

Review Article: Cancer Trends in Asia

Cancer Control in the Asia Pacific Region: Current Status and Concerns

Hai-Rim Shin^{1,*}, Marie Clem Carlos² and Cherian Varghese¹

¹Noncommunicable Disease and Health Promotion, Western Pacific Regional Office, World Health Organization, Manila and ²Department of Epidemiology and Biostatistics, University of the Philippines, Manila, The Philippines

*For reprints and all correspondence: Hai-Rim Shin, PO Box 2932 (1000 United Nations Avenue), Manila, The Philippines. E-mail: shinh@wpro.who.int

Received February 5, 2012; accepted April 15, 2012

Cancer is becoming an increasingly important health problem in the low- and middle-income countries in the Asia Pacific region, as well as in high-income countries because of ageing populations and changes in lifestyle associated with economic development and epidemiologic transition. This paper reviews the cancer burden and control in the Asia Pacific region (limited to East Asia, South Eastern Asia and Pacific Islands countries, territories and other areas), with relevant information primarily extracted from the GLOBOCAN 2008, Cancer Incidence in Five Continents series and WHO websites. Most low- and middle-income countries have a cancer control strategy and/or an action plan; however, coverage of cancer registration is still very low and does not meet the international standard in terms of quality. Therefore, only limited data were available for the recent global estimation of cancer burden. Large variations, in both cancer incidence and mortality, were observed in the populations in the different sub-regions of Asia. The most common cancer in males is lung cancer in the Eastern and South Eastern sub-regions, while prostate cancer comes close to lung cancer in the Pacific Island countries. In females, breast cancer is the most common in all three regions. The predominance of lung, stomach, colorectal, prostate, breast and cervical cancers makes cancer control more amenable in the Asia Pacific region. Up-to-date statistics on cancer occurrence and outcome are essential for the planning and evaluation of cancer control programmes. Priority can be given to population-based cancer registration, risk reduction, especially tobacco control, and primary health care based enhancement of health care systems to diagnose and manage cancer specifically in low- and middle-income countries.

Key words: cancer burden – control – cancer registry – Asia Pacific region

INTRODUCTION

Non-communicable diseases (NCDs), which include cancer, are currently the leading global cause of deaths worldwide. A total of 57 million deaths occurred in the world in 2008, of which 36 million (63%) were due to NCDs. Nearly one-third of the deaths (>12 million) were in the Asia Pacific region, which is undergoing a rapid epidemiological transition (1). The global leading causes of NCD deaths in 2008 were cardiovascular diseases (17 million deaths, or

48% of NCD deaths); cancer (7.6 million, or 21% of NCD deaths) and respiratory diseases, which include asthma and chronic obstructive pulmonary disease (4.2 million). Diabetes caused an additional 1.3 million deaths (1).

Among NCDs, cancer is a unique disease entity with available morbidity information from cancer registrations. The recent global estimates of cancer incidence and mortality from 27 cancers in 2008 were published in 2010 for 184 countries, territories and other areas (2,3).

Until the 1980s, a few population-based cancer registries (PBCRs) provided data on cancer morbidity from China, Japan, the Philippines, Singapore and Thailand from Eastern and South Eastern Asian regions. For the Pacific region, no information was available except in Fiji (4).

During the last two decades, cancer has become a more important health problem in the Asia Pacific region. Owing to the increasing cancer risk, only relatively high-income countries (HICs) such as Japan (5), Republic of Korea (6) and Singapore (7), led to the development and implementation of national cancer control programmes. Further to the WHO publication on National cancer control programme (8) and the World Health Assembly resolution in 2005 (9), several low- and middle-income countries (LMICs) also started to develop and establish their national cancer control programmes including PBCR.

There is a recent global mandate given through the Political Declaration of the United Nations General Assembly during the High Level Meeting held in September 2011, to move towards targets and indicators. In order to achieve these, it is important to assess the current situation and mechanisms for measurement.

This paper reviews the cancer burden, prevalence of main modifiable risk factors and status of cancer control programmes in countries, territories and other areas in the Asia Pacific region which is projected to have the greatest total number of NCD deaths in 2020 (10).

DATA SOURCES AND METHOD

Countries in the two sub-regions in Asia (East, South East) and Pacific Islands Countries (Micronesia, Melanesia and Polynesia) were included in this paper on the basis of the geographical grouping followed in GLOBOCAN 2008 (<http://GLOBOCAN.iarc.fr/>). The GLOBOCAN 2008 estimates were based on the most recent cancer data available in the International Agency for Research on Cancer database and the information available online (3).

Table 1 presents the data sources and methods used in the GLOBOCAN estimates by country and also provides the available data on incidence and mortality by country. Most LMICs do not have data on nationwide incidence and mortality.

The current burden of cancer in the Asia Pacific regions shows the cancer estimates and crude and adjusted rates that were taken from GLOBOCAN 2008 (published in 2010). Incidence, prevalence and mortality data sets were likewise extracted. The GLOBOCAN estimates and methods for country estimates were tabulated by countries and sub-regions.

Data on the prevalence of risk factors were extracted from the WHO Global Status Report on NCD published in 2010 (1).

The existence of an operational policy/strategy/action plan for cancer in the country responses to the WHO 2010 NCD

Country Capacity Survey was extracted from the WHO Global Health Observatory Data Repository (<http://apps.who.int/ghodata/>). Data on cancer registration and cancer control for the countries, territories and other areas in the Asia Pacific region were then extracted from the Cancer Incidence in Five Continents Volume IX (CI5) (11).

RESULTS

CANCER BURDEN BASED ON GLOBOCAN ESTIMATES

Data on incidence, prevalence and mortality estimates were available in 25 countries, territories and other areas of the three sub-regions (Eastern, South Eastern and Pacific Islands) (Table 2). Cancer risk varies substantially from one country to another in the sub-regions. Marked differences were also seen among men and women. Men in Republic of Korea (309.4) and women in French Polynesia (256.8) had the highest age-standardized incidence rates. Age-standardized death rates also show similar variation among countries, Mongolian men and women having the highest rates. But even with high incidence rates, HICs, such as Republic of Korea and Singapore, have relatively lower mortality rates, which is a reflection of the quality of their health care services. Countries with huge populations have very large numbers of 5 year prevalent cases. However, even smaller countries have a sizeable number of prevalent cases.

Figure 1 shows 10 leading cancers by sex of each sub-region. The most common cancer site in males is the lungs in the Eastern and Southeastern parts, while prostate cancer and oral cancer come close with lung cancer in the Pacific Island countries. In females, breast cancer is the leading cancer in all the three sub-regions.

Figures 2 and 3 show incidence and mortality rates of the most common cancer sites for selected countries, territories and other areas in the Asia Pacific that provided their actual data. In men, lung cancer rates were more or less similar across the sub-region except the relatively low rates in Fiji, Papua New Guinea (PNG) and Vanuatu. Countries in Eastern Asia showed high rates of stomach and liver cancers. Colorectal cancer and prostate cancer rates were higher in HICs than in LMICs.

In women, there was a 7-fold difference in breast cancer incidence rates, but it was 2.5-fold in mortality rates. Lung cancer risks were relatively similar across the sub-regions. Countries in Eastern Asia showed higher rates of stomach cancer than in Pacific Islands. Colorectal and breast cancer rates were higher in HICs than in LMICs.

