

# **Chapter 13**

## **Smokeless Tobacco Use in the South-East Asia Region**



## Chapter Contents

Description of the Region .....	379
Types of Products and Patterns of Use .....	380
Prevalence of Smokeless Tobacco Use.....	382
Toxicity and Nicotine Profiles of Products.....	389
Health Problems Associated With Product Use.....	389
Cancer .....	389
Oral Cancer .....	390
Pharyngeal Cancer .....	391
Esophageal Cancer.....	391
Other Cancers.....	391
Precancerous and Other Oral Conditions.....	391
Reproductive Outcomes.....	392
Cardiovascular Diseases .....	392
Overall Excess Mortality .....	392
Dependency Issues.....	393
Marketing and Production Practices of Industry .....	393
Production.....	393
Marketing Practices .....	394
Distribution and Sales.....	395
Current Policy and Interventions .....	395
Prevention and Cessation Interventions.....	395
School-Based Interventions .....	395
Community Interventions .....	396
Workplace Interventions.....	397
Evidence From Cessation Clinics .....	397
Mass Media Campaigns.....	397
Current Policy.....	397
Taxation .....	399
Bans on Public Use.....	399
Bans on Sale to Minors.....	399
Health Warnings on Packages .....	399
Restrictions on Advertising.....	399
Bans on Sale.....	400
Import Bans.....	400
Summary and Conclusions .....	401
References.....	402

**Tables, Figures, and Maps**

Table 13-1	Population and land area of countries of the South-East Asia Region .....	379
Table 13-2	Percentage of adolescents aged 13–15 years who currently used smokeless tobacco in the South-East Asia Region, from the Global Youth Tobacco Surveys, 2007–2009.....	382
Table 13-3	Percentage of adults ( $\geq 15$ years) who currently used smokeless tobacco in the South-East Asia Region, 2006–2010 .....	383
Table 13-4	Nicotine and nitrosamine levels in selected regional products.....	389
Table 13-5	Annual age-standardized incidence rate of lip and oral cavity cancers in South-East Asia Region countries: Estimates from GLOBOCAN, 2008 .....	390
Table 13-6	Relative risks for all-cause mortality by type of smokeless tobacco used, from the 1992–1999 Mumbai Cohort Study .....	393
Table 13-7	Policy measures for controlling smokeless tobacco use in the South-East Asia Region.....	398
Figure 13-1	Prevalence of current smokeless tobacco use among adults ( $\geq 15$ years) in Myanmar, 2001, 2004, and 2007 .....	386
Figure 13-2	Current smoking versus current smokeless tobacco use prevalence among men and women in six South-East Asia Region countries, 2006–2009 .....	387
Figure 13-3	Percent of dual use, smoking only, and smokeless tobacco use only among adult tobacco users, by sex and country, GATS 2009–2010 .....	388
Map 13-1	Prevalence of current smokeless tobacco use among adults in the World Health Organization’s South-East Asia Region .....	384

## Description of the Region

The South-East Asia Region of the World Health Organization (WHO) consists of 11 countries. Six of them are geographically located in South Asia: India, Bangladesh, Nepal, Bhutan, Sri Lanka, and the Maldives. Four are located in South-East Asia: Thailand, Myanmar, Indonesia, and Timor-Leste. The Democratic People's Republic of Korea (DPR Korea; North Korea) is also a part of this WHO Region.<sup>1</sup>

More than 1.8 billion people live in the South-East Asia countries.<sup>2</sup> Although countries in the South-East Asia Region comprise only 5% of the world's surface area, about 26% of the world's population live there.<sup>3,4</sup> Five countries account for nearly 96% of the total population of the South-East Asia Region: India, Indonesia, Bangladesh, Thailand, and Myanmar (Table 13-1). The annual average population growth rate of this region is roughly 1.4%, and about two-thirds to three-fourths of the population are rural, with the exception of DPR Korea, which is 60% urban.<sup>2</sup> Hence, large rural populations characterize the region. Some of the world's major tobacco producers are South-East Asia countries: India, Indonesia, Thailand, DPR Korea, and Bangladesh.<sup>5</sup>

**Table 13-1. Population and land area of countries of the South-East Asia Region**

Country	Area (km <sup>2</sup> )	Population (thousands)
Bangladesh	143,942	148,692
Bhutan	48,400	726
Democratic People's Republic of Korea (North Korea)	120,525	24,346
India	3,283,147	1,224,614
Indonesia	1,903,738	239,871
Maldives	298	316
Myanmar	675,535	47,963
Nepal	146,858	29,959
Sri Lanka	65,597	20,860
Thailand	512,015	69,122
Timor-Leste	14,789	1,124
<b>Total</b>	<b>6,914,844</b>	<b>1,807,593</b>

Abbreviation: km = kilometer.

Source: United Nations 2011 (3).

## Types of Products and Patterns of Use

This chapter will first describe the wide variety of smokeless tobacco (ST) products that are made and used in this region. Various ST products are chewed, sucked (dipped), applied to the gums and teeth, snuffed, or gargled. Products may be as simple and inexpensive as unmanufactured, loose flakes of tobacco leaves that are sold by weight and may be chewed with only slaked lime (calcium hydroxide) paste, or as complex as a paste made from boiled tobacco and spice flavorings (e.g., kiwam) and sold in small glass bottles.<sup>6-9</sup>

A common way of consuming chewing tobacco in the region is as an ingredient in betel quid. Use of betel quid is an ancient practice. Tobacco was added as an ingredient in the quid beginning around 1600, and it is now used in betel quid in many parts of South-East Asia. Betel quid is composed of pieces of areca nuts (from the *Areca catechu* palm), betel leaf from the *Piper betle* L. (*Piperaceae*) vine, aqueous slaked lime paste (calcium hydroxide, made from roasted limestone or seashells), and other minor ingredients such as catechu (for astringency), cardamom, and clove, according to the taste of the user. Some of these components are agricultural products (e.g., betel leaf, areca nut), and others are simple ingredients that could be cottage industry products (e.g., slaked lime). They are combined by vendors and users and made into fresh betel quids for immediate consumption. Historically, betel quid has been incorrectly believed to have beneficial medicinal properties.<sup>10,11</sup> The user who incorporates tobacco into it may not consider tobacco a harmful addition.<sup>12</sup>

Smokeless tobacco products of different kinds with different names are often incorporated into betel quid, although some are also used separately. The most common type of tobacco incorporated into betel quid is plain tobacco flakes (also called sada pata); sometimes flavored tobacco flakes such as zarda or khaini may be added. Snuff-type products, which tend to be applied to gums or teeth rather than chewed, are not used with betel quid. Although areca nut itself is mildly addictive, a betel quid user may not understand the much higher addictive potential of tobacco in the quid.<sup>8</sup>

In India, some products have been manufactured on an industrial scale since 1975. These commercially produced ST products, such as pan masala and gutka, are modeled after betel quid and contain many of the same ingredients but in a dried form and without fresh betel leaf. The manufactured products were designed to be easily carried and consumed anywhere at any time, unlike betel quid, which is highly perishable and inconvenient to carry because of its high moisture content. In addition to being dried and packaged in single-use doses, these manufactured products contain preservatives to lengthen their shelf life. They may also contain other ingredients, such as small pieces of areca nut, calcium hydroxide, catechu, sweeteners, perfumes, tobacco flakes and/or powder, and flavorings such as menthol, cardamom, and clove. Gutka always contains tobacco, but most brands of pan masala do not. Gutka and pan masala products frequently carry the same brand names, allowing manufacturers to circumvent laws banning tobacco advertisements since they are able to advertise a product that appears identical to tobacco-containing gutka.<sup>6</sup>

Each country in this region has its own set of ST products (see Appendix A: Description of Representative Products From Four Broad Categories of Smokeless Tobacco Products Used Globally, and Appendix B: Global Smokeless Tobacco Product Factsheets):

- Bangladesh: Products for chewing: sada pata, zarda, and khaini are used; for oral application: gul.<sup>13</sup>
- Bhutan: Products with various uses: tobacco leaf, snuff, khaini, surti or baba (zarda),<sup>7</sup> and gutka. Production and commercial imports are banned, but some products are smuggled.<sup>14</sup>
- India (the country with the widest product range):
  - Products for chewing: (1) Products made with unprocessed tobacco (sada pata): betel quid with tobacco, zarda, and khaini. (2) Products made with cured tobacco: gundi, kadapan, and flavored zarda. (3) Products containing areca nut: gutka, mawa, Mainpuri tobacco, and dohra. Some forms of khaini contain areca nut as well as tobacco.<sup>15</sup>
  - Products for oral application: Snuff products including mishri/masheri, bajjar, gudakhu, tapkeer, red toothpowder, kiwam, creamy snuff, and gul.
  - Other products or uses: Snuff used nasally, and tobacco water for gargling (tuibur).<sup>6,12</sup>
- Indonesia: Products for chewing: chewing tobacco as well as cut strands of tobacco chewed with betel quid<sup>6,16</sup>; also dried tobacco leaves rolled to the size of a thumb and inserted into the mouth between lips and teeth.<sup>7</sup>
- Maldives: Chewing tobacco with betel quid or areca nut; during the 1990s, chewing tobacco of unspecified nature was imported into the country in increasing quantities.<sup>17</sup>
- Myanmar: Products for chewing: tobacco mixed with honey, alcohol, or lemon juice (hnat hsey) which is usually chewed with betel quid; raw tobacco (most users of unmanufactured or “raw” tobacco incorporate it into betel quid); gutka and zarda from India are also available.<sup>18</sup> Snuff is used both orally and nasally.<sup>6,19</sup>
- Nepal: Products for chewing: betel quid with tobacco, khaini, zarda, surti, and gutka.<sup>20</sup>
- Sri Lanka: Products for chewing: Chewing tobacco (unmanufactured), mainly used in betel quid<sup>21</sup>; also Indian gutka.
- Thailand: Snuff tobacco used nasally and orally, chewing tobacco, betel quid with tobacco, and other ST products, all made in cottage industries.<sup>22,23</sup>
- Timor-Leste: Chewing tobacco.<sup>24</sup>

Wherever gutka is sold, generally pan masala without tobacco is also available—that is, in India, Bangladesh, Bhutan, Myanmar, Nepal, and Sri Lanka.

## Prevalence of Smokeless Tobacco Use

Surveys of ST use employ varying methods, questions, and definitions, and for that reason caution should be exercised in comparing estimates of prevalence. Surveys' definitions of current use vary: Some surveys define it as any use within the past 30 days, while others ask about different time periods; some surveys ask about daily use and use on some days, and still other surveys ask about "current" use without defining the term further.

Current ST use among youth, typically defined as any use in the past 30 days, is as prevalent as smoking or more prevalent than smoking among adolescents in the South-East Asia Region.<sup>25</sup> Prevalence of ST use among youth aged 13–15 years varies across the region and by sex, as shown by data from the Global Youth Tobacco Survey (GYTS) for eight countries (Bangladesh, Bhutan, India, Indonesia, Myanmar, Nepal, Sri Lanka, and Thailand)<sup>26</sup> (Table 13-2). The prevalence of current ST use among boys ranges from 3.3% in Indonesia to 14.1% in Bhutan, and prevalence for girls ranges from 2.3% in Indonesia to 6.0% in India. In four of the countries, reported prevalence of current ST use for boys is more than twice that for girls. In Bangladesh, the prevalence of use among boys (5.8%, 95% confidence interval [CI]: 3.5–9.3) and girls (4.2%, 95% CI: 1.9–9.1) is not significantly different. Despite a national ban on the sale of all tobacco products,<sup>9</sup> the prevalence of ST use among boys and girls combined in Bhutan was 9.4%. India (9.0%) and Sri Lanka (6.8%) also reported high prevalence of ST use for boys and girls combined.

**Table 13-2. Percentage of adolescents aged 13–15 years who currently used smokeless tobacco in the South-East Asia Region, from the Global Youth Tobacco Surveys, 2007–2009**

Country	Year	Total (%)	Boys (%)	Girls (%)
Bangladesh	2007	4.9	5.8	4.2
Bhutan	2009	9.4	14.1	5.3
India	2009	9.0	11.1	6.0
Indonesia	2009	2.8	3.3	2.3
Myanmar	2007	6.5	10.3	2.7
Nepal	2007	6.1	8.8	2.9
Sri Lanka	2007	6.8	9.6	3.9
Thailand	2009	5.7	7.3	4.1

Source: Global Youth Tobacco Surveys, 2007–2009 (26).



