sectors
Cyprus	-	-	Given only by the private sector
Denmark	12 years (x3);	entire	-
Fiji	9-12 years;	entire	Girls
France	1st contact; +2, +6 months;	entire	Girls at 14 years
Germany	12-17 years x3;	entire	Girls
Greece	12-15 years; +1-2, +6 months;	entire	-
Luxembourg	12-18 years;	entire	-
Macedonia, TFYR	-	entire	From September 2009
Malaysia	-	entire	From 2009
Micronesia	-	entire	From September 2008
Netherlands	-	entire	From September 2009
Norway	-	entire	From September 2009
Palau	11 years; +2, +6 months;	entire	-
Panama	10 years;	entire	-
Peru	1st contact; +2, +6 months;	part	-
Portugal	13 years, +1, +6 months;	entire	-
San Marino	12 years (x3);	entire	-
Spain	11-14 years (x3);	entire	Only one cohort of girls
Sweden	-	entire	From January 2010
Switzerland	11-14 years; +1, +6 months;	entire	-
Uganda	10-12 years; +4 weeks; +5 months;	part	-
United Kingdom	12-13 years x 3	entire	Catchup campagin starting 2009 for 15-18 years
United States of America	11-12 years;	entire	X 3 doses

†Entire or part of the population covered.
Vaccination is for girls only.
Data sources:
WHO-UNICEF Joint Reporting Form and WHO Regional offices 2009, WHO Immunization surveillance, assessment, and monitoring (http://www.who.int/immunization_monitoring/data/data_subject/en/index.html)

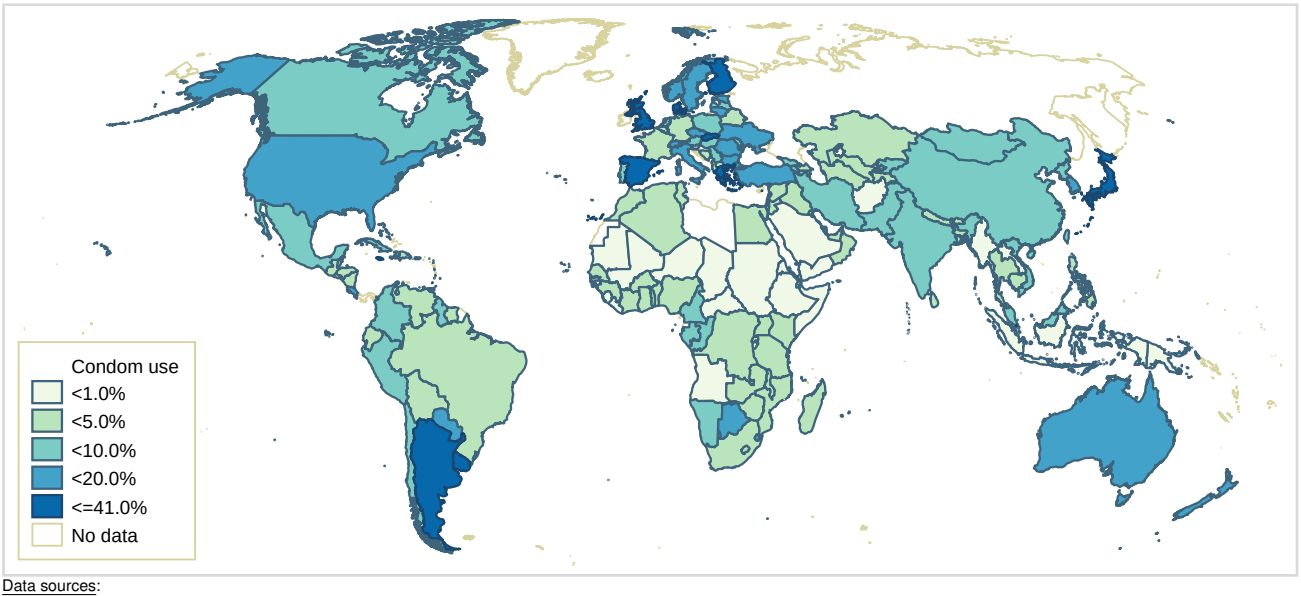
7.3 Male circumcision and condom use

Figure 38: Global prevalence of male circumcision



Data from Demographic and Health Surveys (DHS) and other publications to categorize the country-wide prevalence of male circumcision as <20%, 20-80%, or >80%.
Data sources: WHO 2007: Male circumcision: Global trends and determinants of prevalence, safety and acceptability

Figure 39: Global prevalence of condom use



Data sources:
United Nations, Department of Economic and Social Affairs, Population Division. World Contraceptive Use 2005 (http://www.un.org/esa/population/publications/contraceptive2007/contraceptive2007.htm)

8 References

HPV-related statistics were gathered from specific databases created at the Institut Català d´Oncologia and the International Agency for Research on Cancer.

Systematic collection of published literature from peer-reviewed journals is stored in these databases. Data correspond to results from the following reference papers as well as updated results from continuous monitoring of the literature by the HPV Information Centre:

Cytologically normal women

Data have been compiled by the HPV Information Centre in the Unit of Infections and Cancer at the Institut Catala d´Oncologia and have been published as a meta-analysis in:

De Sanjosé S, Diaz M, Castellsagué X, Clifford G, Bruni L, Muñoz N, Bosch FX. Worldwide prevalence and genotype distribution of cervical human papillomavirus DNA in women with normal cytology: a meta-analysis. Lancet Infect Dis 2007;7:453-59.

