RESEARCH COMMUNICATION

Differences in Cancer Risks in the South and North of Viet Nam.

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Abstract

Background: As there are few available data regarding cancers in Viet Nam, the aim of the present study was to evaluate cancer risk ratios and geographical differences in cancer incidences between the south and north populations in the 1990s.

Methods: Data for cancer incidences in Ho Chi Minh (HCM) and Hanoi were derived from published reports. The method for comparison of cancer incidence in two groups used in the present study was the Mantel-Haenszel test.

Results: In HCM, all cancers were observed to be lower in males , (RR = 0.87, 95% CI = 0.83-0.91) but higher in females, (RR = 1.06, 95% CI = 1.01-1.12) than in Hanoi. For males, significantly higher incidences in HCM were observed for cancers of the oesophagus (RR = 1.66, 95% CI = 1.19-2.32), liver (RR = 1.22, 95% CI = 1.09-1.36), gall bladder (RR = 5.95, 95% CI = 2.49-14.23), and larynx (RR = 3.54, 95% CI = 2.26-5.55). In contrast, there were much lower incidences in HCM for cancers of the nasopharynx (RR = 0.5, 95% CI = 0.41-0.61), stomach (RR = 0.76, 95% CI = 0.67-0.86), and lung (RR = 0.7, 95% CI = 0.64-0.78). For females, breast cancer incidence was much lower (RR = 0.65, 95% CI = 0.57-0.73) but that of cervical cancer was significantly higher in HCM than in Hanoi, (RR = 3.94, 95% CI = 3.36-4.62), especially for the age group 55-64, (RR = 8.7, 95% CI = 5.9-13.3).

Conclusion: The present findings show that cancer risk is quite different in the south and north populations within Viet Nam.

Key words: Viet Nam - cancer incidences - risk ratio - risk factors of cancers

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Introduction

Cancer is now realised to be a big public health problem in Viet Nam because the annual number of hospitalized cancer patients has been steadily increasing throughout the country. The estimated annual number of new cancer cases rose from 65,000 to 100,000 patients nationwide from 1988-90, (Duc, 1993; Hung et al., 1993; Lien, 1993). In response to the large burden of cancer occurrence, health care facilities for cancer patients have been constantly improving in terms of cancer palliative care, treatment, diagnosis, training, screening and prevention, (Duc, 1993; Janjan et al., 1994; Raab, 1996). In order to develop rational strategies for cancer prevention in Viet Nam, regional differences in cancer risks between the south and north populations must be clearly identified as soon as possible. However, cancer incidences in general and risk factors of cancers in particular in Viet Nam have not been fully investigated. In addition, the south population had been heavily exposed to dioxin (2,3,7,8 TCDD) during the Viet Nam War but not the north population, (Schecter et al., 1995; Schecter and Olson, 1997; Sterling and Arundel, 1986). Dioxin (2,3,7,8 TCDD) is carcinogenic to human, (IARC, 1997). Therefore, study on geographical differences in cancer incidences between the south and north populations is timely and urgent. The aim of the present study was to evaluate cancer risk ratios and

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Table 1. Number of Cancer Cases, Crude Rates, and Age-Standardized Incidence Rates per 100,000 by Cancer Site and by Region, Rate Ratio and 95% CI in Males

