

THYROID

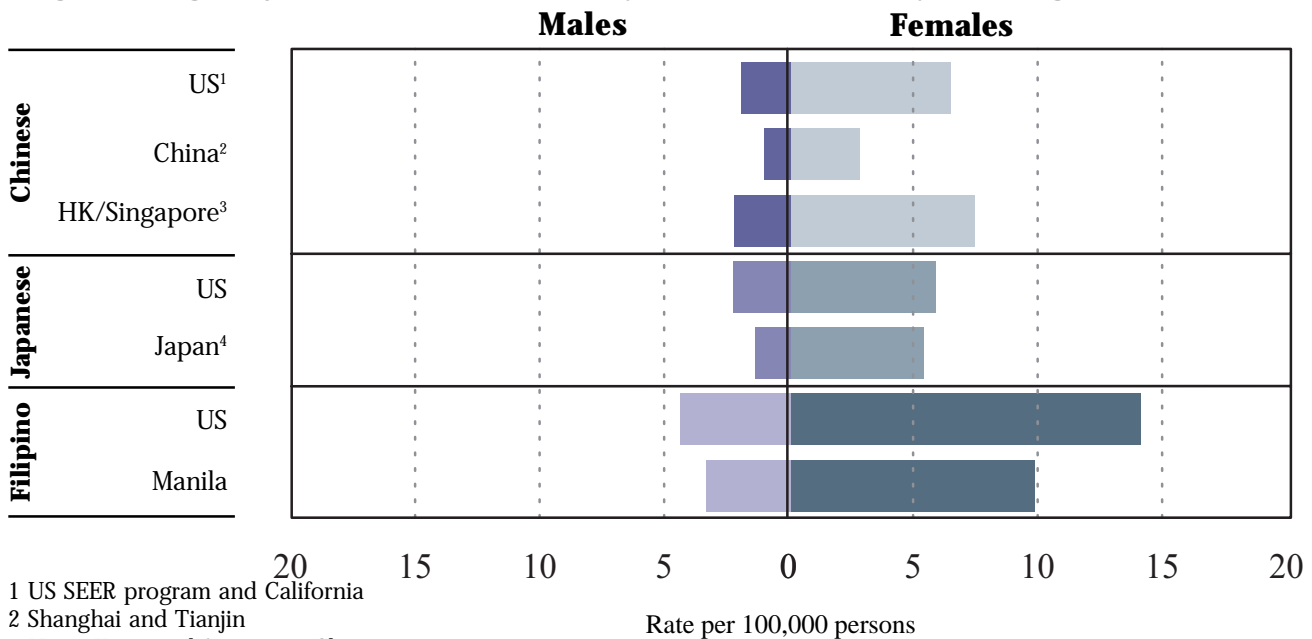
Thyroid cancer is a relatively rare, highly survivable cancer that is unusual in being more common in women than men. The five-year relative survival is about 91% among males and 96% among females¹. Most cancers of the thyroid (95%) can be classified as epithelial in origin. These epithelial tumors can be further subdivided into papillary, follicular, medullary, and anaplastic histology². Papillary tumors are the most commonly occurring histologic type, accounting for 50-70% of thyroid tumors in the general population, followed in frequency by follicular tumors (13-22%)². Occurrence of the particular histologic subtypes varies by demographic factors including race/ethnicity, gender and age, and may also be related to thyroid cancer causation and survival^{2,3}. Therefore, histologic subtype should be accounted for when studying this disease.

In the period 1983 through 1987, Filipinos in Hawaii experienced the highest rates of thyroid cancer in the world; rates were also high in Iceland, the Philippines, and among United States Jews². The reasons for

may be particularly vulnerable to external radiation because of its location close to the surface of the body and its high rate of cell division. Other sources of radiation exposure implicated in the development of thyroid cancer are medical, wartime, and accidental nuclear release of ¹³¹Iodine and other radioactive isotopes².

The risk of thyroid cancer associated with iodine exposure varies by histology. Endemic goiter is associated with an increased risk of follicular and anaplastic tumors, while exposure to high levels of iodine is associated with an increased risk of papillary tumors². In addition, persons with benign thyroid nodules and goiter have been shown to be up to 10 times more likely to develop thyroid cancer than persons without these conditions; these benign conditions therefore may be precursor lesions for the malignancy in some individuals². For example, migrants from the Philippines may have underlying thyroid disease that, when exposed to high iodine levels in the US, predispose them to developing thyroid cancer⁷. An analysis of incidence

Figure 1: Age-adjusted incidence rates by sex, race/ethnicity, and region, 1988-1992



1 US SEER program and California
 2 Shanghai and Tianjin
 3 Hong Kong and Singapore-Chinese
 4 Miyagi, Nagasaki, Osaka, Yamagata, Saga

the exceptionally elevated rates of thyroid cancer among Filipinos, particularly females living outside the Philippines, are not known^{2,4,6}.

