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Appendix Table 1. Types of smokeless tobacco and areca nut-containing products, location most commonly used, major constituents, and other features (adapted from International Agency for Research on Cancer Handbook on Cancer Prevention Vol. 19: Oral cancer prevention¹)

Product name	Alternative/colloquial name(s) (if any) and location (country/WHO region)	Major constituents	Mode of consumption; processing & manufacturing
1. Smokeless tobacco products alone (without areca nut)			
<i>Chimó</i>	Venezuela, Colombia	Tobacco leaf, baking soda, brown sugar, ashes from Mamón tree	Oral – sucked, held in mouth; Cottage industry or manufactured commercially
Creamy Snuff	Tobacco toothpaste; Commonly used in SEAR	Tobacco, clove oil, glycerine, spearmint, menthol, camphor	Oral – applied to teeth and gums; Manufactured commercially
Dry Snuff	Scotch snuff, snuff (USA, Canada, Germany); <i>taaba</i> (in Burkina Faso), <i>snuif</i> (in South Africa); <i>sneif</i> (Botswana, Lesotho, South Africa); <i>Azo</i> (in Benin); <i>Simonte</i> (in the Kalunga community of Brazil); <i>tapkeer/tapkir/bajjar</i> (India)	Tobacco (fire- or air-cured, fermented powdered), flavours	Oral and nasal – sucked, held in mouth or through nasal application; Manufactured commercially
Moist snuff	Dip, spit tobacco (USA, Canada, Mexico)	Tobacco (air- or fire-cured), flavourings, inorganic salts, humectants, slaked lime, ash, black pepper, oil	Oral – sucked; Manufactured commercially
	<i>Shammah: El-Shama, bajeli, haradi, sharaci</i> , black <i>shammah</i> (in Yemen); <i>al-shammah</i> (Saudi Arabia); <i>chemma</i> (in Algeria);		
	<i>Toombak: Saute, sute, ammari, saood</i> ; Commonly found in Eastern Mediterranean Region (Sudan), African Region (Chad)		
Dissolvables tobacco	Dissolvables; commonly used in Region of the Americas – United States	Tobacco, humectants, preservatives, flavours	Oral – sucked, held in mouth, dissolved; manufactured commercially
Tobacco-based dentifrices	<i>Gudakhu</i> : Commonly used in SEAR – India	Tobacco powder, molasses, red soil, lime, water	Oral – applied to teeth and gums (teeth cleaning), held in mouth; Manufactured commercially and custom-made
	<i>Gul/Gulmanjan</i> : commonly used in SEAR – India, Bangladesh	Tobacco (fire-cured, fermented powdered), molasses, unknown ingredients	
	<i>Mishri/Masheri</i> : commonly used in SEAR – India	Tobacco – toasted on hot metal plate and powdered	
	<i>Tapkeer/Tapkir/Bajjar</i> : commonly used in SEAR – India		

<i>Iq'mik</i>	Blackbull, <i>dediguss</i> ; Commonly used in Regions of the Americas – USA (Alaska)	Tobacco (fire-cured), tree fungus ash or other ash derived from wood or bush	Oral – chewed; Custom-made
<i>Khaini</i>	<i>Chadha, sada, surti</i> (in Nepal and neighbouring parts of India); Commonly used in SEAR – India, Bangladesh, Nepal, Bhutan	Coarsely cut tobacco leaves (sun-dried, fermented), slaked lime	Oral – sucked, held in mouth; Manufactured commercially, cottage industry, custom-made
<i>Kiwam</i>	<i>Qiwam, qimam, khiwam, kimam</i> ; commonly used in SEAR, Eastern Mediterranean Region – Pakistan	Paste of tobacco extract, spices (cardamom, saffron, aniseed), additives such as musk	Oral, mostly used as an ingredient in betel quid– chewed or held in mouth; Manufactured commercially
<i>Nass</i>	<i>Naswar, niswar, nasway, nasvay</i> ; commonly used in Eastern Mediterranean Region (Pakistan, Islamic Republic of Iran, Afghanistan, United Arab Emirates), European Region (Armenia, Kazhakastan, Kyrgyzstan, Uzbekistan, Poland, Slovakia)	Tobacco, ash, cotton or sesame oil, water, flavourings such as cardamom and menthol	Oral – chewed, sucked, held in mouth; Cottage industry and custom-made
<i>Rapé</i>	Commonly used in Region of the Americas – Brazil	Dried tobacco leaf, selected tree ashes, flavourings such as tonka bean, clove, cinnamon powder, and camphor	Nasal inhalation; Cottage industry and custom- made
Red toothpowder	<i>Lal dant manjan</i> ; commonly used in SEAR – India	Fine red tobacco powder, herbs, flavourings. Additionally, ginger, pepper, and camphor may be used	Oral – teeth brushing/cleaning; Manufactured commercially
<i>Snus</i>	Commonly used in Nordic and some other European countries, Region of the Americas (USA, Canada, Brazil), African Region (South Africa)	Tobacco, moisturizers, sodium carbonate, salt, sweeteners, flavourings	Oral – held in mouth; Manufactured commercially
Tobacco Leaf	<i>Sada pata, Chadha</i> ; commonly used in SEAR – India, Bangladesh, Myanmar, Bhutan	Tobacco leaf	Oral – chewed; Custom-made
	<i>hsey or hsey wah</i> – in Myanmar	<i>dried raw tobacco leaves</i>	
	<i>Hsey me'</i> – in Myanmar	cured and roasted tobacco leaves	
	<i>hsey paung or hnut hsey</i> – in Myanmar	tobacco leaves treated with alcohol and honey	
Tobacco water	<i>Tuibur, hidakpha</i> ; commonly used in SEAR – India	Tobacco smoke, water	Sipped or gargled; Cottage industry and custom- made

<i>hsey</i>	In Myanmar	scented tobacco soaked in honey, lime juice and water	
<i>paung yay/</i> black water			
<i>Zarda</i>	<i>Dokta</i> ; commonly used in SEAR (India, Bangladesh, Myanmar, Nepal, Bhutan), Eastern Mediterranean Region (Yemen)	Tobacco, lime, vegetable dyes, aromatic spices	Oral – chewed (sometimes chewed with areca nut or silver flecks); Manufactured commercially
Chewing tobacco	Loose leaf, Chew, <i>chaw</i> , spit tobacco; Commonly used in Region of the Americas – USA	Air cured tobacco leaf, sugar, liquorice	Oral – chewed or held in mouth; Manufactured commercially
	Plug, Chew, <i>chaw</i> , spit tobacco; Commonly used in Regions of the Americas – USA, Canada	Heavy-grade or cigar tobacco top leaves, emerged in liquorice or sugar, and pressed into a plug	Oral – chewed, sucked, held in mouth; Manufactured commercially
	Twist, Chew, <i>chaw</i> , chewing tobacco; commonly used in Regions of the Americas: USA	Tobacco, tobacco leaf extract, sweetener, flavorings	Oral – chewed, held in mouth
	<i>Paraky</i> (in rural Madagascar)		Oral – chewed; Manufactured mainly in cottage industry
	<i>hsey or hsey-ywet kyee</i> (in Myanmar)	raw and cured tobacco	
	<i>Hsey hmwe</i> (in Myanmar)	other varieties of tobacco mixture added with fragrances	
	Bush tobacco – <i>Pituri/ Mingkulpa</i> (among indigenes in Australia)	fresh or dry leaves of certain tobacco species are mixed with burnt wood ash and chewed into a quid	Oral – sucked
2. Areca nut products without tobacco			
<i>Paan masala</i>	<i>Pan masala</i> , commonly used in SEAR	Areca nut, slaked lime, catechu, flavourings, sweeteners	Oral – chewed; Manufactured commercially and cottage industry
Betel quid	Southern China, Pacific Islands	Areca nut (fresh, unripe) alone or with lime;	Oral – chewed; Cottage industry and custom made – prepared by individual vendors for sale or assembled at home by individual users
	Hunan Province in China	Areca nut (dried, unripe) alone or with lime;	
	South Asia	Areca nut (cured, ripe) alone or with lime;	
	Taiwan, China, Hainan Island, Papua New Guinea and Pacific Islands	Areca nut (fresh, unripe) with lime and betel leaves	
	Lao People's Democratic Republic- <i>hwa</i> quid (Taiwan, China, Papua New Guinea)	Areca nut (fresh, unripe) with lime and betel inflorescence	

	Stem quid:		
	Taiwan, China;	Areca nut (fresh, unripe) with lime and betel stem;	
	Guam;	Areca nut (fresh, ripe) with betel leaves;	
	South Asia	Areca nut (cured, ripe) with lime and betel leaves	
	<i>Pan or paan</i> (south Asia)	Areca nut (cured, ripe) with lime, an additional source of catechins, flavourings and betel leaves	
Areca nut	<i>Supari</i> (in SEAR – India), <i>doma khando</i> (in Bhutan), <i>buah pinang</i> (in Indonesia), <i>meeru bileygan'd & heera panna</i> (in Maldives), <i>pugua'</i> (in Guam), <i>binglang</i> (in China), <i>Buai, dak</i> (in Papua New Guinea), <i>pinang</i> (in Malaysia), <i>puwak</i> (in Sri Lanka), <i>gua</i> (in Bangladesh), <i>mak</i> (in Thailand), <i>kun-ywet</i> (in Myanmar), <i>Bura tamol</i> in Assam, India	Areca nut	Oral – chewed raw, fermented or ripened, held in mouth
<i>Kili</i>	Commonly used in Maldives	Areca nut, betel, cloves, cardamom and sugar	Oral; Cottage industry and custom-made – produced by individual vendors for sale in small home-made paper pouches
3. Areca nut products with tobacco			
Betel quid (with tobacco)	<i>Paan or pan</i> (India), <i>khilli pan</i> (Bangladesh); commonly used in SEAR, Eastern Mediterranean Region, Western Pacific Region In Micronesia the areca nut in the betel quid is referred to as: <i>Bu</i> (in Yap), <i>Buuch</i> (in Palau), <i>Ju</i> (in Marshall Islands), <i>Pugua</i> or <i>ppwu</i> in the Commonwealth of the Northern Mariana Islands, <i>Pu</i> (in Kosrae), <i>Puu</i> (in Chuuk), <i>Pwuh</i> (in Pohnpei)	Tobacco, areca nut, slaked lime (calcium hydroxide), betel leaf, catechu (Acacia catechu tree extract) Micronesia excludes catechu	Oral – chewed; Cottage industry and custom made – prepared by individual vendors for sale or assembled at home by individual users
<i>Dohra</i>	Commonly used in SEAR – India	Tobacco, areca nut, catechu, slaked lime, peppermint, cardamom	Oral – chewed; Custom-made – produced by individual vendors for sale

<i>Gutkha</i>	Commonly used in SEAR, Eastern Mediterranean Region	Tobacco (sun dried finely chopped), areca nut, slaked lime, catechu, flavourings, sweeteners	Oral – chewed; Manufactured commercially and cottage industry
<i>Mainpuri</i>	<i>Kapoori</i> ; commonly used in SEAR – India (Uttar Pradesh)	Tobacco leaves pieces, slaked lime, areca nut, flavours (camphor, cloves)	Oral – chewed or held in mouth; Cottage industry and custom-made – produced by individual vendors for sale
<i>Mawa</i>	<i>Kharra</i> ; commonly used in SEAR – India	Crushed tobacco leaves (sun-dried), sun-cured areca nut, slaked lime	Oral – chewed; Cottage industry and custom-made – produced by individual vendors for sale
<i>Tombol</i>	Commonly used in Eastern Mediterranean Region – Yemen	Tobacco, areca nut, <i>noura</i> , slaked lime, <i>catechu</i> , tombol leaf	Oral – chewed, held in mouth; custom-made

SEAR: WHO South-East Asia Region.

