

Cancer Incidence in the Republic of Panama, 1974-78^{1,2}

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ABSTRACT—Data were examined from the Panama National Cancer Register, which was created by the Panamanian National Oncology Institute in 1974 to record data on all histopathologically diagnosed cancers in the Republic. Age- and sex-specific incidence rates were summarized for all cancers registered between 1974 and 1978. The age-adjusted incidences of invasive cervical cancer (37.8/100,000 population), penis cancer (1.9/100,000), and oral cancer (male, 3.2/100,000; female, 3.7/100,000) were among the highest in the world. In addition, both male and female genital cancers were clustered in rural Herrera Province (age-adjusted incidence: cervix, 84.7; and penis, 4.3).—*JNCI* 1982; 68:219-225.

Tropical countries have historically devoted most of their health resources to the fight against infectious diseases. In countries such as Panama, with rapidly improving environmental and health standards, infectious diseases remain the principal cause of morbidity but not of mortality. In Panama, along with the population's increasing life-span, non-infectious chronic diseases are emerging as major health problems, as reflected in the documented cause-specific mortality rates. Cancer has been among the three principal causes of death since 1968 (1). The National Oncology Institute of Panama initiated a National Cancer Register in 1974 to document and quantify cancer incidence. This paper reports results gathered during the Registry's first 5 years.

METHODS

Beginning in 1974, the Panama National Cancer Register recorded all histologically diagnosed cancers. The secretary of the Registry routinely visited each certified pathologist in Panama and reviewed all histopathology reports. We made no attempt to register individuals with only clinically diagnosed malignancy nor have we included people certified as dying of cancer, but without histopathologic evidence. For each newly diagnosed cancer we recorded the patient's name, age, sex, hospital or clinic chart number, as well as the date of diagnosis, anatomic site and type of cancer coded according to ICD-9 (2), and town where the tissue specimen was obtained (this allowed a crude estimation of residence). Register data was maintained on a General Automation SPC 16/65 minicomputer system with the use of the Conversational Computer Statistical System (3). Duplicate registration was monitored by checking the patient's name and hospital or clinic chart number. When necessary, specific charts were retrieved to verify information.

¹ We obtained 1974-78 population data from the Census Bureau, Contraloría General de Panamá. Panama maintains an extremely accurate and current census. A complete national census was taken in 1970; a second census in 1975

counted the voting population for the Canal Treaty ratification; a third census in 1978 documented the voting population to elect the House of Representatives; the fourth complete census in 10 years occurred in May 1980. Activities throughout the entire country ceased on census day and people were required to remain at home until enumerated. The Government made particular effort to completely tabulate the rural population. To compare Panama's cancer incidence rates with data reported by other countries, we adjusted the age to the standard world population (4). We used the Mantel-Haenszel method (5) to contrast age-specific interprovince incidence rates.

Cancer data from Darien Province or Comarca de San Blas are not reported. These areas are extremely isolated and have limited health care facilities. Data from Chiriqui and Bocas del Toro Provinces were combined.

RESULTS

The Republic of Panama is a rapidly developing tropical Latin American Country located 7° north of the equator. At the chronological midpoint of this report in 1976, the population of Panama was estimated as 1,718,700; with its 77,082-km² surface area, Panama had an overall population density of 24.9 persons/km².

Panama's public health system operated clinics and hospitals in each province (1). In 1976 there were 7.9 physicians per 10,000 population. This ratio ranged from 19.3 per 10,000 in the capital city to 2.7 per 10,000 in the most remote province. In 1976 Panama had 330 health care centers (30 hospital medical centers, 12 hospitals, and 288 health centers with outpatient clinics) or 1.9 health care centers per 10,000 inhabitants. Panama's cause-specific mortality rates reflected her excellent health care delivery sys-

ABBREVIATIONS USED: IARC=International Agency for Research on Cancer; ICD=International Classification of Diseases.

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tem; ischemic heart disease, cancer, accidents-suicide-homicide, and stroke have constituted the principal causes of death since 1968 (1).

The average annual male and female age-specific incidence rates for all cancers registered during the period 1974-78 are shown in tables 1 and 2. Invasive cervical cancer was the most frequently diagnosed malignancy and accounted for 33% of female cancers. In addition, Panama's invasive cervical cancer incidence rate was higher than that in most of the countries in the World Health Organization and IARC registry programs (table 3) (6). Penis cancer also had a unusually high incidence compared to that of other areas (table 4).