PREVALENCE OF MAIN PREVENTABLE RISK FACTORS

The prevalence of major preventable risk factors and the latest year of national data of each factor, except alcohol, as published in the WHO global status report on NCD 2010, are presented in Table 3 (countries with no information were not included although cancer burden was estimated). The

Table 1. Method and data used to estimate incidence cases and deaths in GLOBOCAN 2008

Region	Country, territory and area	Method used to estimate incidence cases and deaths in GLOBOCAN 2008	
		Incidence	Mortality
Eastern Asia	China	Local incidence data and national mortality data: incidence was estimated from national mortality by modelling, using incidence mortality ratios derived from recorded data in country-specific cancer registries	Sample mortality data: estimated national mortality for 2008 for 'all cancers' (WHO) was partitioned by site and age, using the sample mortality data
	Taiwan, China	Incidence rates (2000–06) projected to 2008	Mortality rates (2000–06) projected to 2008
	Japan	Sample mortality data: estimated national mortality for 2008 for 'all cancers' (WHO) was partitioned by site and age, using the sample mortality data	National mortality data: recorded mortality in 2008
	Korea, Democratic People's Republic	No data: Incidence rates from the cancer registries of Hei Long Jiang and Liao Ning provinces of China, were applied to 2008 population	No data: Mortality rates from cancer registries of Hei Long Jiang and Liao Ning provinces of China were applied to 2008 population. Finally, the number of cancer cases and cancer deaths were scaled to the estimated number of cancer deaths by sex for 2008 (source WHO)
	Korea, Republic of	National incidence rates (2000–07) ¹ projected to 2008 (except for thyroid cancer for which incidence rates for 2007 were applied to 2008 population). Korea Central Cancer Registry, National Cancer Center, Korea	National mortality rates (2000–07, source WHO) projected to 2008
	Mongolia	National incidence data: reliable estimates of the national incidence in 2008	National mortality data: recorded mortality in 2008
South Eastern Asia	Brunei Darussalam	Local incidence data and national mortality data: incidence was estimated from national mortality by modelling, using incidence mortality ratios derived from recorded data in local cancer registries in neighbouring countries	Local incidence data and national mortality data: incidence was estimated from national mortality by modelling, using incidence mortality ratios derived from recorded data in local cancer registries in neighbouring countries
	Cambodia	Frequency data: age-/sex- specific incidence rates for all cancers were partitioned using data on relative frequency of different cancers (by age and sex) obtained from local source	No data: the number of cancer deaths was estimated from incidence estimates and site-specific survival, provided by neighbouring countries
	Indonesia	No data: the incidence rates are those of neighbouring countries in the same area	No data: the number of cancer deaths was estimated from incidence estimates and site-specific survival, estimated by the GDP method
	Lao People's Democratic Republic	Simple mean of rates observed in the cancer registries of Khon Kaen and Chiang Mai (Thailand)	Mortality was estimated from the 2008 national incidence estimate, using site-specific relative survival from Thai and Chinese cancer registries. The number of cancer deaths (all ages) was partitioned by sex and age, using proportions from Chinese cancer registries mortality files
	Malaysia	Simple mean of incidence rates recorded in peninsular Malaysia (2003), Penang (1998–2002) and Sarawak (1998–2002)	The number of cancer deaths in 2008 was estimated from incidence estimates (see above) and site-specific survival, estimated by the GDP method

Continued

Table 1. Continued

Region	Country, territory and area	Method used to estimate incidence cases and deaths in GLOBOCAN 2008	
		Incidence	Mortality
	Myanmar	<p>Simple average on the rates from:</p> <p>(1) Weighted average of incidence rates from the cancer registries of Chiang Mai and Lampang (1998–2002) cancer registries in Thailand</p> <p>(2) Weighted average of Dibrugarh district, Imphal West district and Mizoram state (2003–05) cancer registries in India</p> <p>(3) Weighted average of two Chinese cancer registries in the Western region (2003–05)</p>	<p>Mortality was estimated from the 2008 national incidence estimate, using site-specific relative survival from Thai and Chinese cancer registries</p> <p>The number of cancer deaths (all ages) was partitioned by sex and age, using proportions from Chinese cancer registries mortality files</p> <p>Finally, the number of cancer cases and cancer deaths were scaled to the estimated WHO total number of cancer deaths by sex for 2008</p>
	The Philippines	<p>Local incidence data and national mortality data: incidence was estimated from national mortality by modelling, using incidence mortality ratios derived from recorded data in local cancer registries in neighbouring countries</p>	<p>Sample mortality data: estimated national mortality for 2008 for 'all cancers' (WHO) was partitioned by site and age, using the sample mortality data</p>
	Singapore	<p>National incidence data: incidence rates projected to 2008</p>	<p>National mortality data: mortality rates projected to 2008</p>
	Thailand	<p>Local incidence data. No mortality data: incidence rates were estimated as the weighted average of the local rates</p>	<p>Local incidence data. No mortality data: incidence rates were estimated as the weighted average of the local rates</p>
	Timore-Leste	<p>No data available. Incidence rates for the country were estimated as the incidence rates from Malaysia, Penang (1998–2002) were applied to 2008 population</p>	<p>The number of cancer deaths in 2008 was estimated from incidence estimates (seen earlier) and site-specific survival, estimated by the GDP method. Finally, the number of cancer cases and cancer deaths were 'scaled' to the estimated WHO total number of cancer deaths by sex for 2008</p>
	Viet Nam	<p>Local incidence data and national mortality data: incidence was estimated from national mortality by modelling, using incidence mortality ratios derived from recorded data in local cancer registries in neighbouring countries</p>	<p>Sample mortality data: estimated national mortality for 2008 for 'all cancers' (WHO) was partitioned by site and age, using the sample mortality data</p>
	Melanesia		
	Fiji	<p>National incidence rates observed in the Fiji Cancer Registry (1991–99)² were applied to the 2008 population</p>	<p>The number of cancer deaths in 2008 was estimated from incidence estimates (see above) and site-specific survival, estimated by the GDP method</p>
	New Caledonia	<p>Incidence rates observed in the territorial cancer registry (1999–2004)³ were applied to the 2008 population</p>	<p>No data: the number of cancer deaths was estimated from incidence estimates and site-specific survival, estimated by the GDP method</p>
	Papua New Guinea	<p>Frequency data: age-/sex- specific incidence rates for all cancers were partitioned using data on relative frequency of different cancers (by age and sex)</p>	<p>No data: the number of cancer deaths was estimated from incidence estimates and site-specific survival, estimated by the GDP method</p>

Continued

Table 1. *Continued*

Region	Country, territory and area	Method used to estimate incidence cases and deaths in GLOBOCAN 2008	
		Incidence	Mortality
	Solomon Islands	No data: Incidence was estimated as the simple mean of the country-specific estimates for Fiji and Vanuatu	No data: the number of cancer deaths was estimated from incidence estimates and site-specific survival, estimated by the GDP method
	Vanuatu	Mortality rates (1998–2002, provided by cancer registry) applied to the population (2008)	The number of cancer deaths in 2008 was estimated from incidence estimates (seen earlier) and site-specific survival, estimated by the GDP method
	Micronesia		
	Guam	Incidence rates (1998–2002) applied to the population (2008)	Mortality rates (1998–2002, provided by cancer registry) applied to the population (2008)
	Polynesia		
	French Polynesia	Incidence rates (1998–2002) applied to the population (2008)	Mortality rates (1998–2002, provided by cancer registry) applied to the population (2008)
	Samoa	National incidence rates (1981–87) applied to the population (2008)	Estimated incidence for 2008 (seen earlier) was converted into mortality, using mortality incidence ratios obtained by the aggregation of data from French Polynesia and Guam

¹Korea Central Cancer Registry, National Cancer Center, Korea.