National or subnational prevalence data on current use of ST are available for adults (people aged 15 years and older) in nine countries in the region for the years 2006–2010 (Table 13-3; Map 13-1).<sup>27–29</sup> Current use among adults is defined as use every day or on some days. For three countries (Bangladesh, India, and Thailand), reports of the Global Adult Tobacco Surveys (GATS) are available.<sup>28</sup> Data have been reported for Bhutan, Myanmar, and Sri Lanka in the *WHO Report on the Global Tobacco Epidemic, 2011* (GTCR) from the WHO STEPwise Approach to Surveillance surveys (WHO STEPS).<sup>27</sup> Data from the Demographic and Health Surveys (DHS)<sup>29</sup> have been reported for the Maldives and Timor-Leste, and data for Nepal are derived from the individual country survey reported in the GTCR.<sup>20,27</sup>

**Table 13-3. Percentage of adults (≥15 years) who currently used smokeless tobacco in the South-East Asia Region, 2006–2010**

Country	Year	Age group (years)	Total (%)	Men (%)	Women (%)
Bangladesh*	2009	15+	27.2	26.4	27.9
Bhutan† (subnational)	2007	25–74	19.4	21.1	17.3
India*	2009	15+	25.9	32.9	18.4
Maldives‡	2009	Men, 15–64; Women, 15–49	—	6.0	4.2
Myanmar†	2009	15–64	29.6	51.4	16.1
Nepal§	2008	15–64	18.6	31.2	4.6
Sri Lanka†	2006	15–64	15.8	24.9	6.9
Thailand*	2009	15+	3.9	1.3	6.3
Timor-Leste‡	2009–2010	15–49	—	2.5	1.9

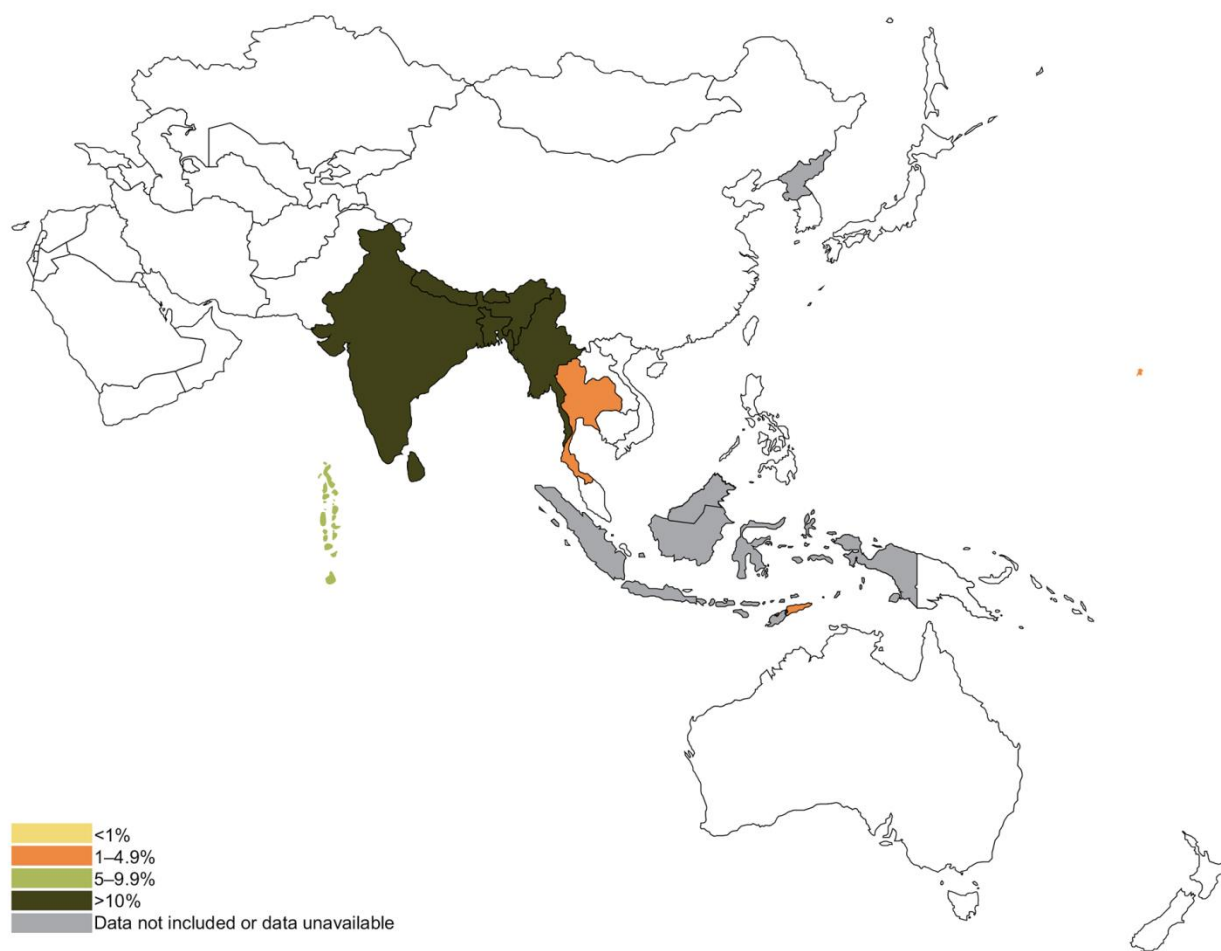
\*Global Adult Tobacco Survey, 2009 (28).

†WHO STEPS, 2006–2009 from: *WHO Report on the Global Tobacco Epidemic, 2011* (27).

‡Demographic and Health Surveys, 2009–2010 (29).

§Individual country surveys from: *WHO Report on the Global Tobacco Epidemic, 2011* (27).

Map 13-1. Prevalence of current smokeless tobacco use among adults in the World Health Organization's South-East Asia Region



Note: A rate for males and females combined was not available for Maldives and Timor-Leste. For each of these countries, a total figure was calculated by averaging the available male and female rate.

Sources: Global Adult Tobacco Survey, 2009 (28); WHO STEPS, 2006–2009 from: *WHO Report on the Global Tobacco Epidemic, 2011* (27); Demographic and Health Surveys, 2009–2010 (29); Individual country surveys from: *WHO Report on the Global Tobacco Epidemic, 2011* (27).

Prevalence of current ST use among men in the South-East Asia Region is high, ranging between 24.9% and 51.4% in five of the countries, although in Thailand it is less than 2%. Among women, prevalence of current ST use is high in four countries—Bangladesh, Bhutan, India, and Myanmar—with a range from 16.1% in Myanmar to 27.9% in Bangladesh. In Bangladesh the prevalence of ST use among women (27.9%) is roughly equal to that among men (26.4%), a unique situation in the region. In India, 32.9% of men and 18.4% of women use smokeless tobacco. Prevalence is highest in the Central, Eastern, and Northeastern States. The highest prevalence of ST use among men (62%) is in Bihar; among women, the highest prevalence is 49% in Mizoram.<sup>12</sup>

The prevalence of ST use tends to be higher in rural areas in Bangladesh, India, and Thailand than in urban areas (which is also generally true for smoking).<sup>12,13,22,28</sup> In a study of tobacco users in Myanmar in 2004, reports of ST use were higher in metropolitan areas, where smoking prevalence was reported to be lower; reports of ST use were lower in the central plain, where smoking prevalence appears higher.<sup>18</sup>

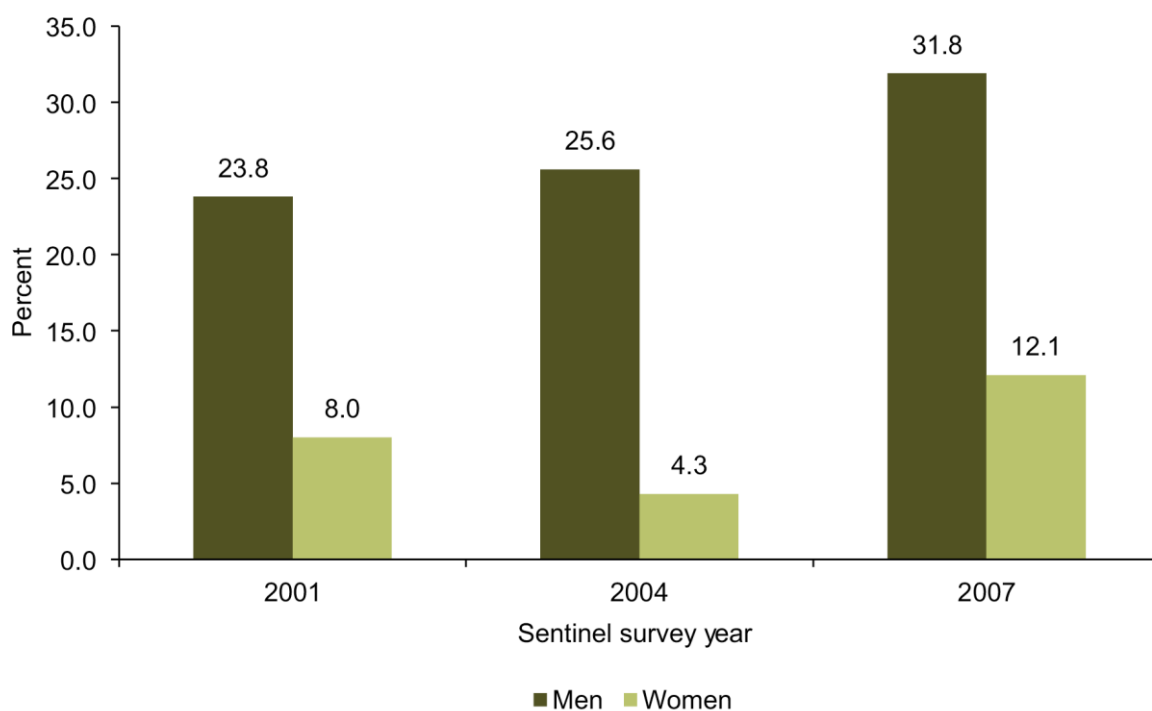
Smokeless tobacco users aged 15 years and older in three countries in the South-East Asia Region (India, Bangladesh, and Myanmar) number close to 259 million. For the entire region, the estimated number of ST users aged 15 years and older is 268.6 million (see chapter 2). Rural users in Bangladesh and India make up around 80% of total ST users, reflecting the largely rural populations in these countries.<sup>12,13</sup>

Product preference information for India and Bangladesh, from 2009 GATS data,<sup>12,13</sup> is available for individuals aged 15 years and older. In India, tobacco with lime (khaini) appeared to be the most common form of ST used (11.6% of adults), followed in descending order by gutka (8.2%), betel quid with tobacco (6.2%), tobacco for oral application (4.7%), and other oral/nasal products that may contain tobacco (4.4%).<sup>12</sup> These findings demonstrate that the centuries-old practice of chewing betel quid with tobacco has become less prevalent than use of gutka, which is essentially a dry, commercially manufactured version of betel quid developed in the late 1960s.<sup>8</sup> Using betel quid with tobacco in India is still the most common practice in the Northeastern States and Odisha (formerly known as Orissa); elsewhere gutka has overtaken betel quid. The 2009 GATS data for Bangladesh showed that betel quid with tobacco was by far the most favored product, with a prevalence of 24.3%, followed by gul (5.3%), sada pata (1.8%), tobacco with lime (khoinee) (1.5%), and other products (1.4%).<sup>13</sup>

A large international study of betel quid use, the Asian Betel-Quid Consortium (ABC) study, captured data on ST use in parts of Nepal, Indonesia, and Sri Lanka in 2010.<sup>30</sup> The study found that prevalence of chewing betel quid with tobacco was comparatively high in central Nepal (men, 43.6%; women, 34.9%) and high among women in Indonesia (men, 10.4%; women, 31.7%), but generally low in Sri Lanka (men, 6.4%; women, 3.2%).

Data from the Myanmar Sentinel Prevalence Studies of Tobacco Use show that prevalence among men increased from 23.8% in 2001 to 31.8% in 2007; for the same years, prevalence among women increased from 8.0% to 12.1%<sup>31</sup> (Figure 13-1). Definitive data on trends in most countries are unavailable, because successive surveys with the same methodology have not yet been conducted.