Site (ICD-9)		HCM, (two years)			Hanoi, (three years)			Rate ratio (HCM/HN)	
		Nº of Cases	Rate per 100,000 Crude	ASR	Nº of Cases	Rate per 100,000 Crude	ASR	RR	95% CI
	All sites	4,080	89.0	130.9	3,498	112.2	145.6	0.87	0.83-0.91
140-5	Oral cavity	125	2.7	4.1	59	2.1	2.7	1.63	1.19-2.22
147	Nasopharynx	170	3.7	5.1	255	8.2	10.3	0.50	0.41-0.61
146, 8, 9	Other pharynx	99	2.1	3.3	59	1.8	2.5	1.25	0.91-1.73
150	Esophagus	109	2.4	3.9	50	1.6	2.2	1.66	1.19-2.32
151	Stomach	495	10.8	16.5	482	15.5	20.9	0.76	0.67-0.86
153-4	Colon/rectum	300	6.6	9.5	225	7.2	9.5	0.96	0.81-1.14
155	Liver	803	17.5	25.3	496	15.9	20.3	1.22	1.09-1.36
156	Gall bladder	45	1.0	1.6	8	0.3	0.3	5.95	2.49-14.23
157	Pancreas	64	1.4	2.2	47	1.5	2	1.04	0.71-1.53
161	Larynx	110	2.4	3.9	20	0.6	0.8	3.54	2.26-5.55
162	Bronchus Lung	724	15.8	24.6	788	25.3	34.9	0.70	0.64-0.78
163-4	Other thoracic organs	34	0.7	1.1	48	1.5	2.1	0.48	0.31-0.72
170	Bone	37	0.8	0.9	57	1.8	2.1	0.48	0.32-0.74
171	Connective tissue	41	0.9	1.1	58	1.9	2.3	0.51	0.34-0.77
172	Melanoma of skin	3	0.1	0.1	10	0.3	0.3	0.31	0.09-1.16
173	Other skin	102	2.2	3.5	67	2.1	2.9	1.14	0.84-1.56
185	Prostate	65	1.4	2.3	24	0.8	1.2	2.08	1.28-3.39
186	Testis	27	0.6	0.6	21	0.7	0.7	0.85	0.47-1.52
187	Penis	43	0.9	1.3	52	1.7	2.2	0.58	0.39-0.87
188	Bladder	68	1.5	2.3	39	1.3	1.7	1.21	0.82-1.79
191-2	Brain/nervous system	83	1.8	2.2	37	1.2	1.3	1.50	1.03-2.18
193	Thyroid	36	0.8	1.1	30	1.0	1.2	0.86	0.53-1.39
201	Hodgkin's disease	12	0.3	0.4	48	1.5	1.7	0.20	0.10-0.36
200, 2	NHK	95	2.1	2.8	167	5.4	6.3	0.43	0.33-0.55
204-8	Leukemia	163	3.6	4	104	3.6	3.6	1.08	0.84-1.38

geographical differences in cancer incidences between the south and north populations in the 1990s.

Materials and Methods

The two population based cancer registries in Viet Nam were introduced in detail in previous reports, (Anh et al., 1997; Quoc et al., 1998). In this report, some specific characteristics of the two population based cancer registries that were established in 1987 and 1990 in Hanoi and HCM, respectively are briefly described. After collecting data for 4 years in Hanoi and 5 years in HCM, cancer incidences in the general populations in Hanoi from 1991-93 and in HCM from 1995-96 have been initially stated for each region, (Anh et al., 1997; Quoc et al., 1998). These two results of cancer incidences were the sources of data for the present study.

The HCM City is the largest city in Viet Nam situated in the Mekong Delta River area where a large number of relatively modern medical research institutes, specialized hospitals and university hospitals are established. The average population in 1995-96 was numbered at 4,820,131. It is a tropical region with high humidity and an average temperature of 27.5ºC, with two seasons: rainy and dry. It covers 2,093 km2, a population density was 2,303 persons per km2 in 1995-96, (Quoc et al., 1998).

The city of Hanoi, the Vietnamese Capital, is the second largest city in Viet Nam situated in the Red Delta River in north Viet Nam. It is a center of medical science with the highest technique for medical research and for health care in Viet Nam. The average population in 1991-93 was numbered at 2,115,673. It covers 921 km2, a population density was 2,297 persons per km2 in 1991-93. It is subtropical region with four seasons: spring, summer, autumn, and winter, with high humidity in spring-summer and high temperatures in summer-autumn, (Anh et al., 1997; Anh et al., 1993).

The method for comparison of cancer incidences in the two groups was used in the present study using the Mantel-Haenszel test, (Esteve et al., 1994). We decided that the cancer incidences (ICD-9: 140-208) in the population of Hanoi City would be the reference group. Cancer incidences were stratified to seven age groups from 0-14 to 65+. Stratified incidence rate ratio (RR) and 95% confidence interval between HCM, in 1995-96 and Hanoi in 1991-93 was calculated using "Epitab" provided by Stata Statistical Software, (STATA, 1999).

