**REGIONAL REVIEW**

**Cancer Epidemiology in Mainland South-East Asia - Past, Present and Future**

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**Abstract**

The countries of mainland South-East Asia, Myanmar, Thailand, Laos, Cambodia and Viet Nam, share a long history of interactions and many cultural similarities, as well as geographical contiguity. They therefore can be usefully examined as a group when considering measures for control of cancer and other non-communicable diseases. Liver cancer is consistently found at higher incidence than most other parts of Asia, with lung cancer as the other most important neoplasm in males. In females cervical and breast cancer about equally predominate, throughout. However, there are also major differences, particularly with regard to stomach and nasopharyngeal cancer, only found at relatively high incidence in Viet Nam. The present review was conducted to gather together registry data on cancer prevalence and epidemiological findings cited in PubMed in order to obtain as comprehensive picture as possible of the present status. It is hoped that future cooperation across the region will facilitate development of coordinated cancer control programs to reduce the burden.

*Asian Pacific J Cancer Prev, 10*, 67-80

**Introduction**

The countries of the Myanmar (Burma), Thailand, Laos, Cambodia and Viet Nam constitute mainland South-East Asia with a population of approximately 200 million. They share a great deal in terms of culture and this is reflected to some extent in the prevalent cancers. Naturally, they also present socioeconomic diversity and this allows pointers to be gained into etiological factors. The present review concerns cancer registration findings, available at the International Agency for Cancer Research Descriptive Epidemiology group website (www-dep.iarc.fr), and published information on epidemiology of the disease, accessible through PubMed.

**Cancer Registration in Mainland South-East Asia**

The population-based cancer registries included in Cancer Incidence in Five Continents (CIV) are listed in Table 1 and members of the International Association for Cancer Registries within the region are shown in Figure 1. In Volume VIII in 2002 there were some seven regarded as sufficiently accurate for inclusion but this was reduced to only three in 2007. Therefore, for Tables 2 and 3, data from 2007 were used for Chiang Mai, Lampang and Songkhla, while those for other registries are from the 2002 volume. Since there are no national registries, data from Globocan 2002 have been used for comparison purposes to generate the percentages of all cancers accounted for by the five most frequent tumours in Figure 2 in the present report.

With the exception of Globocan, no data are publically available for Myanmar, Laos or Cambodia. In Thailand, cancer registration was started in 1971 by the National Cancer Institute, with the collection of information on cancer patients treated in 53 hospitals throughout the region. Since there are no national registries, data from Globocan 2002 have been used for comparison purposes to generate the percentages of all cancers accounted for by the five most frequent tumours in Figure 2 in the present report.

**Table 1. Numbers of Mainland South-East Registries in the Series of Nine Volumes of CIV**

<table>
<thead>
<tr>
<th>Volume</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
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<tr>
<td>Khon Kaen</td>
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</tr>
<tr>
<td>Bangkok</td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Ho Chi Minh City</td>
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<td></td>
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<td>1</td>
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<td>Hanoi</td>
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<td>1</td>
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</tbody>
</table>

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From the Ngoan group on population-based mortality and survival in different parts of the country (Ngoan, 2006a; 2006b; Ngoan et al., 2002; 2007a; 2007b), as well as differences in incidences between Hanoi in the north and Ho Chi Minh City in the south of the country (Ngoan et al., 2001). Both Thailand (Deerasamee et al., 2001) and Viet Nam (Anh, 2001) contributed to the 2001 APJCP supplement on Cancer in Asia (Parkin and Vatanasapt, 2001).

Organ Specific Epidemiology

Skin Cancer

Skin cancer is very infrequent in the region.

Oral Cancer

Cancer of the buccal cavity is relatively common in Myanmar, Cambodia and in the South of Thailand, where it occupies second place and equal numbers of tongue and mouth sites have been described. Otherwise it is generally rare (see Figure 3) and may be decreasing, as observed for Chiang Mai (Reichart et al., 2003). Betel chewing may be prevalent in elderly, like Cambodian women, but younger people do not take up the habit (Reichart et al., 1996; 1997; 2002). In Songkhla, genetic influence has been proposed to interact with environmental factors (Kietthubthew et al., 2001; Kietthubthew et al., 2003; Kietthubthew et al., 2005). Betel chewing with or without smokeless tobacco use may induce oral cancers via a p53-independent pathway (Thongsuksai and Boonyaphiphat, 2001). Individuals who have homozygous deletion of the GSTM1 gene have increased risk, which increases further when these individuals are exposed to environmental...