²Fiji Cancer Registry, unpublished.

³New Caledonia Cancer Registry, unpublished.

prevalence of daily tobacco smoking varied widely from 55.9% in the Democratic People’s Republic of Korea (DPRK) to 14.9% in Fiji among men and from 26.3% in PNG to 1.0% in Vietnam among women.

Information on smoking prevalence in some countries was not up to date and there were no national data in the DPRK, Brunei, and Solomon Islands.

Koreans in the Republic of Korea were reported to consume the highest amount of pure alcohol per capita (14.8 l) as against Indonesians, who were reported to consume the lowest amount (0.56 l). More than half of the Japanese, Malaysian and Samoan (women only) populations were reported to have insufficient physical exercise. Half the countries had no national data on physical activity. Prevalence of overweight and obesity among Pacific Islanders are 4–5 times higher than those of Asians.

CANCER CONTROL STRATEGY AND PBCR

Table 4 shows the status of cancer control policy/programme, inclusion of CI5 series (% coverage overall) and PBCR. Most countries in the Asia Pacific listed in Table 3, including Cook Islands, Kiribati, Federated States of Micronesia, Palau, Tuvalu and Vanuatu (not shown in the table), were found to have an operational policy, strategy or action plan for cancer as denoted in the WHO 2010 NCD country Capacity Survey (except Brunei, Lao PDR, Timore

Leste, Solomon Islands and Samoa). The latest Cancer Incidence in Five Continents Volume IX publication included data from the central cancer registry of the Republic of Korea, Singapore and French Polynesia and PBCRs of China, Japan, the Philippines, Thailand and Vietnam. The coverage of PBCR for these countries varies from 1 to 20%. Although Mongolia had a long history of nationwide cancer registration, quality indicators of cancer cases were not fully collated for the evaluation of the cancer registration (12). Since the National Registry of Diseases Act of Singapore was enacted in December 2007, the Singapore National Registry of Disease has been managing registries for five areas of medical care: cancer, renal disorders, stroke, acute myocardial infarction and donor care (kidney and liver) (13). In Japan, the Cancer Control Act was enacted in 2006 and there were expectations on the standardization and improvement of all the cancer registries in 35 prefectures and one city (Hiroshima) (14). Brunei established its national cancer registry in 2000 (15), while the Ministry of Health in Malaysia established its National Cancer Patient Registry in 2009, which covers 75% of cancer cases (16).

DISCUSSION

More than 70% of all cancer deaths occur in LMICs and the number of deaths has been projected to rise continuously to

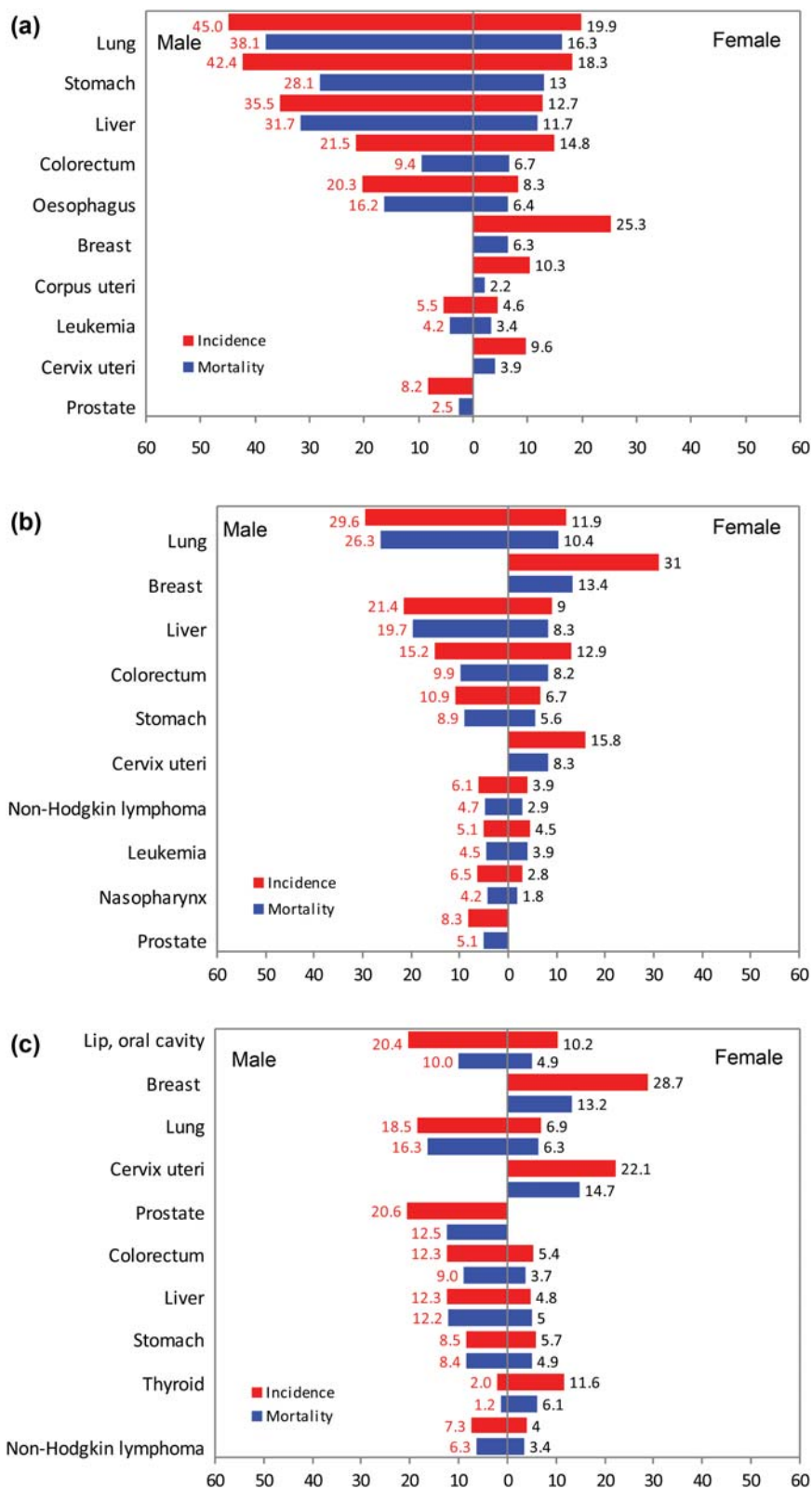


Figure 1. Ten most common cancers by sex and sub-region, GLOBOCAN 2008. (a) Eastern Asia. (b) South Eastern Asia. (c) Pacific Island.