Results

In HCM City, during the two-year period of our study,

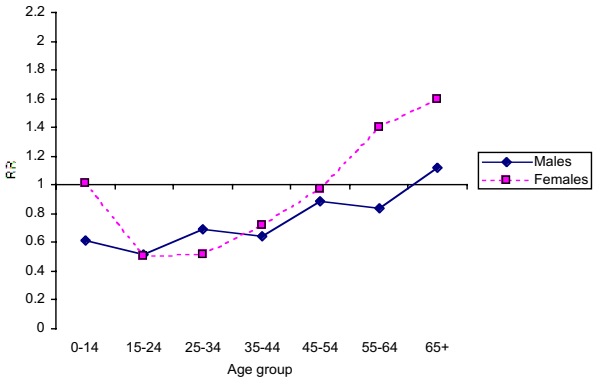

Figure 1. Cancer Rate Ratio (HCM/Hanoi) by Age Group for all Cancer Sites in Males and Females

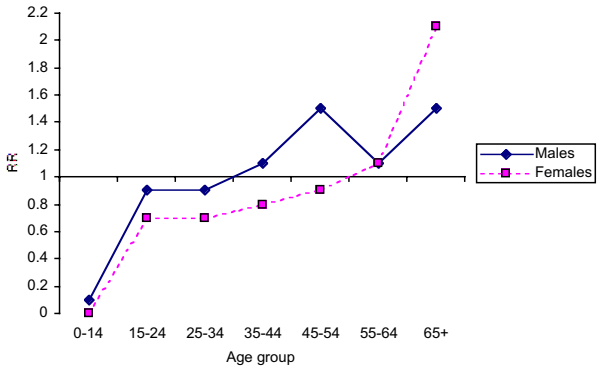

Figure 2. Cancer Rate Ratio (HCM/Hanoi) by Age Group for Liver Cancers in Males and Females

the number of cancer cases registered was 4,080 in males and 4,338 in females. Cancer incidences for all sites were 130.9 and 100.7 per 100,000 (ASR) in males and females, respectively. For males, the five most common incidences were cancers of liver, lung, stomach, nasopharynx, and oesophagus, (Table 1). Cervical cancer was the most common, followed by cancers of breast, stomach, lung, and liver for females, (Table 2).

In Hanoi City, the number of cancer cases registered was 3,498 in males and 2,625 in females during the three-year period of our study for all sites. Cancer incidences were 145.6 and 91.8 per 100,000 (ASR) in males and females, respectively. For males, cancer of lung was the first in frequency, followed by stomach, liver, nasopharynx, and oesophagus, (Table 1). For females, cancer of breast was the most common cancer, followed by stomach, lung, cervix, and liver, (Table 2).

All cancers were observed to be lower in males in HCM, (RR = 0.87, 95% CI = 0.83-0.91) but higher in females, (RR = 1.06, 95% CI = 1.01-1.12) than in Hanoi, (Table 1, Table 2, Fig. 1).

For males, among the five most common incidences, cancers of the oesophagus and liver were significantly higher in HCM, (RR = 1.66, 95% CI = 1.19-2.32 and RR = 1.22, 95% CI = 1.09-1.36, respectively), (Table 1, Fig. 2). In contrast, cancers of the nasopharynx, stomach, and lung were lower in HCM when compared to those in Hanoi, (RR = 0.50, 95% CI = 0.41-0.61, RR = 0.76, 95% CI = 0.67-0.86, and RR = 0.70, 95% CI = 0.64-0.78, respectively), (Fig. 5, Fig. 3, and Fig. 4). For the remaining cancer sites, incidences of gall bladder, larynx, and prostate were observed to be much higher in HCM in comparison with those in Hanoi, (RR = 5.95, 95% CI = 2.49-14.23, RR = 3.54, 95% CI = 2.26-5.55, and RR = 2.08, 95% CI = 1.28-3.39, respectively). Cancer incidences were found to be slightly higher in HCM for pancreas (RR = 1.04, 95% CI = 0.71-1.53) and bladder (RR = 1.21, 95% CI = 0.82-1.79) than in Hanoi. The reverse of this observation was found for cancers of the bone, connective tissue, testis, penis, and Hodgkin's disease with significant differences, (Table 1).