Panama's cervical cancer incidence varied by province (text-fig. 1). Women living in Herrera Province had a risk of invasive cervical cancer 1.6 times that of women from

Panama Province and 4.5 times more than the combined remaining provinces (overall rate 18.8 cases per 100,000). These relative risks remained constant between 1974 and 1978. Herrera had significantly greater in situ and invasive cervical cancer incidence rates than Panama Province ($P < .001$) and both diseases were significantly more frequent in Panama Province than in the combined other provinces ($P < .001$) (tables 5 and 6).

Penile cancer incidence also varied by province (text-fig. 2). Men from Herrera had a 1.7 times greater penile cancer incidence than that of males diagnosed in Panama Province and 3.4 times the risk of men in the combined other provinces (1.27 per 100,000). Since only 52 such cancers occurred during the study, differences in annual incidence were not apparent.

In addition to having a high overall rate, women from

TABLE 1.—Male cancer incidence rates, Republic of Panama, 1974-78

Site	No. of total cases		Average annual incidence per 100,000 by age group, yr													Crude rate ^a	Standardized rate ^b	ICD code
	All ages	Unknown age	0-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60+				
Lip, vermilion border	2	1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.1	1.1	140	
Tongue	26	2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	1.3	2.5	8.1	0.6	1.1	141	
Salivary gland	25	2	0.1	0.0	0.0	0.8	0.7	0.4	0.4	1.1	0.6	2.0	0.8	4.1	0.6	0.9	142	
Mouth	80	4	0.0	0.0	0.0	0.0	0.7	0.8	0.4	2.6	1.8	4.0	9.0	20.3	1.9	3.1	143-145	
Oropharynx	17	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.7	0.8	5.3	0.4	0.7	146	
Nasopharynx	17	1	0.0	0.0	0.0	0.3	0.0	1.2	1.0	2.1	1.2	1.3	0.8	0.8	0.4	0.5	147	
Hypopharynx	8	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.0	0.0	2.4	0.2	0.3	148	
Esophagus	48	1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.6	1.2	3.3	2.5	13.8	1.1	2.0	150	
Stomach	270	12	0.0	0.0	0.0	0.5	1.3	3.2	3.6	6.3	13.6	28.1	27.1	56.0	6.5	10.4	151	
Small intestine	4	1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.8	0.1	0.1	152	
Colon	44	6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.6	1.8	3.3	4.9	10.6	1.2	1.8	153	
Rectum	83	6	0.0	0.0	0.0	0.5	0.7	0.4	1.0	0.5	2.4	7.4	11.5	18.7	2.0	3.2	154	
Liver	54	4	0.0	0.0	0.0	0.0	0.7	0.4	1.3	1.6	0.6	2.7	9.0	11.8	1.3	2.1	155	
Gallbladder	24	2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.2	0.7	4.1	6.1	0.6	1.0	156	
Pancreas	15	1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.6	2.0	1.6	3.2	0.4	0.6	157	
Nose, sinuses	8	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.6	0.0	0.8	1.6	0.2	0.3	160	
Larynx	67	7	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	3.6	2.7	9.9	17.0	1.7	2.7	161	
Bronchus, trachea, lung	128	15	0.0	0.0	0.0	0.0	0.0	0.0	1.8	2.6	5.3	12.0	20.5	27.2	3.3	5.0	162	
Bone	32	2	0.2	0.9	0.9	1.1	1.0	1.2	0.4	1.1	1.8	0.7	1.6	0.8	0.8	0.8	170	
Connective tissue	68	1	0.2	0.8	0.0	1.1	1.6	2.0	1.3	2.1	4.1	4.7	2.5	9.3	1.6	2.3	171	
Melanoma of skin	23	3	0.0	0.0	0.0	0.5	0.0	0.0	0.9	2.1	0.0	0.0	2.5	4.9	0.6	0.9	172	
Other skin	433	67	0.0	0.2	0.0	1.1	2.0	3.6	10.2	8.9	15.4	33.4	38.6	101.4	11.5	16.9	173	
Prostate	333	24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.2	6.0	20.5	119.7	8.2	14.4	185	
Testis	13	0	1.0	0.2	0.7	0.3	0.7	0.8	0.0	0.0	0.0	0.7	0.0	0.4	0.3	0.3	186	
Penis	51	1	0.0	0.0	0.0	0.5	0.0	1.2	0.0	2.1	5.3	2.7	3.3	10.1	1.2	1.9	187	
Bladder	59	9	0.0	0.0	0.0	0.3	0.0	0.0	1.3	1.1	1.2	2.7	4.1	17.0	1.6	2.4	188	
Other urinary	28	4	0.4	0.0	0.0	0.0	0.0	0.4	0.4	2.1	1.2	2.0	0.8	4.5	0.7	1.0	189	
Eye	20	0	0.5	0.2	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.7	1.6	2.4	0.5	0.6	190	
Brain, nervous system	48	4	0.5	0.2	0.9	1.1	1.3	1.2	2.2	0.0	1.2	2.0	3.3	4.5	1.2	1.4	191-192	
Thyroid	17	1	0.1	0.0	0.0	0.3	0.0	0.8	2.2	0.0	1.8	0.0	1.6	1.2	0.4	0.5	193	
Other endocrine	6	1	0.0	0.0	0.0	0.0	0.3	0.0	0.4	0.5	0.0	0.7	0.0	0.0	0.2	0.2	194	
Lymphosarcoma	45	1	0.3	0.4	0.9	0.3	1.0	0.8	0.4	2.1	0.6	2.7	0.8	7.3	1.1	1.5	200	
Hodgkin's lymphoma	43	4	0.7	0.8	1.2	1.1	1.6	1.2	0.0	0.5	0.6	0.7	2.5	2.4	1.1	1.1	201	
Other reticulososes	26	4	0.1	0.2	0.5	0.3	0.3	0.4	0.9	0.5	0.6	1.3	2.5	4.1	0.7	0.9	202	
Multiple myeloma	9	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.8	2.8	0.3	0.4	203	
Other and unspecified	114	17	0.1	0.4	0.0	0.3	1.0	2.0	0.9	0.5	2.9	6.7	11.5	26.4	3.0	4.4	149, 158, 159, 163, 195, 196, 199	
All sites	2,288	215	3.3	4.1	5.3	10.4	15.0	22.7	33.3	48.2	77.5	140.9	205.4	530.1	57.7	89.0		