Table 2. Estimated cancer incidence, mortality and 5 year prevalent cases by sub-region in 2008 (men and women)

Region	Country, territory and area	Men						Women					
		Population (1000)	Estimated incident cases		Estimated deaths		5 year prevalent cases, adult population (per 100 000)	Population (1000)	Estimated incident cases		Estimated deaths		5 year prevalent cases, adult population (per 100 000)
			Number (1000)	ASR (W)	Number (1000)	ASR (W)			Number (1000)	ASR (W)	Number (1000)	ASR (W)	
Eastern Asia (EA)	China	697 555	1622.5	211.0	1222.2	158.6	2187.1	647 363	1194.7	152.4	736.1	91.6	2416.1
	Taiwan, China	11 724	44.7	282.3	26.4	158.0	98.0	11 495	33.2	208.5	14.7	85.0	94.0
	Japan	62 033	361.6	247.3	206.0	129.4	974.3	65 259	253.9	167.6	136.2	68.0	755.7
	<i>Korea, DPR</i>	11 755	14.8	124.9	11.8	104.0	20.0	12 063	22.4	140.1	15.0	85.1	43.2
	Korea, Rep. of	23 839	89.5	309.4	43.5	149.9	208.8	24 312	79.1	234.4	25.2	64.1	252.1
	Mongolia	1306	2.2	281.5	1.8	230.3	2.5	1334	2.1	210.8	1.4	147.2	3.3
South Eastern Asia (SEA)	Brunei	202	0.2	176.7	0.1	91.5	0.4	189	0.2	153.5	0.1	109.4	0.4
	<i>Cambodia</i>	7117	5.9	152.9	4.6	127.5	9.2	7444	7.0	123.0	4.3	80.1	16.5
	<i>Indonesia</i>	113 517	136.2	145.9	110.1	120.0	226.1	113 827	156.5	144.6	104.5	98.2	376.6
	<i>Lao PDR</i>	3093	2.7	154.1	2.2	129.1	3.7	3111	3.0	140.9	2.0	98.8	6.3
	Malaysia	13 719	15.1	142.9	10.9	106.6	25.8	13 294	16.9	145.2	9.2	82.2	42.0
	<i>Myanmar</i>	24 221	27.9	141.0	21.7	110.3	42.8	25 341	38.8	164.8	24.0	103.5	89.9
	The Philippines	45 508	36.4	118.7	26.1	87.4	56.3	44 840	40.8	115.2	22.2	65.9	102.0
	Singapore	2319	6.4	208.2	3.4	110.0	11.9	2295	6.5	188.4	2.7	73.3	17.8
	Thailand	33 154	50.4	146.0	35.5	102.6	77.9	34 231	62.3	156.1	34.9	85.9	158.5
	Timore-Leste	559	0.4	129.7	0.3	115.7	0.6	539	0.4	118.2	0.3	92.3	0.9
Viet Nam	42 973	55.0	154.4	43.7	122.6	67.3	44 122	56.5	127.7	38.3	85.0	107.8	
Pacific	Fiji	428	0.3	102.8	0.3	89.2	0.6	415	0.6	156.8	0.4	107.3	1.5
	French Polynesia	135	0.3	289.7	0.2	168.4	0.6	129	0.3	256.8	0.1	115.0	0.8
	Guam	89	0.1	152.9	0.1	104.7	0.2	86	0.2	165.4	0.1	70.7	0.4
	New Caledonia	123	0.3	234.4	0.2	174.4	0.5	122	0.3	208.4	0.1	110.2	0.8
	PNG	3343	2.5	154.7	2.0	126.9	4.4	3233	2.6	125.2	1.8	93.3	6.8
	Samoa	93	0.1	94.2	0.0	63.0	0.1	85	0.1	96.1	0.0	36.5	0.2
	<i>Solomon Islands</i>	264	0.1	80.9	0.1	75.1	0.2	246	0.2	105.2	0.1	79.5	0.4
	Vanuatu	119	0.1	100.8	0.1	88.0	0.1	114	0.1	126.6	0.1	89.9	0.3

Countries in italics used estimates from other countries (with similar characteristics to them) to compute the estimates. Information from these countries were excluded in the comparison with other countries.

Korea DPR, Democratic People's Republic of Korea; Lao PDR, People's Democratic Republic; PNG, Papua New Guinea.

ASR (W): standardized rate for world population per 100 000.

Data source: GLOBOCAN2008 by International agency for Research on Cancer.

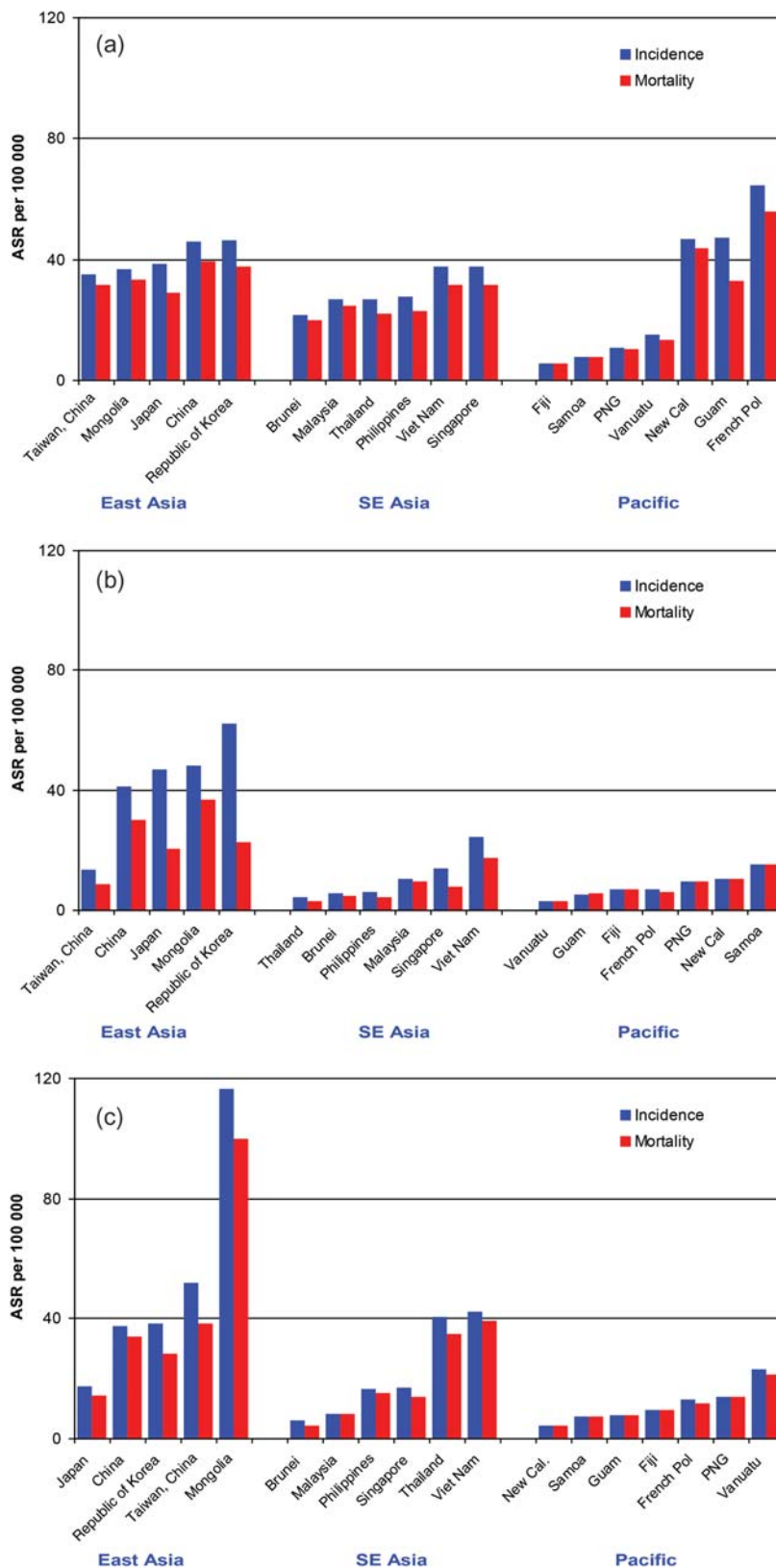


Figure 2. Age-standardized rate of leading cancers by country and sub-region, males, GLOBOCAN 2008; (a) lung cancer, (b) stomach cancer, (c) liver cancer, (d) colorectum cancer and (e) prostate cancer.