Table 2. Age-standardized Population-based Cancer Incidence Data for Mainland South-East Asian Countries - Males

<table>
<thead>
<tr>
<th></th>
<th>Thailand</th>
<th>Viet Nam</th>
</tr>
</thead>
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<tr>
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<td>Chiang Mai</td>
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</tr>
<tr>
<td>Lip</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Tongue</td>
<td>2.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Mouth</td>
<td>2.0</td>
<td>1.3</td>
</tr>
<tr>
<td>Nasopharynx</td>
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<td>2.5</td>
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<tr>
<td>Hypopharynx</td>
<td>1.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Oesophagus</td>
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<td>1.6</td>
</tr>
<tr>
<td>Stomach</td>
<td>5.9</td>
<td>5.3</td>
</tr>
<tr>
<td>Colon</td>
<td>5.0</td>
<td>7.9</td>
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<tr>
<td>Rectum</td>
<td>4.6</td>
<td>3.9</td>
</tr>
<tr>
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<td>18.4</td>
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<tr>
<td>Gallbladder</td>
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<td>2.9</td>
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<td>Pancreas</td>
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<td>2.0</td>
</tr>
<tr>
<td>Larynx</td>
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<td>1.9</td>
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<td>Trachea, lung</td>
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<tr>
<td>Prostate</td>
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<tr>
<td>Kidney</td>
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<td>0.8</td>
</tr>
<tr>
<td>Bladder</td>
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<td>5.6</td>
</tr>
<tr>
<td>Brain</td>
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<td>1.1</td>
</tr>
<tr>
<td>Thyroid</td>
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<td>0.8</td>
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<tr>
<td>Non-Hodgkin</td>
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</tr>
<tr>
<td>Leukemia</td>
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<td>4.1</td>
</tr>
</tbody>
</table>

*Curado et al., 2007; Parkin et al., 2002

Table 2. Age-standardized Population-based Cancer Incidence Data for Mainland South-East Asian Countries - Males

- Lip
- Tongue
- Mouth
- Nasopharynx
- Hypopharynx
- Oesophagus
- Stomach
- Colon
- Rectum
- Liver
- Gallbladder
- Pancreas
- Larynx
- Trachea, lung
- Penis
- Prostate
- Kidney
- Bladder
- Brain
- Thyroid
- Non-Hodgkin
- Leukemia

*Curado et al., 2007; Parkin et al., 2002
Table 3. Age-standardized Population-based Cancer Incidence Data for Mainland South-East Asian Countries - Females

<table>
<thead>
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<td></td>
<td>Chiang Mai*</td>
<td>Lampang*</td>
</tr>
<tr>
<td>Lip</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Tongue</td>
<td>0.9</td>
<td>0.8</td>
</tr>
<tr>
<td>Mouth</td>
<td>1.6</td>
<td>1.7</td>
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<tr>
<td>Nasopharynx</td>
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<td>1.5</td>
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<tr>
<td>Hypopharynx</td>
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<tr>
<td>Oesophagus</td>
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<td>0.6</td>
</tr>
<tr>
<td>Stomach</td>
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<td>3.3</td>
</tr>
<tr>
<td>Colon</td>
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<td>7.2</td>
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<tr>
<td>Rectum</td>
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<td>2.4</td>
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<tr>
<td>Liver</td>
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<td>Pancreas</td>
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<td>1.9</td>
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<tr>
<td>Larynx</td>
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<td>0.8</td>
</tr>
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<td>Trachea, lung</td>
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<tr>
<td>Breast</td>
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<td>22.0</td>
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<tr>
<td>Ovary</td>
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<td>5.4</td>
</tr>
<tr>
<td>Corpus uteri</td>
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<td>3.1</td>
</tr>
<tr>
<td>Cervix uteri</td>
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<td>22.4</td>
</tr>
<tr>
<td>Kidney</td>
<td>0.9</td>
<td>0.4</td>
</tr>
<tr>
<td>Bladder</td>
<td>2.3</td>
<td>1.6</td>
</tr>
<tr>
<td>Brain</td>
<td>1.4</td>
<td>2.2</td>
</tr>
<tr>
<td>Thyroid</td>
<td>4.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Non-Hodgkin</td>
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<td>4.6</td>
</tr>
<tr>
<td>Leukemia</td>
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<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>159</td>
<td>154</td>
</tr>
</tbody>
</table>