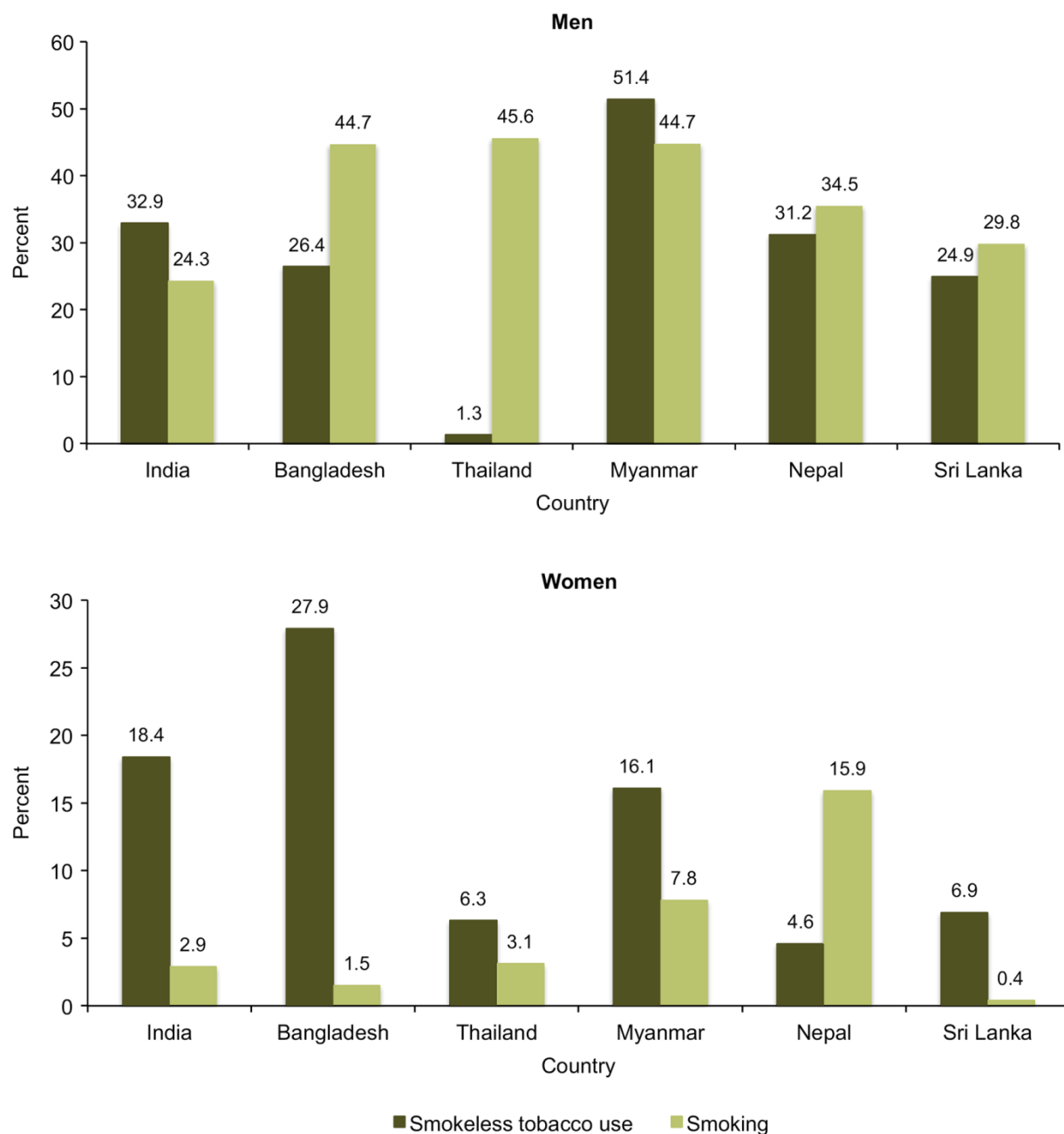
**Figure 13-1. Prevalence of current smokeless tobacco use among adults (≥15 years) in Myanmar, 2001, 2004, and 2007**



Source: Ministry of Health (Myanmar) 2009 (31).

Comparing ST use with smoking in the countries of the South-East Asia Region, data from the GATS, WHO STEPS, and other surveys<sup>12,13,19–22,27–29,32–34</sup> reveal that, among men, smoking is the predominant mode of tobacco use in Indonesia, Thailand, Bangladesh, Sri Lanka, and Nepal, whereas ST use is the predominant practice in India and Myanmar (Figure 13-2). Smoking rates among women in the region remain low—mostly well under 15%. Smokeless tobacco use among women is generally more common than smoking, except in Nepal.<sup>33</sup> The National Family Health Survey conducted in India in 2005–2006 was the first survey to find that men had a higher rate of ST use than of smoking.<sup>9</sup>

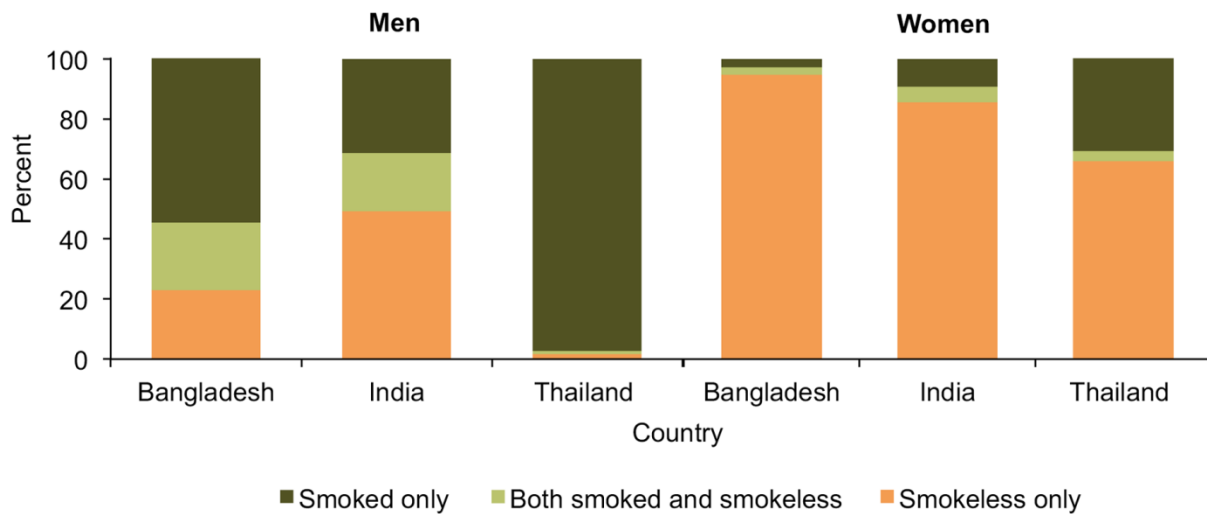
**Figure 13-2. Current smoking versus current smokeless tobacco use prevalence among men and women in six South-East Asia Region countries, 2006–2009**



Source: World Health Organization, 2011 (33).

Information on the use of both smoked and ST products, or dual use, is available from the GATS for Bangladesh, India, and Thailand (Figure 13-3). In India, 15.4% of tobacco users—42.3 million people—use both smokeless and smoked tobacco. In Bangladesh, about one-fifth (22.4%) of male tobacco users are dual users, compared to approximately 19% in India and only 1% in Thailand. Among women tobacco users in Bangladesh, Thailand, and India, only 2.5%, 3.3%, and approximately 5%, respectively, both smoke and use smokeless tobacco.<sup>12,13,22</sup> In a cross-sectional study of women in a town in Nepal, tobacco smokers were twice as likely as non-smokers to chew tobacco ( $p < 0.0001$ ).<sup>35</sup>

**Figure 13-3. Percent of dual use, smoking only, and smokeless tobacco use only among adult tobacco users, by sex and country, GATS 2009–2010**



Abbreviation: GATS = Global Adult Tobacco Survey.

Sources: India: GATS, 2010 (12); Bangladesh: GATS, 2009 (13); Thailand: GATS, 2009 (22).

## Toxicity and Nicotine Profiles of Products

Some types of ST products in the South-East Asia Region are characterized by high levels of tobacco-specific nitrosamines (TSNAs), including khaini and zarda, and some, such as gul powder, also have high levels of nicotine.<sup>15,36</sup> In addition, the use of areca nut with tobacco introduces other harmful constituents.<sup>8</sup> Table 13-4 includes the nicotine and nitrosamine levels of several regional products, including gul powder, zarda, gutka (both commercially manufactured and cottage industry products), and khaini.

**Table 13-4. Nicotine and nitrosamine levels in selected regional products**

Product	pH	Total nicotine	Free nicotine	NNK	NNN	NNAL	Total TSNAs*
		mg/g wet weight	mg/g wet weight	ng/g wet weight			
Gul Powder	8.79–9.22	33.4–34.1	29.1–31.0	1,330–1,370	5,190–8,020	590–630	13,400–17,100
Zarda	5.22–6.51	9.55–30.4	0.17–0.63	457–3,840	2,910–28,600	248–3,460	5,490–53,700
Gutka:							
Manufactured (India)	8.46–8.88	1.09–1.78	0.86–1.78	57.1–456	167–1,280	23.2–258	370–2,250
Cottage Industry (India)	7.43–8.61	0.91–4.20	0.19–3.33	7.1–375	154–18,600	10.8–1,030	264–23,900
Khaini	9.65–9.79	2.53–4.79	2.48–4.68	288–502	16,800–17,500	1,350–1,440	21,600–23,500

\*Total TSNAs represent the sum of NNK, NNN, and NNAL (shown); *N'*-nitrosoanatabine and *N'*-nitrosoanabasine (not shown). Abbreviations: NNK = 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone; NNN = *N'*-nitrosoanornicotine; NNAL = 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol; TSNA = tobacco-specific nitrosamines; mg/g = milligram per gram; ng/g = nanogram per gram. Source: Stanfill et al. 2011 (15).

## Health Problems Associated With Product Use

A large body of published epidemiologic studies shows strong associations between ST use in the South-East Asia Region and several serious health consequences.

### Cancer

Incidence of oral and pharyngeal cancers is high in the countries of this region compared to most of the world.<sup>37</sup> The high incidence rates for these cancers have been attributed in large part to ST and areca nut use, as well as to smoking products such as bidis, cheeroots, pipes, and cigars. Estimated incidence rates for oral cancers (lip and oral cavity) for the countries of the region are shown in Table 13-5.

Most of the epidemiologic studies on ST come from India and pertain to cancer. The International Agency for Research on Cancer (IARC) evaluated existing evidence, including evidence from the South-East Asia Region, on the carcinogenicity of ST and of betel quid with tobacco and declared the evidence “sufficient,” meaning that a causal relation had been established between ST use and cancer, specifically of the oral cavity.<sup>8–10</sup> The evidence that betel quid with tobacco causes pharyngeal and esophageal cancers was also declared sufficient.<sup>8</sup> A few illustrative studies are mentioned below.

**Table 13-5. Annual age-standardized incidence rate of lip and oral cavity cancers in South-East Asia Region countries: Estimates from GLOBOCAN, 2008**

Country	Men		Women		Both	
	Cases	ASRW	Cases	ASRW	Cases	ASRW
Bangladesh	5,048	9.6	5,354	9.9	10,402	9.7
Bhutan	19	6.9	10	4.5	29	5.7
India	45,445	9.8	24,375	5.2	69,820	7.5
Indonesia	2,693	2.8	2,310	2.1	5,003	2.4
Maldives	23	24.5	7	8.2	30	16.5
Myanmar	1,001	5.1	908	3.9	1,909	4.5
Nepal	886	10.2	357	3.6	1,243	6.7
Sri Lanka	1,701	16.5	589	5.0	2,290	10.3
Thailand	2,038	5.8	2,360	5.8	4,398	5.9
Timor-Leste	9	3.1	7	2.2	16	2.6
Democratic People's Republic of Korea (North Korea)	138	1.1	122	0.8	260	0.9
<b>Total for South-East Asia Region</b>	<b>59,001</b>	<b>8.4</b>	<b>36,399</b>	<b>5.0</b>	<b>95,400</b>	<b>6.7</b>

Abbreviation: ASRW = Age-standardized incidence rate (for the world population) per 100,000 people.

Source: Ferlay et al. 2010 (37).