^a Average total annual incidence per 100,000 population.

^b Incidence per 100,000 population adjusted to standard world population.

Herrera developed invasive cervical cancer at an unusually young age (table 5). The Herrera invasive cervical cancer incidence among 20-39-year-old women was several times greater than that for the rest of the country. The age distribution of in situ carcinoma was similar throughout Panama (table 6), and women younger than 50 years were involved. Penis cancer mainly involved older men, and age-specific incidence rates were similar throughout the country.

DISCUSSION

The Panama National Cancer Register had two limitations. First, because it enumerated only histologically diagnosed disease, true cancer incidence was underestimated. However, limiting registration to confirmed diagnoses eliminated local variation in clinical diagnostic criteria. Histologic standards were constant because most biopsies were

TABLE 2.—Female cancer incidence rates, Republic of Panama, 1974-78

Site	No. of total cases		Average annual incidence per 100,000 by age group, yr													Crude rate ^a	Standardized rate ^b	ICD code ^c
	All ages	Unknown age	0-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60+				
Lip, vermilion border	1	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	140	
Tongue	21	1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.8	0.0	7.9	0.5	0.9	141	
Salivary gland	16	1	0.0	0.0	0.0	0.3	0.0	0.0	0.9	0.6	2.6	3.0	1.9	0.8	0.4	0.6	142	
Mouth	84	7	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.6	2.0	3.8	3.7	28.5	2.2	3.7	143-145	
Oropharynx	9	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.9	2.5	0.2	0.4	146	
Nasopharynx	6	2	0.0	0.0	0.0	0.3	0.0	0.0	0.5	0.0	0.0	0.8	1.9	0.4	0.2	0.2	147	
Hypopharynx	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	0.1	148	
Esophagus	30	2	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.6	2.6	4.5	0.9	7.0	0.8	1.3	150	
Stomach	153	7	0.0	0.0	0.0	0.8	0.7	1.6	4.2	6.8	7.8	9.8	20.5	31.4	3.8	6.1	151	
Small intestine	4	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	1.2	0.1	0.2	152	
Colon	63	5	0.0	0.2	0.2	0.8	0.3	1.6	1.4	2.3	2.0	3.8	4.7	13.6	1.6	2.4	153	
Rectum	76	9	0.0	0.0	0.0	0.0	0.7	0.4	0.5	2.3	4.6	7.6	13.1	15.3	2.0	3.1	154	
Liver	36	5	0.0	0.0	0.0	0.3	0.0	0.8	1.4	1.1	2.6	0.0	5.6	7.4	1.0	1.4	155	
Gallbladder	42	4	0.0	0.0	0.0	0.0	0.0	0.4	0.9	0.0	1.3	0.8	7.5	11.6	1.1	1.8	156	
Pancreas	9	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.7	0.0	0.9	2.1	0.2	0.4	157	
Nose, sinuses	8	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.8	2.8	1.2	0.2	0.3	160	
Larynx	20	2	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.6	1.3	1.5	3.7	3.7	0.5	0.8	161	