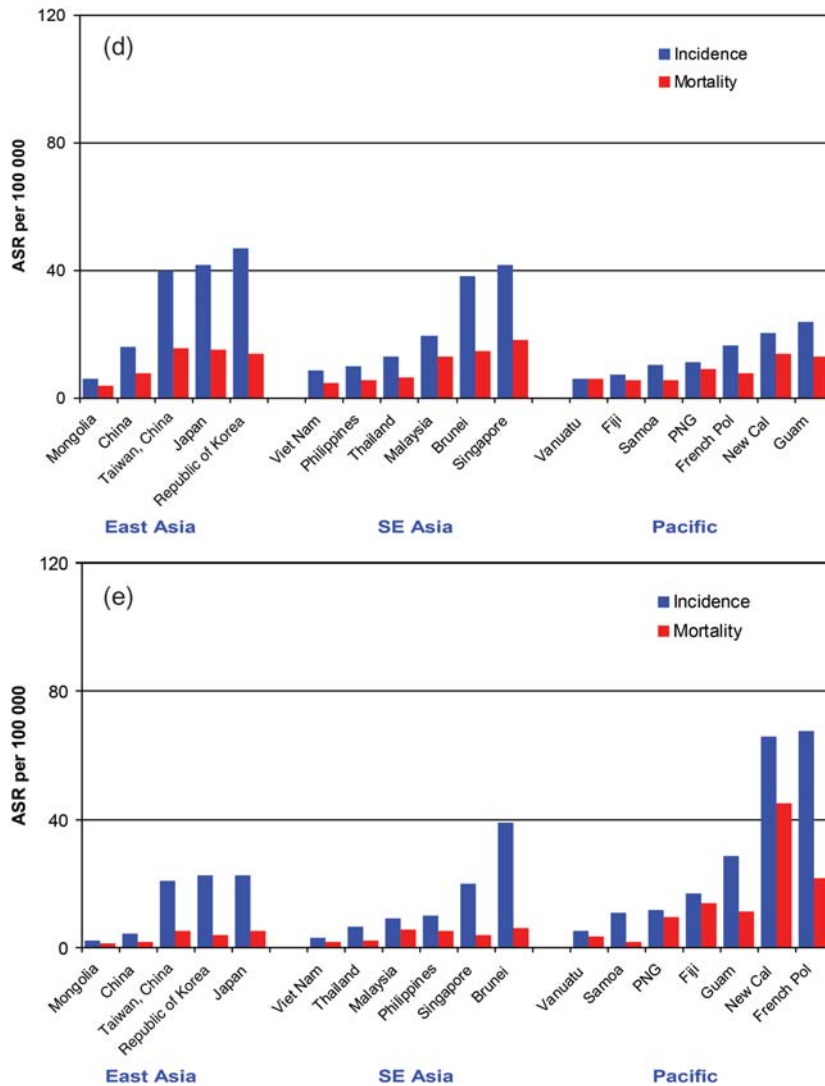


Figure 2. Continued

over 16 million in 2025 in the Asia Pacific region (East Asia, South eastern Asia and Pacific Islands countries, territories and other areas) (2). Cancer burden will rise more rapidly with ageing populations and changes in lifestyles associated with economic development.

According to the GLOBOCAN 2008 estimates, the Asia Pacific region has less than one-third of the world population (Eastern Asia: 23.2%, South-Eastern Asia: 8.5% and Pacific Islands countries: 0.1%); however, a relatively higher proportion of cancer cases (4582 thousand, 36.2% of the global estimate: 12.6 million) and deaths (2996.5 thousand, 39.6% of the global estimate: 7.6 million) occur in these three sub-regions. The number of 5 year prevalent cases per population of 100 000 was 8512.6 thousand, which is 30% of the global prevalent cases. The proportion of prevalent cancer cases is a result of low survival rates. Cancer prevalence is expected to increase if there is an improved opportunity for diagnosis and treatment/management that will result in longer survival.

The economic burden of cancer will also rise as a consequence.

Although the GLBOCAN estimates provide contemporary estimates at national level for countries, data sources of many LMICs were hospital records, and the estimates of neighbouring countries were applied for estimation for the countries with no available data. Some caution may be exercised when comparing these estimates with those published earlier, because the sources of data of these estimates are not consistent and continuously improving in quality and coverage for some countries. In addition, the estimates for those countries that did not provide both mortality and incidence information are not truly comparable with those of the neighbouring countries, because information from neighbouring areas was used in the modelling (2). Despite these constraints, the figures of overall cancer magnitude are comparable across the sub-regions.