### Oral Cancer

The first known hospital-based case-control study in India was reported by Orr in 1933.<sup>38</sup> In the mid-1960s several additional studies were conducted in South-East Asia Region countries, including a study in India and Sri Lanka by Hirayama.<sup>8,39</sup> The studies by both Orr and Hirayama found a dose-response relationship between chewing betel quid with tobacco and cancer.<sup>10,38,39</sup> A 2003 multicenter study from southern India found that chewers of betel quid with tobacco had a ninefold excess risk of oral cancer compared to never chewers (odds ratio [OR] = 9.27; 95% CI: 6.79–12.66), which was nearly four times higher odds than that for smokers.<sup>40</sup>

A review article from 1990 found that the peak age of occurrence of oral cancer was at least a decade earlier in India than in Western countries. In the 1980s, only 10% to 15% of people with oral cancer in India went to the hospital when their cancers were in localized stages, a delay that results in poor survival rates.<sup>41</sup>

In the South-East Asia Region only a few studies have investigated the use of ST without areca nut. Most notable was a large cross-sectional study from the mid-1960s in north-central India, which found that, compared to the risk for non-chewers of tobacco, the excess risk of oral cancer was three times greater for chewers of plain leaf tobacco and 22 times greater for users of areca nut mixed with tobacco, although the statistical significance of this finding was not reported.<sup>42</sup>



### **Pharyngeal Cancer**

In a case-control study in central India, chewers of tobacco with traditional/local ingredients (such as lime or betel quid) had a ninefold higher risk of oropharyngeal cancer than non-chewers (OR = 9.0; 95% CI: 4.6–15.2).<sup>43</sup> In a study conducted in southern India, a stratified analysis showed that chewers of betel quid with tobacco who had never smoked or been alcohol drinkers had a nearly fourfold excess risk of pharyngeal cancer (OR = 3.7, 95% CI: 2.2–6.3).<sup>40</sup> Another study found that hypopharyngeal cancer may develop from chewing gutka, betel quid with tobacco, zarda, or mawa.<sup>44</sup>

### **Esophageal Cancer**

A 1970s case-control study in Sri Lanka found an association between ST use and esophageal cancer.<sup>45</sup> A more recent (2001) case-control study in northeastern India found that users of dried tobacco leaf (chadha) had adjusted excess risks of esophageal cancer between three and five times higher than the risks for non-users ( $p < 0.001$ , adjusted for tobacco smoking and alcohol drinking).<sup>46</sup> In a study in southern India, users of betel quid with tobacco who did not smoke or drink alcohol had a nearly sixfold excess risk of esophageal cancer (OR = 5.7, 95% CI: 3.5–9.4).<sup>40</sup>

### **Other Cancers**

Some evidence from India supports associations between ST and other cancers. Evidence for stomach cancer in users of chewing tobacco, betel quid, and tuibur was found in one study in India's northeastern region.<sup>47</sup> Moreover, case-control studies have found evidence of associations between betel quid use and cervical and breast cancers.<sup>48,49</sup> Another study found evidence for an association between use of chewing tobacco and snuff and the development of penile cancer.<sup>50</sup>

### **Precancerous and Other Oral Conditions**

Abnormal changes in the oral mucosa often precede the development of squamous cell carcinoma. Oral leukoplakia is the most common of these changes. It is generally associated with any form of tobacco use, including ST use and smoking.<sup>51</sup> Another condition is oral submucous fibrosis (OSF), a progressive disease in which the oral mucosa loses elasticity and develops fibrous bands that cause difficulty in opening the mouth. OSF can progress to cancer, although the malignant transformation rate of OSF is relatively low. It is also associated with chewing areca nut, which is often consumed with tobacco.<sup>8</sup>

Gutka chewing is also very strongly associated with the development of OSF. A review showed that five studies found a strong relationship between gutka chewing and OSF, including a dose–response relationship.<sup>52</sup> OSF appears earlier in pan masala and gutka users than in betel quid users. In one Indian study, OSF was diagnosed on average about 3 years after individuals had begun using pan masala or gutka, compared to roughly 9 years after initiation of betel quid use.<sup>53</sup> OSF was even found in teenagers.<sup>54</sup> Incidence of OSF has also increased. In the Indian state of Gujarat, from 1993–1994 to 2003–2004, incidence of OSF increased sixteenfold, and incidence of squamous cell carcinoma of the oral cavity increased by around 11%.<sup>55</sup>

A 2010 cross-sectional study of 1,029 adults in Sri Lanka showed the prevalence of oral disorders to be 11.3%, or 102 cases; 25 of these cases were OSF cases.<sup>56</sup>

### Reproductive Outcomes

Use of ST during pregnancy can lead to adverse reproductive outcomes such as low birth weight, stillbirth, and pre-term birth, as has been demonstrated in numerous studies in India. A cohort study in Mumbai in 2004 found that women using ST had a 60% higher risk of having a low birth weight baby than non-users ( $p < 0.05$ ).<sup>57</sup> After adjustment for potential confounders, users also had a 2.6-times higher risk of stillbirth (95% CI: 1.4–4.8). A dose–response relationship was found between stillbirth and use of mishri, the most commonly used product in this cohort.<sup>58</sup> Other studies have noted that betel quid both with and without tobacco may be associated with adverse pregnancy outcomes such as reduced birth weight and pre-term birth.<sup>8,9</sup>

### Cardiovascular Diseases

Information has been accumulating globally on the association between ST and cardiovascular disease. The international INTERHEART study showed an independent association between ST use and cardiovascular events such as acute myocardial infarction in different parts of the world, including India.<sup>59</sup> A similar association was shown in a study of randomly selected death records from a small town in Uttar Pradesh, India.<sup>60</sup>

Supporting the results on cardiovascular-related events and deaths, other studies show that cardiovascular risk factors are higher among ST users than non-users, as they are in smokers compared to non-smokers. For example, in a cross-sectional study in India, ST users had a nearly threefold higher risk of diastolic hypertension (OR = 2.7, 95% CI: 1.4–4.9) compared to people who did not use tobacco, adjusted for age, body mass index, exercise, and family history of high blood pressure.<sup>61</sup> In another study in India, tobacco chewers had a significantly higher ( $p < 0.001$ ) systolic blood pressure, diastolic blood pressure, and resting heart rate, as well as significantly higher levels of total cholesterol, low-density lipoprotein (LDL) cholesterol, and triglycerides when compared to individuals in a control group matched on sex and age. Prevalence of these cardiovascular risk factors was similar among chewers and smokers.<sup>62</sup>

### Overall Excess Mortality

The conclusion that ST contributes to premature death is supported by the results of a cohort study undertaken in Mumbai, where the most commonly used product was mishri (or masher). Participants in this study were 99,244 individuals aged 35 years or older at baseline, with follow-up taking place on average at 5.5 years. The study found that the relative risks of premature death associated with ST use were significant for both women (25% higher risk) and men (16% higher risk).<sup>63</sup> See Table 13-6 for this study's data on all-cause mortality, by type of ST product.

**Table 13-6. Relative risks for all-cause mortality by type of smokeless tobacco used, from the 1992–1999 Mumbai Cohort Study**

Type of Smokeless Tobacco	Relative risk* (95% confidence interval)	
	Men	Women
Mishri	1.14 (0.97–1.33)	1.21 (1.10–1.34)
Mishri plus other smokeless tobacco†	1.18 (1.07–1.31)	1.36 (1.24–1.48)
Other smokeless tobacco†	1.24 (1.08–1.41)	1.37 (1.09–1.73)
Never tobacco use	1.0 (reference)	1.0 (reference)

\*Age- and education-adjusted relative risk using Cox model.

†Other smokeless tobacco was generally tobacco with lime.

Source: Gupta et al. 2005 (63).

### Dependency Issues

Tobacco addiction is a major health consequence of ST use. It is characterized by continued frequent use of ST and chronic exposure to all the other harmful effects of tobacco and its related conditions. Quit rates are very low in the region, as shown in the GATS in India, Bangladesh, and Thailand. The proportions of ever users of ST who had successfully quit as of 2009 were 7.8% in Bangladesh, 7.9% in India, and 21.8% in Thailand (quit ratios calculated from full GATS reports).<sup>12,13,22</sup>

One study in Myanmar found that tobacco users believed that quitting betel quid with tobacco is more difficult than quitting smoking.<sup>18</sup> Older intervention studies in India found that smokers who also use ST have the most difficulty of all.<sup>64</sup> The addictiveness of tobacco is the major factor responsible for sustaining the market, both for smoking and using smokeless tobacco.

### Marketing and Production Practices of Industry

With its long tradition of use in the region, ST has economic importance even in countries where smoking predominates (Indonesia and Thailand), and its importance has been growing in several other countries (Bangladesh, Bhutan, India, Nepal, and Myanmar).

### Production

Production figures on tobacco destined for smokeless use are available for India only: In 2002–2003, India produced about 84.9 thousand tons of tobacco to be used in making chewing tobacco products, and 6.4 thousand tons of tobacco to be used in snuff products, out of a total of 491.7 thousand tons of tobacco produced. Thus, 18.6% of tobacco produced was destined for making ST products.<sup>65</sup>

Most ST product manufacturers are cottage-based industries, though some are large factory operations. A few multinational corporations have also entered the market in the last 10 years. In 2001, Swedish Match launched the Click brand of snus in India, but the product was not accepted as well as expected, and after a few years it was discontinued.<sup>66,67</sup>

Cottage-based ST is sometimes packaged in small pouches like the manufactured, commercial products. Some products can be made or assembled by a vendor (such as mawa or betel quid with tobacco) on demand from users, or users can buy the ingredients from shops and assemble them (as in betel quid and tobacco) or process them (such as by roasting and powdering tobacco flakes to make mishri). In India, Bangladesh, Myanmar, and to an extent Indonesia, preparation of ST products was traditionally a cottage industry, but large manufacturers have entered the scene in more recent years with, for example, fire-cured snuff. In India since the early 1970s, and more rapidly since 1991 after the economy was liberalized, industrial-scale production of chewing tobacco products, especially gutka, increased. The cost of gutka was typically 1 to 2 Indian rupees (INR) (US\$0.02–0.04), but it is now being purchased for up to INR 7 (US\$0.13) for a small sachet.<sup>68</sup> Also since the early 1990s, India has seen a rise in industrial production of chewing tobacco, from INR 1.1 billion (US\$36 million) in 1993–1994 to INR 6.7 billion (US\$142 million) in 2000–2001, as demonstrated by excise collections.<sup>69</sup>

### Marketing Practices

Smokeless tobacco products are made palatable by adding spices, areca nut, sweeteners, and scents. They are made attractive to consumers by colorful packaging, and this packaging is convenient as well. Since 1985, products have been sold in single-dose plastic sachets. Prices are low, with single-dose packages cheap enough that even schoolchildren can buy them (as mentioned above, from INR 2 to INR 7, or US\$0.04–0.13 for a small sachet).<sup>68</sup>

Brand names are chosen to appeal to different social segments: names of resort areas (Shimla and Goa), appellatives (e.g., Sir, by which students usually address teachers), names with religious significance (Tulsi, meaning holy basil), and fun names (Chaini Khaini). Brand names for products not containing tobacco, such as most varieties of pan masala, are the same as those for products containing tobacco (gutka, khaini). This identical branding, both of tobacco and non-tobacco products and of smokeless and smoked tobacco products, is intended to boost the sales of the lesser known product. Godfrey Phillips (partly owned by Philip Morris) entered the chewing product market with a pan masala in 2010, stating that the company expected that its cigarette business would “provide the synergy to its chewing product.”<sup>70</sup>

Identical branding of tobacco and non-tobacco products is also an attempt by manufacturers to circumvent India’s ban on tobacco advertising, using the non-tobacco products as surrogates for the tobacco-containing products. Thus, advertising for the non-tobacco versions of the tobacco-containing products is considered indirect advertisement of those tobacco products.<sup>71</sup>

Advertisements for the non-tobacco products have different themes, such as a favorite elderly uncle, middle-aged parents, a couple in love, and a sexy young lady. These advertisements are seen on television, in outdoor media (such as on buses), and sometimes in newspapers.<sup>71</sup>

### Distribution and Sales

A few brands of chewing tobacco, including gutka, are sold nationwide in India; others are sold regionally or locally. In the South-East Asia Region, ST products are normally sold through street vendors, kiosks, and grocery/convenience stores. At kiosks and street vendor stands they are sold along with smoking products, candies, and snacks.

Smokeless tobacco Internet sites appear to be targeted toward foreign buyers (e.g., <http://www.Desismoke.com>). Companies in Bangladesh, India, Indonesia, Nepal, and Sri Lanka advertise their chewing tobacco products on the Internet, and many trade websites display contact information for outlets in the region that sell ST, among other products (such as the manufacturer directory at <http://www.Alibaba.com>). On one major website, by far the largest number of exporters, 186, are located in India, whereas other individual South-East Asia Region countries have 7 at most.<sup>72</sup> Through this website, companies in India and Nepal are exporting gutka,<sup>72</sup> and India, Nepal, and Indonesia are exporting snuff.