Bruni L, Ferrer E, Diaz M, Louie KS, Albero A, Muñoz J, Castellsagué X, Bosch FX, De Sanjosé S. Worldwide HPV type-specific prevalence in cytologically normal women (1995-2008). In: Abstract book of the 25th International Papillomavirus Conference, Malmo, Sweden, 8-14 May 2009 (Manuscript in preparation).

Women with low-grade cervical lesions

Data have been compiled by the IARC Infection and Cancer Epidemiology Group and have been published as a systematic review and meta-analysis in:

Clifford GM, Rana RK, Franceschi S, Smith JS, Gough G, Pimenta JM. Human papillomavirus genotype distribution in low-grade cervical lesions: comparison by geographic region and with cervical cancer. Cancer Epidemiol Biomarkers Prev 2005;14(5):1157-64.

Women with high-grade cervical lesions

Data have been compiled by the IARC Infection and Cancer Epidemiology Group and have been published as a systematic review and meta-analysis in:

Clifford GM, Smith JS, Aguado T, Franceschi S. Comparison of HPV type distribution in high-grade cervical lesions and cervical cancer: a meta-analysis. Br J Cancer 2003;89(1):101-5.

Smith JS, Lindsay L, Hoots B, Keys J, Franceschi S, Winer R, Clifford GM. Human papillomavirus type distribution in invasive cervical cancer and high- grade cervical lesions: A meta-analysis update. Int J Cancer 2007 1;121(3):621-32.

Women with Invasive Cervical Cancer

Data have been compiled by the IARC Infection and Cancer Epidemiology Group and have been published as a systematic review and meta-analysis in:

Clifford GM, Smith JS, Plummer M, Munoz N, Franceschi S. Human papillomavirus types in invasive cervical cancer worldwide: a meta-analysis. Br J Cancer 2003;88(1):63-73.

Clifford G, Franceschi S. Members of the human papillomavirus type 18 family (alpha-7 species) share a common association with adenocarcinoma of the cervix. Int J Cancer 2008;122(7):1684-5.

Anal cancer, vulvar cancer, and vaginal cancer

Ongoing data are complied by the HPV Information Centre in the Unit of Infections and Cancer at the Institut Català d'Oncologia based on the initial meta-analaysis conducted by the IARC Infection and Cancer Epidemiology Group in:

De Vuyst H, Clifford GM, Nascimento MC, Madeleine MM, Franceschi S. Prevalence and type distribution of human papillomavirus in carcinoma and intraepithelial neoplasia of the vulva, vagina, and anus: a meta-analysis. Int J Cancer 2009; 124 (7): 1626-36.

Penile Cancer

Data have been compiled by the HPV Information Centre in the Unit of Infections and Cancer at the Institut d'Oncologia d'Oncologia and have been published as a systematic review in:

Miralles-Guri C, Bruni L, Cubilla AL, Castellsagué, Bosch FX, de Sanjose S. HPV prevalence and type distribution in penile carcinoma. J Clin Pathol 2009; In press.

Table 15: References of studies included in the meta-analyses

	Region/Country	Reference							
Africa									
Eastern Africa	Ethiopia	Fanta BE, Ethiop Med J 2005; 43: 151				❹			
	Kenya	De Vuyst H, Curr Opin Oncol 2007; 19: 470				❹			
		De Vuyst H, Int J Cancer 2008; 122: 244				❹			
		De Vuyst H, Sex Transm Dis 2003; 30: 137	❶	❷	❸				
		Ng'ayo MO, Sex Transm Infect 2008; 84: 62							❾
	Mozambique	Castellsague X, Int J Cancer 2008; 122: 1901				❹			
		Castellsague X, Lancet 2001; 358: 1429	❶						
		Naucler P, J Gen Virol 2004; 85: 2189				❹			
	Uganda	Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹			
		Odida M, BMC Infect Dis 2008; 8: 85				❹			
		Tobian AA, N Engl J Med 2009; 360: 1298							❾
		Tornesello M, Cancer Lett 2008a; 269: 159						❽	
	Tanzania	Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹			
		ter Meulen J, Int J Cancer 1992; 51: 515				❹			
	Zimbabwe	Stanczuk GA, Acta Obstet Gynecol Scand 2003; 82: 762				❹			
		Womack SD, Int J Cancer 2000; 85: 206	❶						
Northern Africa	Algeria	Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹			
		Hammouda D, Int J Cancer 2005; 113: 483	❶			❹			
	Egypt	Abdel Aziz MT, Med Sci Monit 2006; 12: MT43	❶						
	Morocco	Amrani M, J Clin Virol 2003; 27: 286	❶						
		Chaouki N, Int J Cancer 1998; 75: 546	❶			❹			
	Tunisia	Hassen E, Infection 2003; 31: 143	❶						
Southern Africa	South Africa	Allan B, J Clin Microbiol 2008; 46: 740	❶						
		Auvert B, J Infect Dis 2009; 199: 14							
		Jones HE, J Clin Microbiol 2007; 45: 1679	❶						
		Kay P, J Med Virol 2003; 71: 265			❸	❹			
		Marais DJ, J Med Virol 2008; 80: 953		❷	❸				
		Pegoraro RJ, Int J Gynecol Cancer 2002; 12: 383				❹			
		Williamson AL, J Med Virol 1994; 43: 231				❹			
		Wright TC, JAMA 2000; 283: 81	❶						
Western Africa	Benin	Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹			