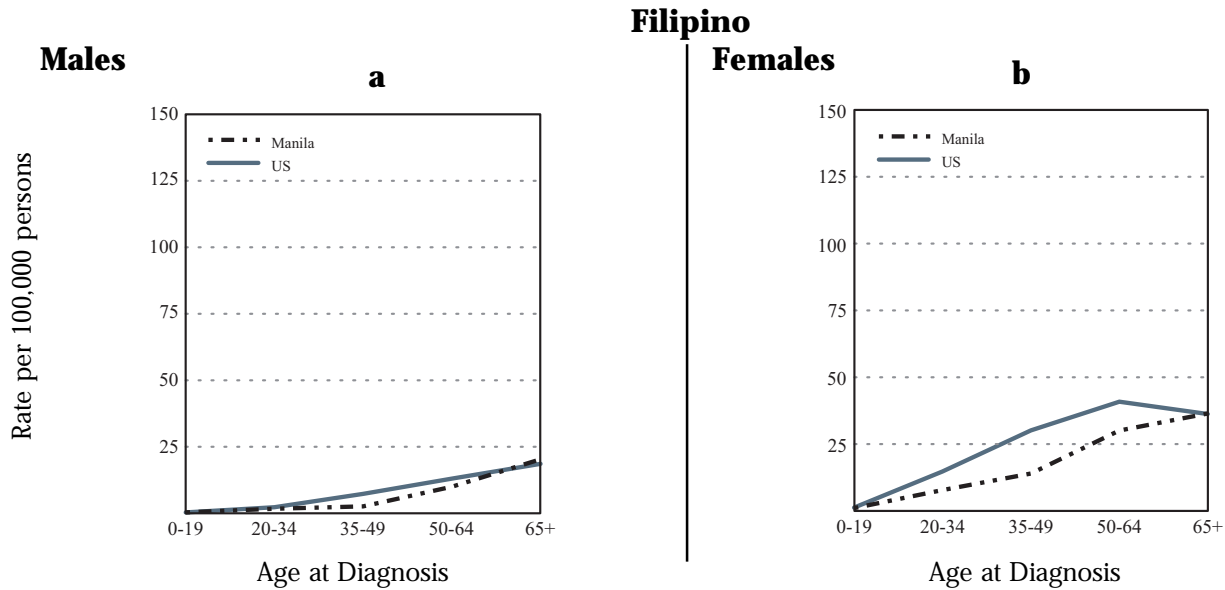
Risk Factors

In the US, the primary known risk factor for the development of thyroid cancer is therapeutic irradiation of the head and neck, especially during infancy and childhood; risk associated with this exposure is especially elevated for papillary carcinomas². The thyroid gland

rates by birthplace as recorded in hospital records showed that the incidence rate of thyroid cancer among foreign-born Filipinos in the US was more than five times the annual rate among US-born Filipinos, and almost twice the rate for Filipinos living in Manila⁸.

A large study in Hawaii (including about 20% Filipinos) showed that, among females, consumption of cruciferous vegetables reduced the risk of thyroid cancer, while eating seafood (especially shellfish) and a particular type of fermented fish sauce was found to sig-

Figure 2: Age-specific incidence rates by sex and region, 1988-1992



nificantly increase disease risk³. In addition, dietary iodine was associated with a slightly elevated risk of the disease, as were miscarriage and fertility drug use³. Obesity, family history of thyroid disease, and work as a farm laborer increased the risk of developing thyroid cancer in both males and females³. However, these risk factors cannot fully explain the large difference in incidence rates between Filipino females in Hawaii and females in the mainland US³.

Incidence

Overall, age-adjusted incidence rates among Filipinos were higher than those for Chinese and Japanese populations for the period 1988-1992 (Figure 1). In addition, the incidence of thyroid cancer was about three times higher in females than males; Filipino females experienced particularly high rates of thyroid cancer during this time. In fact, thyroid cancer was the third most commonly diagnosed cancer among US Filipinas after breast and lung cancers. The higher rate among Filipinas in the US (mostly driven by the high rates in Hawaii) than among Filipinas in Manila points to environmental influences such as diet and lifestyle factors on disease development.