India is one of the world's largest exporters of tobacco, exporting approximately 50% of its total tobacco production to other countries, according to the Directorate of Tobacco Development of the Government of India.<sup>65</sup> From 2000–2001 to 2009–2010, legal exports of chewing tobacco from India increased nearly 450%, from 1,953 tons to 8,725 tons.<sup>73,74</sup> The value of exported chewing tobacco products in 2009–2010 was around US\$63.6 million. In addition to legal exports, some amount of ST is smuggled to other countries in South-East Asia, and possibly around the world.<sup>75</sup> During 2009–2010, India exported chewing tobacco products to more than 48 countries, and snuff to at least 6 countries. The countries to which India exported 11 tons or more of tobacco for chewing include: the United Arab Emirates, 4,477 tons; Saudi Arabia, 980 tons; Malaysia, 323 tons; the United States, 160 tons; and Kenya, 77 tons.<sup>73</sup> India also exported 85 tons of snuff products in 2009–2010, primarily to China, Tanzania, and the United States.

Smokeless tobacco products exported from India mainly cater to the South Asian diaspora, but use of South-East Asian ST products by local inhabitants in various countries has also been reported.<sup>52</sup>

### Current Policy and Interventions

#### Prevention and Cessation Interventions

##### *School-Based Interventions*

School-based interventions can lead to successful primary prevention of tobacco use. Project MYTRI (Mobilizing Youth for Tobacco-Related Initiatives in India) aimed to decrease tobacco use/uptake by students in grades 6–9 in 32 urban schools in India. This culture-specific intervention, Indian in content and communication, addressed both smokeless and smoked forms of tobacco. Teachers were trained to assist with the program, and this teacher training was critically important to rigorous implementation of the program. Teacher training, a higher proportion of students participating in classroom discussions, and better peer-leader-student communication all helped to support the implementation of the program and lower children's reported susceptibility to chewing tobacco.<sup>76</sup> Project MYTRI was conducted in schools in Delhi and Chennai by HRIDAY-SHAN (Health Related Information Dissemination Amongst

Youth Student Health Action Network), a voluntary organization of health care professionals and social scientists.<sup>76,77</sup>

Policies that ban all tobacco use on school grounds are in place in federal schools run by India's central government, which are few in number,<sup>78</sup> but these bans are not implemented as widely in schools run by the states. A study in Bihar found that in federal schools, where there was a policy of no tobacco use, teachers' daily use of ST was significantly lower than in state schools (41.7% versus 14.1%, respectively).<sup>79</sup>

Although most children have become aware that smoking tobacco and using khaini and zarda are harmful to their health, they do not appear to recognize that gutka, an ST product commonly used among children, also causes many health problems.<sup>80</sup>

### **Community Interventions**

A program of interventions was conducted in the 1970s and 1980s in three rural areas in India with 36,000 tobacco users aged 15 years and older (12,000 in each area).<sup>64</sup> The interventions included oral examinations by dentists at yearly intervals, followed by individual counseling by specially trained social scientists<sup>81</sup>; two documentary films viewed by groups of 20–25 participants, followed by discussion; and radio spots, newspaper articles, and posters. Interventions were followed up by small group “cessation camps,” in which villagers trying to quit met with counselors, and detailed discussions were held daily to address difficulties in quitting until people felt confident of remaining abstinent on their own. These interactions were updated and informed by the progress of the intervention.<sup>82</sup> Quit rates obtained in these single-arm interventions (after 10 years: 15.1% for men and 18.4% for women chewers) were higher than those found in the no-intervention population (2.3% of men and 7.8% of women).<sup>81</sup> Another anti-tobacco community education program in rural India demonstrated similar results in the early 1990s: After 5 years, the use of ST decreased approximately 6% (from 16.4% to 10.8%;  $p < 0.0001$ ) among men in the intervention group compared with a 0%–1% decrease in control populations.<sup>83</sup>

Various voluntary organizations conduct anti-tobacco interventions from time to time in rural areas of the region, but they do not always evaluate the interventions or publish their findings, so the experiences are lost to the public health community. Nevertheless, published data show positive results, both in terms of cessation and reduction of tobacco use and in the regression of oral precancerous lesions.<sup>81</sup>

In 2003, Myanmar piloted a cessation intervention in 13 communities. Over 200 facilitators were trained to lead intervention activities, which varied across communities. Some of these activities included roundtable discussions, advocacy talks with community leaders, monthly meetings between facilitators and quitters, distribution of health education materials, and live entertainment education such as songs and plays performed at festivals. The impact of these cessation activities varied widely in different communities depending on the intensity of the interventions. Among smokers, 11% completely stopped smoking, but ST quit rates across the communities was not reported.<sup>84</sup>



### **Workplace Interventions**

A workplace tobacco cessation program was conducted and evaluated at a chemical plant in Ratnagiri, a rural district of Maharashtra, India. Before the program, over 48% of the employees used tobacco, mostly in smokeless form, with little awareness of its health effects. Precancerous lesions were found in 40%, mainly in ST users.<sup>85</sup> The intervention consisted of awareness lectures, group discussions and individual counseling on how to quit, and an offer of pharmacotherapy (bupropion). Awareness programs were also arranged for family members and contract employees. Follow-up sessions were held every 6 to 8 weeks, and tobacco quit rates improved with each session, reaching 40% at the end of one year, which was verified through urine cotinine testing. Among employees who quit, many noticed that their oral lesions decreased in size.<sup>86</sup>

### **Evidence From Cessation Clinics**

In 2002, India's Ministry of Health and Family Welfare and the WHO set up tobacco cessation clinics in hospitals and nongovernmental organization (NGO) settings in India. The original 13 clinics expanded to 19, and 34,741 participants were registered in the first 5 years. For 69% of the participants, behavioral strategies alone were used, and for the remaining 31%, pharmacotherapy was added, mainly bupropion and nicotine gum.<sup>87,88</sup> The results showed that at 6 weeks, 14% of the study participants had completely quit and 22% had reduced their tobacco intake by half. Results at 3, 6, and 9 months showed that younger male patients, users of smokeless forms of tobacco, and those receiving a combination of pharmacotherapy and behavioral counseling were more likely to reduce tobacco use.

### **Mass Media Campaigns**

As a part of the National Cancer Control Programme, the Indian Council for Medical Research and All India Radio collaboratively conducted a mass media intervention on drugs, alcohol, and tobacco. Called Radio-DATES (for Drugs, Alcohol, and Tobacco Education), the intervention, consisting of 20-minute programs, was broadcast in 16 languages on 84 radio stations (of 104 existing stations at that time) once a week for 30 weeks.<sup>89</sup> To assess the impact and reach of this media campaign, community-based surveys were conducted in two rural communities where no organized tobacco control programs existed. After hearing the programs, about 6% of tobacco users quit in rural Karnataka and 4% quit in rural Goa. In Karnataka, 32% of potential listeners heard at least one episode on tobacco compared to 27% in Goa.<sup>90</sup>

### **Current Policy**

All member states in the region except Indonesia have ratified the WHO FCTC.<sup>91</sup> As of January 2014, nine of the countries that have ratified have adopted comprehensive tobacco control laws.<sup>33</sup> (Timor-Leste has ratified the FCTC and as of December 2013 was in the process of passing national-scale legislation.) Table 13-7 summarizes the policies of these countries.

Bhutan has introduced the strongest tobacco restrictions of any country in the world. In addition to banning imports, Bhutan has banned exports, agricultural production, manufacture, and sale of tobacco and all tobacco products. Health warnings are required on tobacco brought in from another country for personal use.<sup>92</sup>

Implementation and enforcement are a huge challenge in the region for various reasons. In India specifically, a major obstacle to implementing tobacco control legislation has been fear of the economic consequences of job losses among the country's large number of tobacco workers (especially bidi workers). Other obstacles to successful and efficient implementation include a time lag to prioritize allocation of resources, interference from the organized tobacco industry, the informal nature of a large part of the industry, and high rates of use in large populations.

**Table 13-7. Policy measures for controlling smokeless tobacco use in the South-East Asia Region**

Countries	Ban on exports	Ban on imports	Ban on advertisement	Ban on sale to minors	Health warning for smokeless tobacco	Ban on sale within 100 yards/meters of a school
Bangladesh			✓		Yes	
Bhutan	✓	✓*	✓	✓	Yes†	N/A‡
Democratic People's Republic of Korea (North Korea)				✓		
India			✓	✓	Yes	✓
Indonesia						
Maldives			✓	✓	Yes§	
Myanmar			✓	✓	Yes§	✓
Nepal			✓	✓	Yes§	✓
Sri Lanka				✓	Yes§	
Thailand		✓	✓	✓	Yes	
Timor-Leste						

✓ = Ban applied.

\*Bhutan allows limited import of tobacco products for personal consumption only.

†Health warnings are required on all imported tobacco products (added by the country of origin).

‡Bhutan banned sale of smokeless tobacco products in any location, therefore a specific ban on sale near schools does not apply.

§Health warnings are required on tobacco products by the national laws, but there is no specific rule for smokeless tobacco.

Abbreviation: N/A = not applicable.

Sources: Adapted from World Health Organization, 2011 (19); Bangladesh data from Campaign for Tobacco-Free Kids, 2013 (116).



### **Taxation**

Unlike taxes on cigarettes, taxes on ST are low or nonexistent. In the South-East Asia Region, unmanufactured tobacco sold in loose form is often not taxed. Betel quid with tobacco, which is sold fresh by street vendors, is not taxed and has no warning labels. In 2008–2009, the government of Bangladesh recognized ST (mainly for chewing) as a manufacturing industry rather than a cottage industry and, under the 2011–2012 budget, Bangladesh taxed ST products for the first time.<sup>93</sup> In India, the ST industry, particularly the gutka industry, has grown tremendously in the last three decades. All manufacturers of tobacco products in India are expected to register with the government and pay excise taxes, but this is poorly enforced, and it is estimated that only one-fourth of the excise tax due on the gutka and pan masala industry is actually paid.<sup>94</sup> In 2008–2009, India collected INR 35 billion (US\$632 million) in taxes on chewing tobacco.<sup>95</sup>

### **Bans on Public Use**

Nepal banned the use of any tobacco product in all indoor public places in its Tobacco Control and Regulation Act, which came into force on August 7, 2011.<sup>96,97</sup>

### **Bans on Sale to Minors**

Sale of ST to minors is prohibited in the countries with comprehensive laws (except Bangladesh). India, Myanmar, and Nepal are the only countries in the region that prohibit selling tobacco within 100 yards of educational institutions. In 2011 India, with the assistance of some NGOs, local governments, and courts, intensified enforcement of this ban.<sup>98</sup>

### **Health Warnings on Packages**

India requires textual and pictorial health warnings for ST products sold domestically but not for exports. However, industry interference has caused a long delay in introducing pictorial warnings.<sup>99,100</sup> In Thailand, packages of shredded tobacco meant for roll-your-own cigarettes carry a warning about smoking, but no warning about using tobacco in smokeless form is required. In Bhutan, commercial importation of tobacco is banned, but health warnings are required on tobacco brought in from another country for personal use. Nepal passed legislation in 2011 requiring graphic warnings on all kinds of tobacco products.<sup>101</sup> In much of this region, unmanufactured, loose tobacco is also not advertised and does not display any warnings.<sup>95</sup>

### **Restrictions on Advertising**

Bhutan, India, Maldives, Myanmar, Sri Lanka, and Thailand have prohibited advertisements for ST, but implementation is inadequate, mainly due to the indirect advertising shown on Indian television (that is, advertisements for non-tobacco products that are similar to tobacco products in various ways; see the discussion of indirect advertising in “Marketing Practices of Industry,” above). Bangladesh and DPR Korea have no restrictions on advertising of smokeless tobacco. Around 70% of adults in Bangladesh had noticed advertisements for ST as well as ST company sponsorships or promotions, according to the GATS (2009).<sup>28,102</sup> In India, a ban on direct advertisements is enforced, but indirect advertisements and

surrogate advertisements persist. Direct advertisement continues at points of sale, and 10.8% of adults have noticed point-of-sale advertisements or promotions of ST.<sup>12</sup>

### **Bans on Sale**

Bhutan bans the sale of all forms of tobacco. In India, a 1992 amendment to the Drugs and Cosmetics Act of 1940 prohibited the manufacture, sale, and distribution of toothpastes and toothpowders containing tobacco (such as creamy snuff and red toothpowder), although several studies continue to find nicotine in some brands of dental care products.<sup>103,104</sup>