*Curado et al., 2007; #Parkin et al., 2002
Stomach Cancer

Stomach cancer is rare except in Viet Nam (see Figure 4) and rates appear steady (Suwanrungruang et al., 2006). Within Thailand there is also some variation, with higher rates in the North and Bangkok, to some extent corresponding with differences in dietary nitrate, nitrite, and nitrosamine intakes (Mitacek et al., 2008). High intake of salt and fermented foods is associated with an increased risk (Suwanrungruang et al., 2008). While prevalence of Helicobacter pyloris infection in Viet Nam is from 70-75% in both sexes (Hoang et al., 2005), the stomach cancer rate in males is significantly higher, suggesting an influence of other environmental risk factors (Ngoan et al., 2008b).

Colorectal Cancer

Colorectal cancer is not infrequent in Thailand, Cambodia and Viet Nam (see Figure 4) and is on the increase (Siripiput et al., 2006; Suwanrungruang et al., 2008; Khuhaprema and Srivatanakul, 2008). The male:female ratio is generally above or around 1:1 (see Table 5), but there is considerable variation in the colon:rectum ratio. Risk factors include meat consumption and cancer in the family (genetic influence) (Sriamporn et al., 2007). An earlier study pointed to elevated risk for those with a history of bowel polyps, parent’s history of colon cancer, anal abscess, chronic colitis, chronic hemorrhoids, a low frequency of stools and some dietary factors like bacon and butter (Lohsoonthorn and Danvivat, 1995). The prevalence in the Central region of Thailand and in Ho Chi Minh City might point to a link with affluence. A colorectal cancer screening programme is now planned for Thailand (Khuhaprema and Srivatanakul, 2008). COX-2 levels in colorectal tumor specimens were significantly correlated with histological differentiation, (Sankhasard et al., 2004).

toxicants such as chemicals in cigarette smoke, alcohol, and betel quid (Kietthubthew et al., 2001). More recently, a case-control study suggested a role of radium-contaminated well water as a risk factor for cancer of the upper digestive tract (Hirunwatthanakul et al., 2006). The lower risk of advanced stage oral squamous cell carcinoma associated with ulcerative tumours and those on the floor of the mouth may be due to their being more readily detected by the patients (Kerdpon and Siripun, 2001).

Nasopharyngeal Cancer

Nasopharyngeal cancer is relatively rare except in Viet Nam. In Thailand it is associated with the GSTM1 null genotype (Tiwawech et al., 2005), which may be a useful genetic marker detectable by PCR (Tiwawech et al., 2008a). The LMP1 subtypes of the Epstein-Barr virus may also be involved in susceptibility to nasopharyngeal carcinoma in Thais (Tiwawech et al., 2008b).

Oesophageal Cancer

Oesophageal cancer is relatively common in Myanmar and the South of Thailand but is infrequent elsewhere (see Figure 3). Alcohol consumption, smoking and chewing betel significantly increase risk (Boonyaphiphat et al., 2002). Mostly the oesophageal cancers are SCCs (see Table 4), found in the mid thoracic portion, at least in Songkhla (Puttawibul et al., 2001).

Table 4. Oesophageal Cancer Histopathology: SCC-AC Percentages

<table>
<thead>
<tr>
<th></th>
<th>SCC</th>
<th>AC</th>
<th>Ratio</th>
<th>Male</th>
<th>SCC</th>
<th>AC</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiang Mai</td>
<td>92.1</td>
<td>5.3</td>
<td>17.4:1</td>
<td>85.5</td>
<td>5.0</td>
<td>17.1:1</td>
<td></td>
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<tr>
<td>Lampang</td>
<td>80.0</td>
<td>8.0</td>
<td>10.0:1</td>
<td>100</td>
<td>0</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Songkhla</td>
<td>94.5</td>
<td>1.1</td>
<td>77.0:1</td>
<td>88.1</td>
<td>9.5</td>
<td>9.3:1</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4. Male Gastric (left) and Colorectal (right) Cancer Incidences/100,000 (Globocan, 2002: Ferlay et al., 2004)
Cancer Epidemiology in Mainland South-East Asia