As thyroid cancer is far more common in Filipinos than in Chinese or Japanese populations, age-specific rates are shown only for Filipinos. While most cancers disproportionately affect the elderly, thyroid cancer affects persons in the younger age groups as well, although its occurrence does increase steadily with age (Figures 2a-2b). For both sexes, age-specific rates were higher among US Filipinos than among Filipinos in Manila at the younger age groups (0-64), but similar in the two populations at the oldest age group (65+); this pattern was particularly evident for females. Thus, the

difference in age-adjusted rates between Filipinos in Manila and the US was attributable mostly to the elevated rates among US Filipinos under age 65.

URINARY BLADDER

Cancer of the urinary bladder is a relatively common malignancy in most Asian countries as well as in the United States. In the US, nearly all cancers of the bladder are transitional-cell carcinomas, with other histologic types comprising less than 2 percent of cases¹. Survival after bladder cancer in the US is generally favorable, with an overall five-year relative survival rate of 78 percent¹. The staging of bladder cancers can present a challenge to pathologists, as the degree of tumor invasion is often difficult to ascertain. For this reason, bladder cancer incidence rates in this monograph include both invasive and *in situ* tumors, except for rates derived from two of the Chinese registries (Shanghai and Tianjin), for which data were available for invasive cancers only.

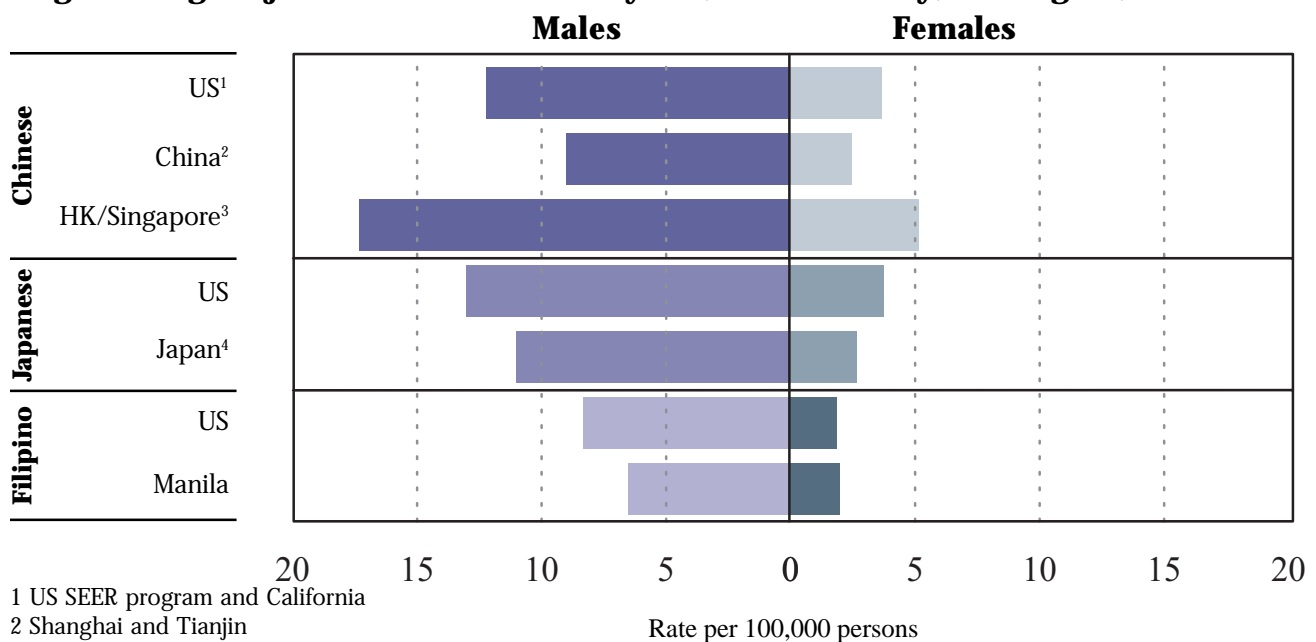
Risk Factors

Fifty percent of bladder cancers in males and 33 percent in females have been attributed to cigarette smoking

and occupational exposure to similar compounds also may increase risk of bladder cancer, as workers in the rubber and leather industries, truck drivers, and hairstylists have been reported to have elevated rates of the disease³. Perhaps due in part to these smoking and occupational patterns, male sex is an important risk factor for bladder cancer, with males at least twice as likely to develop the disease as females¹. Other factors strongly associated with bladder cancer development include chronic infection with the bladder fluke *Schistosoma haematobium*, use of analgesic drugs containing phenacetin, and exposure to the cancer chemotherapeutic agent cyclophosphamide³. Characteristics of drinking water, including high arsenic content in well water and high levels of chlorination by-products, also have been investigated as bladder cancer risk factors³.