Appendix Table 2. Sources of prevalence data of smokeless tobacco or areca nut consumption per country

United Nations geographical region	Country	Source	Year	Prevalence reported by sex	Prevalence reported by age
Eastern Africa	Burundi	DHS	2016–2017	X	X
Eastern Africa	Comoros	STEPS	2011	X	X
Eastern Africa	Eritrea	STEPS	2010	X	X
Eastern Africa	Ethiopia	STEPS	2015	X	X
Eastern Africa	Kenya	GATS	2014	X	X
Eastern Africa	Madagascar	DHS	2008–2009	X	X
Eastern Africa	Malawi	STEPS	2009	X	X
Eastern Africa	Mozambique	STEPS	2005	X	X
Eastern Africa	Rwanda	STEPS	2012	X	X
Eastern Africa	Seychelles	STEPS	2013	X	X
Eastern Africa	Uganda	STEPS	2014	X	X
Eastern Africa	United Republic of Tanzania	STEPS	2012	X	X
Eastern Africa	Zambia	STEPS	2017	X	X
Eastern Africa	Zimbabwe	DHS	2011	X	X
Middle Africa	Angola	DHS	2015–2016	X	
Middle Africa	Cameroon	DHS	2011	X	X
Middle Africa	Central African Republic	STEPS	2010	X	X
Middle Africa	Chad	STEPS	2008	X	
Middle Africa	Democratic Republic of the Congo	STEPS	2005	X	X
Middle Africa	Gabon	STEPS	2009		X
Middle Africa	Republic of the Congo	DHS	2011–2012	X	
Middle Africa	Sao Tome and Principe	STEPS	2008	X	X
Northern Africa	Algeria	Algeria Adult Tobacco Survey	2010	X	X
Northern Africa	Egypt	STEPS	2011–2012	X	X
Northern Africa	Libya	STEPS	2009	X	X
Northern Africa	Morocco	STEPS	2017	X	X
Northern Africa	Sudan	STEPS	2016	X	X
Northern Africa	Tunisia	Tunisian Health Examination Survey	2016	X	X
Southern Africa	Botswana	STEPS	2014	X	X
Southern Africa	Eswatini	STEPS	2014	X	X
Southern Africa	Lesotho	STEPS	2012	X	X
Southern Africa	Namibia	DHS	2006–2007	X	
Southern Africa	South Africa	DHS	2016	X	
Western Africa	Benin	STEPS	2015	X	X
Western Africa	Burkina Faso	STEPS	2013	X	X
Western Africa	Cabo Verde	STEPS	2007	X	X
Western Africa	Côte d'Ivoire	DHS	2011–2012	X	
Western Africa	Gambia	STEPS	2010	X	X
Western Africa	Ghana	DHS	2008	X	X
Western Africa	Guinea	STEPS	2009		

Western Africa	Liberia	STEPS	2011	X	X
Western Africa	Mali	DHS	2018	X	
Western Africa	Mauritania	STEPS	2006	X	X
Western Africa	Niger	STEPS	2007	X	X
Western Africa	Nigeria	GATS	2012	X	
Western Africa	Senegal	GATS	2015	X	
Western Africa	Sierra Leone	STEPS	2009	X	X
Western Africa	Togo	STEPS	2010–2011	X	X
Eastern Asia	China	GATS	2010	X	X
Eastern Asia	Democratic Republic of Korea	National Adult Tobacco Survey	2017	X	
Eastern Asia	Mongolia	STEPS	2013	X	X
Eastern Asia	Republic of Korea	Korea National Health and Nutrition Examination Survey	2021		
South-Central Asia	Afghanistan	STEPS	2019	X	X
South-Central Asia	Bangladesh	STEPS	2013	X	X
South-Central Asia	Bhutan	STEPS	2014	X	X
South-Central Asia	India	GATS	2009–2010	X	X
South-Central Asia	Iran (Islamic Republic of)	STEPS	2021	X	X
South-Central Asia	Kazakhstan	National Sociological Survey	2012	X	X
South-Central Asia	Kyrgyzstan	DHS	2012	X	X
South-Central Asia	Maldives	STEPS	2011	X	X
South-Central Asia	Nepal	STEPS	2012–2013	X	X
South-Central Asia	Pakistan	GATS	2014	X	X
South-Central Asia	Sri Lanka	STEPS	2014–2015	X	X
South-Central Asia	Tajikistan	STEPS	2016–2017	X	X
South-Central Asia	Turkmenistan	STEPS	2013–2014	X	X
South-Central Asia	Uzbekistan	STEPS	2014	X	X
South-Eastern Asia	Brunei Darussalam	National Health and Nutritional Status Survey	2009–2011	X	X
South-Eastern Asia	Cambodia	National Adults Tobacco Survey of Cambodia	2011	X	X
South-Eastern Asia	Indonesia	Indonesia Basic Health Research	2013	X	
South-Eastern Asia	Lao People's Democratic Republic	National Adult Tobacco Survey	2012	X	X
South-Eastern Asia	Malaysia	GATS	2011	X	
South-Eastern Asia	Myanmar	STEPS	2014	X	X
South-Eastern Asia	Philippines	GATS	2008–2009	X	X
South-Eastern Asia	Thailand	GATS	2011	X	X
South-Eastern Asia	Timor-Leste	STEPS	2014	X	X
South-Eastern Asia	Viet Nam	GATS	2010	X	
Western Asia	Armenia	STEPS	2016	X	X
Western Asia	Azerbaijan	STEPS	2017	X	X
Western Asia	Georgia	STEPS	2010	X	X
Western Asia	Iraq	STEPS	2015	X	X
Western Asia	Jordan	STEPS	2019	X	
Western Asia	Kuwait	STEPS	2014	X	X

Western Asia	Lebanon	STEPS	2016–2017	X	
Western Asia	Oman	STEPS	2017	X	X
Western Asia	Qatar	STEPS	2012	X	
Western Asia	Saudi Arabia	Saudi Health Interview Survey	2013	X	X
Western Asia	Syrian Arab Republic	National Survey on Tobacco Use	1999	X	
Western Asia	Turkey	STEPS	2017	X	X
Western Asia	Yemen	DHS	2013	X	X
Eastern Europe	Belarus	STEPS	2016–2017	X	X
Eastern Europe	Bulgaria	Pricing Policies and Control of Tobacco in Europe	2010	X	
Eastern Europe	Czech Republic	The use of tobacco and alcohol in the Czech Republic	2012	X	X
Eastern Europe	Hungary	European Health Interview Survey	2014	X	
Eastern Europe	Poland	GATS	2009–2010	X	X
Eastern Europe	Republic of Moldova	STEPS	2013	X	X
Eastern Europe	Romania	GATS	2011	X	X
Eastern Europe	Russian Federation	GATS	2009	X	X
Eastern Europe	Slovakia	Tobacco and Health Education Survey	2014	X	
Eastern Europe	Ukraine	GATS	2010	X	X
Northern Europe	Denmark	Monitoring smoking habits in the Danish population	2013	X	
Northern Europe	Estonia	Health Behaviour among Estonian Adult Population	2012	X	X
Northern Europe	Finland	Health Behaviour and Health among the Finnish Adult Population	2013	X	X
Northern Europe	Iceland	DHS	2015	X	X
Northern Europe	Ireland	Pricing Policies and Control of Tobacco in Europe	2010	X	
Northern Europe	Latvia	Health behaviour among Latvian adult population	2014	X	X
Northern Europe	Lithuania	Eurobarometer 385: Attitudes of Europeans towards Tobacco	2012	X	
Northern Europe	Norway	Statistics Norway Smoking Habits Survey	2011	X	X
Northern Europe	Sweden	National Survey on Public Health	2012	X	X
Northern Europe	United Kingdom	Pricing Policies and Control of Tobacco in Europe (England)	2010	X	
Southern Europe	Albania	Pricing Policies and Control of Tobacco in Europe	2010	X	
Southern Europe	Croatia	European Health Interview Survey	2014–2015	X	X
Southern Europe	Cyprus	Eurobarometer 385: Attitudes of Europeans towards Tobacco	2012	X	
Southern Europe	Greece	GATS	2013	X	

Southern Europe	Italy	Pricing Policies and Control of Tobacco in Europe	2010	X	
Southern Europe	Malta	Eurobarometer 385: Attitudes of Europeans towards Tobacco	2012	X	
Southern Europe	Portugal	Pricing Policies and Control of Tobacco in Europe	2010	X	
Southern Europe	Slovenia	National Health and Healthcare Survey	2014	X	X
Southern Europe	Spain	Pricing Policies and Control of Tobacco in Europe	2010	X	
Western Europe	Austria	Representative Survey on Substance Use	2015	X	X
Western Europe	Belgium	Health Interview Survey	2013	X	
Western Europe	France	Pricing Policies and Control of Tobacco in Europe	2010	X	
Western Europe	Germany	Eurobarometer 385: Attitudes of Europeans towards Tobacco	2012	X	
Western Europe	Luxembourg	Eurobarometer 385: Attitudes of Europeans towards Tobacco	2012	X	
Western Europe	Netherlands	The Dutch Continuous Survey of Smoking Habits	2011	X	
Western Europe	Switzerland	Addiction Monitoring survey	2012	X	
Caribbean and Central America	Bahamas	STEPS	2012	X	X
Caribbean and Central America	Barbados	STEPS	2007	X	X
Caribbean and Central America	Belize	MICS	2015–2016	X	
Caribbean and Central America	Costa Rica	National household survey on drug use	2010	X	X
Caribbean and Central America	Cuba	MICS	2019	X	
Caribbean and Central America	Dominica	STEPS	2007–2008	X	X
Caribbean and Central America	Dominican Republic	DHS	2007	X	
Caribbean and Central America	Haiti	DHS	2016–2017	X	
Caribbean and Central America	Mexico	GATS	2009	X	X
Caribbean and Central America	Panama	GATS	2013	X	
Caribbean and Central America	Saint Kitts and Nevis	STEPS	2007–2008	X	X
Caribbean and Central America	Saint Lucia	STEPS	2012	X	X
Caribbean and Central America	Saint Vincent and the Grenadines	STEPS	2013–2014	X	X
Caribbean and Central America	Trinidad and Tobago	STEPS	2011	X	X
South America	Argentina	GATS	2011–2012	X	
South America	Bolivia (Plurinational State of)	STEPS	2019		
South America	Brazil	GATS	2008	X	X
South America	Colombia	Pedroso et al. ²	2012–2020		

South America	Ecuador	STEPS	2018	X	
South America	Guyana	STEPS	2016		
South America	Paraguay	STEPS	2011	X	X
South America	Uruguay	GATS	2016–2017	X	X
South America	Venezuela	National Drug Study in General Population	2011	X	X
North America	Canada	Canada Tobacco Use Monitoring Survey	2012	X	
North America	United States of America	National Survey on Drug Use and Health	2012	X	X
Australia and New Zealand	Australia	National Drug Strategy Household Survey	2013	X	
Melanesia, Micronesia and Polynesia	American Samoa	Adult Hybrid Survey	2018		
Melanesia, Micronesia and Polynesia	Federated States of Micronesia - Kosrae	Adult Hybrid Survey	2019	X	
Melanesia, Micronesia and Polynesia	Federated States of Micronesia - Pohnpei	Adult Hybrid Survey	2019	X	
Melanesia, Micronesia and Polynesia	Fiji	MICS	2021	X	X
Melanesia, Micronesia and Polynesia	Guam	Behavioral Risk Factor Surveillance System	2009	X	
Melanesia, Micronesia and Polynesia	Kiribati	STEPS	2015–2016	X	X
Melanesia, Micronesia and Polynesia	Marshall Islands	Hybrid Survey	2018	X	
Melanesia, Micronesia and Polynesia	Nauru	STEPS	2015–2016		X
Melanesia, Micronesia and Polynesia	Niue	STEPS	2011	X	X
Melanesia, Micronesia and Polynesia	Northern Mariana Islands	Non-communicable Diseases & Risk Factor Hybrid Surveillance Report	2016	X	
Melanesia, Micronesia and Polynesia	Papua New Guinea	STEPS	2007–2008	X	X
Melanesia, Micronesia and Polynesia	Samoa	STEPS	2013	X	
Melanesia, Micronesia and Polynesia	Solomon Islands	STEPS	2015	X	X
Melanesia, Micronesia and Polynesia	Vanuatu	STEPS	2011	X	X

DHS: Demographic Household Survey; GATS: Global Adult Tobacco Survey; MICS: Multiple Indicator Cluster Surveys; STEPS: WHO STEPwise approach to NCD risk factor surveillance; WHO: World Health Organization.