In India between 2001 and 2003, five states attempted to ban chewing tobacco (including gutka) and pan masala, but Goa is the only state that has managed to actively restrict the sale of chewing tobacco.<sup>105</sup> In 2004, after a group of manufacturers challenged the bans in Maharashtra and Andhra Pradesh, the Supreme Court of India ruled that state bans were unconstitutional because only the central government has the power to ban such items.<sup>106</sup>

Despite the early success in Goa, it would be another 7 years before the next state would ban ST products. The Food Safety and Standards Authority of India helped pave the way for states to ban gutka and other chewing tobaccos under Regulation 2.3.4 of the Food Safety and Standards Regulations, 2011, which prohibits any harmful ingredient, including nicotine and tobacco, from being added to food.<sup>107–109</sup> The Indian Supreme Court determined in 2004 that gutka was a “food product” and was thus covered under this regulation. The regulation authorizes state food commissioners to ban all gutka products throughout the country, although it was not widely enforced at first. In April 2012, Madhya Pradesh became the first state to implement the ban on gutka by invoking Regulation 2.3.4.<sup>107,108,110</sup> As of October 2013, all of India’s states and union territories except Meghalaya and Lakshadweep have banned the sale of gutka.<sup>111</sup>

This ban has been enforced in varying degrees across India, and some states, such as Maharashtra and Manipur, have banned other types of ST including zarda and khaini.<sup>111</sup> While some states and union territories have been relatively successful in enforcing the ban on gutka, industry is also circumventing these bans by selling pan masala and tobacco in separate pouches.<sup>109</sup>

### **Import Bans**

Thailand (1992) and Bhutan (2011) have banned the import of ST products. Thailand instituted this policy out of concern about the possibility of American and European ST products becoming widely used in the country. Thailand’s ban on imports was supported by both the public health community and the state-owned Thailand Tobacco Monopoly.<sup>23</sup>

In 2009, Bhutanese school boys aged 13–15 years had the highest prevalence of ST use by young adolescents in the region.<sup>26</sup> Bhutan first introduced a ban on tobacco sales and imports in 2004, but implementation was weak, and a thriving black market for tobacco developed.<sup>112–114</sup> In 2010, Bhutan passed the Tobacco Control Act, which imposed harsher penalties and strengthened enforcement.<sup>113,115</sup> Now individuals may bring in small amounts of ST for personal use if they declare it and pay a duty.

## Summary and Conclusions

Smokeless tobacco use is highly prevalent in the South-East Asia Region, especially when compared with other regions of the world, ranging from 25% to 51% in five countries (Bangladesh, India, Myanmar, Nepal, and Sri Lanka) compared to only 2% in Thailand. Specifically, governments in this region are faced with newer manufactured products such as pan masala and gutka, as well as brands of packaged chewing tobacco, which may pose dangers greater than those of traditional products such as betel quid and ordinary chewing tobacco. The cottage industry nature of some products complicates efforts to understand and regulate traditional products in the region.

Evidence from existing toxicity profiles indicates high levels of TSNAs in products such as khaini and zarda. Harmful constituents are found not only in tobacco, but also in areca nut, which is widely incorporated in ST products.

High incidence of oral cancer exists in several areas of the region, especially in India, and is partly attributed to the use of ST and areca nut products. Additional research illustrates other adverse health outcomes associated with these products, including negative reproductive outcomes and cardiovascular disease. Much of this research is based on data from India, however, and additional research on health outcomes from a variety of products across the region is necessary to fully understand the health impact of smokeless tobacco.

Government action is also required to curb illegal imports of ST from other countries within and outside the South-East Asia Region. In addition, advocacy campaigns to strengthen and enforce policies restricting ST and smoking are needed in most of the region's countries, but these efforts require more resources, both for the present and the long term. Several intervention programs, specifically school-based interventions, community interventions, and mass media campaigns, have been evaluated and shown to have some impact, but most of this work was conducted only in India. Policies to raise awareness of these interventions and increase the accessibility of cessation counseling with behavior therapy and pharmacotherapy are still needed in many other countries across the region.

The WHO FCTC has been ratified across South-East Asia, except by Indonesia, but enforcement of tobacco control policies is weak in the region. Taxes and health warnings are mostly nonexistent for ST products (specifically unmanufactured tobacco). Countries such as Bhutan, India, Maldives, Myanmar, Sri Lanka, and Thailand have banned ST advertising, but more work is needed to improve these efforts in the South-East Asia Region.

## References

1. World Health Organization. History of the WHO South-East Asia Region. New Delhi: World Health Organization, Regional Office for South-East Asia; c2006 [updated 2006 Apr 26] [cited 2012 Oct 17]. Available from: <http://www.searo.who.int/EN/Section898/Section1443.htm>
2. United Nations Population Fund. State of the world population 2010. New York: United Nations; 2010. Available from: <http://unispal.un.org/UNISPAL.NSF/0/CCBE0F8F97E09C0A852577C2006749A2>
3. United Nations, Department of Economic and Social Affairs, Population Division. World population prospects: the 2010 revision. New York: United Nations; 2011. Available from: <http://esa.un.org/unpd/wpp/index.htm>
4. Central Intelligence Agency. The world factbook. Washington, DC: Central Intelligence Agency; 2012. Available from: <https://www.cia.gov/library/publications/the-world-factbook/>
5. FAOSTAT. Agricultural commodities production. Countries by commodity. Unmanufactured tobacco. Provisional 2004 production data [Internet database]. Rome: Food and Agriculture Organization of the United Nations; 2009. Available from: <http://faostat.fao.org/site/339/default.aspx>
6. World Health Organization. Report on oral tobacco use and its implications in South-East Asia. New Delhi: World Health Organization, Regional Office for South-East Asia; 2004 [cited 2011 Jul 6]. Available from: [http://www.searo.who.int/entity/tobacco/topics/oral\\_tobacco\\_use.pdf](http://www.searo.who.int/entity/tobacco/topics/oral_tobacco_use.pdf)
7. Kyaing NN. Regional situation analysis of women and tobacco in South-East Asia. New Delhi: World Health Organization, Regional Office for South-East Asia; 2004. Available from: [http://209.61.208.233/LinkFiles/NMH\\_regSituationAnalysis.pdf](http://209.61.208.233/LinkFiles/NMH_regSituationAnalysis.pdf)
8. International Agency for Research on Cancer. Betel-quid and areca-nut chewing and some areca-nut-derived nitrosamines. IARC monographs on the evaluation of carcinogenic risks to humans. Vol. 85. Lyon, France: World Health Organization, International Agency for Research on Cancer; 2004.
9. International Agency for Research on Cancer. Smokeless tobacco and some tobacco-specific *N*-nitrosamines. IARC monographs on the evaluation of carcinogenic risks to humans. Vol. 89. Lyon, France: World Health Organization, International Agency for Research on Cancer; 2007. Available from: <http://monographs.iarc.fr/ENG/Monographs/vol89/mono89.pdf>
10. International Agency for Research on Cancer. Tobacco habits other than smoking; betel-quid and areca-nut chewing; and some related nitrosamines. IARC monographs on the evaluation of carcinogenic risks to humans. Vol. 37. Lyon, France: World Health Organization, International Agency for Research on Cancer; 1985.
11. Gode PK. Studies in the history of tumbula: some beliefs about the number of ingredients in a tumbula. In: Gode, PK. Studies in Indian cultural history. Vol. I. Hoshiarpur, India: Vishveshvaranand Vedic Research Institute; 1961, p. 139–44.
12. International Institute for Population Sciences, Ministry of Health and Family Welfare, Government of India. Global Adult Tobacco Survey India (GATS India), 2009–10. New Delhi: Ministry of Health and Family Welfare; Mumbai: International Institute for Population Sciences; 2010. Available from: [http://whoindia.org/EN/Section20/Section25\\_1861.htm](http://whoindia.org/EN/Section20/Section25_1861.htm)
13. Ministry of Health and Family Welfare (Bangladesh). Global Adult Tobacco Survey: Bangladesh report 2009. Dhaka, Bangladesh: World Health Organization, Country Office for Bangladesh; 2009. Available from: [http://www.who.int/tobacco/surveillance/global\\_adult\\_tobacco\\_survey\\_bangladesh\\_report\\_2009.pdf](http://www.who.int/tobacco/surveillance/global_adult_tobacco_survey_bangladesh_report_2009.pdf)
14. Magistad MK. Bhutan's tough tobacco laws [Internet]. The World. 2011 Apr 19 [cited 2011 Apr 25]. Available from: <http://www.theworld.org/2011/04/bhutan-tough-tobacco-laws/>
15. Stanfill SB, Connolly GN, Zhang L, Jia LT, Henningfield JE, Richter P, et al. Global surveillance of oral tobacco products: total nicotine, unionised nicotine and tobacco-specific *N*-nitrosamines. *Tob Control*. 2011;20(3):e2. Epub 2010 Nov 25. doi: 10.1136/tc.2010.037465
16. Reid A. From betel-chewing to tobacco-smoking in Indonesia. *J Asian Stud*. 1985;44(3):529–47. Available from: <http://www.jstor.org/stable/2056266>
17. Afaal A, Shareef IR. Economics of tobacco control—the Maldives. HNP discussion paper. Economics of tobacco control paper no. 17. Washington, DC: The World Bank; New Delhi: World Health Organization, Regional Office for South-East Asia; 2003 [cited 2012 Jan 20]. Available from: [http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Afaal-Economics\\_whole.pdf](http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Afaal-Economics_whole.pdf)

18. Kyaing NN, Perucic A-M, Rahman K. Study on poverty alleviation and tobacco control in Myanmar. HNP discussion paper. Economics of tobacco control paper no. 31. Washington, DC: The World Bank; New Delhi: World Health Organization; 2005. Available from: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/MyanmarTobaccoFinalSm.pdf>
19. World Health Organization. Expert group meeting on smokeless tobacco control and cessation, New Delhi, India, 16–17 August 2011. New Delhi: World Health Organization, Regional Office for South-East Asia; 2011. Available from: <http://www.searo.who.int/entity/tobacco/documents/seatobacco43/en/index.html>
20. Ministry of Health and Population (Nepal). Brief profile on tobacco control in Nepal. Kathmandu: Nepal Ministry of Health and Population; 2010. Available from: [http://www.who.int/fctc/reporting/party\\_reports/nepal\\_2012\\_annex2\\_tobacco\\_profile.pdf](http://www.who.int/fctc/reporting/party_reports/nepal_2012_annex2_tobacco_profile.pdf)
21. Arunatilake N, Opatha M. The economics of tobacco in Sri Lanka. HNP discussion paper. Economics of tobacco control paper no. 12. Washington, DC: The World Bank; New Delhi: World Health Organization, Regional Office for South-East Asia; 2003 [cited 2012 Jan 23]. Available from: [http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Arunatilake-TheEconomics\\_whole.pdf](http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Arunatilake-TheEconomics_whole.pdf)
22. World Health Organization. Global Adult Tobacco Survey: Thailand country report. Nonthaburi, Thailand: World Health Organization, Regional Office for South-East Asia; 2009. Available from: [http://www.who.int/tobacco/surveillance/thailand\\_gats\\_report\\_2009.pdf](http://www.who.int/tobacco/surveillance/thailand_gats_report_2009.pdf)
23. Chitanondh, H. Banning smokeless tobacco. Bangkok: Thailand Health Promotion Institute; 2007–2008 [cited 2011 Jul 17]. Available from: <http://www.thpinhf.org/WEB%201.5%20-%20Banning%20smokeless%20T.1.pdf>
24. Kusumawardani N, Rahman K, Warren CW, Jones NR, Asma S, Lee J, et al. Linking Global Youth Tobacco Survey (GYTS) data to the WHO Framework Convention on Tobacco Control: the case for Timor-Leste. Jakarta: Indonesia Ministry of Health, National Institute of Health Research and Development, Biomedical and Pharmacy Research Center; New Delhi: World Health Organization, Regional Office for South-East Asia; Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Office on Smoking and Health; Dili: Timor-Leste Ministry of Health, Non-Communicable Diseases Unit, Tobacco Control; 2006.
25. World Health Organization. Noncommunicable diseases in the South-East Asia Region: situation and response, 2011. New Delhi: World Health Organization, Regional Office for South-East Asia; 2011. Available from: [http://www.searo.who.int/entity/noncommunicable\\_diseases/documents/9789290224136/en/index.html](http://www.searo.who.int/entity/noncommunicable_diseases/documents/9789290224136/en/index.html)
26. Centers for Disease Control and Prevention. [Unpublished data from the 2007–2010 Global Youth Tobacco Surveys (GYTS)]. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; [no date] [cited 2012 Jan 25]. Available from: [http://www.who.int/tobacco/global\\_report/2011/en\\_tfi\\_global\\_report\\_2011\\_appendix\\_VIII\\_table\\_2.pdf](http://www.who.int/tobacco/global_report/2011/en_tfi_global_report_2011_appendix_VIII_table_2.pdf)
27. World Health Organization. WHO report on the global tobacco epidemic, 2011. Appendix VIII—Table 8.2: crude smokeless tobacco prevalence in WHO member states. Geneva: World Health Organization; 2011. Available from: [http://www.who.int/tobacco/global\\_report/2011/en\\_tfi\\_global\\_report\\_2011\\_appendix\\_VIII\\_table\\_2.pdf](http://www.who.int/tobacco/global_report/2011/en_tfi_global_report_2011_appendix_VIII_table_2.pdf)
28. Centers for Disease Control and Prevention. Global Adult Tobacco Survey, 2008–2010. Percentage of adults who currently use smokeless tobacco. Global Tobacco Surveillance System data [Internet database]. Atlanta: Centers for Disease Control and Prevention; [no date] [cited 2012 Jan 25]. Available from: <http://apps.nccd.cdc.gov/GTSSData/default/IndicatorResults.aspx?TYPE=&SRCH=C&SUID=GATS&SYID=RY&CAID=Topic&SCID=C443&QUID=Q469&WHID=WW&COID=&LOID=LL&DCOL=S&FDSC=FD&FCHL=&FREL=&FAGL=&FSEL=&FPRL=&DSRT=DEFAULT&DODR=ASC&DSHO=False&DCIV=N&DCSZ=N&DOCT=0&XMAP=TAB&MPVW=&TREE=0>
29. Kishor S, et al. Prevalence of current cigarette smoking and tobacco use among women and men in developing countries. Forthcoming, 2014 [cited 2012 Jan 25].
30. Lee CH, Ko AM, Warnakulasuriya S, Yin BL, Sunarjo, Zain RB, et al. Intercountry prevalences and practices of betel-quid use in south, southeast and eastern Asia regions and associated oral preneoplastic disorders: an international collaborative study by Asian Betel-Quid Consortium of South and East Asia. *Int J Cancer*. 2011;129(7):1741–51.
31. Ministry of Health (Myanmar). Brief profile on tobacco control in Myanmar. Yangon: Myanmar Ministry of Health; 2009. Available from: [http://209.61.208.233/LinkFiles/Tobacco\\_Free\\_Initiative\\_SEA-Tobacco-25.pdf](http://209.61.208.233/LinkFiles/Tobacco_Free_Initiative_SEA-Tobacco-25.pdf)
32. Sinha DN, Palipudi KM, Rolle I, Asma S, Rinchen S. Tobacco use among youth and adults in member countries of South-East Asia region: review of findings from surveys under the Global Tobacco Surveillance System. *Indian J Public Health*. 2011;55(3):169–76.