Recent studies of bladder cancer risk have emphasized genetic susceptibility, focusing on genetic aspects of the liver enzyme N-acetyltransferase, which is in-

Figure 1: Age-adjusted incidence rates by sex, race/ethnicity, and region, 1988-1992

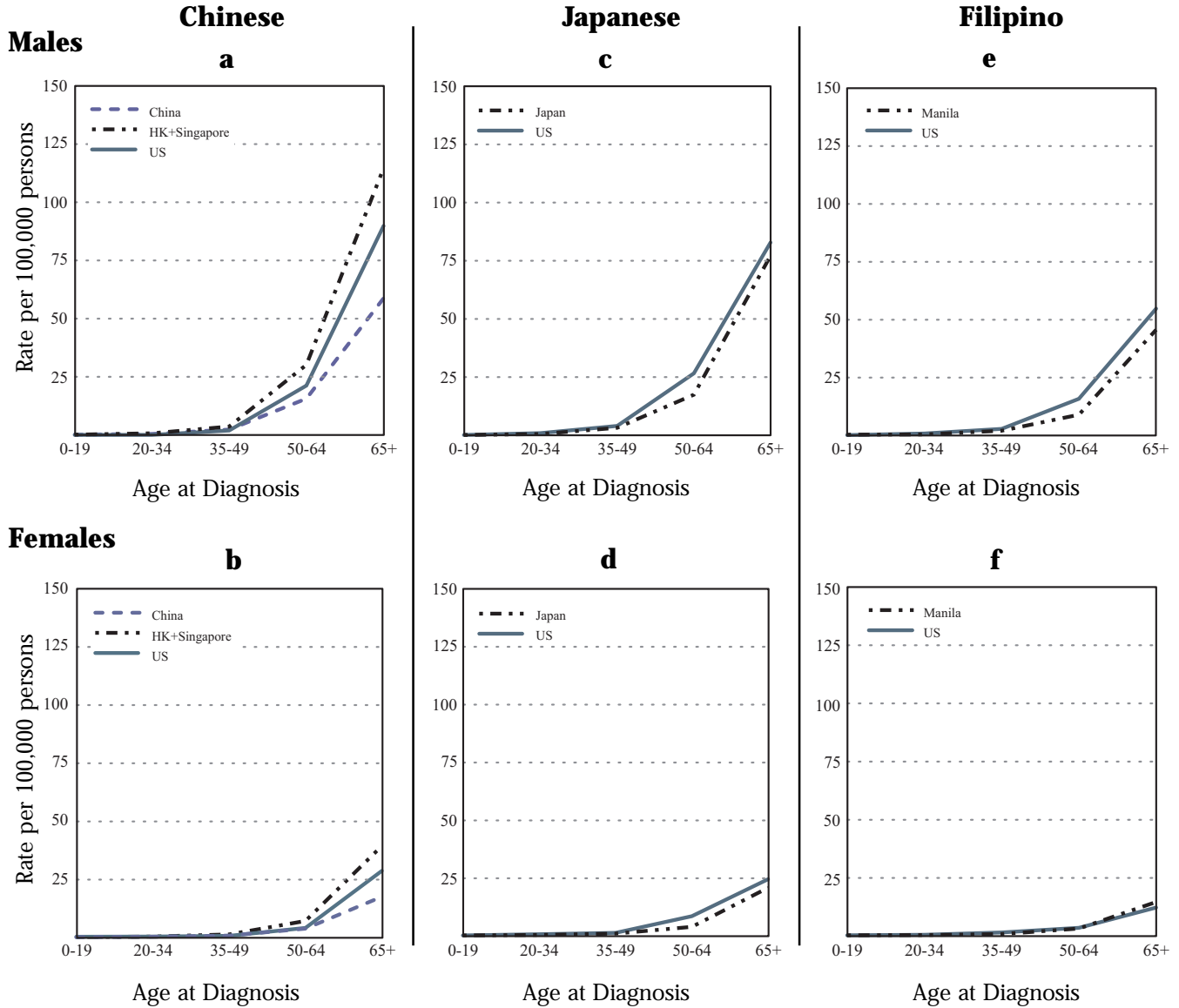


1 US SEER program and California
 2 Shanghai and Tianjin
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 4 Miyagi, Nagasaki, Osaka, Yamagata, Saga