Table 5. Colorectal Cancers: Colon and Rectal Carcinoma Incidences and Ratios

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colon</td>
<td>Rectum</td>
<td>Ratio</td>
<td>Colon</td>
</tr>
<tr>
<td>Chiang Mai</td>
<td>5.0</td>
<td>4.6</td>
<td>1.1:1</td>
</tr>
<tr>
<td>Lampang</td>
<td>7.9</td>
<td>3.9</td>
<td>2.0:1</td>
</tr>
<tr>
<td>Khon Kaen</td>
<td>4.8</td>
<td>2.7</td>
<td>1.8:1</td>
</tr>
<tr>
<td>Bangkok</td>
<td>10.3</td>
<td>6.3</td>
<td>1.6:1</td>
</tr>
<tr>
<td>Songkhla</td>
<td>5.3</td>
<td>4.4</td>
<td>1.2:1</td>
</tr>
<tr>
<td>Ho Chi Minh</td>
<td>5.5</td>
<td>5.2</td>
<td>1.1:1</td>
</tr>
<tr>
<td>Hanoi</td>
<td>7.5</td>
<td>5.5</td>
<td>1.4:1</td>
</tr>
</tbody>
</table>

Liver Cancer

The mainland area of South-East Asia is very definitely high risk with regard to liver cancer (see Figure 5). However, the situation is complicated by the more than 12-fold geographic variation in the occurrence of cholangiocarcinoma (CCA), while the frequency of hepatocellular cancer is more or less constant (Srivatanakul et al., 2004). CCA is usually rare (worldwide it accounts for about 15% of liver cancers); the very high incidence in Khon Kaen is the result of infection by the liver fluke (*Opisthorchis viverrini*), acquired through eating raw fish, a common feature of the local diet (Srivatanakul et al., 1991a; IARC, 1994; Chaimuangraj et al 2003; Sripamorn et al., 2004; Srivatanakul et al., 2004; Honjo et al., 2005). Cigarette smoking may act together with the parasite (Mitacek et al., 1999). There may also be roles for carcinogens like aflatoxin and nitrosamines (Srivatanakul et al., 1991a;1991b). In Khon Kaen, 82% of cases are CCA and the proportion is also relatively high in Chiang Mai and Lampang, but lower in Bangkok, where the cases may be mainly in migrants from the northeast, and rare in Songkhla (Sriplung et al, 2003; Sriplung et al, 2005).

Liver cancer appears to be increasing, especially in the central and southern regions of Thailand (Amon et al., 2005). The possible role of nitrosamines in Thai food in the aetiology of both types of liver cancer has been stressed (Srivatanakul et al., 2004). Hepatitis B is the main etiologic factor (Sooklim et al., 2003), with a lesser role for HCV (Tangkijvanich et al., 1999). However, there is a reported high prevalence of hepatitis C in patients with thalassemia and patients with liver diseases in Myanmar (Burma) (Okada et al., 2000). There is a high age-dependent incidence of liver cancer among carriers of HBsAg (+) in Hanoi City (Ngoan and Yoshimura, 2001). HBV and HCV infection are widely spread in rural ethnic populations of northern Thailand (Ishida et al., 2002). Another potential influence is dioxin exposure (Ngoan and Yoshimura, 2001a). Liver cancer was earlier reported to be more frequent in the South of Viet Nam than in the North (Anh et al., 1993; Nguyen et al., 1998; Anh and Duc, 2002).

Control of hepatitis virus infection must emphasize new developments (Poovorawan et al., 2001). The incidence of hepatocellular carcinoma is significantly lower in Thai children who receive hepatitis B vaccine at birth (Wichajarn et al., 2008), although one evaluation of the vaccination programme in Chiang Mai showed a moderate coverage in Thai children (Jutavijittum et al., 2005). However, it was still much lower than the prevalence reported in the same region prior to vaccination (Kozik et al, 2000).