❶ Normal cytology ❷ Low-grade cervical lesions ❸ High-grade cervical lesions ❹ Cervical cancer
❺ Anal cancer ❻ Vulvar Cancer ❼ Vaginal cancer ❽ Penile cancer ❾ Men

Region/Country		Reference						
	Côte d'I	La Ruche G, Int J Cancer 1998; 76: 480	❶	❷	❸			
	Gambia	Wall SR, Br J Cancer 2005; 93: 1068	❶					
	Guinea	Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹		
		Keita N, Br J Cancer (Accepted) ; :	❶					
	Mali	Bayo S, Int J Epidemiol 2002; 31: 202				❹		
		Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹		
	Nigeria	Schnatz PF, J Womens Health (Larchmt) 2008; 17: 279	❶					
		Thomas JO, Br J Cancer 2004; 90: 638	❶	❷				
	Senegal	Astori G, Intervirology 1999; 42: 221	❶					
		Chabaud M, J Med Virol 1996; 49: 259		❷	❸			
		Lin P, Cancer Epidemiol Biomarkers Prev 2001; 10: 1037				❹		
		Xi LF, Int J Cancer 2003; 103: 803	❶	❷	❸	❹		
Americas								
Caribbean	Cuba	Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹		
		Soto Y, Sex Transm Dis 2007; 34: 974		❷	❸			
	Jamaica	Rattray C, J Infect Dis 1996; 173: 718		❷	❸			
		Strickler HD, J Med Virol 1999; 59: 60		❷	❸	❹		
	Trinidad & Tobago	Ragin CC, Biomarkers 2007; 12: 510	❶					
Central America	Belize	Cathro HP, Hum Pathol 2009; :	❶					
	Costa Rica	Herrero R, J Infect Dis 2005; 191: 1796	❶	❷	❸	❹		
		Safaeian M, J Clin Microbiol 2007; 45: 1447	❶					
	Guatemala	Valles X, Int J Cancer 2009; :	❶					
	Honduras	Ferrera A, Int J Cancer 1999; 82: 799	❶	❷	❸	❹		
		Tabora N, Am J Trop Med Hyg 2005; 73: 50	❶					
	Mexico	Giuliano AR, Cancer Epidemiol Biomarkers Prev 2001; 10: 1129	❶	❷				
		Giuliano AR, Cancer Epidemiol Biomarkers Prev 2008; 17: 2036						❾
		Giuliano AR, Int J STD AIDS 2005; 16: 247	❶					
		Gonzalez-Losa Mdel R, J Clin Virol 2004; 29: 202		❷	❸			
		Illades-Aguiar B, Cancer Detect Prev 2008; 32: 300	❶					
		Lajous M, Cancer Epidemiol Biomarkers Prev 2005; 14: 1710						❾
		Lazcano-Ponce E, Int J Cancer 2001; 91: 412	❶					
		Lazcano-Ponce E, Sex Transm Dis 2001; 28: 277						❾
		Meyer T, J Infect Dis 1998; 178: 252				❹		
		Pina-Sanchez P, Int J Gynecol Cancer 2006; 16: 1041	❶	❷	❸	❹		
		Rojo Contreras W, Ginecol Obstet Mex 2008; 76: 9	❶					
		Salazar E, Arch Androl 2005; 51: 327					❽	
		Salmeron J, Cancer Causes Control 2003; 14: 505	❶					
		Sanchez-Anguiano LF, BMC Infect Dis 2006; 6: 27	❶					
		Torroella-Kouri M, Gynecol Oncol 1998; 70: 115		❷	❸	❹		
		Vaccarella S, Int J Cancer 2006; 119: 1934						❾
	Nicaragua	Hindryckx P, Sex Transm Infect 2006; 82: 334		❷	❸	❹		
	Panama	Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹		
Northern America	Canada	Al-Ghamdi A, Gynecol Oncol 2002; 84: 94					❻	
		Antonishyn NA, Arch Pathol Lab Med 2008; 132: 54		❷	❸			
		Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹		
		Duggan MA, Hum Pathol 1995; 26: 319				❹		
		Kapala J, J Virol Methods 2007; 142: 223	❶					
		Koushik A, Cancer Detect Prev 2005; 29: 307		❷				
		Maden C, J Natl Cancer Inst 1993; 85: 19					❽	
		Mayrand MH, Int J Cancer 2006; 119: 615	❶					
		Moore RA, Cancer Causes Control 2009; :	❶					
		Richardson H, Cancer Epidemiol Biomarkers Prev 2003; 12: 485	❶	❷				
		Sellors JW, CMAJ 2000; 163: 503	❶	❷				
		Sellors JW, CMAJ 2000; 163: 513		❷	❸			
		Tran-Thanh D, Am J Obstet Gynecol 2003; 188: 129		❷		❹		
		Young TK, Sex Transm Dis 1997; 24: 293	❶					
	United States of America	ASCUS-LSIL Traige Study (ALTS) Group, Am J Obstet Gynecol 2003; 188: 1393		❷				
		Adam E, Am J Obstet Gynecol 1998; 178: 1235			❸			
		Adam E, Am J Obstet Gynecol 2000; 182: 257		❷				
		Aoyama C, Diagn Mol Pathol 1998; 7: 324			❸			

❶ Normal cytology ❷ Low-grade cervical lesions ❸ High-grade cervical lesions ❹ Cervical cancer
❺ Anal cancer ❻ Vulvar Cancer ❼ Vaginal cancer ❽ Penile cancer ❾ Men