For female, among the five most common incidencs, cancer of the cervix was much higher in HCM than in Hanoi, (RR = 3.94, 95% CI = 3.36-4.62), especially for the age group 55-64, (RR = 8.72, 95% CI = 5.94-13.31), (Figure 7). In contrast, incidences of breast cancers was found to be much lower in HCM than in Hanoi (RR = 0.65, 95% CI =

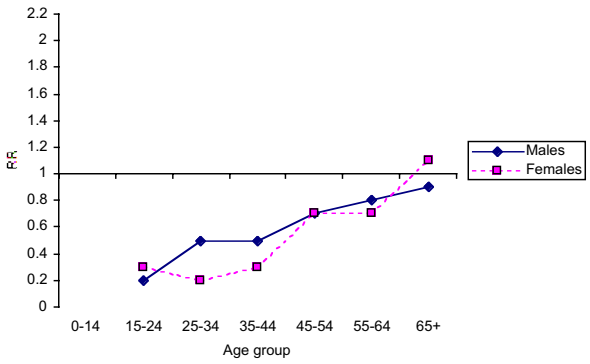

Figure 3. Cancer Rate Ratio (HCM/Hanoi) by Age Group for Stomach Cancers in Males and Females

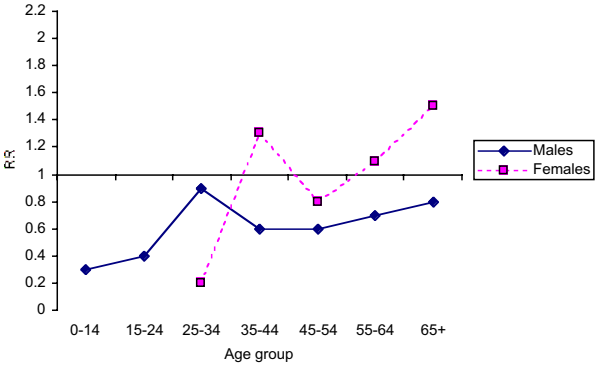

Figure 4. Cancer Rate Ratio (HCM/Hanoi) by Age Group for Lung Cancers in Males and Females

Table 2. Number of Cancer Incidences, Crude Rates, and Age-Standardized Incidence Rates per 100,000 by Cancer Site and by Region, Rate Ratio and 95% CI in Females

Site (ICD-9)		HCM, (two years)			Hanoi, (three years)			Rate ratio (HCM/HN)	
		Nº of Cases	Rate per 100,000 Crude	ASR	Nº of Cases	Rate per 100,000 Crude	ASR	RR	95% CI
	All sites	4,338	85.8	100.7	2,625	81.3	91.8	1.06	1.01-1.12
140-5	Oral cavity	135	2.7	3	85	2.6	2.8	1.05	0.80-1.38
147	Nasopharynx	75	1.5	1.5	137	4.2	4.8	0.37	0.28-0.50
146, 8, 9	Other pharynx	26	0.5	0.6	21	0.7	0.7	0.81	0.46-1.43
150	Esophagus	28	0.6	0.6	17	0.5	0.6	1.25	0.67-2.36
151	Stomach	319	6.3	7.5	297	9.2	10.4	0.69	0.59-0.81
153-4	Colon/rectum	345	6.8	8.1	151	4.7	5.4	1.46	1.21-1.76
155	Liver	254	5.0	5.9	137	4.2	4.9	1.21	0.98-1.49
156	Gall bladder	40	0.8	1	3	0.1	0.1	5.98	1.81-19.78
157	Pancreas	51	1.0	1.2	20	0.6	0.8	1.70	1.02-2.84
161	Larynx	15	0.3	0.4	2	0.1	0.1	4.56	1.12-18.50
162	Bronchus Lung	285	5.6	6.8	175	5.4	6.3	1.08	0.90-1.31
163-4	Other thoracic organs	20	0.4	0.5	24	0.7	0.8	0.56	0.31-1.01
170	Bone	30	0.6	0.5	28	0.9	0.9	0.65	0.39-1.08
171	Connective tissue	26	0.5	0.6	40	1.2	1.3	0.42	0.25-0.69
172	Melanoma of skin	3	0.1	0.1	7	0.2	0.3	0.65	0.13-3.35
173	Other skin	129	2.6	2.9	70	2.2	2.4	1.29	0.96-1.73
174	Breast	523	10.3	12.2	504	15.6	18.2	0.65	0.57-0.73
180	Cervix uteri	1,059	20.9	26	171	5.3	6.1	3.94	3.36-4.62
181	Placenta	11	0.2	0.2	63	2.0	1.8	0.10	0.05-0.19
182	Corpus uteri	108	2.1	2.7	41	1.3	1.5	1.69	1.18-2.41
183	Ovary	170	3.4	3.7	82	2.5	2.9	1.32	1.02-1.72
184	Other female genital	23	0.5	0.5	46	1.4	1.6	0.33	0.20-0.55
188	Bladder	26	0.5	0.6	6	0.2	0.2	3.51	1.34-9.18
191-2	Brain/nervous system	64	1.3	1.4	27	0.8	0.9	1.51	0.96-2.38
193	Thyroid	108	2.1	2.1	90	2.8	3.1	0.64	0.49-0.84
201	Hodgkin's disease	7	0.1	0.2	28	0.9	0.9	0.30	0.12-0.72
200, 2	NHK	92	1.8	2.1	85	2.6	2.8	0.68	0.51-0.91
204-8	Leukemia	164	3.2	3.6	103	3.2	3.2	1.04	0.81-1.33