The possibility that the incidence of non-endemic cholangiocarcinoma is increasing should also be investigated as a global increasing trend has been observed worldwide (Patel, 2002). There was no correlation between histologic subtypes and morphological findings, as well as HBV, HCV, and cirrhotic status (Sooklim et al., 2003). Tumor markers have been evaluated for the detection of hepatocellular carcinoma (Taketa et al., 2002) and ultrasound (U/S) for cholangiocarcinoma can be applied for those presenting symptoms and/or OV positive (Mairiang et al., 2006).

Gallbladder Cancer

Gallbladder cancer is relatively rare throughout the region, with the highest incidences of 2.9 in males and 3.7 in females per 100,000 in Lampang.

Pancreatic Cancer

Rates for pancreatic cancer are also low, except in Viet Nam (see Figure 5), being highest in Ho Chi Minh City at 2.4 per 100,000.

Pharyngeal and Laryngeal Cancer

Pharyngeal and laryngeal cancer is also relatively infrequent, except in Myanmar and to a lesser extent Cambodia (see Figure 7), where risk factors are unclear. Elsewhere, highest population-based rates for laryngeal cancer have been observed in Ho Chi Minh City and Bangkok, at 4.6 and 4.1 per 100,000, respectively.

Lung Cancer

Lung cancer is more of a problem (see Figure 10), especially in Viet Nam and the North of Thailand. In males, approximately equal numbers of squamous cell carcinomas (SCCs) and adenocarcinomas are observed, whereas in females the latter clearly predominate (see Table 6). In one series of case in Bangkok, adenocarcinomas were...
prevailing in non-smokers (Limisila et al., 1994). In this context it should be noted that the success of the anti-smoking campaign in Thailand has reduced the prevalence of cigarette smoking among males aged 25-59 years from around 70% in 1986 to 40% in 2004 (Action on Smoking and Health Foundation/Thailand, 2005). In Vietnam the incidence of lung cancer has reduced with decline in smoking prevalence (Ngoan, 2006c). There is a tendency for more SCCs in Lampang and it should be is noted that there smoking is common, especially of local cigarettes (Khiyo). It has been estimated that 96% of male and 64% of female lung cancers can be explained on this basis (Pisani et al., 2006). Commercial Thai cigarettes are known to be high in nitrosamines (Mitacek et al., 1999). However, polymorphisms in the CYP1A1 gene or deletion of the GSTM1 had no effect on the risk of lung cancer in one study (Pisani et al., 2006) and other factors, like chronic benign respiratory disease caused by the infection of fungi such as M. canis, may also be involved in the etiology (Nakachi et al., 1999). Data suggest that mutations in this study group are induced by exposure to substances other than tobacco smoke (Bumroongkit et al., 2008).

Fruit and vegetables appear to be protective, considering consumption patterns in high and low-risk districts of Chiang Mai (Sone et al., 1998).

Table 6. Lung Cancer Histopathology: SCC-AC Percentages

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SCC</td>
<td>AC</td>
<td>Ratio</td>
<td>SCC</td>
<td>AC</td>
</tr>
<tr>
<td>Chiang Mai</td>
<td>34.9</td>
<td>41.2</td>
<td>0.8:1</td>
<td>25.4</td>
<td>48.9</td>
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<tr>
<td>Lampang</td>
<td>27.8</td>
<td>18.5</td>
<td>1.5:1</td>
<td>25.6</td>
<td>39.9</td>
</tr>
<tr>
<td>Songkhla</td>
<td>38.5</td>
<td>38.9</td>
<td>1.0:1</td>
<td>22.0</td>
<td>59.3</td>
</tr>
</tbody>
</table>

Figure 7. Male Pharyngeal (left) Laryngeal (middle) and Lung (right) Cancer Incidences/100,000 (Globocan, 2002: Ferlay et al., 2004)

Kidney Cancer
Renal cancer is low in frequency throughout the region (see Figure 8), with the highest rate of 2 per 100,000 in Bangkok.

Urinary Bladder Cancer
Urinary bladder cancer rates are relatively low at between 3 and 7 per 100,000, with highest incidences in Thailand (see Figure 8).

Prostate Cancer
The situation is similar for prostate cancers, with the highest rate found in Bangkok. However, all the countries have the lowest category for the present series of maps.