Appendix Table 3. Countries with missing prevalence data on smokeless tobacco and or areca nut consumption and source of imputed data

United Nations geographical	Country	Estimated oral cancer ASR of missing country, 2022 ³	Imputed with average of prevalence from the following countries	Average estimated oral cancer ASR of imputing countries, 2022 ³
Eastern Africa	Djibouti	1.64	Eritrea, Ethiopia	1.52
Eastern Africa	France, La Reunion	4.99	Madagascar	2.32
Eastern Africa	Mauritius	3.09	Madagascar	2.32
Eastern Africa	Somalia	2.26	Ethiopia, Kenya	2.01
Eastern Africa	South Sudan	1.75	Sudan	1.9
Middle Africa	Equatorial Guinea	2.69	Cameroon, Gabon	2.64
Western Africa	Guinea-Bissau	1.08	Guinea, Senegal	1.4
Eastern Asia	Japan	3.07	Korea, Republic of	1.64
South-Eastern Asia	Singapore	2.32	Malaysia	2.27
Western Asia	Bahrain	1.94	Qatar, Saudi Arabia	1.65
Western Asia	Israel	1.74	Egypt, Jordan, Lebanon, Syrian Arab Republic	1.37
Western Asia	Gaza Strip and West Bank	1.22	Egypt, Jordan, Lebanon, Syrian Arab Republic	1.37
Western Asia	United Arab Emirates	1.84	Oman, Saudi Arabia	1.72
Southern Europe	Bosnia Herzegovina	2.31	Croatia	3.33
Southern Europe	North Macedonia	1.60	Albania, Bulgaria, Greece	2.51
Southern Europe	Montenegro	2.15	Albania	1.71
Southern Europe	Serbia	3.75	Albania, Bulgaria, Croatia, Hungary, Romania	3.99
Caribbean and Central America	El Salvador	1.18	Belize, Mexico	0.52
Caribbean and Central America	France, Guadeloupe	3.47	Barbados, Dominica, Saint Lucia	3.01
Caribbean and Central America	France, Martinique	2.05	Barbados, Dominica, Saint Lucia	3.01
Caribbean and Central America	Guatemala	0.87	Belize, Mexico	0.52
Caribbean and Central America	Honduras	1.05	Belize, Mexico	0.52
Caribbean and Central America	Jamaica	0.81	Cuba, Haiti	3.16
Caribbean and Central America	Nicaragua	0.59	Costa Rica	1.40
Caribbean and Central America	Puerto Rico	2.95	Dominican Republic	1.33
South America	Chile	1.15	Argentina, Bolivia	1.30
South America	French Guyana	1.31	Brazil	3.78
South America	Peru	1.68	Bolivia, Brazil, Colombia, Ecuador	1.72
South America	Suriname	1.70	Brazil, Guyana	2.46
Australia/New Zealand	New Zealand	4.01	Australia, Fiji	4.55
Melanesia, Micronesia and Polynesia	New Caledonia	4.48	Australia, Fiji, Vanuatu	3.73
Melanesia, Micronesia and Polynesia	French Polynesia	3.34	American Samoa, Niue, Samoa	1.81

ASR: Age-standardised rate per 100 000 population.

Appendix Table 4. Sources of data of oral cancer risk associated with smokeless tobacco or areca nut consumption

Author, year	Study population	Study design	Exposure and reference category	Type of smokeless tobacco/areca nut exposure	RR/OR (95% CI)	RR/OR used for the following countries
Gupta et al., 2022 ⁴	Taiwan (China), Papua New Guinea	Meta-analysis	Current vs non-user	Betel quid chewing	7.89 (3.9–15.98)	China, Papua New Guinea, Oceania (excl. Australia & New Zealand)
Araghi et al., 2021 ⁵	Sweden	Pooled analysis	Current vs never	Swedish snus	0.93 (0.59–1.44)	Sweden
Siddiqi et al., 2020 ⁶	India	Meta-analysis	Ever vs never	All smokeless tobacco	5.32 (3.53–8.02)	India, Southern Asia (excl. Pakistan & Afghanistan), South-East Asia, United Kingdom, Comoros, La Réunion, Madagascar, Mauritius
Siddiqi et al., 2020 ⁶	India, Pakistan, Norway, Sweden, United States	Meta-analysis	Ever vs never	All smokeless tobacco	3.94 (2.7–5.76)	Northern Africa, sub-Saharan Africa (excl. Sudan, Chad), East Asia (excl. China), Western Asia, Northern & Western Europe (excl. UK, Sweden & Norway), Southern and Central & Eastern Europe, Latin America & Caribbean, Australia & New Zealand
Siddiqi et al., 2020 ⁶	Pakistan	Meta-analysis	Ever vs never	All smokeless tobacco	14.52 (7.69–27.41)	Pakistan, Afghanistan, Iran (Islamic Republic of), Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
Hassanin et al., 2017 ⁷	Sudan	Case-control	Current vs non-user	Toombak	3.8 (1.7–8.59)	Sudan, Chad
Wyss et al., 2016 ⁸	United States	Pooled analysis	Ever vs never	Snuff	3.01 (1.63–5.55)	United States, Canada
Siddiqi et al., 2015 ⁹	Norway	Meta-analysis	Ever vs never	All smokeless tobacco	1.1 (0.5–2.42)	Norway

CI: Confidence interval; OR: Odds ratio; RR: Relative risk.

Appendix Table 5. Sources of product-specific prevalence data of smokeless tobacco or areca nut consumption and oral cancer risk associated with smokeless tobacco or areca nut consumption

Country	Survey	Year	Product type reported in survey	Source of OR/RR used	Study design of OR/RR source	Exposure and reference category	Type of smokeless tobacco/areca nut exposure	OR/RR (95% CI)
Bangladesh	GATS	2017	Betel quid with tobacco	Asthana et al., 2018 ¹⁰	Meta-analysis	Ever vs never	<i>Pan</i> tobacco/areca nut + lime + tobacco	7.18 (5.48–9.41)
Bangladesh	GATS	2017	<i>Gul</i>	Gupta et al., 2017 ¹¹	Hospital-based case-control	Ever vs never	Tobacco based dentifrice (<i>mishri</i>)	3.41 (1.9–6.12)
Bangladesh	GATS	2017	<i>Khoinee</i>	Siddiqi et al., 2020 ⁶	Meta-analysis	Ever vs never	All smokeless tobacco	5.32 (3.53–8.02)
Bangladesh	GATS	2017	<i>Sada pata</i>	Khan et al., 2014 ¹²	Meta-analysis	Current vs non-user	Chewing tobacco (predominantly <i>Gutkha</i> & tobacco leaves)	4.72 (3.13–7.11)
India	GATS	2016–2017	Areca nut	Madani et al., 2012 ¹³	Hospital-based case-control	Current vs non-user	<i>Supari</i>	6.6 (3.0–14.8)
India	GATS	2016–2017	Betel quid with tobacco	Asthana et al., 2018 ¹⁰	Meta-analysis	Ever vs never	<i>Pan</i> tobacco/areca nut + lime + tobacco	7.18 (5.48–9.41)
India	GATS	2016–2017	Betel quid without tobacco	Guha et al., 2014 ¹⁴	Meta-analysis	Current vs non-user	Betel quid without tobacco	2.41 (1.82–3.19)
India	GATS	2016–2017	<i>Gutka</i> , tobacco lime, areca-nut mixture	Asthana et al., 2018 ¹⁰	Meta-analysis	Ever vs never	<i>Gutkha</i>	8.67 (3.59–20.95)
India	GATS	2016–2017	<i>Khaini</i> or tobacco-lime mixture	Siddiqi et al., 2020 ⁶	Meta-analysis	Ever vs never	All smokeless tobacco	5.32 (3.53–8.02)
India	GATS	2016–2017	Oral tobacco	Gupta et al., 2017 ¹¹	Hospital-based case-control	Ever vs never	Tobacco based dentifrice (<i>mishri</i>)	3.41 (1.9–6.12)
India	GATS	2016–2017	Other smokeless tobacco products	Siddiqi et al., 2020 ⁶	Meta-analysis	Ever vs never	All smokeless tobacco	5.32 (3.53–8.02)
India	GATS	2016–2017	<i>Paan masala</i> with tobacco	Asthana et al., 2018 ¹⁰	Meta-analysis	Ever vs never	<i>Pan</i> tobacco/areca nut + lime + tobacco	8.67 (3.59–20.95)
India	GATS	2016–2017	<i>Paan masala</i> without tobacco	Madani et al., 2012 ¹³	Hospital-based case-control	Current vs non-user	<i>Supari</i>	6.6 (3.0–14.8)
Pakistan	GATS	2014	<i>Gutka</i>	Asthana et al., 2018 ¹⁰	Meta-analysis	Ever vs never	<i>Pan</i> tobacco/areca nut + lime + tobacco	8.67 (3.59–20.95)
Pakistan	GATS	2014	<i>Mainpuri</i>	Asthana et al., 2018 ¹⁰	Meta-analysis	Ever vs never	<i>Gutkha</i>	3.32 (1.32–8.36)
Pakistan	GATS	2014	<i>Naswar</i>	Khan et al., 2019 ¹⁵	Meta-analysis	Ever vs never	All smokeless tobacco	11.81 (8.49–16.43)
Pakistan	GATS	2014	Paan with Tobacco	Asthana et al., 2018 ¹⁰	Hospital-based case-control	Ever vs never	Tobacco based dentifrice (<i>mishri</i>)	7.18 (5.48–9.41)
Papua New Guinea	STEPS	2007–2008	Areca nut (Reported as betel nut)	Gupta et al., 2022 ⁴	Meta-analysis	Ever vs never	All smokeless tobacco	7.89 (3.9–15.98)

CI: Confidence interval; GATS: Global Adult Tobacco Survey; OR: Odds ratio; RR: Relative risk; STEPS: WHO STEPwise approach to NCD risk factor surveillance.

Appendix Table 6. Number, population attributable fraction, and age-standardised rate of oral cancer cases in 2022 attributable to smokeless tobacco and/or areca nut consumption by sex and country