Region/Country	Reference
	Baken LA, J Infect Dis 1995; 171: 429 ❾
	Baldwin SB, J Infect Dis 2003; 187: 1064 ❾
	Bell MC, Gynecol Oncol 2007; 107: 236 ❷ ❸
	Bloss JD, Hum Pathol 1991; 22: 711 ❻
	Bosch FX, J Natl Cancer Inst 1995; 87: 796 ❹
	Brown DR, Sex Transm Dis 2002; 29: 763 ❷
	Bryan JT, J Med Virol 2006; 78: 117 ❹
	Burger RA, J Natl Cancer Inst 1996; 88: 1361 ❹
	Burnett AF, Gynecol Oncol 1992; 47: 343 ❹
	Carter JJ, Cancer Res 2001; 61: 1934 ❻ ❼
	Chan JK, Br J Cancer 2003; 89: 1062 ❸
	Chaturvedi AK, J Med Virol 2005; 75: 105 ❶
	Cibas ES, Gynecol Oncol 2007; 104: 702 ❶
	Crum CP, J Infect Dis 2004; 189: 1348 ❸
	Cubilla A, Am J Surg Pathol 1998; 22: 755 ❽
	Cupp M, J Urol 1995; 154: 1024 ❽
	Daling J, Int J Cancer 2005; 116: 606 ❽
	Daling JR, Cancer 2004; 101: 270 ❺
	Daling JR, Gynecol Oncol 2002; 84: 263 ❼
	Datta SD, Ann Intern Med 2008; 148: 493 ❶
	Einstein MH, Int J Cancer 2007; 120: 55 ❷ ❸
	Eliezri Y, J Am Acad Dermatol 1990; 23: 836 ❽
	Evans MF, Cancer 2006; 106: 1054 ❶ ❷ ❸
	Evans MF, Eur J Gynaecol Oncol 2003; 24: 373 ❸
	Evans MF, Mod Pathol 2002; 15: 1339 ❷
	Ferguson AW, Mod Pathol 1998; 11: 11 ❹
	Fife KH, Sex Transm Dis 2003; 30: 246 ❾
	Giuliano AR, Cancer Epidemiol Biomarkers Prev 1999; 8: 615 ❶
	Giuliano AR, Cancer Epidemiol Biomarkers Prev 2001; 10: 1129 ❶ ❷
	Giuliano AR, Cancer Epidemiol Biomarkers Prev 2008a; 17: 2036 ❾
	Giuliano AR, J Infect Dis 2008b; 198: 827 ❾
	Goodman MT, Cancer Res 2008; 68: 8813 ❶
	Gregoire L, J Natl Cancer Inst 1995; 87: 1705 ❽
	Guo M, Mod Pathol 2007; 20: 256 ❷ ❸ ❹
	Hernandez BY, J Infect Dis 2008; 197: 787 ❾
	Hernandez BY, Nutr Cancer 2004; 49: 109 ❶
	Hu L, Mod Pathol 2005; 18: 267 ❷ ❸
	Insinga RP, Cancer Epidemiol Biomarkers Prev 2007; 16: 709 ❶
	Jarboe EA, Hum Pathol 2004; 35: 396 ❷ ❸
	Khanna N, Int J Gynecol Cancer 2007; 17: 615 ❶
	Kim YT, Hum Pathol 1996; 27: 389 ❻
	Kiyabu M, Am J Surg Pathol 1989; 13: 221 ❽
	Kiyabu MT, Am J Surg Pathol 1989; 13: 221 ❻ ❼
	Kong CS, Am J Surg Pathol 2007; 31: 33 ❷ ❸
	Kotloff KL, Sex Transm Dis 1998; 25: 243 ❶
	Kulasingam SL, JAMA 2002; 288: 1749 ❷
	Lee YY, Oncogene 1994; 9: 1655 ❻
	Liaw KL, J Natl Cancer Inst 1999; 91: 954 ❷
	Madeleine MM, J Natl Cancer Inst 1997; 89: 1516 ❻
	Medeiros F, J Low Genit Tract Dis 2005; 9: 154 ❸
	Monk BJ, Obstet Gynecol 1995; 85: 709 ❻
	Moscicki AB, JAMA 2001; 285: 2995 ❶
	Nielson CM, Cancer Epidemiol Biomarkers Prev 2007; 16: 1107 ❾
	Noffsinger AE, Mod Pathol 1995; 8: 509 ❺
	Nuovo GJ, Gynecol Oncol 1991; 43: 275 ❻
	Palefsky JM, Cancer Res 1991; 51: 1014 ❺
	Paquette RL, Cancer 1993; 72: 1272 ❹
	Park K, Int J Gynecol Pathol 2007; 26: 457 ❷
	Partridge JM, J Infect Dis 2007; 196: 1128 ❾
	Pinto AP, Am J Pathol 1999a; 154: 1009 ❻
	Pirog EC, Am J Pathol 2000; 157: 1055 ❹
	Resnick RM, J Natl Cancer Inst 1990; 82: 1477 ❹
	Rubin M, Am J Pathol 2001; 159: 1211 ❽

❶ Normal cytology ❷ Low-grade cervical lesions ❸ High-grade cervical lesions ❹ Cervical cancer
❺ Anal cancer ❻ Vulvar Cancer ❼ Vaginal cancer ❽ Penile cancer ❾ Men