ing, which remains the strongest environmental risk factor for this disease². Smokers' risk of bladder cancer may be up to three times that of non-smokers³. Risk increases with the number of cigarettes smoked per day, but the length of the smoking habit may be as or more important than the intensity, as cessation of smoking has been associated with a 30-60% reduction in bladder cancer risk³. Components of cigarette smoke, specifically arylamine compounds, are believed to be involved in bladder carcinogenesis in smokers. Occu-

involved in detoxifying the carcinogenic by-products of arylamine metabolism. The "slow acetylator" phenotype of this enzyme, associated with slower metabolism of the by-products, has been linked to decreased risk of bladder cancer as well as to Japanese or Chinese race/ethnicity in a sample of men in Los Angeles^{4,5}.

Figure 2: Age-specific incidence rates by race/ethnicity, sex, and region, 1988-1992



Incidence

In the period 1988-1992, age-adjusted incidence rates of bladder cancer were three to four times higher in Asian males than in Asian females (Figure 1), an observation consistent with findings in non-Asian populations¹. In the US, incidence patterns were similar for Chinese and Japanese populations; however, for US Filipinos, rates were lower at all ages (Figures 1-2e). In Asia, too, age-adjusted rates in Manila were lower than those in China or Japan (Figure 1). Within racial/ethnic groups, incidence rates of bladder cancer tended to be slightly higher in US than Asian populations. An exception is the Hong Kong/Singapore Chinese, whose rates were markedly higher than rates for Chinese in the US or China (Figures 1-2b); however, comparisons with the China data may be problematic, as the exclu-

sion of *in situ* diagnoses from the Shanghai and Tianjin registries may cause underestimation of the true incidence in those populations. Differences in bladder cancer occurrence among populations may be related to differences in smoking characteristics, but in this data, differences between US and Asian groups of the same race/ethnicity do not mimic trends for other smoking-related cancers such as lung and esophagus, for which rates in Asia were higher than rates in the US. Thus, it is not clear why the incidence of bladder cancer in US Asians is elevated above that of similar groups in Asia.

THYROID

Five-Year Counts, Average Annual Age-Adjusted Incidence Rates and 95% Confidence Intervals by Registry Group and Sex, 1988-1992¹

Registry Group	Count	US Standard		World Standard	
		Rate	95% CI	Rate	95% CI

TOTAL

Chinese					
US ²	203	4.2	3.6-4.9	3.9	3.4-4.5
China ³	1209	1.9	1.8-2.0	1.8	1.7-1.9
HK ⁴ /Singapore	1924	4.8	4.6-5.0	4.4	4.2-4.6
Japanese					
US	169	4.2	3.6-4.9	3.8	3.2-4.4
Japan ⁵	3090	3.5	3.3-3.6	3.0	2.9-3.2
Filipino					
US	477	9.7	8.8-10.7	9.0	8.2-9.8
Manila	884	6.8	6.3-7.3	6.0	5.5-6.4

MALES

Chinese					
US	45	2.0	1.4-2.6	1.8	1.3-2.3
China	323	1.1	1.0-1.2	1.0	0.9-1.1
HK/Singapore	429	2.3	2.1-2.5	2.0	1.8-2.2
Japanese					
US	41	2.3	1.6-3.1	2.0	1.4-2.7
Japan	559	1.4	1.3-1.5	1.2	1.1-1.3
Filipino					
US	93	4.4	3.5-5.4	3.8	3.1-4.7
Manila	175	3.4	2.8-4.0	2.9	2.4-3.4

FEMALES

Chinese					
US	158	6.4	5.4-7.5	6.0	5.0-7.0
China	886	2.8	2.6-2.9	2.6	2.4-2.8
HK/Singapore	1495	7.3	7.0-7.7	6.8	6.5-7.2
Japanese					
US	128	5.8	4.8-6.9	5.3	4.4-6.3
Japan	2531	5.3	5.1-5.5	4.8	4.6-5.0
Filipino					
US	384	14.0	12.6-15.5	13.1	11.8-14.5
Manila	709	9.8	8.9-10.6	8.7	8.0-9.4

¹ Data are not shown for rates based on fewer than 5 cases.