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
Eastern Africa	Burundi	<5	6.6 (5.8–7.7)	0.1 (0.1–0.1)	<5	0.3 (0.2–0.4)	0.0 (0.0–0.0)	<5	2.2 (1.9–2.5)	0.0 (0.0–0.0)
Eastern Africa	Comoros	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	5 (5–5)	59.0 (53.8–63.3)	1.9 (1.7–2.0)	5 (5–5)	59.0 (53.8–63.3)	0.9 (0.8–0.9)
Eastern Africa	Djibouti	<5	1.4 (0.8–2.2)	0.0 (0.0–0.0)	<5	19.4 (15.6–23.8)	0.3 (0.3–0.4)	<5	10.4 (8.5–12.6)	0.2 (0.1–0.2)
Eastern Africa	Eritrea	<5	0.3 (0.2–0.6)	0.0 (0.0–0.0)	5 (5–5)	24.5 (20.8–28.3)	0.5 (0.4–0.6)	5 (5–5)	13.0 (11.1–15.0)	0.2 (0.2–0.3)
Eastern Africa	Ethiopia	10 (5–15)	2.0 (1.3–2.9)	0.0 (0.0–0.0)	20 (15–30)	4.5 (3.4–5.8)	0.1 (0.0–0.1)	35 (25–40)	3.2 (2.6–4.0)	0.0 (0.0–0.1)
Eastern Africa	France, La Réunion	5 (5–5)	39.1 (34.8–43.4)	0.6 (0.5–0.7)	35 (30–35)	61.4 (56.5–65.2)	5.4 (4.9–5.7)	40 (35–40)	57.2 (53.2–60.4)	2.8 (2.6–3.0)
Eastern Africa	Kenya	65 (50–85)	17.4 (13.5–21.7)	0.5 (0.4–0.6)	65 (55–80)	18.1 (14.9–21.5)	0.6 (0.5–0.7)	135 (115–155)	17.8 (15.2–20.5)	0.5 (0.4–0.6)
Eastern Africa	Madagascar	25 (25–30)	29.8 (26.6–32.9)	0.3 (0.3–0.4)	165 (150–175)	55.8 (51.9–58.7)	2.3 (2.1–2.4)	190 (180–200)	49.7 (46.7–52.1)	1.2 (1.2–1.3)
Eastern Africa	Malawi	10 (10–10)	11.8 (9.6–14.1)	0.2 (0.2–0.2)	5 (5–10)	6.2 (4.8–7.9)	0.2 (0.1–0.2)	15 (15–20)	8.8 (7.5–10.2)	0.2 (0.1–0.2)
Eastern Africa	Mauritius	10 (10–10)	38.6 (34.7–42.6)	0.9 (0.8–1.0)	25 (20–25)	61.6 (57.0–65.2)	2.4 (2.2–2.5)	35 (30–35)	51.9 (48.7–54.6)	1.6 (1.5–1.7)
Eastern Africa	Mozambique	10 (10–15)	12.8 (10.6–15.2)	0.1 (0.1–0.2)	10 (10–10)	6.7 (5.3–8.3)	0.2 (0.1–0.2)	20 (20–25)	9.1 (7.8–10.4)	0.1 (0.1–0.2)
Eastern Africa	Rwanda	5 (5–5)	14.6 (12.3–17.1)	0.1 (0.1–0.1)	<5	1.2 (0.6–2.0)	0.0 (0.0–0.0)	5 (5–5)	5.6 (4.7–6.6)	0.1 (0.1–0.1)
Eastern Africa	Somalia	10 (10–10)	10.3 (8.2–12.7)	0.2 (0.2–0.3)	10 (10–15)	11.7 (9.3–14.3)	0.3 (0.2–0.4)	20 (20–25)	11.0 (9.5–12.8)	0.3 (0.2–0.3)
Eastern Africa	South Sudan	<5	0.6 (0.3–1.2)	0.0 (0.0–0.0)	20 (15–25)	28.9 (22.4–36.3)	0.6 (0.4–0.7)	20 (15–25)	15.6 (12.1–19.5)	0.3 (0.2–0.4)
Eastern Africa	Tanzania, United Republic of	30 (25–35)	13.7 (10.5–17.1)	0.2 (0.2–0.3)	35 (25–45)	8.3 (6.1–10.9)	0.3 (0.2–0.4)	65 (55–80)	10.2 (8.3–12.2)	0.3 (0.2–0.3)
Eastern Africa	Uganda	20 (15–25)	15.4 (11.7–18.9)	0.2 (0.2–0.3)	45 (35–55)	14.1 (11.7–16.8)	0.6 (0.5–0.7)	65 (55–75)	14.5 (12.4–16.6)	0.4 (0.3–0.5)
Eastern Africa	Zambia	10 (10–10)	19.1 (16.2–22.0)	0.2 (0.2–0.2)	5 (5–5)	7.3 (5.4–9.3)	0.2 (0.1–0.2)	15 (15–15)	11.7 (10.2–13.5)	0.2 (0.2–0.2)
Eastern Africa	Zimbabwe	<5	3.8 (2.9–5.0)	0.0 (0.0–0.1)	5 (5–5)	8.7 (7.0–10.9)	0.2 (0.1–0.2)	5 (5–10)	6.5 (5.4–7.8)	0.1 (0.1–0.1)
Middle Africa	Angola	<5	0.5 (0.4–0.7)	0.0 (0.0–0.0)	15 (15–20)	6.1 (5.1–7.4)	0.2 (0.2–0.3)	20 (15–20)	3.2 (2.8–3.9)	0.1 (0.1–0.1)

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
Middle Africa	Cameroon	5 (5-5)	4.0 (3.1-5.1)	0.0 (0.0-0.1)	15 (15-20)	11.5 (9.7-13.8)	0.3 (0.2-0.3)	20 (20-25)	8.8 (7.6-10.3)	0.2 (0.1-0.2)
Middle Africa	Central African Republic	5 (5-5)	20.7 (16.3-24.6)	0.3 (0.2-0.3)	5 (5-5)	28.7 (22.4-33.9)	0.5 (0.4-0.6)	10 (10-10)	25.0 (21.0-28.3)	0.4 (0.3-0.4)
Middle Africa	Chad	<5	0.8 (0.4-1.6)	0.0 (0.0-0.0)	<5	3.7 (2.1-6.7)	0.0 (0.0-0.1)	<5	1.4 (1.0-2.3)	0.0 (0.0-0.0)
Middle Africa	Congo, Democratic Republic of	50 (45-60)	24.0 (19.8-27.6)	0.2 (0.2-0.2)	95 (80-110)	31.0 (25.7-35.2)	0.4 (0.4-0.5)	150 (130-165)	28.1 (24.5-30.9)	0.3 (0.3-0.4)
Middle Africa	Congo, Republic of	<5	4.3 (3.6-5.4)	0.0 (0.0-0.0)	<5	19.6 (16.7-23.1)	0.1 (0.1-0.1)	5 (0-5)	12.7 (11.1-14.7)	0.1 (0.1-0.1)
Middle Africa	Equatorial Guinea	<5	4.5 (3.0-6.2)	0.1 (0.0-0.1)	<5	7.5 (6.1-9.3)	0.3 (0.2-0.4)	<5	6.7 (5.6-8.1)	0.2 (0.2-0.2)
Middle Africa	Gabon	<5	4.6 (3.1-6.3)	0.1 (0.1-0.1)	<5	3.4 (2.5-4.5)	0.2 (0.1-0.2)	<5	3.7 (2.9-4.7)	0.1 (0.1-0.2)
Middle Africa	Sao Tome and Principe	<5	0.0 (0.0-0.0)	0.0 (0.0-0.0)	<5	0.0 (0.0-0.0)	0.0 (0.0-0.0)	<5	0.0 (0.0-0.0)	0.0 (0.0-0.0)
Northern Africa	Algeria	5 (0-5)	2.6 (1.8-3.6)	0.0 (0.0-0.0)	55 (45-60)	23.4 (20.4-26.8)	0.2 (0.2-0.3)	55 (50-65)	16.4 (14.5-18.7)	0.1 (0.1-0.1)
Northern Africa	Egypt	<5	0.0 (0.0-0.0)	0.0 (0.0-0.0)	10 (10-15)	1.6 (1.3-2.1)	0.0 (0.0-0.0)	10 (10-15)	0.7 (0.6-0.9)	0.0 (0.0-0.0)
Northern Africa	Libya	<5	0.7 (0.2-1.4)	0.0 (0.0-0.0)	<5	5.1 (3.5-6.9)	0.1 (0.0-0.1)	<5	3.0 (2.1-3.9)	0.0 (0.0-0.0)
Northern Africa	Morocco	<5	0.2 (0.0-0.5)	0.0 (0.0-0.0)	45 (35-55)	10.8 (8.6-13.3)	0.2 (0.2-0.3)	45 (35-55)	6.2 (5.0-7.7)	0.1 (0.1-0.1)
Northern Africa	Sudan	<5	0.6 (0.3-1.2)	0.0 (0.0-0.0)	105 (75-135)	30.6 (22.5-39.6)	0.8 (0.6-1.0)	105 (75-135)	18.4 (13.6-23.7)	0.4 (0.3-0.5)
Northern Africa	Tunisia	5 (5-5)	3.9 (2.9-5.1)	0.0 (0.0-0.0)	15 (15-20)	9.2 (7.7-11.0)	0.2 (0.2-0.3)	20 (20-25)	7.2 (6.2-8.5)	0.1 (0.1-0.1)
Southern Africa	Botswana	5 (0-5)	24.2 (20.6-27.5)	0.3 (0.2-0.3)	5 (5-5)	7.2 (4.7-9.7)	0.6 (0.4-0.8)	5 (5-10)	10.0 (7.8-12.2)	0.4 (0.3-0.5)
Southern Africa	Eswatini	<5	11.0 (7.3-15.5)	0.1 (0.1-0.1)	<5	14.1 (9.0-19.6)	0.2 (0.1-0.3)	<5	12.8 (9.5-16.4)	0.2 (0.1-0.2)
Southern Africa	Lesotho	5 (5-5)	40.8 (36.1-45.1)	0.4 (0.3-0.4)	5 (0-5)	16.9 (12.5-21.5)	0.5 (0.4-0.7)	5 (5-10)	24.3 (20.9-27.7)	0.4 (0.4-0.5)
Southern Africa	Namibia	5 (0-5)	6.2 (5.4-7.3)	0.3 (0.2-0.3)	5 (5-5)	5.0 (4.2-6.1)	0.5 (0.4-0.6)	5 (5-5)	5.5 (4.9-6.3)	0.4 (0.3-0.4)
Southern Africa	South Africa	85 (75-100)	14.2 (12.3-16.5)	0.3 (0.2-0.3)	35 (25-40)	3.1 (2.6-3.9)	0.1 (0.1-0.2)	120 (105-135)	7.1 (6.4-8.1)	0.2 (0.2-0.2)
Western Africa	Benin	5 (5-5)	11.6 (9.0-14.4)	0.1 (0.1-0.2)	10 (5-10)	23.3 (18.1-28.4)	0.3 (0.2-0.3)	15 (10-15)	16.9 (14.0-19.6)	0.2 (0.2-0.2)

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
Western Africa	Côte d'Ivoire	5 (5-5)	3.6 (3.1-4.3)	0.0 (0.0-0.1)	<5	1.6 (1.2-2.1)	0.0 (0.0-0.0)	5 (5-5)	2.6 (2.3-3.0)	0.0 (0.0-0.0)
Western Africa	Burkina Faso	30 (25-35)	35.5 (29.2-41.6)	0.6 (0.5-0.7)	15 (15-20)	11.6 (9.0-14.5)	0.3 (0.3-0.4)	45 (40-50)	20.3 (17.5-23.2)	0.5 (0.4-0.6)
Western Africa	Cabo Verde	<5	23.4 (13.2-31.4)	0.5 (0.3-0.7)	<5	16.3 (10.1-21.0)	1.3 (0.8-1.7)	5 (0-5)	18.6 (13.1-22.5)	0.8 (0.6-1.0)
Western Africa	Ghana	<5	1.1 (0.2-2.1)	0.0 (0.0-0.0)	10 (10-15)	6.6 (5.2-8.4)	0.1 (0.1-0.1)	10 (10-15)	5.2 (4.1-6.6)	0.0 (0.0-0.1)
Western Africa	Guinea	<5	3.7 (3.2-4.5)	0.0 (0.0-0.0)	<5	3.7 (3.1-4.5)	0.0 (0.0-0.1)	5 (5-5)	3.7 (3.3-4.3)	0.0 (0.0-0.0)
Western Africa	Guinea-Bissau	<5	3.4 (2.5-4.6)	0.0 (0.0-0.0)	<5	2.4 (1.9-3.2)	0.0 (0.0-0.0)	<5	2.9 (2.4-3.6)	0.0 (0.0-0.0)
Western Africa	Liberia	<5	12.4 (10.1-15.0)	0.2 (0.1-0.2)	<5	2.9 (1.8-4.1)	0.0 (0.0-0.1)	5 (0-5)	7.5 (6.3-8.9)	0.1 (0.1-0.1)
Western Africa	Mali	<5	0.5 (0.4-0.7)	0.0 (0.0-0.0)	5 (5-5)	3.3 (2.9-4.0)	0.1 (0.1-0.1)	5 (5-5)	1.6 (1.4-1.9)	0.0 (0.0-0.0)
Western Africa	Mauritania	10 (10-15)	50.2 (36.4-54.7)	0.8 (0.6-0.9)	5 (0-5)	11.4 (6.9-15.1)	0.2 (0.1-0.2)	15 (10-15)	30.0 (22.9-32.7)	0.5 (0.4-0.6)
Western Africa	Niger	5 (5-5)	4.5 (2.9-6.2)	0.1 (0.0-0.1)	5 (5-10)	7.9 (6.1-10.2)	0.1 (0.1-0.2)	10 (10-15)	6.0 (4.8-7.4)	0.1 (0.1-0.1)
Western Africa	Nigeria	15 (10-15)	2.3 (1.9-2.8)	0.0 (0.0-0.0)	60 (50-70)	7.2 (6.0-8.7)	0.1 (0.1-0.2)	70 (65-85)	5.1 (4.4-6.0)	0.1 (0.1-0.1)
Western Africa	Senegal	5 (0-5)	2.7 (2.1-3.4)	0.0 (0.0-0.1)	<5	0.8 (0.6-1.1)	0.0 (0.0-0.0)	5 (5-5)	1.8 (1.5-2.3)	0.0 (0.0-0.0)
Western Africa	Sierra Leone	<5	14.1 (6.7-23.5)	0.0 (0.0-0.0)	<5	7.1 (1.2-14.2)	0.0 (0.0-0.0)	<5	10.6 (5.9-16.4)	0.0 (0.0-0.0)
Western Africa	The Republic of the Gambia	<5	0.0 (0.0-0.0)	0.0 (0.0-0.0)	<5	1.8 (0.9-3.0)	0.0 (0.0-0.0)	<5	1.8 (0.9-3.0)	0.0 (0.0-0.0)
Western Africa	Togo	5 (5-5)	11.5 (9.1-14.1)	0.2 (0.1-0.2)	5 (5-10)	17.5 (14.4-20.9)	0.3 (0.2-0.3)	10 (10-10)	14.8 (12.8-17.0)	0.2 (0.2-0.2)
Eastern Asia	China	60 (45-80)	0.4 (0.3-0.6)	0.0 (0.0-0.0)	3 100 (2 700-3 600)	12.8 (11.2-14.9)	0.3 (0.2-0.3)	3 200 (2 800-3 700)	8.5 (7.4-9.8)	0.1 (0.1-0.2)
Eastern Asia	Japan	65 (50-85)	1.4 (1.1-1.9)	0.0 (0.0-0.0)	95 (80-120)	1.4 (1.2-1.8)	0.1 (0.1-0.1)	160 (140-190)	1.4 (1.3-1.7)	0.0 (0.0-0.0)
Eastern Asia	Korea, Democratic Republic of	<5	0.0 (0.0-0.0)	0.0 (0.0-0.0)	<5	0.0 (0.0-0.0)	0.0 (0.0-0.0)	<5	0.0 (0.0-0.0)	0.0 (0.0-0.0)
Eastern Asia	Korea, Republic of	10 (5-10)	1.4 (1.2-1.8)	0.0 (0.0-0.0)	15 (15-20)	1.4 (1.2-1.8)	0.0 (0.0-0.0)	25 (20-30)	1.4 (1.3-1.7)	0.0 (0.0-0.0)
Eastern Asia	Mongolia	<5	0.5 (0.1-1.0)	0.0 (0.0-0.0)	<5	4.9 (3.2-6.8)	0.1 (0.1-0.1)	<5	2.9 (1.9-3.9)	0.0 (0.0-0.1)