33. World Health Organization. Profile on implementation of WHO Framework Convention on Tobacco Control in the South-East Asian Region. New Delhi: World Health Organization, Regional Office for South-East Asia; 2011 [cited 2011 Jul 17]. Available from: <http://www.searo.who.int/entity/tobacco/documents/9789290223986/en/index.html>
34. World Health Organization. Noncommunicable disease risk factor survey, Myanmar 2009. New Delhi: World Health Organization, Regional Office for South-East Asia; 2011. Available from: [http://www.who.int/chp/steps/2009\\_STEPS\\_Survey\\_Myanmar.pdf](http://www.who.int/chp/steps/2009_STEPS_Survey_Myanmar.pdf)
35. Niraula SR. Tobacco use among women in Dharan, eastern Nepal. *J Health Popul Nutr.* 2004;22(1):68–74.
36. Stepanov I, Hecht SS, Ramakrishnan S, Gupta PC. Tobacco-specific nitrosamines in smokeless tobacco products marketed in India. *Int J Cancer* 2005;116(1):16–19.
37. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. GLOBOCAN 2008, cancer incidence and mortality worldwide: IARC CancerBase no. 10 [Internet database]. Lyon, France: World Health Organization, International Agency for Research on Cancer; 2010 [cited 2011 Mar 19]. Available from: <http://globocan.iarc.fr>
38. Orr IM. Oral cancer in betel nut chewers in Travancore: its aetiology, pathology and treatment. *Lancet.* 1933;ii:575–80.
39. Hirayama T. An epidemiologic study of oral and pharyngeal cancer in Central and South-East Asia. *Bull World Health Org.* 1966;34:41–69. Available from: [http://whqlibdoc.who.int/bulletin/1966/Vol34/Vol34-No1/bulletin\\_1966\\_34\(1\)\\_41-69.pdf](http://whqlibdoc.who.int/bulletin/1966/Vol34/Vol34-No1/bulletin_1966_34(1)_41-69.pdf)
40. Znaor A, Brennan P, Gajalakshmi V, Mathew A, Shanta V, Varghese C, et al. Independent and combined effects of tobacco smoking, chewing and alcohol drinking on the risk of oral, pharyngeal and esophageal cancers in Indian men. *Int J Cancer.* 2003;105(5):681–6.
41. Sankaranarayanan R. Oral cancer in India: an epidemiologic and clinical review. *Oral Surg Oral Med Oral Pathol.* 1990;69(3):325–30.
42. Wahi PN. The epidemiology of oral and oropharyngeal cancer. A report of the study in Mainpuri District, Uttar Pradesh, India. *Bull World Health Organ.* 1968;38(4):495–521.
43. Wasnik KS, Ughade SN, Zodpey SP, Ingole DL. Tobacco consumption practices and risk of oropharyngeal cancer: a case-control study in central India. *Southeast Asian J Trop Med Public Health.* 1998;29(4):827–34.
44. Sapkota A, Gajalakshmi V, Jetly DH, Roychowdhury S, Dikshit RP, Brennan P, et al. Smokeless tobacco and increased risk of hypopharyngeal and laryngeal cancers: a multicentric case-control study from India. *Int J Cancer.* 2007;121(8):1793–8.
45. Stephen SJ, Urugoda CG. Some observations on oesophageal carcinoma in Ceylon, including its relationship to betel chewing. *Br J Cancer.* 1970;24(1):11–5.
46. Phukan RK, Ali MS, Chetia CK, Mahanta J. Betel nut and tobacco chewing: potential risk factors of cancer of oesophagus in Assam, India. *Br J Cancer* 2001;85(5):661–7.
47. Phukan RK, Zomawia E, Narain K, Hazarika NC, Mahanta J. Tobacco use and stomach cancer in Mizoram, India. *Cancer Epidemiol Biomarkers Prev.* 2005;14(8):1892–6.
48. Rajkumar T, Franceschi S, Vaccarella S, Gajalakshmi V, Sharmila A, Snijders PJ, et al. Role of paan chewing and dietary habits in cervical carcinoma in Chennai, India. *Br J Cancer.* 2003;88(9):1388–93.
49. Kaushal M, Mishra AK, Raju BS, Ihsan R, Chakraborty A, Sharma J, et al. Betel quid chewing as an environmental risk factor for breast cancer. *Mutat Res.* 2010;703(2):143–8. Epub 2010 Aug 20.
50. Harish K, Ravi R. The role of tobacco in penile carcinoma. *Br J Urol.* 1995;75(3):375–7.
51. van der Waal I, Schepman KP, van der Meij EH, Smelee LE. Oral leukoplakia: a clinicopathological review. *Oral Oncol.* 1997;33(5):291–301.
52. Javed F, Chotai M, Mehmood A, Almas K. Oral mucosal disorders associated with habitual gutka usage: a review. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2010;109(6):857–64. Epub 2010 Apr 9.
53. Babu S, Bhat RV, Kumar PU, Sesikaran B, Rao KV, Aruna P, et al. A comparative clinico-pathological study of oral submucous fibrosis in habitual chewers of pan masala and betelquid. *J Toxicol Clin Toxicol.* 1996;34(3):317–22.
54. Babu S, Sesikaran B, Bhat RV. Oral fibrosis among teenagers chewing tobacco, areca nut, and pan masala. *Lancet.* 1996;348(9028):692.
55. Misra V, Singh PA, Lal N, Agarwal P, Singh M. Changing pattern of oral cavity lesions and personal habits over a decade: hospital based record analysis from Allahabad. *Indian J Community Med.* 2009;34(4):321–5.
56. Amarasinghe HK, Usgodaarachchi US, Johnson NW, Lalloo R, Warnakulasuriya S. Betel-quid chewing with or without tobacco is a major risk factor for oral potentially malignant disorders in Sri Lanka: a case-control study. *Oral Oncol.* 2010;46(4):297–301.

57. Gupta PC, Subramoney S. Smokeless tobacco use, birth weight, and gestational age: population based, prospective cohort study of 1217 women in Mumbai, India. *BMJ*. 2004;328:1538–40.
58. Gupta PC, Subramoney S. Smokeless tobacco use and risk of stillbirth: a cohort study in Mumbai, India. *Epidemiology*. 2006;17(1):47–51.
59. Teo KK, Ounpuu S, Hawken S, Pandey MR, Valentin V, Hunt D, et al. Tobacco use and risk of myocardial infarction in 52 countries in the INTERHEART study: a case-control study. *Lancet*. 2006;368(9536):647–58.
60. Singh RB, Singh S, Chattopadhyaya P, Singh K, Singhz V, Kulshrestha SK, et al. Tobacco consumption in relation to causes of death in an urban population of north India. *Int J Chron Obstruct Pulmon Dis*. 2007;2(2):177–85.
61. Pandey A, Patni N, Sarangi S, Singh M, Sharma K, Vellimana AK, et al. Association of exclusive smokeless tobacco consumption with hypertension in an adult male rural population of India. *Tob Induc Dis*. 2009;5:15.
62. Gupta BK, Kaushik A, Panwar RB, Chaddha VS, Nayak KC, Singh VB, et al. Cardiovascular risk factors in tobacco-chewers: a controlled study. *J Assoc Physicians India*. 2007;55:27–31.
63. Gupta PC, Pednekar MS, Parkin DM, Sankaranarayanan R. Tobacco associated mortality in Mumbai (Bombay) India. Results of the Bombay Cohort Study. *Int J Epidemiol*. 2005;34(6):1395–402.
64. Gupta PC, Mehta FS, Pindborg JJ, Aghi MB, Bhonsle RB, Daftary DK, et al. Intervention study for primary prevention of oral cancer among 36,000 Indian tobacco users. *Lancet*. 1986;1(8492):1235–9.
65. Directorate of Tobacco Development (India). Status paper on tobacco. Chennai, India: Ministry of Agriculture, Directorate of Tobacco Development; 2006 [cited 2011 Nov 21]. Available from: [http://dtd.dacnet.nic.in/TS\\_PAPER\\_FINE.pdf](http://dtd.dacnet.nic.in/TS_PAPER_FINE.pdf)
66. Gupta P. India: Swedish Match steps in. *Tob Control*. 2001;10(4):304.
67. Swedish Match. Swedish Match to launch snuff in India [press release]. Stockholm: Swedish Match; 2001 Apr 23. Available from: <http://www.swedishmatch.com/en/Media/Pressreleases/Press-releases/1996-2004/Swedish-Match-to-launch-snuff-in-India/>
68. Times of India. Addicts buying gutka at double the price. *The Times of India*. 2011 May 15 [cited 2012 Oct 17]. Available from: [http://articles.timesofindia.indiatimes.com/2011-05-15/mangalore/29549004\\_1\\_gutka-plastic-sachets-demand-supply-mismatch](http://articles.timesofindia.indiatimes.com/2011-05-15/mangalore/29549004_1_gutka-plastic-sachets-demand-supply-mismatch)
69. Panchamukhi PR, Woollery T, Nayanatara SN. Economics of bidis in India. In: Gupta PC, Asma S, editors. *Bidi smoking and public health*. New Delhi: Ministry of Health and Family Welfare; 2008, p. 167–95. Available from: [http://www.who.int/tobacco/publications/prod\\_regulation/bidi\\_smoking\\_public\\_health.pdf](http://www.who.int/tobacco/publications/prod_regulation/bidi_smoking_public_health.pdf)
70. Yadav S. Godfrey Phillips forays into pan masala category [press release]. Indore, India: Godfrey Phillips India Ltd.; 2010 Feb 17. Available from: <http://www.prlog.org/10535760-godfrey-phillips-india-forays-into-pan-masala-category.html>
71. Sushma C, Sharang C. Pan masala advertisements are surrogate for tobacco products. *Indian J Cancer*. 2005;42(2):94–8.
72. Alibaba. Product directory: suppliers, exporters, and importers of chewing tobacco—snuff [Internet]. Hong Kong: Alibaba; c1999–2011 [cited 2011 Nov 20]. Available from: <http://www.alibaba.com/showroom/chewing-tobacco.html> and <http://www.alibaba.com/showroom/snuff.html>
73. Tobacco Board. Exports of unmanufactured tobacco and tobacco products from India in 2009–10: a review. Guntur, India: Ministry of Commerce and Industry, Tobacco Board; 2011 [cited 2011 Nov 26]. Available from: [http://www.indiantobacco.com/admin/statisticsfiles/exp\\_perf\\_2009\\_10.pdf](http://www.indiantobacco.com/admin/statisticsfiles/exp_perf_2009_10.pdf)
74. Tobacco Board. Export performance of tobacco and tobacco products: 2003–2004. Guntur, India: Ministry of Commerce and Industry, Tobacco Board; 2004 [cited 2012 Jun 26]. Available from: [http://www.indiantobacco.com/admin/statisticsfiles/exp\\_perf\\_2003\\_04.pdf](http://www.indiantobacco.com/admin/statisticsfiles/exp_perf_2003_04.pdf)
75. Kabir FHM, Shukla DS, Iqbal N, Peiris M. Tracing illicit tobacco trade in South Asia. Geneva: Framework Convention Alliance and Health Bridge; 2010. Available from: <http://www.healthbridge.ca/Illicit%20Tobacco%20Trade%20in%20South%20Asia.pdf>
76. Goenka S, Tewari A, Arora M, Stigler MH, Perry CL, Saulina Arnold JP, et al. Process evaluation of a tobacco prevention program in Indian schools—methods, results and lessons learnt. *Health Educ Res*. 2010;25(6):917–35. Epub 2010 Sep 30.
77. Perry CL, Stigler MH, Arora M, Reddy KS. Prevention in translation: tobacco use prevention in India. *Health Promot Pract*. 2008;9(4):378–86. Epub 2006 Jul 21.
78. Central Board of Secondary Education (India). Quarterly Bulletin of the Central Board of Secondary Education. July–September 2009. New Delhi: Central Board of Secondary Education; 2009. Available from: [www.cbse.nic.in/cenbosec/jul-sep-2009/page-88-103.pdf](http://www.cbse.nic.in/cenbosec/jul-sep-2009/page-88-103.pdf)