² US = SEER + California

³ China = Shanghai + Tianjin

⁴ HK = Hong Kong + Singapore Chinese

⁵ Japan = Miyaki, Osaka, Saga, Yamagata, Nagasaki

THYROID

Five-Year Counts, Average Annual Age-Specific Incidence Rates and 95% Confidence Intervals by Registry Group, Age, and Sex, 1988-1992¹

Age Group	MALES			FEMALES		
	Count	Rate	95% CI	Count	Rate	95% CI
US²-Chinese						
0-19	<5	-	-	7	1.3	0.5-2.6
20-34	5	0.9	0.3-2.0	37	6.3	4.4-8.6
35-49	14	2.9	1.6-4.9	58	11.3	8.6-14.6
50-64	9	3.5	1.6-6.6	27	9.8	6.5-14.3
65+	16	8.7	5.0-14.1	29	13.3	8.9-19.1
China³						
0-19	8	0.1	0.1-0.3	10	0.2	0.1-0.3
20-34	55	0.7	0.5-0.9	184	2.5	2.1-2.9
35-49	88	1.4	1.1-1.7	330	5.7	5.1-6.4
50-64	99	2.3	1.9-2.8	226	5.1	4.4-5.8
65+	73	3.2	2.5-4.0	136	4.9	4.1-5.8
Hong Kong/Singapore Chinese						
0-19	11	0.2	0.1-0.3	47	0.9	0.6-1.1
20-34	92	1.6	1.3-1.9	380	6.6	6.0-7.3
35-49	106	2.5	2.1-3.0	432	11.2	10.2-12.3
50-64	131	5.1	4.2-6.0	361	15.1	13.6-16.8
65+	89	6.6	5.3-8.1	275	15.4	13.7-17.4
US-Japanese						
0-19	<5	-	-	<5	-	-
20-34	8	2.0	0.9-4.0	22	5.7	3.6-8.7
35-49	8	2.4	1.0-4.7	29	8.1	5.4-11.6
50-64	9	4.0	1.8-7.6	40	11.8	8.4-16.0
65+	16	7.6	4.3-12.3	37	14.2	10.0-19.6
Japan⁴						
0-19	8	0.1	0.0-0.2	32	0.3	0.2-0.5
20-34	30	0.4	0.3-0.6	197	2.6	2.3-3.0
35-49	114	1.4	1.1-1.6	739	8.7	8.0-9.3
50-64	196	3.0	2.6-3.4	838	12.1	11.3-12.9
65+	211	6.4	5.5-7.3	725	14.3	13.3-15.4
US-Filipino						
0-19	<5	-	-	5	0.7	0.2-1.6
20-34	10	1.7	0.8-3.1	76	11.5	9.1-14.4
35-49	28	5.7	3.8-8.3	144	23.8	20.1-28.0
50-64	25	10.3	6.7-15.2	101	32.4	26.4-39.3
65+	29	14.8	9.9-21.2	58	28.7	21.8-37.1
Manila						
0-19	7	0.1	0.1-0.3	26	0.5	0.4-0.8
20-34	40	1.2	0.9-1.7	214	5.9	5.2-6.8
35-49	33	2.0	1.3-2.7	185	10.9	9.4-12.6
50-64	57	7.9	6.0-10.2	191	23.7	20.5-27.4
65+	38	16.2	11.4-22.2	93	28.8	23.3-35.3

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² US = SEER + California

³ China = Shanghai + Tianjin

⁴ Japan = Miyaki, Osaka, Saga, Yamagata, Nagasaki

URINARY BLADDER

Five-Year Counts, Average Annual Age-Adjusted Incidence Rates and 95% Confidence Intervals by Registry Group and Sex, 1988-1992¹

Registry Group	Count	US Standard		World Standard	
		Rate	95% CI	Rate	95% CI

TOTAL

Chinese					
US ²	308	7.6	6.8-8.6	5.7	5.0-6.3
China ³	2870	5.5	5.2-5.7	4.1	3.9-4.2
HK ⁴ /Singapore	3460	10.6	10.2-10.9	8.0	7.7-8.2
Japanese					
US	348	7.9	6.9-8.8	5.8	5.2-6.5
Japan ⁵	5371	6.1	6.0-6.3	4.5	4.4-4.6
Filipino					
US	204	5.0	4.3-5.8	3.7	3.2-4.3
Manila	295	4.0	3.5-4.5	3.0	2.7-3.4