Region/Country		Reference	
		Sagerman PM, Gynecol Oncol 1996; 61: 328	❻
		Sarkar F, J Urol 1992; 147: 389	❽
		Schiff M, Am J Epidemiol 2000; 152: 716	❷ ❸
		Schwartz SM, J Clin Oncol 2001; 19: 1906	❹
		Sebbelov AM, Microbes Infect 2000; 2: 121	❹
		Sherman ME, J Natl Cancer Inst 2003; 95: 46	❶
		Shroyer KR, Am J Clin Pathol 1995; 104: 299	❺
		Smith EM, Cancer Detect Prev 2003; 27: 472	❶
		Smith EM, Int J Gynaecol Obstet 2004; 87: 131	❶
		Sutton BC, Mod Pathol 2008; 21: 345	❻
		Swan DC, J Clin Microbiol 1999; 37: 1030	❶ ❷ ❸
		Tarkowski TA, J Infect Dis 2004; 189: 46	❶
		Tate JE, Gynecol Oncol 1994; 53: 78	❻
		Tortolero-Luna G, Cad Saude Publica 1998; 14 Suppl 3: 149	❷
		Varma V, Hum Pathol 1991; 22: 908	❽
		Waggoner SE, Obstet Gynecol 1994; 84: 404	❼
		Weaver BA, J Infect Dis 2004; 189: 677	❾
		Wentzensen N, Int J Cancer 2009; 124: 964	❷ ❸ ❹
		Wideroff L, Nutr Cancer 1998; 30: 130	❶
		Wiener J, Int J Cancer 1992; 50: 694	❽
		Wistuba II, Cancer Res 1997; 57: 3154	❹
		Zaki SR, Am J Pathol 1992; 140: 1345	❺
		Zhao C, Cancer 2007; 111: 292	❶
		Zuna RE, Mod Pathol 2007; 20: 167	❷ ❸ ❹
South America	South America	Longatto-Filho A, Int J Gynecol Cancer 2006; 16: 955	❶
	Argentina	Abba MC, Rev Argent Microbiol 2003; 35: 74	❶ ❷ ❸
		Alonio LV, J Clin Virol 2003; 27: 263	❸ ❹
		Bosch FX, J Natl Cancer Inst 1995; 87: 796	❹
		Chouhy D, Int J Mol Med 2006; 18: 995	❷ ❸
		Golijow CD, Gynecol Oncol 2005; 96: 181	❸ ❹
		Matos E, Sex Transm Dis 2003; 30: 593	❶
		Picconi M, J Med Virol 2000; 61: 65	❽
		Tonon SA, Infect Dis Obstet Gynecol 1999; 7: 237	❷
		Turazza E, Acta Obstet Gynecol Scand 1997; 76: 271	❹
	Bolivia	Bosch FX, J Natl Cancer Inst 1995; 87: 796	❹
	Brazil	Bezerra A, Am J Surg Pathol 2001a; 25: 673	❽
		Bezerra A, Cancer 2001b; 91: 2315	❽
		Bosch FX, J Natl Cancer Inst 1995; 87: 796	❹
		Camara GN, Mem Inst Oswaldo Cruz 2003; 98: 879	❸
		Cambruzzi E, Pathol Oncol Res 2005; 11: 114	❹
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		Eluf-Neto J, Br J Cancer 1994; 69: 114	❹
		Franceschi S, Br J Cancer 2002; 86: 705	❾
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		Giuliano AR, Cancer Epidemiol Biomarkers Prev 2008; 17: 2036	❾
		Levi J, Int J Cancer 1998; 76: 779	❽
		Lorenzato F, Int J Gynecol Cancer 2000; 10: 143	❶ ❷ ❸ ❹
		McCance D, Int J Cancer 1986; 37: 55	❽
		Munoz N, Sex Transm Dis 1996; 23: 504	❶
		Nicolau SM, Urology 2005; 65: 251	❾
		Noronha Vânia Lúcia, DST j bras doenças sex transm 2005; 17: 49	❶
		Pinto AP, Gynecol Oncol 1999b; 74: 61	❻
		Rabelo-Santos SH, Mem Inst Oswaldo Cruz 2003; 98: 181	❹
		Rama CH, Rev Saude Publica 2008; 42: 123	❶
		Terra AP, Tumori 2007; 93: 572	❸
		Trottier H, Cancer Epidemiol Biomarkers Prev 2006; 15: 1274	❶
		Villa L, Int J Cancer 1986; 37: 853	❽
	Chile	Bosch FX, J Natl Cancer Inst 1995; 87: 796	❹
		Ferreccio C, Cancer Epidemiol Biomarkers Prev 2004; 13: 2271	❶
	Colombia	Bosch FX, Cancer Epidemiol Biomarkers Prev 1993; 2: 415	❸

❶ Normal cytology ❷ Low-grade cervical lesions ❸ High-grade cervical lesions ❹ Cervical cancer
❺ Anal cancer ❻ Vulvar Cancer ❼ Vaginal cancer ❽ Penile cancer ❾ Men