0.57-0.73), (Fig. 6). Incidences of stomach cancers in HCM were significantly lower when compared to that in Hanoi, (RR = 0.69, 95% CI = 0.59-0.81), (Fig. 3). There was a fairly higher incidence cancers of the oesophagus (RR = 1.25, 95% CI = 0.67-2.36), liver (RR = 1.21, 95% CI = 0.98-1.49) and lung (RR = 1.08, 95% CI = 0.9-1.31) in HCM than Hanoi in females, (Table 2, Fig. 2, Fig. 4). The significant higher incidences in HCM were cancers of the pancreas, corpus uteri, ovary and bladder when compared to those in Hanoi. There was a much lower incidence in HCM for cancers of the nasopharynx, connective tissue, placenta, other female genital, thyroid, and Hodgkin's disease, with

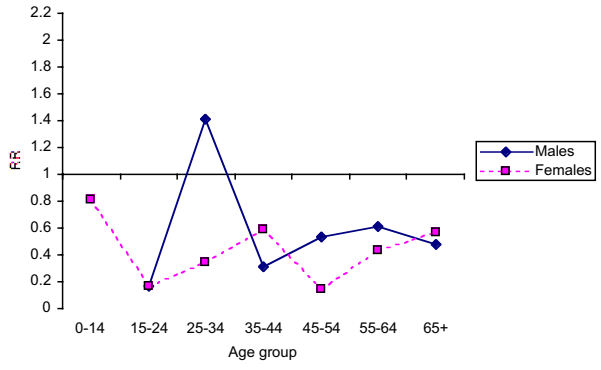

Figure 5. Cancer Rate Ratio (HCM/Hanoi) by Age Group forNasopharygeal Cancers in Males and Females

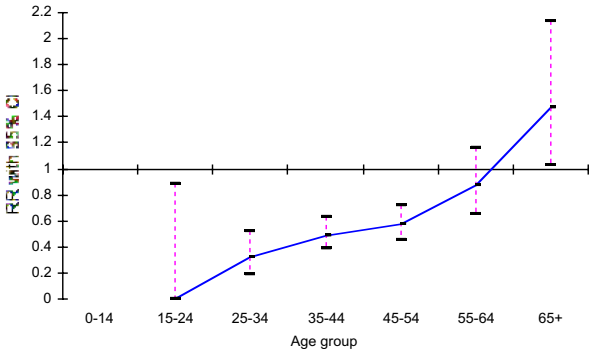

Figure 6. Cancer Rate Ratio (HCM/Hanoi) by Age Group for Breast Cancers in Females

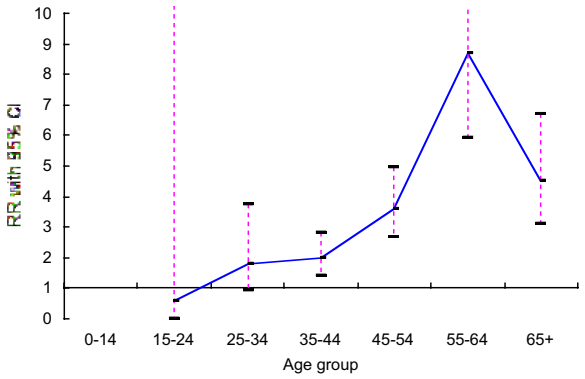

Figure 7. Cancer Rate Ratio (HCM/Hanoi) by Age Group for Cervical Cancer

significant differences, (Table 2).

Due to small number of cases registered, according to ICD-9, cancers of the oral cavity, other pharynx, colon/rectum, other thoracic organs, brain/nervous system, non-Hodgkin's lymphoma, leukaemia and the remaining cancer sites in both males and females were grouped. These cancer incidence rate ratios showed also large differences between south and north Viet Nam, (Table 1 and Table 2).