MALES

Chinese					
US	229	12.2	10.5-13.9	9.1	7.9-10.3
China	2170	9.0	8.6-9.5	6.7	6.4-7.0
HK/Singapore	2529	17.3	16.6-18.0	12.9	12.4-13.4
Japanese					
US	251	13.0	11.2-14.9	9.8	8.5-11.1
Japan	3992	11.0	10.6-11.3	8.1	7.8-8.3
Filipino					
US	162	8.3	7.0-9.6	6.3	5.3-7.3
Manila	213	6.5	5.6-7.6	4.9	4.2-5.6

FEMALES

Chinese					
US	79	3.7	2.9-4.6	2.7	2.1-3.3
China	700	2.5	2.3-2.7	1.9	1.7-2.0
HK/Singapore	931	5.2	4.8-5.5	3.8	3.5-4.0
Japanese					
US	97	3.8	2.9-4.7	2.8	2.2-3.4
Japan	1379	2.7	2.5-2.8	1.9	1.8-2.0
Filipino					
US	42	1.9	1.3-2.6	1.5	1.0-2.0
Manila	82	2.0	1.6-2.5	1.5	1.2-1.9

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URINARY BLADDER

Five-Year Counts, Average Annual Age-Specific Incidence Rates and 95% Confidence Intervals by Registry Group, Age, and Sex, 1988-1992¹

Age Group	MALES			FEMALES		
	Count	Rate	95% CI	Count	Rate	95% CI

US²-Chinese

0-19	<5	-	-	<5	-	-
20-34	<5	-	-	<5	-	-
35-49	9	1.9	0.9-3.6	<5	-	-
50-64	55	21.2	16.0-27.6	11	4.0	2.0-7.2
65+	165	89.8	76.6-104.6	62	28.5	21.8-36.5

China³

0-19	<5	-	-	<5	-	-
20-34	32	0.4	0.3-0.5	15	0.2	0.1-0.3
35-49	144	2.3	1.9-2.7	40	0.7	0.5-0.9
50-64	660	15.6	14.4-16.8	165	3.7	3.2-4.3
65+	1330	58.7	55.6-61.9	480	17.4	15.9-19.1

Hong Kong/Singapore Chinese

0-19	5	0.1	0.0-0.2	<5	-	-
20-34	41	0.7	0.5-1.0	17	0.3	0.2-0.5
35-49	151	3.6	3.0-4.2	45	1.2	0.9-1.6
50-64	779	30.1	28.1-32.3	167	7.0	6.0-8.1
65+	1553	114.6	108.9-120.4	698	39.2	36.3-42.2

US-Japanese

0-19	<5	-	-	<5	-	-
20-34	<5	-	-	<5	-	-
35-49	13	3.9	2.1-6.6	<5	-	-
50-64	60	26.5	20.3-34.2	28	8.2	5.5-11.9
65+	175	82.7	70.9-95.9	63	24.3	18.6-31.0

Japan⁴

0-19	<5	-	-	<5	-	-
20-34	29	0.4	0.3-0.6	12	0.2	0.1-0.3
35-49	262	3.1	2.7-3.5	63	0.7	0.6-0.9
50-64	1141	17.3	16.4-18.4	256	3.7	3.3-4.2
65+	2557	77.0	74.0-80.0	1045	20.6	19.4-21.9

US-Filipino

0-19	<5	-	-	<5	-	-
20-34	<5	-	-	<5	-	-
35-49	13	2.7	1.4-4.5	7	1.2	0.5-2.4
50-64	38	15.7	11.1-21.5	10	3.2	1.5-5.9
65+	107	54.5	44.7-65.9	24	11.9	7.6-17.7

Manila

0-19	<5	-	-	<5	-	-
20-34	9	0.3	0.1-0.5	<5	-	-
35-49	32	1.9	1.3-2.7	9	0.5	0.2-1.0
50-64	64	8.8	6.8-11.3	23	2.9	1.8-4.3
65+	107	45.5	37.3-55.0	46	14.3	10.4-19.0

¹ Data are not shown for rates based on fewer than 5 cases.

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