	Region/Country	Reference							
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		Franceschi S, Br J Cancer 2002; 86: 705							❾
		Leon S, Sex Transm Dis 2009; 36: 290	❶						
		Molano M, Br J Cancer 2002; 87: 1417		❷					
		Molano M, Br J Cancer 2002; 87: 324	❶						
		Munoz N, Int J Cancer 1992; 52: 743				❹			
		Munoz N, Sex Transm Dis 1996; 23: 504	❶						
	Paraguay	Cubilla A, Am J Surg Pathol 1998; 22: 755						❽	
		Gregoire L, J Natl Cancer Inst 1995; 87: 1705						❽	
		Rolon PA, Int J Cancer 2000; 85: 486	❶			❹			
		Rubin M, Am J Pathol 2001; 159: 1211						❽	
		Tonon SA, Infect Dis Obstet Gynecol 1999; 7: 237		❷					
	Peru	Almonte M, Int J Cancer 2007; 121: 796	❶						
		Garcia PJ, Bull World Health Organ 2004; 82: 483	❶						
		Santos C, Br J Cancer 2001; 85: 966	❶			❹			
	Suriname	De Boer MA, Int J Cancer 2005; 114: 422				❹			
Asia									
Eastern Asia	China	Belinson J, Gynecol Oncol 2001; 83: 439	❶						
		Belinson JL, Int J Gynecol Cancer 2003; 13: 819	❶						
		Chan K, J Clin Pathol 1994; 47: 823						❽	
		Chan MK, Gynecol Oncol 1996; 60: 217			❸				
		Chan PK, Int J Cancer 2006; 118: 243				❹			
		Chan PK, J Infect Dis 2002; 185: 28	❶						
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		Chao A, Int J Cancer 2008; 122: 2835	❶						
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		Hong D, Int J Gynecol Cancer 2008; 18: 104		❷	❸	❹			
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		Huang LW, J Clin Virol 2004; 29: 271				❹			
		Huang S, Int J Cancer 1997; 70: 408				❹			
		Huang YK, Br J Cancer 2008; 98: 863	❶						
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		Liu J, Gynecol Oncol 2004; 94: 803				❹			
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		Ngan HY, Eur J Cancer 1999; 35: 481					❻		
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		Stephen AL, Int J Cancer 2000; 86: 695				❹			
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		Tao PP, Zhonghua Fu Chan Ke Za Zhi 2006; 41: 43		❷	❸	❹			
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		Wu CH, Sex Transm Dis 1994; 21: 309			❸				
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		Wu Y, J Clin Virol 2006; 35: 264				❹			

❶ Normal cytology ❷ Low-grade cervical lesions ❸ High-grade cervical lesions ❹ Cervical cancer
❺ Anal cancer ❻ Vulvar Cancer ❼ Vaginal cancer ❽ Penile cancer ❾ Men

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		Yang YY, J Microbiol Immunol Infect 2004; 37: 282				❹		
		Yeoh GP, Acta Cytol 2006; 50: 627	❶					
		Yu MY, Int J Cancer 2003; 105: 204				❹		
		Zhao Y, Pathol Int 2008; 58: 643		❷	❸	❹		
	Hong Kong	Chan K, J Clin Pathol 1994; 47: 823						❽
	Japan	Asato T, J Infect Dis 2004; 189: 1829	❶			❹		
		Fujinaga Y, J Gen Virol 1991; 72 (Pt 5): 1039				❹		
		Harima Y, Int J Radiat Oncol Biol Phys 2002; 52: 1345				❹		
		Ichimura H, Int J Clin Oncol 2003; 8: 322			❸			
		Inoue M, Int J Gynecol Cancer 2006; 16: 1007	❶	❷	❸	❹		
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		Ishikawa H, Cancer 2001; 91: 80				❹		
		Iwasawa A, J Urol 1993; 149: 59						❽
		Kagawa R, Surg Today 2006; 36: 885					❺	
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		Kashiwabara K, Acta Pathol Jpn 1992; 42: 876				❹		
		Koyamatsu Y, Gynecol Oncol 2003; 90: 547					❻	❼
		Maehama T, Infect Dis Obstet Gynecol 2005; 13: 77	❶			❹		
		Maki H, Jpn J Cancer Res 1991; 82: 411				❹		
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		Nakagawa H, Anticancer Res 2002; 22: 1655				❹		
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		Takahashi S, Sex Transm Dis 2003; 30: 629						❾
		Tsuda H, Gynecol Oncol 2003; 91: 476		❷	❸	❹		
		Yamakawa Y, Gynecol Oncol 1994; 53: 190				❹		
		Yanagawa N, Virchows Arch 2008; 452: 377						❽
		Yoshida T, Cancer 2004; 102: 100		❷	❸	❹		
		Yoshikawa H, Br J Cancer 1999; 80: 621	❶					
		Yoshikawa H, Jpn J Cancer Res 1991; 82: 524			❸			
	Mongolia	Dondog B, Cancer Epidemiol Biomarkers Prev 2008; 17: 1731	❶					
	Republic of Korea	An HJ, Cancer 2003; 97: 1672	❶	❷	❸	❹		
		An HJ, Mod Pathol 2005; 18: 528				❹		
		Cho NH, Am J Obstet Gynecol 2003; 188: 56	❶	❷	❸	❹		
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		Tong SY, Int J Gynecol Cancer 2007; 17: 1307				❹		
		Youk EG, Dis Colon Rectum 2001; 44: 236					❺	
South-Eastern Asia	Indonesia	Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹		
		Schellekens MC, Gynecol Oncol 2004; 93: 49				❹		
		de Boer MA, Int J Gynecol Cancer 2006; 16: 1809	❶					

❶ Normal cytology ❷ Low-grade cervical lesions ❸ High-grade cervical lesions ❹ Cervical cancer
❺ Anal cancer ❻ Vulvar Cancer ❼ Vaginal cancer ❽ Penile cancer ❾ Men