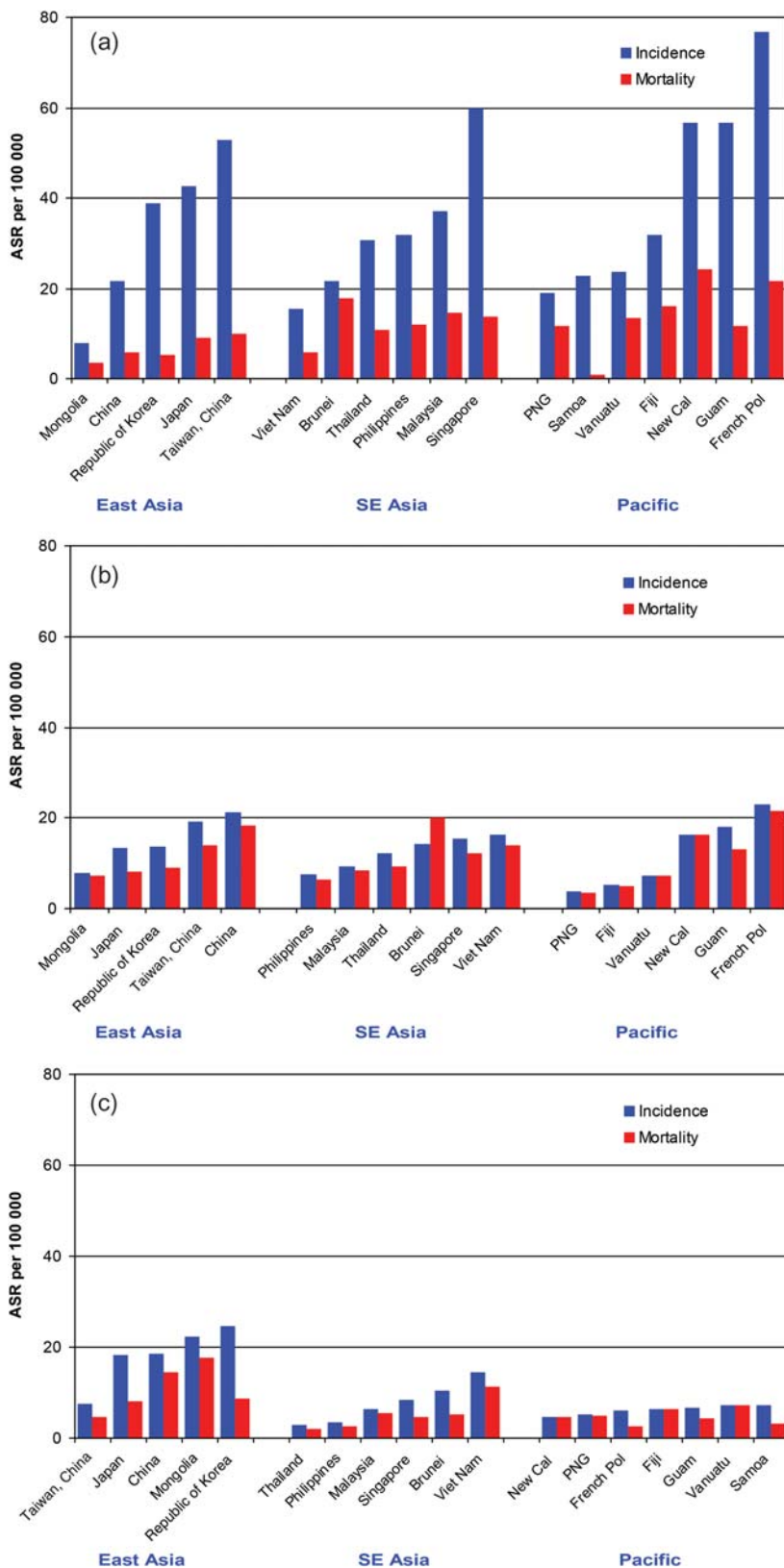


Figure 3. Age-standardized rate of leading cancers by country and sub-region, females, GLOBOCAN 2008; (a) breast cancer, (b) lung cancer, (c) stomach cancer, (d) colon cancer and (e) cervix cancer.

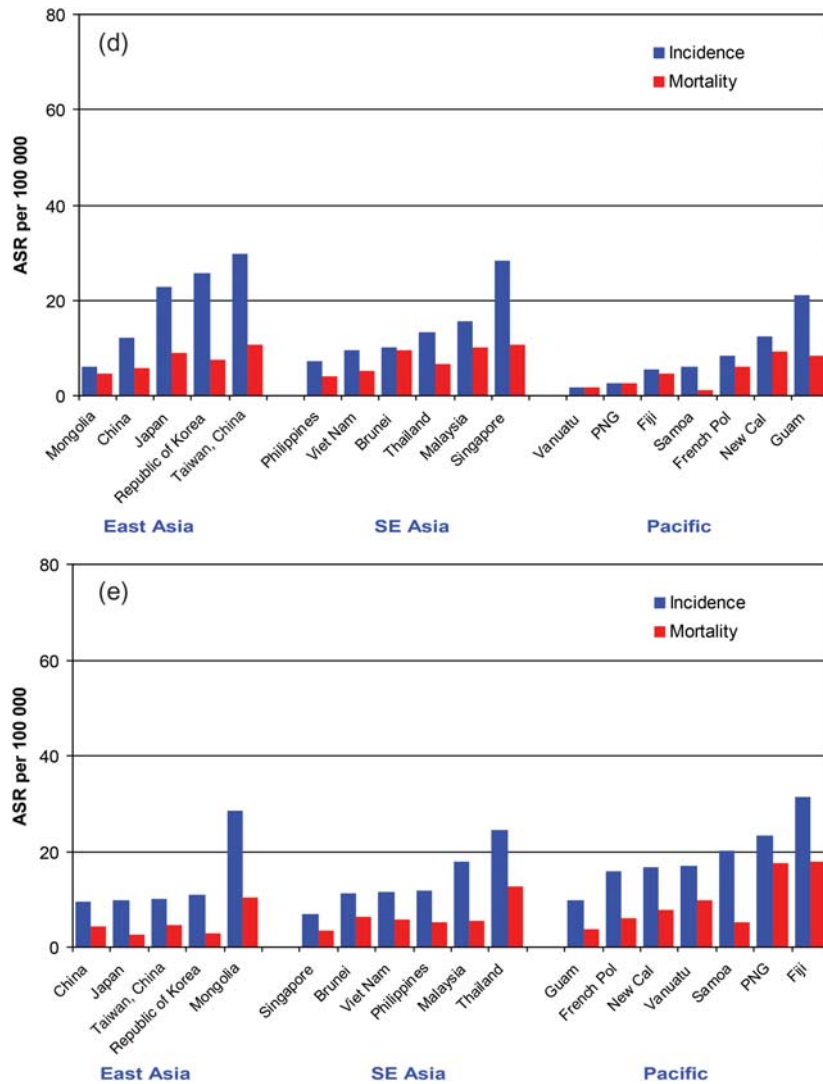


Figure 3. Continued

A large proportion of cancers including those of lung, stomach, oesophagus, colorectum, breast and cervical cancers are preventable. These cancers share modifiable risk factors such as tobacco use, unhealthy diet, lack of physical activity and alcohol abuse, overweight and obesity.

Tobacco is the most widely used harmful product and the main avoidable cause of cancer. One-third of male cancers and >70% of lung cancer are attributable to tobacco smoking (1,17). A framework for guidelines and protocols to reduce tobacco consumption and tobacco supply through evidence-based interventions was set by the WHO Framework Convention on Tobacco Control (18). Despite many cost-effective interventions including increase in tobacco tax and prices of tobacco products, <10% of the world's population in 2008 was fully covered by the tobacco control policies including smoke-free environments, cessation programmes, health warnings, advertising bans and taxation (19). A stronger national initiative on tobacco control would be helpful for cancer control too.

In relation to harmful use of alcohol, effective strategies for prevention of cancers of oral cavity, pharynx, larynx, oesophagus, liver, colorectum and female breast should target both the level and patterns of alcohol consumption (1,20). In 2010, WHO endorsed the WHO global strategy to reduce harmful use of alcohol, which recommends 10 target areas for action in countries to reduce alcohol abuse: leadership awareness and commitment; participation in health services through counselling and treatment; community involvement in identifying needs and solutions; policies controlling drunk-driving and countermeasure; reducing the availability of alcohol; regulating the marketing of alcohol beverages; pricing policies; reducing the negative consequences of drinking and alcohol intoxication; reducing the public health impact of illicit alcohol and informally produced alcohol, and monitoring and surveillance (21).

Unhealthy diet increase the risk of some cancers especially nasopharyngeal cancer associated with intake of salted fish and stomach cancer with limited evidence (20).

Table 3. Age-standardized prevalence of selected risk factors, Asia (East and Southeast) and Pacific Island countries, 2008