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
South-Central Asia	Afghanistan	120 (90–135)	37.1 (27.5–42.6)	1.2 (0.9–1.4)	565 (540–580)	82.0 (78.0–84.1)	5.3 (5.0–5.4)	685 (640–705)	67.8 (63.5–69.9)	3.3 (3.0–3.4)
South-Central Asia	Bangladesh	3 200 (3 000–3 400)	60.8 (56.6–64.2)	4.3 (4.0–4.5)	6 400 (5 900–6 800)	59.7 (55.2–63.3)	8.2 (7.6–8.7)	9 700 (9 100–10 100)	60.0 (56.7–62.6)	6.3 (6.0–6.6)
South-Central Asia	Bhutan	<5	36.8 (30.8–42.7)	0.6 (0.5–0.7)	10 (10–10)	50.5 (45.8–54.5)	2.2 (1.9–2.3)	10 (10–10)	47.4 (43.5–50.7)	1.5 (1.3–1.6)
South-Central Asia	India	18 500 (16 900–19 900)	51.5 (47.1–55.2)	2.6 (2.4–2.8)	64 900 (60 400–68 600)	60.2 (56.0–63.6)	8.8 (8.2–9.3)	83 400 (78 600–87 200)	58.0 (54.7–60.7)	5.8 (5.4–6.0)
South-Central Asia	Iran, Islamic Republic of	10 (5–15)	1.5 (1.0–2.4)	0.0 (0.0–0.0)	95 (80–120)	12.9 (10.7–16.1)	0.2 (0.2–0.3)	105 (90–130)	8.0 (6.7–9.9)	0.1 (0.1–0.1)
South-Central Asia	Kazakhstan	60 (50–70)	36.2 (31.1–41.9)	0.4 (0.4–0.5)	285 (255–305)	65.5 (59.0–70.4)	3.0 (2.7–3.2)	345 (315–370)	57.4 (52.6–61.2)	1.5 (1.4–1.6)
South-Central Asia	Kyrgyzstan	<5	2.6 (2.1–3.6)	0.0 (0.0–0.0)	30 (25–35)	43.1 (35.7–49.4)	1.3 (1.1–1.5)	30 (25–35)	29.3 (24.5–33.6)	0.5 (0.4–0.6)
South-Central Asia	Maldives	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	22.4 (14.9–29.2)	0.6 (0.4–0.7)	<5	22.4 (14.9–29.2)	0.3 (0.2–0.4)
South-Central Asia	Nepal	60 (55–70)	22.9 (20.0–26.3)	0.4 (0.4–0.5)	425 (395–450)	60.8 (56.6–64.3)	3.6 (3.3–3.8)	485 (455–510)	50.4 (47.3–53.1)	1.8 (1.7–1.9)
South-Central Asia	Pakistan	2 000 (1 700–2 300)	38.9 (33.1–44.5)	2.5 (2.2–2.9)	6 800 (6 200–7 300)	63.6 (57.8–67.8)	7.8 (7.1–8.3)	8 900 (8 100–9 700)	55.6 (51.2–58.9)	5.2 (4.8–5.5)
South-Central Asia	Sri Lanka	160 (135–180)	27.9 (24.1–32.1)	0.8 (0.7–0.9)	1 100 (1 000–1 200)	57.5 (52.7–61.4)	8.0 (7.3–8.5)	1 300 (1 200–1 400)	51.0 (47.1–54.1)	4.1 (3.8–4.3)
South-Central Asia	Tajikistan	<5	1.9 (1.0–3.1)	0.0 (0.0–0.0)	30 (30–35)	75.1 (70.6–77.9)	1.1 (1.1–1.2)	35 (30–35)	40.8 (38.4–42.4)	0.6 (0.5–0.6)
South-Central Asia	Turkmenistan	<5	0.6 (0.0–1.3)	0.0 (0.0–0.0)	40 (30–45)	36.2 (28.5–42.3)	1.8 (1.4–2.0)	40 (30–45)	26.7 (21.1–31.2)	0.8 (0.6–0.9)
South-Central Asia	Uzbekistan	15 (5–20)	5.1 (2.5–8.1)	0.1 (0.0–0.1)	595 (555–620)	77.9 (72.8–80.9)	4.1 (3.8–4.3)	610 (570–635)	60.3 (56.4–62.6)	1.9 (1.8–2.0)
South-Eastern Asia	Brunei	<5	31.4 (23.6–39.9)	0.3 (0.2–0.3)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	31.4 (23.6–39.9)	0.1 (0.1–0.2)
South-Eastern Asia	Cambodia	130 (120–140)	47.8 (43.7–51.3)	1.7 (1.6–1.8)	15 (10–15)	5.4 (4.1–6.9)	0.3 (0.2–0.3)	145 (130–155)	27.3 (25.1–29.3)	1.1 (1.0–1.2)
South-Eastern Asia	Indonesia	420 (370–485)	16.7 (14.8–19.3)	0.3 (0.2–0.3)	570 (500–665)	14.2 (12.4–16.6)	0.4 (0.3–0.5)	990 (905–1 100)	15.2 (13.9–17.0)	0.3 (0.3–0.4)
South-Eastern Asia	Lao People's Democratic Republic	40 (35–40)	38.7 (34.9–42.2)	1.4 (1.2–1.5)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	40 (35–40)	17.9 (16.1–19.5)	0.8 (0.7–0.8)

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
South-Eastern Asia	Malaysia	10 (10–10)	2.5 (2.0–3.1)	0.0 (0.0–0.1)	15 (10–20)	3.7 (2.8–4.8)	0.1 (0.1–0.1)	25 (20–30)	3.1 (2.6–3.8)	0.1 (0.1–0.1)
South-Eastern Asia	Myanmar	430 (395–465)	51.3 (46.7–55.1)	1.3 (1.2–1.4)	1 200 (1 000–1 200)	70.6 (66.7–73.4)	4.6 (4.3–4.8)	1 600 (1 500–1 700)	64.1 (61.0–66.3)	2.8 (2.6–2.9)
South-Eastern Asia	Philippines	90 (65–120)	10.6 (7.4–13.9)	0.2 (0.1–0.2)	140 (110–175)	13.2 (10.1–16.6)	0.3 (0.2–0.4)	230 (190–275)	12.1 (9.8–14.4)	0.2 (0.2–0.3)
South-Eastern Asia	Singapore	<5	2.5 (2.0–3.1)	0.0 (0.0–0.0)	5 (5–10)	3.7 (2.8–4.9)	0.1 (0.1–0.1)	10 (5–10)	3.3 (2.7–4.2)	0.1 (0.1–0.1)
South-Eastern Asia	Thailand	615 (545–685)	29.8 (26.4–33.3)	0.7 (0.6–0.8)	170 (140–210)	7.0 (5.8–8.5)	0.3 (0.2–0.3)	785 (710–865)	17.4 (15.7–19.2)	0.5 (0.5–0.6)
South-Eastern Asia	Timor-Leste	5 (5–5)	71.3 (66.3–74.9)	0.9 (0.8–0.9)	5 (0–5)	63.6 (56.6–69.1)	0.6 (0.5–0.7)	5 (5–5)	68.2 (64.1–71.2)	0.8 (0.7–0.8)
South-Eastern Asia	Viet Nam	50 (40–55)	8.9 (7.7–10.5)	0.1 (0.1–0.1)	25 (20–30)	1.3 (1.0–1.7)	0.0 (0.0–0.1)	75 (65–85)	3.0 (2.6–3.5)	0.1 (0.0–0.1)
Western Asia	Armenia	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.6 (0.1–1.2)	0.0 (0.0–0.0)	<5	0.5 (0.1–0.9)	0.0 (0.0–0.0)
Western Asia	Azerbaijan	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.4 (0.3–0.6)	0.0 (0.0–0.0)	<5	0.3 (0.2–0.4)	0.0 (0.0–0.0)
Western Asia	Bahrain	<5	0.7 (0.0–1.5)	0.0 (0.0–0.0)	<5	5.7 (3.9–8.0)	0.1 (0.1–0.2)	<5	4.6 (3.2–6.4)	0.1 (0.1–0.1)
Western Asia	Gaza Strip and West Bank	<5	1.4 (1.1–1.9)	0.0 (0.0–0.0)	<5	3.0 (2.3–3.8)	0.0 (0.0–0.1)	<5	2.5 (2.0–3.1)	0.0 (0.0–0.0)
Western Asia	Georgia	<5	0.4 (0.2–0.7)	0.0 (0.0–0.0)	5 (5–5)	3.0 (1.9–4.3)	0.2 (0.1–0.2)	5 (5–5)	2.4 (1.6–3.4)	0.1 (0.0–0.1)
Western Asia	Iraq	<5	0.1 (0.1–0.2)	0.0 (0.0–0.0)	<5	0.4 (0.2–0.6)	0.0 (0.0–0.0)	<5	0.2 (0.1–0.4)	0.0 (0.0–0.0)
Western Asia	Israel	<5	1.4 (1.1–2.0)	0.0 (0.0–0.0)	5 (5–5)	2.9 (2.4–3.7)	0.1 (0.0–0.1)	5 (5–5)	2.1 (1.8–2.6)	0.0 (0.0–0.0)
Western Asia	Jordan	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	1.2 (0.8–1.6)	0.0 (0.0–0.0)	<5	0.7 (0.5–1.0)	0.0 (0.0–0.0)
Western Asia	Kuwait	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	1.4 (0.7–2.2)	0.0 (0.0–0.0)	<5	1.0 (0.5–1.5)	0.0 (0.0–0.0)
Western Asia	Lebanon	<5	5.6 (4.3–7.0)	0.0 (0.0–0.1)	5 (5–5)	8.4 (6.9–10.4)	0.1 (0.1–0.1)	5 (5–10)	7.4 (6.3–8.8)	0.1 (0.1–0.1)
Western Asia	Oman	<5	0.6 (0.1–1.1)	0.0 (0.0–0.0)	5 (0–5)	4.7 (3.4–6.2)	0.1 (0.1–0.1)	5 (0–5)	3.7 (2.7–5.0)	0.1 (0.0–0.1)
Western Asia	Qatar	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	6.4 (4.5–8.6)	0.1 (0.1–0.1)	<5	5.5 (3.8–7.3)	0.1 (0.0–0.1)
Western Asia	Saudi Arabia	5 (0–5)	1.6 (0.8–2.5)	0.0 (0.0–0.0)	15 (10–20)	5.0 (3.8–6.5)	0.1 (0.1–0.1)	15 (15–20)	3.5 (2.8–4.5)	0.1 (0.0–0.1)