	Region/Country	Reference							
	Malaysia	Yadav M, Med J Malaysia 1995; 50: 64				❹			
	Philippines	Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹			
		Franceschi S, Br J Cancer 2002; 86: 705							❾
		Ngelangel C, J Natl Cancer Inst 1998; 90: 43	❶			❹			
	Thailand	Bhattarakosol P, J Med Assoc Thai 1996; 79 Suppl 1: S56				❹			
		Bhattarakosol P, J Med Assoc Thai 2002; 85 Suppl 1: S360		❷	❸				
		Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹			
		Chaiwongkot A, Asian Pac J Cancer Prev 2007; 8: 279	❶	❷					
		Chichareon S, J Natl Cancer Inst 1998; 90: 50	❶			❹			
		Ekalaksananan T, J Obstet Gynaecol Res 2001; 27: 117		❷	❸				
		Franceschi S, Br J Cancer 2002; 86: 705							❾
		Limpaiboon T, Southeast Asian J Trop Med Public Health 2000; 31: 66			❸				
		Senba M, J Med Virol 2006; 78: 1341						❽	
		Settheetham-Ishida W, Microbiol Immunol 2005; 49: 417	❶			❹			
		Siriaunkgul S, Gynecol Oncol 2008; 108: 555				❹			
		Siritantikorn S, Southeast Asian J Trop Med Public Health 1997; 28: 707	❶			❹			
		Sriamporn S, Int J Gynecol Cancer 2006; 16: 266	❶			❹			
		Sukvirach S, J Infect Dis 2003; 187: 1246	❶						
	Viet Nam	Pham TH, Int J Cancer 2003; 104: 213	❶						
Southern Asia	India	Aggarwal R, Indian J Cancer 2006; 43: 110	❶						
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		Laikangbam P, Int J Gynecol Cancer 2007; 17: 107	❶						
		Munirajan AK, Gynecol Oncol 1998; 69: 205				❹			
		Nagpal JK, Eur J Clin Invest 2002; 32: 943		❷	❸	❹			
		Nair P, Pathol Oncol Res 1999; 5: 95		❷					
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		Sankaranarayanan R, Int J Cancer 2004; 112: 341	❶						
		Sowjanya AP, BMC Infect Dis 2005; 5: 116				❹			
	Iran	Ghaffari SR, Asian Pac J Cancer Prev 2006; 7: 529		❷	❸	❹			
		Hamkar R, East Mediterr Health J 2002; 8: 805				❹			
		Mortazavi S, Asian Pac J Cancer Prev 2002; 3: 69				❹			
	Pakistan	Khan S, Int J Infect Dis 2007; 11: 313				❹			
Western Asia	Bahrain	Hajjaj AA, Saudi Med J 2006; 27: 487	❶						
	Israel	Menczer J, Eur J Gynaecol Oncol 2000; 21: 30					❻		
	Turkey	Inal MM, Int J Gynecol Cancer 2007; 17: 1266	❶						
Europe									
Eastern Europe	Belarus	Kulmala SM, J Med Virol 2007; 79: 771		❷	❸	❹			
	Czech Republic	Grce M, J Clin Microbiol 2004; 42: 1341		❷					
		Skapa P, Am J Surg Pathol 2007; 31: 1834					❻		
		Tachezy R, APMIS 2007; 115: 195				❺			
		Tachezy R, Hum Genet 1999; 105: 564			❸				
		Tachezy R, J Med Virol 1999; 58: 378		❷		❹			
	Hungary	Konya J, J Med Virol 1995; 46: 1				❹			
		Nyari T, Eur J Obstet Gynecol Reprod Biol 2006; 126: 246	❶						
		Szoke K, J Med Virol 2003; 71: 585			❸				
	Poland	Bardin A, Eur J Cancer 2008; 44: 557	❶			❹			
		Bosch FX, J Natl Cancer Inst 1995; 87: 796				❹			
		Dybikowska A, Oncol Rep 2002; 9: 871				❹			
		Liss J, Ginekol Pol 1998; 69: 330					❻		
		Liss J, Ginekol Pol 2002; 73: 740				❹			
		Pirog EC, Am J Pathol 2000; 157: 1055				❹			
	Russian Federation	Alexandrova YN, Cancer Lett 1999; 145: 43	❶						
		Kleter B, J Clin Microbiol 1999; 37: 2508				❹			
		Kulmala SM, J Med Virol 2007; 79: 771		❷	❸	❹			
Europe	Europe	Paavonen J, Curr Med Res Opin 2008; 24: 1623	❶						

❶ Normal cytology ❷ Low-grade cervical lesions ❸ High-grade cervical lesions ❹ Cervical cancer
❺ Anal cancer ❻ Vulvar Cancer ❼ Vaginal cancer ❽ Penile cancer ❾ Men