Figure 8. Male Kidney (left) and Urinary Bladder (right) Cancer Incidences/100,000 (Globocan, 2002: Ferlay et al., 2004)
Breast Cancer

Breast cancer incidence rates remain relatively low in mainland South-East Asia (see Figure 9), although clearly on the increase, particularly in the Central region of Thailand (Sriplung et al., 2006). Limited studies have been performed in the area of risk factors in the area. An inverse trend between increasing parity and decreasing breast cancer risk was observed, with alcohol as a risk factor, but family history, age at menarche, cumulative lactation, body mass index, and education were not found to demonstrate any significant relation (Nichols et al., 2005). Though it is likely that the great success in family planning policy to reduce the number of children born to married couples will provoke a side effect in increasing breast cancer incidence among Thai women, one study found a reverse evidence (Raksasook, 1985). Hormone replacement therapy was not found to be a risk factor in post-menopausal women (Ratanawichirasin et al., 2002).

To increase the quality of patient care in the country, a study on delay in breast cancer care suggested unmarried women as a target for educational programmes and improvement of the referral system (Thongsuksai et al., 2000). Breast cancer susceptibility genes BRCA1 and BRCA2 are involved in Thai familial and isolated early-onset breast and ovarian cancer, consistent with the situation in the Western world (Patmasiriwat et al., 2002). Thai women with a certain XRCC1 diplotype or homozygous for two or three variant alleles of XRCC1, OGG1, and APEX1 are likely to have an increased susceptibility to breast cancer (Sangrajrang et al., 2008). Anxiety and depressive disorders are two common psychiatric disorders in breast cancer, predictors including poor family relationship and functioning, maladaptive problem and conflict solving, and presence of pain and fatigue (Lueboonthavatchai, 2007).

Ovarian Cancer

Ovarian cancer is moderately frequent throughout mainland South-East Asia (see Figure 9). Prophylactic oophorectomy at the time of hysterectomy should not be recommended without complete knowledge of patients’ socioeconomic background and propensity to comply with hormone replacement therapy regimens (Charoenkwan et al., 2004).

Corpus uteri

Endometrial cancer is present at a low level, particularly in Myanmar (see Figure 9). Obesity was found to be the only independent factor in young patients in Thailand (Manchana and Khemapech, 2008; Hanprasertpong et al., 2008). Since Tamoxifen significantly increases the risk of developing abnormally thickened endometrium in postmenopausal breast cancer patients, there is a need for gynaecologic surveillance of the affected individuals (Sinawat and Chiyabutra, 2004).

Cervix uteri

Mainland South-East Asia has a relatively high cervical cancer burden (see Figure 10) and there has been little change in the incidence over the last two decades, at least in Thailand (Sriamporn et al., 2003; Sriplung et al., 2006). High-risk HPV is the main cause and two of three of cervical cancer cases in Northeast Thailand are caused by HPV 16 and 18 (Sriamporn et al., 2006). There may be variation in other areas (Sukvirach et al., 2003), both in

![Figure 9. Female Breast (left) Ovarian (middle) and Endometrial (right) Cancer Incidences/100,000 (Globocan, 2002: Ferlay et al., 2004)]](image)

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the types and the percentage of people infected. HR-HPV DNA can be found in all grades of intraepithelial lesions and carcinoma of the cervix uteri, even in the histologically “normal” looking cervix (Tungsinnunsongk et al., 2006). Strong evidence of the importance of HPV exposure was provided by the fact that Northern women in Viet Nam whose husbands had served in the military experienced no significant increase in cervical cancer risk if their husbands had been stationed in North Vietnam during the war years, in contrast to those who served in the South (Huynh et al., 2004). HPV DNA was detected among 10.9% of women in Ho Chi Minh City and only 2.0% in Hanoi (Pham et al., 2003). Cervical HPV infection is extremely common among female sex workers and varies by education level, sexual activity, habits of regular partners, and HIV status (Thomas et al., 2001a; 2001c). Factors that may predispose to persistent, oncogenic HPV-16 or -18 infection may include estrogens or progesterins in the presence of estrogens, immunosuppression, and smoking, but other factors related to low socioeconomic status also appear to be involved (Thomas et al., 2001b).