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
Western Asia	Syrian Arab Republic	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)
Western Asia	Turkey	5 (0–10)	0.5 (0.0–1.0)	0.0 (0.0–0.0)	20 (15–35)	1.5 (0.9–2.3)	0.0 (0.0–0.1)	25 (15–35)	1.1 (0.7–1.6)	0.0 (0.0–0.0)
Western Asia	United Arab Emirates	<5	1.0 (0.4–1.6)	0.0 (0.0–0.1)	5 (0–5)	4.8 (3.4–6.5)	0.1 (0.1–0.1)	5 (0–5)	3.5 (2.6–4.7)	0.1 (0.0–0.1)
Western Asia	Yemen	35 (35–40)	21.6 (19.1–24.5)	0.4 (0.4–0.5)	45 (40–50)	40.4 (36.1–44.4)	0.6 (0.6–0.7)	85 (80–90)	29.3 (27.1–31.7)	0.5 (0.5–0.6)
Eastern Europe	Belarus	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	5 (0–5)	0.5 (0.1–0.9)	0.1 (0.0–0.1)	5 (0–5)	0.4 (0.1–0.7)	0.0 (0.0–0.0)
Eastern Europe	Bulgaria	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)
Eastern Europe	Czechia	10 (5–15)	3.2 (1.5–4.9)	0.1 (0.1–0.2)	40 (25–55)	6.4 (3.8–9.0)	0.4 (0.2–0.6)	50 (35–65)	5.2 (3.5–7.0)	0.2 (0.2–0.3)
Eastern Europe	Hungary	<5	0.3 (0.0–0.5)	0.0 (0.0–0.0)	<5	0.2 (0.0–0.5)	0.0 (0.0–0.0)	5 (0–5)	0.2 (0.1–0.4)	0.0 (0.0–0.0)
Eastern Europe	Poland	<5	0.0 (0.0–0.1)	0.0 (0.0–0.0)	55 (25–85)	1.9 (1.0–2.9)	0.2 (0.1–0.3)	55 (30–85)	1.3 (0.7–2.1)	0.1 (0.0–0.1)
Eastern Europe	Republic of Moldova	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.2 (0.1–0.4)	0.0 (0.0–0.0)	<5	0.2 (0.1–0.4)	0.0 (0.0–0.0)
Eastern Europe	Romania	<5	0.7 (0.2–1.2)	0.0 (0.0–0.0)	15 (5–30)	1.0 (0.3–1.7)	0.1 (0.0–0.2)	20 (10–30)	1.0 (0.4–1.6)	0.1 (0.0–0.1)
Eastern Europe	Russian Federation	15 (5–30)	0.5 (0.2–1.0)	0.0 (0.0–0.0)	120 (75–175)	1.8 (1.1–2.6)	0.1 (0.1–0.2)	135 (90–195)	1.4 (0.9–2.0)	0.1 (0.0–0.1)
Eastern Europe	Slovakia	5 (0–5)	2.3 (1.8–2.9)	0.0 (0.0–0.1)	25 (20–30)	5.3 (4.3–6.6)	0.6 (0.5–0.7)	30 (25–35)	4.7 (3.9–5.7)	0.3 (0.2–0.4)
Eastern Europe	Ukraine	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	25 (10–45)	1.0 (0.3–1.7)	0.1 (0.0–0.2)	25 (10–45)	0.8 (0.3–1.4)	0.0 (0.0–0.1)
Northern Europe	Denmark	<5	1.2 (0.9–1.5)	0.0 (0.0–0.0)	10 (5–10)	2.9 (2.3–3.6)	0.1 (0.1–0.2)	10 (10–15)	2.3 (1.9–2.8)	0.1 (0.1–0.1)
Northern Europe	Estonia	<5	1.2 (0.6–1.9)	0.0 (0.0–0.1)	5 (5–5)	6.5 (4.9–8.4)	0.5 (0.4–0.6)	5 (5–5)	4.8 (3.7–6.1)	0.3 (0.2–0.3)
Northern Europe	Finland	<5	0.4 (0.1–0.8)	0.0 (0.0–0.0)	20 (15–25)	6.1 (4.7–7.6)	0.5 (0.4–0.6)	20 (15–25)	3.7 (2.9–4.6)	0.3 (0.2–0.3)
Northern Europe	Iceland	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	5.7 (4.3–7.2)	0.4 (0.3–0.5)	<5	4.0 (3.0–5.1)	0.2 (0.1–0.2)
Northern Europe	Ireland	<5	2.6 (1.8–3.5)	0.0 (0.0–0.1)	10 (10–15)	4.5 (3.3–5.9)	0.3 (0.2–0.4)	15 (10–15)	4.0 (3.1–5.1)	0.2 (0.1–0.2)
Northern Europe	Latvia	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.2 (0.0–0.5)	0.0 (0.0–0.0)	<5	0.1 (0.0–0.4)	0.0 (0.0–0.0)

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
Northern Europe	Lithuania	<5	0.6 (0.2–1.0)	0.0 (0.0–0.0)	5 (5–10)	3.1 (2.1–4.4)	0.3 (0.2–0.4)	5 (5–10)	2.6 (1.8–3.7)	0.1 (0.1–0.2)
Northern Europe	Norway	<5	0.0 (0.0–0.7)	0.0 (0.0–0.0)	<5	0.0 (0.0–3.6)	0.0 (0.0–0.2)	<5	0.0 (0.0–2.1)	0.0 (0.0–0.1)
Northern Europe	Sweden	<5	0.0 (0.0–0.8)	0.0 (0.0–0.0)	<5	0.0 (0.0–3.7)	0.0 (0.0–0.2)	<5	0.0 (0.0–2.1)	0.0 (0.0–0.1)
Northern Europe	United Kingdom	105 (75–135)	4.5 (3.3–6.0)	0.1 (0.1–0.2)	165 (110–230)	4.1 (2.8–5.7)	0.3 (0.2–0.4)	270 (205–340)	4.3 (3.3–5.4)	0.2 (0.2–0.3)
Southern Europe	Albania	<5	0.6 (0.1–1.1)	0.0 (0.0–0.0)	<5	1.2 (0.6–1.8)	0.0 (0.0–0.0)	<5	1.0 (0.6–1.4)	0.0 (0.0–0.0)
Southern Europe	Bosnia and Herzegovina	<5	1.8 (0.7–3.2)	0.0 (0.0–0.0)	5 (0–5)	2.4 (1.1–3.7)	0.1 (0.0–0.2)	5 (0–5)	2.3 (1.2–3.4)	0.1 (0.0–0.1)
Southern Europe	Croatia	<5	1.6 (0.7–2.6)	0.0 (0.0–0.0)	5 (0–10)	2.3 (1.1–3.8)	0.1 (0.1–0.2)	5 (5–10)	2.1 (1.2–3.2)	0.1 (0.0–0.1)
Southern Europe	Cyprus	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	5.6 (3.7–7.6)	0.2 (0.1–0.2)	<5	3.8 (2.5–5.2)	0.1 (0.0–0.1)
Southern Europe	Greece	<5	0.6 (0.0–1.2)	0.0 (0.0–0.0)	<5	0.6 (0.4–0.9)	0.0 (0.0–0.0)	5 (0–5)	0.6 (0.3–0.9)	0.0 (0.0–0.0)
Southern Europe	Italy	30 (15–45)	1.4 (0.8–2.3)	0.0 (0.0–0.0)	65 (45–95)	2.3 (1.5–3.2)	0.1 (0.1–0.1)	95 (70–125)	1.9 (1.4–2.6)	0.1 (0.0–0.1)
Southern Europe	Malta	<5	4.5 (3.0–6.2)	0.2 (0.1–0.2)	<5	13.5 (10.4–16.9)	0.4 (0.3–0.5)	5 (0–5)	8.5 (6.9–10.2)	0.3 (0.2–0.4)
Southern Europe	Montenegro	<5	0.6 (0.1–1.1)	0.0 (0.0–0.0)	<5	1.2 (0.3–2.2)	0.0 (0.0–0.0)	<5	0.8 (0.4–1.4)	0.0 (0.0–0.0)
Southern Europe	North Macedonia	<5	0.4 (0.0–0.9)	0.0 (0.0–0.0)	<5	0.6 (0.3–1.0)	0.0 (0.0–0.0)	<5	0.5 (0.2–0.8)	0.0 (0.0–0.0)
Southern Europe	Portugal	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)
Southern Europe	Serbia	<5	0.6 (0.2–1.0)	0.0 (0.0–0.0)	5 (0–5)	0.8 (0.3–1.4)	0.1 (0.0–0.1)	5 (5–10)	0.8 (0.4–1.2)	0.0 (0.0–0.0)
Southern Europe	Slovenia	<5	2.1 (1.2–3.1)	0.1 (0.0–0.1)	5 (5–5)	3.4 (2.4–4.7)	0.2 (0.1–0.3)	5 (5–5)	3.0 (2.2–3.9)	0.1 (0.1–0.2)
Southern Europe	Spain	110 (85–145)	7.8 (6.1–10.0)	0.2 (0.1–0.2)	150 (115–190)	5.8 (4.5–7.5)	0.3 (0.2–0.4)	260 (220–315)	6.5 (5.5–7.9)	0.2 (0.2–0.3)
Western Europe	Austria	<5	0.1 (0.0–0.3)	0.0 (0.0–0.0)	20 (15–30)	4.8 (3.5–6.5)	0.3 (0.2–0.4)	20 (15–30)	3.3 (2.4–4.4)	0.1 (0.1–0.2)
Western Europe	Belgium	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	20 (15–30)	2.9 (2.0–4.0)	0.2 (0.1–0.3)	20 (15–30)	1.9 (1.3–2.6)	0.1 (0.1–0.1)
Western Europe	France	105 (75–135)	4.2 (3.1–5.6)	0.1 (0.1–0.2)	185 (135–250)	3.9 (2.8–5.3)	0.3 (0.2–0.4)	290 (230–365)	4.0 (3.2–5.1)	0.2 (0.2–0.3)