79. Sinha DN, Gupta PC, Warren CW, Asma S. Effect of school policy on tobacco use by school personnel in Bihar, India. *J Sch Health*. 2004;74(1):3–5.
80. Chaturvedi P, Chaturvedi U, Sanyai B. Prevalence of tobacco consumption in schoolchildren in rural India—an epidemic of tobacco-related cancers looming ahead in the Third World. *J Cancer Educ*. 2002;17(1):6.
81. Gupta PC, Mehta FS, Pindborg JJ, Bhonsle RB, Murti PR, Daftary DK, et al. Primary prevention trial of oral cancer in India: a 10-year follow-up study. *J Oral Pathol Med*. 1992;21(10):433–9.
82. Aghi MB, Gupta PC, Bhonsle RB, Murti PR. Communication strategies for intervening in the tobacco habits of rural populations in India. In: Gupta PC, Hamner JE III, Murti PR, editors. *Control of tobacco-related cancers and other diseases*. Bombay: Oxford University Press; 1992, p. 303–6.
83. Anantha N, Nandakumar A, Vishwanath N, Venkatesh T, Pallad YG, Manjunath P, et al. Efficacy of an anti-tobacco community education program in India. *Cancer Causes Control*. 1995;6(2):119–29.
84. Kyaing NN, Yin KS, Nwe T. Report of the Myanmar Pilot Project on community based cessation of tobacco use. 2003. Available from [http://209.61.208.233/LinkFiles/NMH\\_cess2.pdf](http://209.61.208.233/LinkFiles/NMH_cess2.pdf)
85. Mishra GA, Shastri SS, Uplap PA, Majmudar PV, Rane PS, Gupta SD. Establishing a model workplace tobacco cessation program in India. *Indian J Occup Environ Med*. 2009;13(2):97–103.
86. Mishra GA, Majmudar PV, Gupta SD, Rane PS, Uplap PA, Shastri SS. Workplace tobacco cessation program in India: a success story. *Indian J Occup Environ Med*. 2009;13(3):146–53.
87. Murthy P, Saddichha S. Tobacco cessation services in India; recent developments and the need for expansion. *Indian J Cancer*. 2010;47(Suppl 1):69–74.
88. Varghese C, Kaur J, Desai NG, Murthy P, Malhotra S, Subbakrishna DK, et al. Initiating tobacco cessation services in India: challenges and opportunities. *WHO South-East Asia Journal of Public Health*. 2012;1(2):159–68.
89. Reddy KS, Gupta PC, editors. *Report on tobacco control in India*. New Delhi: Ministry of Health and Family Welfare; Atlanta, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2004. Available from: [http://www.mohfw.nic.in/WriteReadData/l892s/911379183TobaccocontroinIndia\\_10Dec04.pdf](http://www.mohfw.nic.in/WriteReadData/l892s/911379183TobaccocontroinIndia_10Dec04.pdf)
90. Chaudhry K. Tobacco control in India. In: Agarwal SP, Rao YN, Gupta S, editors. *Fifty years of cancer control in India*. New Delhi: Ministry of Health and Family Welfare, Directorate General of Health Services, National Cancer Control Programme; 2002, p. 196–211. Available from: <http://www.mohfw.nic.in/WriteReadData/l892s/pg1to8-85733997.pdf>
91. WHO Framework Convention on Tobacco Control. Parties to the WHO Framework Convention on Tobacco Control [Internet]; [updated 27 November 2013] [cited January 24 2014]. Available from: [http://www.who.int/ftc/signatories\\_parties/en/index.html](http://www.who.int/ftc/signatories_parties/en/index.html)
92. World Health Organization. *The work of WHO in the South-East Asia Region. Report of the Regional Director, 1 January – 31 December, 2010*. New Delhi: World Health Organization, Regional Office for South-East Asia; 2011. Available from: <http://repository.searo.who.int/handle/123456789/15024>
93. Bangladesh budget speech, 2008–2009 [cited 2011 Nov 21]. Available from: [http://www.mof.gov.bd/en/budget/08\\_09/budget\\_speech/08\\_09\\_en.pdf?phpMyAdmin=GqNisTr562C5oxdV%2CEruqWwoM5](http://www.mof.gov.bd/en/budget/08_09/budget_speech/08_09_en.pdf?phpMyAdmin=GqNisTr562C5oxdV%2CEruqWwoM5)
94. Rediff News. Pan masala, chewing tobacco units under tax scanner. *Rediff News/PTI*; 2007 Mar 16 [cited 2011 Nov 23]. Available from: <http://imsports.rediff.com/money/2007/mar/16tax.htm>
95. Smokeless Tobacco Federation (India). *About us*. Delhi: Smokeless Tobacco Federation (India); c2011 [cited 2012 Jun 26]. Available from: <http://www.slffi.com/about-us>
96. Giri A. Nepal bans tobacco use in all public places [Internet]. 2011 Aug 7 [cited 2013 Oct 29]. Available from: <http://gantdaily.com/2011/08/07/nepal-bans-tobacco-use-in-all-public-places/>
97. Press Trust of India (PTI). Nepal bans smoking in public places. *Hindustan Times (Kathmandu)*; 2011 Aug 8 [cited 25 February 2014]. Available from: <http://www.hindustantimes.com/world-news/nepal-bans-smoking-in-public-places/article1-730592.aspx>
98. Singh AP, editor. Delhi High Court directs police to enforce tobacco ban [Internet]. *The Med Guru*; 2011 Mar 31. Available from: <http://www.themedguru.com/node/44219>
99. Arora M, Yadav A. Pictorial health warnings on tobacco products in India: Sociopolitical and legal developments. *Natl Med J India*. 2010;23(6):357–9. Available from: <http://www.nmji.in/archives/Volume-23/Issue-6/Medicine-and-Societies-II.pdf>
100. Oswal KC, Pednekar MS, Gupta PC. Tobacco industry interference for pictorial warnings. *Indian J Cancer*. 2010;47(Suppl 1):101–4.



101. Framework Convention Alliance News. Nepal tobacco package warnings lead Asia. Geneva: Framework Convention Alliance; 2011 Nov 10. Available from: [http://www.fctc.org/index.php?option=com\\_content&view=article&id=619:nepal-package-warnings-lead-asia&catid=239:packaging-and-labelling&Itemid=243](http://www.fctc.org/index.php?option=com_content&view=article&id=619:nepal-package-warnings-lead-asia&catid=239:packaging-and-labelling&Itemid=243)
102. Centers for Disease Control and Prevention. Differences by sex in tobacco use and awareness of tobacco marketing—Bangladesh, Thailand, and Uruguay, 2009. *MMWR Morb Mortal Wkly Rep.* 2010;59(20):613–8. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5920a2.htm>
103. Agrawal SS, Ray RS. Nicotine contents in some commonly used toothpastes and toothpowders: a present scenario. *J Toxicol.* 2012;2012:237506. Epub 2012 Jan 12. doi: 10.1155/2012/237506
104. Agrawal SS, Rajagopal K. Nicotine contents in various toothpowders (dant manjans): measurement and safety evaluation. *Food Chem Toxicol.* 2009;47(3):511–24.
105. Matharu S. High time smokeless tobacco was banned [Internet]. *Governance Now*; 2011 Nov 14. Available from: <http://governancenow.com/news/regular-story/high-time-smokeless-tobacco-was-banned>
106. Kashyap S. SC lifts ban on gutka [Internet]. *The Times of India.* 2004 Aug 2 [cited 2012 Oct 17]. Available from: [http://articles.timesofindia.indiatimes.com/2004-08-02/pune/27160804\\_1\\_gutka-ban-manikchand-brand](http://articles.timesofindia.indiatimes.com/2004-08-02/pune/27160804_1_gutka-ban-manikchand-brand)
107. Arora M, Madhu R. Banning smokeless tobacco in India: policy analysis. *Indian J Cancer.* 2012;49(4):336–41.
108. Zolty B, Sinha D, Sinha P. Best practices in tobacco control in the South-East Asia Region. *Indian J Cancer.* 2012;49(4):321–6.
109. Pandey K. Gutkha ban: Supreme Court seeks compliance report from states. *Down to Earth.* 2013 Apr 3 [cited 2013 Oct 29]. Available from: <http://www.downtoearth.org.in/content/gutkha-ban-supreme-court-seeks-compliance-report-states>
110. Sandhu V. Gutkha warriors. *Business Standard.* 2012 Aug 18 [cited 2013 Oct 29]. Available from: <http://www.business-standard.com/india/news/gutkha-warriors/483533/>
111. Economic Times Bureau. Health Ministry endorses ban on chewing tobacco, gutka. *The Economic Times.* 2013 Oct 2 [cited 2013 Oct 29]. Available from: [http://articles.economictimes.indiatimes.com/2013-10-02/news/42617601\\_1\\_smokeless-tobacco-indirect-morbidity-costs-tobacco-use](http://articles.economictimes.indiatimes.com/2013-10-02/news/42617601_1_smokeless-tobacco-indirect-morbidity-costs-tobacco-use)
112. Givel MS. History of Bhutan’s prohibition of cigarettes: implications for neo-prohibitionists and their critics. *International J Drug Policy.* 2011;22(4):306–10.
113. Parameswaran G. Bhutan smokers huff and puff over tobacco ban. *Aljazeera.* 2012 Sept 28 [cited 2013 Nov 27]. Available from: <http://www.aljazeera.com/indepth/features/2012/09/201292095920757761.html>
114. Bhutan Department of Trade, Ministry of Trade and Industry; Royal Government of Bhutan. Notification of the ban on sale of tobacco. DT/GEN-2/2004/87g. 2004 Nov 8. Available from: <http://www.tobaccocontrollaws.org/files/live/Bhutan/Bhutan%20-%20Notification%20Ban%20on%20Sale%20of%20Tobacco.pdf>
115. Tobacco Control Act of Bhutan, 2010; 2010 June 6. Available from: <http://www.tobaccocontrollaws.org/files/live/Bhutan/Bhutan%20-%20Tobacco%20Control%20Act.pdf>
116. Campaign for Tobacco-Free Kids. Tobacco control laws: country details for Bangladesh. 22 Oct 2013 [cited 3 Feb 2014]. Available from: <http://www.tobaccocontrollaws.org/legislation/country/bangladesh/summary>