Discussion

The present results have shown that there were large differences in cancer risks between the south and north populations. There was a considerable difference for cancers of the nasopharynx, oesophagus, stomach, liver, gall bladder, lung, connective tissue, and Hodgkin's disease in both males and females. Also, substantial differences in incidences of breast and cervix were seen between HCM and Hanoi in females.

Lower incidences of all sites in HCM than in Hanoi for males may not be due to under registration in HCM because the higher incidences were seen there in females, (Table 1, Table 2). Since then, large geographical differences in cancers for individual cancer sites between HCM and Hanoi was a big problem in Viet Nam in the 1990s.

Between HCM and Hanoi, there were also found to be large differences in childhood cancer incidences in the 1990s. The lower incidences in HCM compared to that in Hanoi were seen for Hodgkin's disease (0.2 VS. 5.7 per million) and lymphomas (10.6 VS. 22.1 per million), and fairly lower incidences in HCM were observed for soft-tissue sarcomas (5.7 VS. 7.1 per million). In contrast, the much neoplasms (10.8 VS. 6.8 per million), (Anh et al., 1998; Quoc et al., 2000). Large differences in childhood cancer incidences were consistent with the present findings in the two general populations.

In spite of different periods, cancer incidence data at the time of the present study was comparable between the period from 1995-96 in HCM and the period from 1991-93 in Hanoi because cancer incidences were fairly stable in the two regions in the 1990s. That is, the annual cancer incidences in Hanoi City from 1991-96 were fairly stable in both males (ASR from 152.4 to 168.7 per 100,000) and females (ASR from 91.4 to 116.8 per 100,000), (Duc, 1998). Also, cancer incidences in HCM City were from 130.9 to 135.0 per 100,000 (ASR) in males and from 100.7 to 100.1 per 100,000 in females, between 1995-96 and 1997, respectively, (Hung et al., 1998; Quoc et al., 1998).

In addition, the completeness and accuracy of cancer registrations in both HCM City and Hanoi City are comparable due to the following points. A high percentage of cancer cases was diagnosed by histological confirmation in both HCM (68.6%) and in Hanoi (55.5%), (Anh et al., 1993; Quoc et al., 1998). Secondly, the same active method to collect cases from similar sources, such as from medical record departments, out patient clinic, pathological laboratories, autopsy services, hematological laboratories was used in both south and north. Also, similar data was collected from each patient regarding name, date of birth, sex, place of birth, residence, date of hospital admission, date when diagnosed, clinical stage, basis of diagnosis. There was a similarity of the method of data processing using a microcomputer with the CANREG system for data entry and management and the ability to recognize duplicate records, (Anh et al., 1997; Anh et al., 1993; Quoc et al., 1998). Thirdly, there was not available cancer mortality data in both HCM and Hanoi because there was no system of death registration for death occurring outside a hospital. Therefore, cancer incidences registered in HCM and Hanoi were compatible. Since then, large differences in cancer incidences between HCM and Hanoi have become a real problem.

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Personal Profile: Le Tran Ngoan

Dr Le Tran Ngoan was born in Vietnam in 1964 and after obtaining his Medical Doctor degree from Hanoi Medical School in 1987, he was Assistant Researcher and Teacher for a three year period, studying for a First Speciality in Medical Science (equivalent to a Masters degree) in the Department of Epidemiology - Environment - Hygiene, 1987-90. He then became an active staff member.

After completing a course in the Japanese language at Kyushu University, he was accepted as a 4-year graduate

student at the University of Occupational and Environmental Health, Japan with a Monbusho fellowship. In 1999, IARC supported his attendance at a two-week course on Cancer Epidemiology, Principles and Methods, in Khon Kaen, Thailand.

Under the academic supervision of Prof. Takesumi Yoshimura, he has been focussing on cancer incidence, mortality, survival, paterns and trends; cancer risk factors for the stomach, uterine cervix, liver , lung and nasopharynx; cancer and nutrition, lifestyle, occupation, and environmental factors, including dioxin exposure in Viet Nam. He is particularly interested in international cooperation in developing cancer epidemiology in Asian countries, accounting for about two thirds of the cancers worldwide, and would welcome contacts from anyone sharing his aims. For future successful studies please contact him at letngoan@med.uoeh-u.ac.jp or ngoantran@hotmail.com .