Region	Country	Smoking			Adult per-capita consumption of pure alcohol (litres) ^a	Physical inactivity			Overweight and Obesity				
		Current daily tobacco smoking		Latest year with national data		Insufficiently active	Latest year with national data	Overweight (BMI \geq 25.0 kg/m ²)		Obesity (BMI \geq 30.0 kg/m ²)		Latest year with national data	
		M	F					M	F	M	F		
East Asia	Japan	37.8	10.3	2006	7.79	58.9	61.6	No national data	28.9	15.9	5.5	3.5	2008
	<i>Korea DPR</i>	55.9	—	No national data	4.34	—	—	No national data	—	—	—	—	No national data
	Korea, Republic of	50.2	4.8	2005	14.81			No national data	33.4	27.4	6.9	7.7	2007
	Mongolia	42.7	5.2	2009	3.41	9.3	9.5	2009	44.4	49.6	11.9	20.7	2009
South Eastern Asia	Brunei			No national data	1.86			No national data					No national data
	<i>Cambodia</i>	48.3	4.2	2010	4.71	11.4	11.1	2010	11.4	13.8	1.6	2.8	2010
	<i>Indonesia</i>	53.5	3.9	2007	0.56	31.5	28.1	No national data	16.1	25.3	2.5	6.9	2001
	<i>Lao PDR</i>	44.2	2.9	2008	6.99	16.7	21.0	2003	11.6	17.8	1.7	4.1	2006
	Malaysia	39.8	1.7	2006	0.87	57.3	65.6	2005	42.4	47.0	10.4	17.9	2005–06
	<i>Myanmar</i>	33.9	11.3	2007	0.58	10.4	14.9	2009	13.8	23.6			No national data
	The Philippines	35.9	8.3	2003	6.08	21.2	26.2	2003	24.5	29.1	4.5	8.3	2003–04
	Singapore	24.9	4.3	2007	1.54			No national data	32.3	23.7	6.6	6.2	2004–07
	Thailand	35.6	1.5	2007	7.08	17.1	21.4	2008	25.8	36.4	4.9	11.8	2004
Viet Nam	41.3	1.0	2006	3.91	14.6	15.9	2003	9.4	10.8	1.2	2.0	2002	
Pacific Island countries	Fiji	14.9	1.7	2002	2.76	NA	NA	No national data	60.1	72.9	21.3	42.2	2002
	PNG	54.8	26.3	2007	3.64	17.2	21.5	No national data	45.4	50.3	11.8	20.1	2007
	Samoa	55.3	17.7	2004	4.51	36.8	65.4	2002	82.6	88.9	45.3	66.7	2002
	<i>Solomon Islands</i>	41.0	14.2	No national data	1.37	38.0	49.5	No national data	64.9	71.1	25.3	39.2	No national data
	Vanuatu	19.6	2.3	1998	0.96	NA	NA	No national data	62.4	68.5	22.9	36.8	1998

Source: WHO global status report on NCD, 2010 (—: no data were available).

M, males; F, females.

Korea DPR, Democratic People's Republic of Korea; Lao PDR, People's Democratic Republic; PNG, Papua New Guinea.

^aNo information of latest year with national data.

Table 4. Status of cancer control policy/programme and population-based cancer registration (PBCR)

Region	Country, territory and area	Cancer control policy/strategy/action plan	Inclusion of CI5 series (% coverage overall)	Number of PBCR with available data
Eastern Asia	China	Yes	8 (1.0% for mainland except Hong Kong)	Five cities and six counties (29)
	Taiwan, China	Yes	100% coverage (not shown in CI5)	1 (30)
	Japan	Yes	7 (13.0%)	35 prefecture and one city (14)
	Korea, DPR	Yes	None	None
	Korea, Republic of	Yes	Nine including National registration (100%)	National cancer registration (25)
	Mongolia	Yes	None	National registration (no information on quality indicators) (12)
South Eastern Asia	Brunei Darussalam	No	None	National cancer registry set up 2000 (15)
	Cambodia	Yes	None	None
	Indonesia	Yes	None	None
	Lao PDR	DK	None	None
	Malaysia	Yes	2 (13.4%)	National Cancer Patient Registry (75% completeness as of 2008) (16)
	Myanmar	Yes	None	None
	The Philippines	Yes	2 (17.0%)	2 (31)
	Singapore	Yes	National registration (100%)	NRD (13)
	Thailand	Yes	5 (21.3%)	5 (32)
	Timore-Leste	No	None	None
	Viet Nam	Yes	2 (9.9%)	6 (33)
Pacific Island country	Melanesia			
	Fiji	Yes	None	None (34)
	New Caledonia		None	Whole area (100%) (34)
	PNG	Yes	None	Historical data only (34)
	Solomon Islands	No	None	None
	Vanuatu	Yes	None	None
	Micronesia			
	Guam	NA	None	Whole area (100%) (34)
	Polynesia			
French Polynesia	NA	Whole area (100%)	Whole area (35,36)	
Samoa	No	None	None	

Korea, Democratic People’s Republic DPR; DK, do not know; NA, not applicable; NRD, National Registry of Diseases.

Lifestyle interventions addressing diet (salt reduction) are considered cost-effective for prevention of these cancers. In addition, healthy diet and physical activity prevent overweight and obesity as well as colorectal and breast cancers.

Besides these major modifiable behavioural risk factors, infection is also an important risk factor for cancer in LMICs, as well as in some HICs in Eastern Asia. Up to one-quarter of cancer cases and deaths were attributable to infection with *Helicobacter pylori*, hepatitis B virus, hepatitis C virus and

human papilloma virus in the Republic of Korea (22). Thus cancer-specific strategies should include specific interventions aimed at avoidance or control of cancer-associated infections.

Monitoring these risk factors, through national NCD surveillance, is important in the cancer control programme, especially in cancer prevention. The WHO STEPS (STEPwise approach to chronic disease risk factor surveillance; <http://www.who.int/chp/steps/riskfactor/en/index.html>) is also a good example of an integrated and phased-approach for risk factor

surveillance that has been used and tested in many countries in the Asia Pacific region. While there is good progress in many countries, nation-wide and regular NCD risk factor surveillance is not yet well-established as a sustainable scheme for monitoring in LMICs.

Nowadays, Palau, Federated States of Micronesia, Guam, Commonwealth of the Northern Mariana Islands, American Samoa and Fiji in the Pacific Islands have cancer registries, but further enhancement in terms of quality control is needed. Cancer registration has likewise been initiated in Cook Islands, Solomon Islands, Tuvalu and Vanuatu, but will need substantial support to improve coverage and quality of registry operations. The referral scheme for treatment of cancer patients outside the Islands adds to the complexity of coverage in some settings (23).

Substantial work is needed to improve PBCR, including capacity building and civil registration systems. Countries should put more emphasis on and commitment to an effective and sustainable surveillance system.

A well-conceived and well-managed national cancer-control programme lowers cancer mortality and improves the life of cancer patients, no matter what resource constraints a country faces. In 2002, WHO published the national cancer-control programme policies and managerial guidelines (8) and for the first time in the history of WHO, an opportunity to reinforce comprehensive cancer policies and strategies among its Member States presented itself in 2005.

The global strategy for the prevention and control of NCDs, which includes cancer, has three key components: surveillance, prevention and health care. Surveillance aims to analyse the social, economic, behavioural and political determinants of NCDs in order to evolve policy, legislative and financial measures (24). Furthermore, cancer surveillance and monitoring through PBCR are essential for implementation of evidence-based cancer control programmes.

Since WHO adopted a cancer prevention and control resolution in 2005 (8), many LMICs have developed an operational policy, strategy or action plan for cancer and indicated the existence of a cancer control policy/strategy/plan in the WHO 2010 NCD Country Capacity Survey. But owing to limited resources and capacity, many low-income countries have not yet established a PBCR. In addition, legislative support is scarce, which is also very critical to the implementation and the operation of cancer registries and ensuring privacy.

After enacting the Cancer Control Act in countries such as the Republic of Korea in 2006 (initially in 2003 and revised in 2006) (25) and Japan (14), countries were able to collate all the information on cancer patients obtained from hospitals. In order to support cancer registries in Asia, the establishment of a network was discussed in 2008 (26); however, adequate/sufficient funding and a governing body have not been negotiated and determined yet.