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
Western Europe	Germany	20 (10–30)	0.9 (0.5–1.4)	0.0 (0.0–0.0)	330 (270–405)	9.3 (7.6–11.4)	0.4 (0.3–0.4)	345 (285–425)	6.2 (5.1–7.5)	0.2 (0.1–0.2)
Western Europe	Luxembourg	<5	3.4 (1.8–5.3)	0.1 (0.0–0.1)	<5	4.5 (2.7–6.5)	0.1 (0.0–0.1)	<5	4.0 (2.7–5.3)	0.1 (0.0–0.1)
Western Europe	Switzerland	5 (5–10)	3.4 (2.8–4.3)	0.0 (0.0–0.1)	65 (55–75)	12.8 (11.0–15.1)	0.8 (0.7–0.9)	70 (60–85)	10.2 (8.9–11.9)	0.4 (0.4–0.5)
Western Europe	The Netherlands	<5	0.3 (0.2–0.4)	0.0 (0.0–0.0)	10 (5–10)	0.9 (0.6–1.2)	0.0 (0.0–0.1)	10 (5–15)	0.6 (0.5–0.8)	0.0 (0.0–0.0)
Caribbean and Central America	Bahamas	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	2.1 (0.3–4.2)	0.0 (0.0–0.1)	<5	2.1 (0.3–4.2)	0.0 (0.0–0.0)
Caribbean and Central America	Barbados	<5	6.1 (0.8–11.6)	0.0 (0.0–0.1)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	2.0 (0.3–3.9)	0.0 (0.0–0.0)
Caribbean and Central America	Belize	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)
Caribbean and Central America	Costa Rica	<5	0.2 (0.0–0.5)	0.0 (0.0–0.0)	<5	2.3 (1.0–3.6)	0.0 (0.0–0.1)	<5	1.5 (0.7–2.3)	0.0 (0.0–0.0)
Caribbean and Central America	Cuba	<5	0.3 (0.1–0.5)	0.0 (0.0–0.0)	145 (125–170)	18.5 (15.8–21.6)	1.5 (1.3–1.7)	145 (125–170)	13.9 (11.9–16.2)	0.7 (0.6–0.8)
Caribbean and Central America	Dominican Republic	<5	0.8 (0.7–1.0)	0.0 (0.0–0.0)	5 (5–5)	5.2 (4.5–6.2)	0.1 (0.1–0.1)	5 (5–5)	3.4 (3.0–4.0)	0.0 (0.0–0.0)
Caribbean and Central America	El Salvador	<5	0.5 (0.2–0.8)	0.0 (0.0–0.0)	<5	0.6 (0.4–0.9)	0.0 (0.0–0.0)	<5	0.5 (0.3–0.8)	0.0 (0.0–0.0)
Caribbean and Central America	France, Guadeloupe	<5	0.6 (0.1–1.3)	0.0 (0.0–0.0)	<5	2.1 (1.1–3.2)	0.2 (0.1–0.2)	<5	1.8 (1.0–2.7)	0.1 (0.0–0.1)
Caribbean and Central America	France, Martinique	<5	1.1 (0.0–2.6)	0.0 (0.0–0.0)	<5	1.9 (1.0–2.9)	0.1 (0.0–0.1)	<5	1.8 (1.0–2.7)	0.0 (0.0–0.1)
Caribbean and Central America	Guatemala	<5	0.5 (0.2–0.8)	0.0 (0.0–0.0)	<5	0.8 (0.4–1.2)	0.0 (0.0–0.0)	<5	0.6 (0.4–0.9)	0.0 (0.0–0.0)
Caribbean and Central America	Haiti	5 (0–5)	8.4 (7.2–9.9)	0.0 (0.0–0.0)	5 (5–10)	6.9 (6.0–8.1)	0.1 (0.1–0.2)	10 (10–10)	7.2 (6.5–8.3)	0.1 (0.1–0.1)
Caribbean and Central America	Honduras	<5	0.4 (0.2–0.7)	0.0 (0.0–0.0)	<5	0.9 (0.4–1.6)	0.0 (0.0–0.0)	<5	0.7 (0.4–1.2)	0.0 (0.0–0.0)
Caribbean and Central America	Jamaica	<5	4.5 (3.7–5.5)	0.0 (0.0–0.0)	<5	12.3 (10.5–14.6)	0.1 (0.1–0.1)	5 (0–5)	8.4 (7.5–9.7)	0.1 (0.1–0.1)
Caribbean and Central America	Mexico	5 (0–10)	0.7 (0.2–1.2)	0.0 (0.0–0.0)	10 (5–20)	1.3 (0.5–2.2)	0.0 (0.0–0.0)	15 (10–25)	1.0 (0.5–1.5)	0.0 (0.0–0.0)
Caribbean and Central America	Nicaragua	<5	0.6 (0.1–1.1)	0.0 (0.0–0.0)	<5	2.1 (0.8–3.6)	0.0 (0.0–0.0)	<5	1.4 (0.6–2.2)	0.0 (0.0–0.0)
Caribbean and Central America	Panama	<5	1.4 (1.2–1.8)	0.0 (0.0–0.0)	<5	2.9 (2.1–3.9)	0.0 (0.0–0.0)	<5	2.2 (1.8–2.8)	0.0 (0.0–0.0)

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
Caribbean and Central America	Puerto Rico	<5	0.9 (0.7–1.1)	0.0 (0.0–0.0)	5 (5–10)	5.3 (4.5–6.4)	0.3 (0.2–0.3)	5 (5–10)	4.0 (3.5–4.8)	0.1 (0.1–0.1)
Caribbean and Central America	Saint Lucia	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	4.3 (1.9–6.9)	0.4 (0.2–0.6)	<5	3.9 (1.7–6.3)	0.2 (0.1–0.3)
Caribbean and Central America	Trinidad and Tobago	<5	0.4 (0.1–0.9)	0.0 (0.0–0.0)	<5	1.4 (0.2–2.7)	0.0 (0.0–0.1)	<5	0.9 (0.3–1.6)	0.0 (0.0–0.0)
South America	Argentina	5 (0–5)	0.6 (0.4–0.8)	0.0 (0.0–0.0)	<5	0.3 (0.2–0.4)	0.0 (0.0–0.0)	5 (5–5)	0.4 (0.3–0.5)	0.0 (0.0–0.0)
South America	Bolivia	<5	0.9 (0.5–1.3)	0.0 (0.0–0.0)	<5	0.9 (0.6–1.3)	0.0 (0.0–0.0)	<5	0.9 (0.7–1.2)	0.0 (0.0–0.0)
South America	Brazil	60 (40–90)	2.2 (1.4–3.3)	0.0 (0.0–0.0)	230 (175–300)	2.8 (2.1–3.6)	0.2 (0.1–0.2)	290 (230–365)	2.6 (2.1–3.3)	0.1 (0.1–0.1)
South America	Chile	<5	0.7 (0.5–0.9)	0.0 (0.0–0.0)	<5	0.6 (0.4–0.8)	0.0 (0.0–0.0)	<5	0.6 (0.5–0.8)	0.0 (0.0–0.0)
South America	Colombia	40 (20–60)	8.2 (4.0–11.9)	0.1 (0.0–0.1)	35 (15–45)	8.3 (3.9–12.0)	0.1 (0.0–0.2)	75 (45–95)	8.3 (5.2–10.8)	0.1 (0.1–0.1)
South America	Ecuador	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)
South America	French Guyana	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	1.7 (1.1–2.6)	0.0 (0.0–0.1)	<5	1.7 (1.1–2.6)	0.0 (0.0–0.0)
South America	Guyana	<5	11.7 (8.2–16.2)	0.0 (0.0–0.1)	<5	11.7 (9.1–14.9)	0.2 (0.2–0.3)	<5	11.7 (9.5–14.4)	0.1 (0.1–0.2)
South America	Paraguay	<5	13.2 (8.5–17.9)	0.0 (0.0–0.1)	10 (5–10)	7.9 (4.7–10.8)	0.2 (0.1–0.3)	10 (5–15)	8.5 (5.6–11.1)	0.1 (0.1–0.2)
South America	Peru	10 (5–15)	2.8 (1.6–4.1)	0.0 (0.0–0.1)	10 (5–15)	3.3 (1.9–4.7)	0.0 (0.0–0.1)	20 (15–30)	3.0 (2.1–4.0)	0.0 (0.0–0.1)
South America	Suriname	<5	7.6 (5.4–10.5)	0.1 (0.1–0.1)	<5	7.5 (6.2–9.2)	0.2 (0.1–0.2)	<5	7.5 (6.4–9.0)	0.1 (0.1–0.1)
South America	Uruguay	<5	0.0 (0.0–0.2)	0.0 (0.0–0.0)	<5	0.4 (0.0–0.9)	0.0 (0.0–0.0)	<5	0.3 (0.0–0.6)	0.0 (0.0–0.0)
South America	Venezuela	10 (5–10)	3.5 (2.4–4.9)	0.0 (0.0–0.1)	60 (50–75)	14.8 (12.4–17.6)	0.4 (0.3–0.5)	70 (60–80)	10.8 (9.2–12.7)	0.2 (0.2–0.2)
North America	Canada	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	45 (35–65)	2.1 (1.6–3.0)	0.1 (0.1–0.2)	45 (35–65)	1.4 (1.0–2.0)	0.1 (0.0–0.1)
North America	United States of America	70 (55–100)	0.8 (0.6–1.1)	0.0 (0.0–0.0)	2 200 (1 700–3 000)	11.8 (9.1–16.0)	0.8 (0.6–1.1)	2 300 (1 800–3 100)	8.4 (6.5–11.2)	0.4 (0.3–0.5)
Australia and New Zealand	Australia	10 (5–10)	0.9 (0.7–1.1)	0.0 (0.0–0.0)	30 (25–40)	1.7 (1.5–2.1)	0.1 (0.1–0.2)	40 (35–45)	1.4 (1.3–1.7)	0.1 (0.1–0.1)
Australia and New Zealand	New Zealand	<5	0.5 (0.4–0.6)	0.0 (0.0–0.0)	15 (10–15)	5.3 (4.1–6.8)	0.3 (0.2–0.4)	15 (10–15)	3.7 (2.9–4.7)	0.1 (0.1–0.2)

United Nations geographical region	Country	Females			Males			Both sexes combined		
		Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR	Attr. cases	PAF (%)	ASR
Melanesia, Micronesia and Polynesia	Fiji	<5	0.6 (0.0–1.6)	0.0 (0.0–0.0)	<5	17.5 (12.6–23.7)	0.6 (0.4–0.8)	5 (0–5)	8.8 (6.4–11.8)	0.3 (0.2–0.4)
Melanesia, Micronesia and Polynesia	France, New Caledonia	<5	1.6 (0.8–2.8)	0.0 (0.0–0.1)	<5	9.9 (7.1–14.2)	0.6 (0.4–0.9)	<5	7.1 (5.3–10.0)	0.3 (0.2–0.4)
Melanesia, Micronesia and Polynesia	French Polynesia	<5	3.3 (1.5–6.1)	0.1 (0.0–0.1)	<5	5.8 (3.8–9.1)	0.3 (0.2–0.4)	<5	5.1 (3.6–7.5)	0.2 (0.1–0.2)
Melanesia, Micronesia and Polynesia	Guam	<5	27.8 (12.1–47.6)	0.2 (0.1–0.4)	<5	22.0 (15.4–30.3)	0.8 (0.6–1.1)	<5	23.2 (17.0–30.8)	0.5 (0.3–0.6)
Melanesia, Micronesia and Polynesia	Papua New Guinea	370 (340–385)	83.8 (77.2–87.3)	10.7 (9.9–11.1)	600 (560–620)	84.1 (78.5–87.1)	19.0 (17.6–19.6)	970 (915–995)	84.0 (79.5–86.2)	14.7 (13.9–15.0)
Melanesia, Micronesia and Polynesia	Samoa	<5	0.0 (0.0–0.0)	0.0 (0.0–0.0)	<5	8.2 (4.7–13.6)	0.3 (0.2–0.5)	<5	8.2 (4.7–13.6)	0.1 (0.1–0.2)
Melanesia, Micronesia and Polynesia	Solomon Islands	<5	14.7 (6.3–23.8)	0.2 (0.1–0.4)	<5	18.9 (10.0–26.7)	0.6 (0.3–0.8)	<5	17.5 (10.8–23.4)	0.4 (0.2–0.5)
Melanesia, Micronesia and Polynesia	Vanuatu	<5	0.7 (0.2–1.6)	0.0 (0.0–0.0)	<5	9.4 (3.9–17.5)	0.2 (0.1–0.3)	<5	4.2 (2.0–7.5)	0.1 (0.0–0.2)

Number of attributable cases suppressed if less than five. Data in parentheses are 95% uncertainty intervals.

ASR: Age-standardised rate per 100 000 population; PAF: Population attributable fraction.

Appendix Table 7. Sensitivity analysis using a global relative risk for all countries: Number and population attributable fraction (PAF, %) of oral cancer cases in 2022 attributable to smokeless tobacco and/or areca nut consumption by world region

United Nations geographical region	Attributable cases	PAF (%)
<i>Africa</i>		
Eastern Africa	635 (605–665)	13.7 (13.1–14.4)
Middle Africa	205 (185–220)	12.6 (11.4–13.6)
Northern Africa	240 (225–265)	6.8 (6.3–7.4)
Southern Africa	140 (125–155)	7.4 (6.8–8.3)
Western Africa	200 (185–215)	6.6 (6.2–7.1)
<i>Americas</i>		
North America	3 300 (2 900–3 800)	10.6 (9.2–12.3)
Caribbean and Central America	200 (175–225)	5.2 (4.6–5.9)
South America	475 (405–555)	3.1 (2.6–3.6)
<i>Asia</i>		
Eastern Asia	1 900 (1 700–2 100)	3.7 (3.4–4.2)
South-Eastern Asia	3 100 (3 000–3 200)	15.7 (15.0–16.4)
South-Central Asia	84 200 (79 400–88 400)	45.9 (43.3–48.2)
Western Asia	160 (145–175)	3.3 (3.0–3.6)
<i>Europe</i>		
Eastern Europe	320 (260–390)	1.4 (1.1–1.7)
Northern Europe	510 (460–565)	5.4 (4.9–6.0)
Southern Europe	385 (335–445)	3.1 (2.7–3.6)
Western Europe	760 (680–870)	4.5 (4.0–5.2)
<i>Oceania</i>		
Australia and New Zealand	50 (45–60)	1.7 (1.5–2.0)
Melanesia, Micronesia and Polynesia	805 (760–835)	64.4 (61.0–66.8)
<i>World</i>	97 600 (92 700–101 900)	25.0 (23.8–26.1)

Data in parentheses are 95% uncertainty intervals. PAF: Population attributable fraction.