Cervical cancer among HIV-infected women in Thailand is considered to be high because of their coexisting HPV status also appear to be involved (Thomas et al., 2001b). Survival is generally good for early stage cancers, with degree of stromal invasion and size, but not perioperative blood transfusion, as the main independent predictors of prognosis in surgical cases of early stage cervical cancers (Chittithaworn et al., 2007). Stage of disease, hemoglobin level, interval between external- intracavitary radiation and fractionations are factors affecting survival cervical patients treated with radiation (Pomros et al., 2007). Overall 5 year survival may be relatively low, however, with a value of only just over 50% found for one series (Sriampon et al., 2004). Prophylactic HPV vaccination with the quadrivalent vaccine has already been approved for use in Thailand but no national or government vaccination policy has so far been implemented (Domingo et al., 2008).

Regarding awareness and education, most registered nurses working at Srinagarind Hospital were found to have an adequate level of knowledge regarding cervical cancer and HPV but there are still some major misunderstandings; thus, educational pamphlets, notices and hospital announcements would be useful in increasing their knowledge (Nganwai et al., 2008).
Brain and Nervous Tissue Cancer

Brain tumours appear to be more common in Laos and Cambodia than in the other countries of the region (see Figure 11).

Thyroid Cancer

From Globocan data, thyroid cancers are observed at medium levels throughout the region, but are somewhat less common in Laos (see Figure 11).

Leukemias and Lymphomas

In both sexes, Non-Hodgkins lymphomas and leukemias appear more common in Cambodia and Viet Nam than elsewhere (see Figure 12).

Future Perspectives

Clearly there is a need to increase the capacity for cancer registration, especially in those countries without population-based registries at present. The National Cancer Institute in Thailand is trying to increase their number to cover at least 20% of the Thai population and there are also plans to improve the situation in Viet Nam. The National Health Security Office, NCI, and the Thai Network of Cancer Registries are focusing on making use of hospital cancer registry data for planning better cancer patient care in the country. The question of how to integrate all of the individual hospital-based registries is also of obvious interest. Research in various areas such as etiologic and risk factors, diagnostic procedures, cancer treatment and patient care, and socio-economic burden are essential to push forward the health policy of all of the countries in the region in cancer control. Advantage could be taken of the variation between and within the countries of mainland South-East Asia in this regard, using the local cancer registries as research resources and also focusing on other related chronic illnesses like diabetes and circulatory disease, which are now very common (Aekplakorn et al., 2003; InterASIA Collaborative Group, 2003; Minh et al., 2003; Le Nguyen et al., 2003; King et al., 2005). The fact of inter-community variation in levels of diabetes and associated disorders, for example in villages in Cambodia (King et al., 2005), is of interest in this regard.

Local registration could also be coordinated with community-based efforts to develop networks of volunteers to transfer information to rural communities (Wiangnon et al., 2007), focusing on the steps necessary to develop trust between researcher and subjects, the actual conditions of the people involved and their problems (Senarak et al., 2006). Research in psychosocial influences, for example impacting on sexual behaviour (Saranrittichai et al., 2006) also need to be performed at the local level.

Thailand has undergone social and economic transitions during the past three decades and is approaching a post-demographic transitional period featuring obesity among children and adolescents (Kosulwat, 2002). The nutrition status is clearly very important and variation again needs to be assessed, especially in relation to change in cancer incidence like increases in breast and colorectal tumours. The number of papers on food frequency or other approaches is limited although a start has been made (Ngoan et al., 2008a). While advances have been made in the area of tobacco control, the health and economic impact of smoking, for example in Thailand, continue to be...
substantial (Leartsakulpanitch et al., 2007). Furthermore, there is the issue of pollution. It has been indicated that children living in a mega city such as Bangkok may have an increased health risk of the development of certain diseases due to exposure to genotoxic substances in air pollution compared to children living in suburban/rural areas (Ruchirawat et al., 2007). High risk occupation for exposure to benzene are police (Wiwanitkit et al., 2005) s were found to be those which have direct contact with benzene in environmental ambient air, with petroleum fuel as the common source (Wiwanitkit, 2006).

In conclusion, building on cancer control efforts in the past (Vatanasapt et al., 2002; Anh and Duc, 2002), from the present overview it appears that more emphasis needs to be placed on research into the Western lifestyle-related cancers of the colon and breast, while continuing to concentrate attention on reducing cervical cancer by screening and liver cancer by education. The burden of other chronic disease is also on the increase and a coordinated approach to prevention would target the causes of well over half of the mortality in the region.

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