By having the United Nations High Level Meeting and agreement on a Political Declaration on NCDs, the matter of addressing NCDs has globally been set in motion in a

tremendous manner and has seen significant progress in moving cancer onto the global health agenda (27). This declaration has given a global mandate to prioritize NCD prevention and control. The control of cancer is one of the top priorities and we can benefit from the integrated approach to NCD risk factors, such as tobacco abuse, alcohol abuse, unhealthy diet and physical inactivity, which are risk factors for cancer as well.

Health system strengthening, especially primary health care, is needed for surveillance of suspected cancer cases and referral for further investigations and management. Well-functioning primary care systems are needed to ensure continuous and palliative care for cancer patients. All these efforts can be effective only through a good surveillance framework, which captures the population prevalence of risk factors, disease incidence and mortality, and health system performance (28). LMICs should invest more in NCD surveillance systems and disease registries, such as cancer registries, as a priority to tackle the emerging problem of cancer and other NCDs.

Acknowledgements

The authors (H.-R.S. and C.V.) are staff members of the World Health Organization. The authors alone are responsible for the views expressed in this publication and they do not necessarily represent the decisions or policies of the World Health Organization.

Conflict of interest statement

None declared.

References

1. WHO. *Global Status Report on Noncommunicable Disease 2010*. Geneva: World Health Organization 2011.
2. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. *GLOBOCAN 2008 v1.2, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 10 [Internet]*. International Agency for Research on Cancer 2010.
3. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. *Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008*. *Int J Cancer* 2010;127:2893–917.
4. Henderson BE, Kolonel LN, Dworsky R, et al. *Cancer incidence in the islands of the Pacific*. *Natl Cancer Inst Monogr* 1985;69:73–81.
5. Yamaguchi K. *Overview of cancer control programs in Japan*. *Jpn J Clin Oncol* 2002;32(Suppl):S22–31.
6. Yoo KY. *Cancer control activities in the Republic of Korea*. *Jpn J Clin Oncol* 2008;38:327–33.
7. Hock LC. *An overview of the cancer control programme in Singapore*. *Jpn J Clin Oncol* 2002;32(Suppl):S62–5.
8. WHO. *National Cancer Control Programme Policies and Managerial Guidelines*. 2nd edn. Geneva: World Health Organization 2002.
9. WHO. *World Health Assembly Resolution (WHA) 58.22 Cancer Prevention and Control*. http://www.who.int/ipcs/publications/wha/cancer_resolution.pdf.
10. WHO. *The Global Burden of Disease: 2004 Update*. Geneva: World Health Organization 2008.

11. Curado MP, Edwards B, Shin HR, et al. *Cancer Incidence in Five Continents Volume IX (IARC Scientific Publications No. 160)*. IARC Scientific Publications No. 160. Vol. IX. Lyon: IARC 2007.
12. Sandagdorj T, Sanjaajamts E, Tudev U, Oyunchimeg D, Ochir C, Roder D. *Cancer incidence and mortality in Mongolia—National Registry Data*. *Asian Pac J Cancer Prev* 2010;11:1509–14.
13. Ministry of Health, S. *National Registry of Diseases Office*. 2012 [cited 14 January 2012]. <http://www.nrdo.gov.sg/>.
14. Sobue T. Current activities and future directions of the cancer registration system in Japan. *Int J Clin Oncol* 2008;13:97–101.
15. Chong VH, Abdullah MS, Telisinghe PU, Jalihal A. *Colorectal cancer: incidence and trend in Brunei Darussalam*. *Singapore Med J* 2009;50:1085–9.
16. Ministry of Health Malaysia. *National Cancer Patient Registry*. 2012 [cited 14 January 2012]. http://www.acmr.org.my/ncpr/default.asp?page=ncpr/faq#2_What_is_the_National_Cancer_Patient_Registry_%28NCPR%29.
17. Wang JB, Jiang Y, Wei WQ, Yang GH, Qiao YL, Boffetta P. *Estimation of cancer incidence and mortality attributable to smoking in China*. *Cancer Causes Control* 2010;21:959–65.
18. WHO. *Guideline for Implementation of the WHO Framework Convention on Tobacco Control*. Geneva: World Health Organization 2011.
19. WHO. *WHO Report on the Global Tobacco Epidemic, 2009: Implementing Smoke-Free Environments*. Geneva: World Health Organization 2009.
20. IARC. *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans a Review of Human Carcinogens: Personal Habits and Indoor Combustions*. Lyon: International Agency for Research on Cancer. 2012;579.
21. WHO. *Global Strategy to Reduce the Harmful Use of Alcohol*. Geneva: World Health Organization 2010.
22. Shin A, Park S, Shin HR, et al. *Population attributable fraction of infection-related cancers in Korea*. *Ann Oncol* 2010;22:1435–42.
23. Walker S. *Training on Cancer Registration for the Pacific*. Manila: World Health Organization, Western Pacific Region 2010.
24. WHO. *2008–2013 Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases*. Geneva: World Health Organization 2008.
25. Shin HR, Jung KW, Won YJ, et al. *National cancer incidence for the year 2002 in Korea*. *Cancer Res Treat* 2007;39:139–49.
26. Sobue T, Inoue M, Tanaka H. *Cancer Registry and Epidemiological Study Working Group report*. *Jpn J Clin Oncol*, 2010;40(Suppl 1): i76–81.
27. UICC. UICC Statement on the Political Declaration of the UN High-Level Meeting on the Prevention and Control of Non-communicable Diseases. 2011 [cited 15 January 2012]. <http://www.uicc.org/node/9103>.
28. WHO. *A Comprehensive Global Monitoring Framework and Voluntary Global Targets for the Prevention and Control of NCDs*. [discussion paper for consultation] 2011 10 January 2012; updated version dated 21 December 2011: http://www.who.int/nmh/events/2011/consultation_dec_2011/WHO_Discussion_Paper_FINAL.pdf.
29. Lei T, Mao WM, Yang HJ, et al. *[Study on cancer incidence through the Cancer Registry Program in 11 Cities and Counties, China]*. *Zhonghua Liu Xing Bing Xue Za Zhi* 2009;30:1165–70.
30. Chiang CJ, Chen YC, Chen CJ, You SL, Lai MS. *Cancer trends in Taiwan*. *Jpn J Clin Oncol* 2010;40:897–904.
31. Laudico AV, Mirasol-Lumague MR, Mapua CA, et al. *Cancer incidence and survival in Metro Manila and Rizal province, Philippines*. *Jpn J Clin Oncol* 2010;40:603–12.
32. Sriplung H, Wiangnon S, Sontipong S, Sumitsawan Y, Martin N. *Cancer incidence trends in Thailand, 1989–2000*. *Asian Pac J Cancer Prev* 2006;7:239–44.
33. MOH. *VietNam Overview: National Strategy for Cancer Control (2010 and 2020)*. 2012 [cited 14 January 2012]. <http://www.who.int/cancer/modules/Viet%20Nam.pdf>.
34. Moore MA, Baumann F, Foliaki S, et al. *Cancer epidemiology in the Pacific islands—past, present and future*. *Asian Pac J Cancer Prev* 2010;11(Suppl 2):99–106.
35. Le Vu B, de Vathaire F, de Vathaire CC, et al. *Cancer incidence in French Polynesia 1985–95*. *Trop Med Int Health* 2000;5:722–31.
36. Gleize L, Laudon F, Sun LY, Challeton-de Vathaire C, Le Vu B, de Vathaire F. *Cancer registry of French Polynesia: results for the 1990–1995 period among native and immigrant population*. *Eur J Epidemiol* 2000;16:661–7.