Appendix Table 8. Sensitivity analysis using the latest survey data year: Sources of prevalence data of smokeless tobacco or areca nut consumption per country if different to main analysis

World region	Country	Source	Year	Prevalence reported by sex	Prevalence reported by age
Eastern Africa	Ethiopia	GATS	2016	X	
Eastern Africa	Kenya	STEPS	2015	X	X
Eastern Africa	Madagascar	Recherche avancée sur la nicotine et le tabac publié	2013	X	X
Eastern Africa	Malawi	STEPS	2017	X	X
Eastern Africa	United Republic of Tanzania	GATS	2018	X	
Eastern Africa	Zambia	DHS	2018	X	
Middle Africa	Cameroon	DHS	2018	X	
Northern Africa	Egypt	STEPS	2016–2017	X	
Southern Africa	Botswana	GATS	2017	X	X
Southern Africa	Lesotho	DHS	2014	X	X
Western Africa	Niger	DHS	2012	X	X
Western Africa	Senegal	DHS	2017	X	
Western Africa	Sierra Leone	DHS	2019	X	
Caribbean and Central America	Costa Rica	GATS	2015	X	
Caribbean and Central America	Mexico	Encuesta Nacional de Consumo de Drogas, Alcohol y Tabaco (ENCODAT)	2016–2017	X	X
Caribbean and Central America	Panama	Encuesta Nacional de Salud	2019	X	
North America	Canada	Canadian Tobacco and Nicotine Survey	2019	X	
North America	United States of America	National Survey on Drug Use and Health (NSDUH)	2019	X	X
Eastern Asia	China	GATS	2018	X	
Eastern Asia	Mongolia	STEPS	2019	X	
South-Central Asia	Bangladesh	STEPS	2018	X	X
South-Central Asia	India	GATS	2016–2017	X	X
South-Central Asia	Kazakhstan	GATS	2019	X	
South-Central Asia	Kyrgyzstan	STEPS	2013	X	X
South-Central Asia	Nepal	STEPS	2019	X	
South-Central Asia	Pakistan	DHS	2017–2018	X	
South-Central Asia	Turkmenistan	STEPS	2018	X	X
South-Central Asia	Uzbekistan	STEPS	2019	X	
South-Eastern Asia	Cambodia	National Adult Tobacco Survey of Cambodia	2014	X	X
South-Eastern Asia	Indonesia	GATS	2021	X	
South-Eastern Asia	Lao People's Democratic Republic	National Adult Tobacco Survey	2015	X	X
South-Eastern Asia	Malaysia	National Health And Morbidity Survey	2015	X	
South-Eastern Asia	Myanmar	DHS	2015–2016	X	X
South-Eastern Asia	Thailand	Smoking and Drinking Behaviour Survey	2017	X	X
South-Eastern Asia	Timor-Leste	DHS	2016	X	

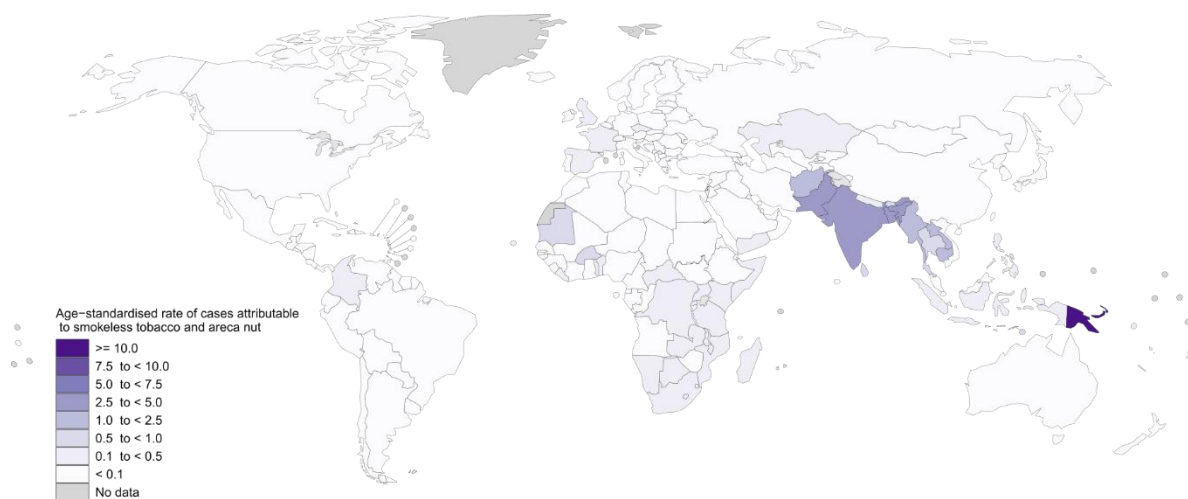
South-Eastern Asia	Viet Nam	GATS	2015	X	
Western Asia	Georgia	National tobacco survey	2019	X	
Western Asia	Saudi Arabia	Saudi Health Information Survey	2014	X	
Eastern Europe	Czech Republic	National Research on Tobacco and Alcohol Use in the Czech Republic (NAUTA)	2021	X	
Eastern Europe	Hungary	Eurobarometer - Attitudes of Europeans towards tobacco and electronic cigarettes	2017		
Eastern Europe	Poland	Nationwide survey on attitudes to smoking	2019	X	
Eastern Europe	Romania	GATS	2018	X	
Eastern Europe	Russian Federation	Selective monitoring of the health of the population survey	2019	X	X
Eastern Europe	Slovakia	Eurobarometer - Attitudes of Europeans towards tobacco and electronic cigarettes	2017		
Eastern Europe	Ukraine	GATS	2017	X	
Northern Europe	Denmark	Danskernes Rygevaner	2020	X	
Northern Europe	Estonia	Health Behaviour among Estonian Adult Population	2018	X	
Northern Europe	Finland	National FinSote Survey	2018	X	

Appendix Table 9. Sensitivity analysis using the latest survey data year: Number and population attributable fraction (PAF, %) of oral cancer cases in 2022 attributable to smokeless tobacco and/or areca nut consumption by world region, by sex

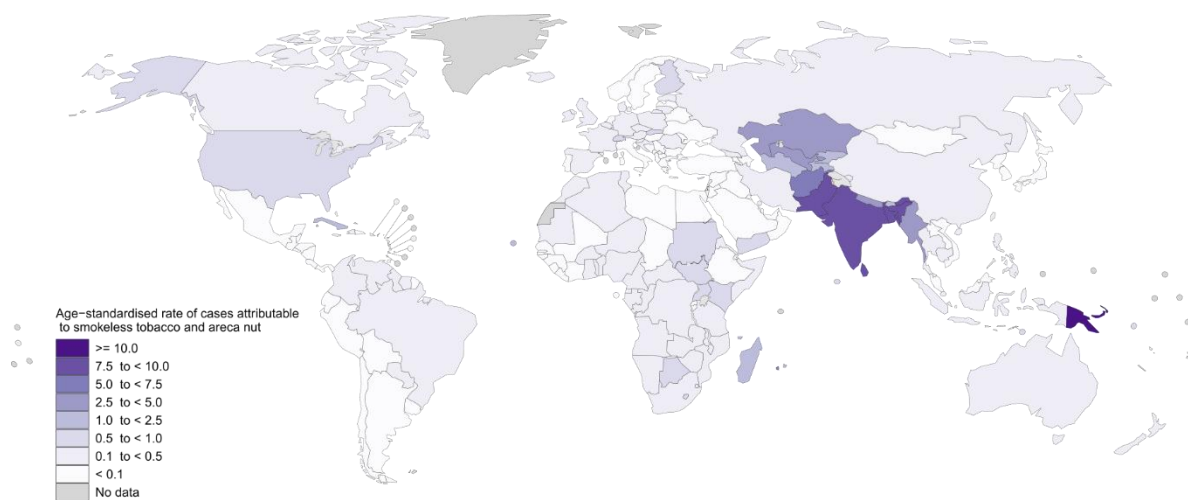
United Nations geographical region	Females		Males		Both sexes	
	Attributable cases	PAF (%)	Attributable cases	PAF (%)	Attributable cases	PAF (%)
<i>Africa</i>						
Eastern Africa	180 (160–195)	9.2 (8.4–10.2)	415 (395–435)	15.4 (14.7–16.1)	595 (570–620)	12.8 (12.3–13.4)
Middle Africa	60 (50–70)	7.9 (6.7–8.9)	130 (115–145)	15.0 (13.1–16.7)	190 (170–205)	11.7 (10.5–12.7)
Northern Africa	10 (10–10)	0.6 (0.5–0.7)	225 (195–260)	12.0 (10.4–13.8)	235 (205–270)	6.6 (5.8–7.6)
Southern Africa	95 (80–105)	14.0 (12.4–16.2)	45 (35–50)	3.6 (3.1–4.3)	135 (125–155)	7.3 (6.7–8.2)
Western Africa	85 (75–90)	6.2 (5.6–6.6)	125 (110–135)	7.4 (6.8–8.2)	205 (195–220)	6.8 (6.4–7.3)
<i>Americas</i>						
North America	90 (70–125)	0.9 (0.7–1.3)	2 000 (1 500–2 700)	9.5 (7.3–12.8)	2 100 (1 600–2 800)	6.8 (5.3–9.1)
Caribbean and Central America	15 (15–20)	1.1 (1.0–1.3)	195 (175–225)	8.5 (7.5–9.7)	215 (190–240)	5.6 (5.0–6.3)
South America	130 (95–160)	2.7 (2.0–3.5)	345 (290–415)	3.2 (2.7–3.9)	475 (410–555)	3.1 (2.6–3.6)
<i>Asia</i>						
Eastern Asia	190 (170–240)	1.0 (0.9–1.3)	4 400 (3 800–5 100)	13.6 (11.9–16.0)	4 500 (4 000–5 300)	9.0 (8.0–10.6)
South-Eastern Asia	1 200 (1 100–1 200)	15.2 (14.3–16.3)	2 000 (1 900–2 100)	16.7 (16.0–17.4)	3 200 (3 100–3 300)	16.1 (15.6–16.7)
South-Central Asia	20 700 (19 300–22 200)	42.6 (39.6–45.6)	79 600 (74 900–83 300)	59.0 (55.5–61.7)	100 300 (95 300–104 300)	54.6 (51.9–56.8)
Western Asia	45 (40–55)	2.6 (2.3–2.9)	100 (90–115)	3.4 (3.1–3.9)	150 (135–165)	3.1 (2.9–3.4)
<i>Europe</i>						
Eastern Europe	125 (110–150)	2.0 (1.7–2.3)	370 (330–430)	2.2 (1.9–2.5)	500 (455–565)	2.1 (1.9–2.4)
Northern Europe	15 (10–20)	0.4 (0.3–0.5)	115 (100–145)	2.0 (1.7–2.4)	130 (115–155)	1.4 (1.2–1.7)
Southern Europe	35 (20–50)	0.8 (0.5–1.1)	95 (70–120)	1.2 (0.9–1.5)	130 (105–160)	1.0 (0.8–1.3)
Western Europe	65 (50–85)	1.1 (0.9–1.4)	195 (170–230)	1.8 (1.6–2.1)	260 (235–300)	1.5 (1.4–1.8)
<i>Oceania</i>						
Australia and New Zealand	10 (5–10)	0.8 (0.7–1.0)	45 (40–50)	2.1 (1.9–2.5)	50 (45–60)	1.7 (1.5–2.0)
Melanesia, Micronesia and Polynesia	370 (340–385)	78.1 (71.9–81.3)	610 (570–630)	78.7 (73.6–81.5)	980 (930–1 000)	78.5 (74.3–80.5)
World	23 400 (22 000–24 900)	19.4 (18.2–20.6)	90 900 (86 300–95 000)	33.8 (32.1–35.3)	114 400 (109 500–118 700)	29.3 (28.1–30.4)

Data in parentheses are 95% uncertainty intervals. PAF: Population attributable fraction.

a)



b)



Appendix Figure 1. Age-standardised incidence rate of oral cancer cases per 100 000 in 2022 attributable to smokeless tobacco and/or areca nut consumption among (a) females and (b) males, by country

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