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Northern Europe	Denmark	Bryndorf T, Cytogenet Genome Res 2004; 106: 43 ❻
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		Hording U, APMIS 1997; 105: 313 ❹
		Hording U, Eur J Obstet Gynecol Reprod Biol 1995; 62: 49 ❷
		Hording U, Gynecol Oncol 1991; 42: 22 ❻
		Hording U, Gynecol Oncol 1994; 52: 241 ❻
		Kjaer SK, BMJ 2002; 325: 572 ❶
		Kjaer SK, Cancer Epidemiol Biomarkers Prev 2005; 14: 1528 ❾
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		Madsen BS, Int J Cancer 2008; 122: 2827 ❼
		Nielsen A, Sex Transm Dis 2008; 35: 276 ❶
		Sebbelov AM, Microbes Infect 2000; 2: 121 ❹
		Sebbelov AM, Res Virol 1994; 145: 83 ❸
		Svare EI, Eur J Cancer 1998; 34: 1230 ❶
		Svare EI, Sex Transm Infect 2002; 78: 215 ❾
	Finland	Hippelainen M, Sex Transm Dis 1993; 20: 321 ❾
		Iwasawa A, Cancer 1996; 77: 2275 ❹
		Iwasawa A, Obstet Gynecol 1997; 89: 81 ❻
		Leinonen M, Int J Cancer 2008; 123: 1344 ❶
	Iceland	Sigurdsson K, Int J Cancer 2007; 121: 2682 ❸❹
	Ireland	Butler D, J Pathol 2000; 192: 502 ❷❸❹
		Keegan H, Br J Biomed Sci 2007; 64: 18 ❶
		Murphy N, J Clin Pathol 2003; 56: 56 ❷❸
		O'Leary JJ, J Clin Pathol 1998; 51: 576 ❸❹
		Skyldberg BM, Mod Pathol 1999; 12: 675 ❹
	Latvia	Kulmala SM, J Med Virol 2007; 79: 771 ❷❸❹
		Silins I, Gynecol Oncol 2004; 93: 484 ❹
	Lithuania	Gudleviciene Z, Medicina (Kaunas) 2005; 41: 910 ❶❷❸❹
	Norway	Gjooen K, APMIS 1996; 104: 68 ❶
		Holm R, Mod Pathol 1994; 7: 449 ❺
		Karlsen F, J Clin Microbiol 1996; 34: 2095 ❹
		Kraus I, Br J Cancer 2004; 90: 1407 ❸
		Molden T, Cancer Epidemiol Biomarkers Prev 2005; 14: 367 ❶❷❸
		Molden T, Gynecol Oncol 2006; 100: 95 ❶
		Roberts CC, J Clin Virol 2006; 36: 277 ❷❸
	Sweden	Andersson S, Acta Obstet Gynecol Scand 2003; 82: 960 ❹
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		Andersson S, Cancer Detect Prev 2005; 29: 37 ❷❸❹
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		Frisch M, Cancer Res 1999; 59: 753 ❺
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		Ylitalo N, Cancer Res 2000; 60: 6027 ❶
		Zehbe I, J Pathol 1997; 181: 270 ❹
		Zehbe I, Virchows Arch 1996; 428: 151 ❷❸
	United Kingdom	Abdel-Hady ES, Cancer Res 2001; 61: 192 ❻
		Arends MJ, Hum Pathol 1993; 24: 432 ❷❸❹
		Brooks LA, Cancer Res 2000; 60: 6875 ❻
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		Cuzick J, Br J Cancer 1994; 69: 167 ❸
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		Cuzick J, Br J Cancer 2000; 82: 1348 ❹
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❶ Normal cytology ❷ Low-grade cervical lesions ❸ High-grade cervical lesions ❹ Cervical cancer
❺ Anal cancer ❻ Vulvar Cancer ❼ Vaginal cancer ❽ Penile cancer ❾ Men

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		Grainge MJ, Emerg Infect Dis 2005; 11: 1680	❶							
		Herbert A, J Fam Plann Reprod Health Care 2007; 33: 171	❶							
		Herrington CS, Br J Cancer 1995; 71: 206			❸					
		Hibbitts S, Br J Cancer 2006; 95: 226	❶							
		Hibbitts S, Br J Cancer 2008; 99: 1929	❶							
		Kitchener HC, Br J Cancer 2006; 95: 56	❶							
		Ogunbiyi OA, J Clin Pathol 1993; 46: 507					❺			
		Ogunbiyi OA, Obstet Gynecol 1994; 83: 212					❺	❻		
		Peto J, Br J Cancer 2004; 91: 942	❶							
		Prowse D, Br J Dermatol 2008; 158: 261								❽
		Sargent A, Br J Cancer 2008; 98: 1704	❶		❸					
		Southern SA, Diagn Mol Pathol 1998; 7: 114			❸					
		Southern SA, Hum Pathol 2001; 32: 1351		❷						
		Tawfik El-Mansi M, Int J Gynecol Cancer 2006; 16: 1025				❹				
Southern Europe	Croatia	Dabic MM, Acta Obstet Gynecol Scand 2008; 87: 366				❹				
		Grahovac M, Coll Antropol 2007; 31 Suppl 2: 73	❶							
		Grce M, Anticancer Res 2001; 21: 579		❷	❸					
		Grce M, Eur J Epidemiol 1997; 13: 645		❷						
		Grce M, J Clin Microbiol 2004; 42: 1341			❸					
		Hadzisejdic I, Coll Antropol 2006; 30: 879				❹				
	Greece	Agorastos T, Eur J Cancer Prev 2004; 13: 145	❶							
		Agorastos T, Eur J Obstet Gynecol Reprod Biol 2005; 121: 99			❸					
		Daponte A, J Clin Virol 2006; 36: 189			❸	❹				
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❺ Anal cancer ❻ Vulvar Cancer ❼ Vaginal cancer ❽ Penile cancer ❾ Men

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Note to the reader

Anyone who is aware of relevant published data that may not have been included in the WHO/ICO Information Centre on HPV and Cervical Cancer is encouraged to contact the HPV Information Centre for potential contributions.

Although efforts have been made by the HPV Information Centre to prepare and include as accurately as possible the data presented, mistakes may occur. Readers are requested to communicate any errors to the HPV Information Centre, so that corrections can be made in future volumes.

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