Trachea, bronchus, lung	47	3	0.0	0.0	0.2	0.5	0.3	0.0	0.9	0.0	2.0	3.8	9.3	9.6	1.2	1.9	162	
Bone	22	0	0.3	0.4	1.1	0.8	0.0	0.0	0.5	0.6	0.7	1.5	0.0	1.2	0.5	0.6	170	
Connective tissue	55	10	0.2	0.6	0.9	0.8	1.0	2.4	1.9	1.7	3.9	3.0	2.8	5.4	1.5	1.8	171	
Melanoma of skin	20	0	0.0	0.2	0.0	0.3	0.3	0.4	0.0	0.0	0.0	3.0	2.8	3.7	0.5	0.8	172	
Other skin	364	59	0.0	0.0	0.2	0.5	2.6	4.1	10.2	11.3	19.6	27.9	35.5	80.9	10.0	14.7	173	
Breast	382	34	0.0	0.0	0.2	0.8	3.9	9.8	16.6	22.6	33.3	34.7	39.2	52.5	9.8	14.4	174	
Cervix uteri ^c	1,069	62	0.0	0.0	0.5	6.1	22.6	46.8	60.1	75.2	86.2	94.4	86.8	102.0	26.7	37.8	180	
Placenta	18	1	0.0	0.0	0.7	1.1	2.0	0.0	0.9	0.0	1.3	0.8	0.0	0.0	0.5	0.5	181	
Corpus uteri	104	4	0.0	0.0	0.0	1.1	0.7	2.0	2.3	2.8	3.3	6.0	14.0	22.7	2.6	4.1	182	
Ovary	91	5	0.0	0.8	1.1	0.5	1.0	2.4	3.2	7.9	4.6	15.1	6.5	6.6	2.3	3.1	183	
Other female genital	61	6	0.0	0.0	0.0	0.3	0.0	0.8	2.3	2.8	5.2	2.3	7.5	12.0	1.6	2.4	184	
Bladder	29	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.5	4.7	8.7	0.9	1.3	188	
Other urinary	27	4	0.5	0.2	0.0	0.0	0.3	0.0	0.9	2.3	0.7	0.8	1.9	3.7	0.7	0.9	189	
Eye	6	5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.8	0.0	1.2	0.3	0.2	190	
Brain, nervous system	28	6	0.2	0.4	0.2	0.3	0.7	0.4	0.9	1.1	3.3	3.0	1.9	1.7	0.8	0.9	191-192	
Thyroid	53	6	0.1	0.2	0.0	1.1	2.9	2.9	1.9	5.1	5.2	0.8	1.9	2.9	1.4	1.7	193	
Other endocrine	5	0	0.0	0.2	0.0	0.0	0.0	0.0	0.9	0.6	0.7	0.0	0.0	0.0	0.1	0.2	194	
Lymphosarcoma	31	3	0.1	0.4	0.0	0.0	0.3	0.0	0.9	0.0	1.3	3.8	2.8	6.2	0.8	1.2	200	
Hodgkin's lymphoma	25	0	0.2	0.2	0.5	1.3	0.3	0.8	0.9	0.0	0.0	0.8	2.8	2.5	0.6	0.8	201	
Other reticuloses	21	2	0.0	0.0	0.2	0.5	0.0	0.0	0.5	1.1	2.0	2.3	0.9	3.3	0.5	0.8	202	
Multiple myeloma	5	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	1.2	0.2	0.2	203	
Other and unspecified	141	14	0.1	0.6	0.5	1.1	2.0	2.0	2.8	2.8	6.5	11.3	14.0	18.6	2.7	3.8	149, 158, 159, 163, 195, 196, 199	
All sites	3,184	282	1.7	4.3	1.4	18.7	43.8	80.6	117.8	156.0	209.1	255.3	294.0	481.9	81.6	121.5		
All sites except 180	2,115	220	1.7	4.3	5.9	12.7	21.2	33.8	57.7	80.8	122.8	160.9	207.2	379.9	54.2	80.7		

^a Average total annual incidence per 100,000 population.

^b Incidence per 100,000 population adjusted to standard world population.

^c Includes only invasive cervical cancer.

cancer incidence rates also existed. Women from Herrera had 1.6 times the risk of developing invasive cervical carcinoma compared to women from Panama Province, and a

4.5-times greater risk than that of women from the combined other Provinces. No area in the world has documented a higher cervical cancer incidence than Herrera, and we know

TABLE 5.—Summary of province and age-specific average annual incidence/100,000 of invasive cervical carcinoma, Panama 1974-78

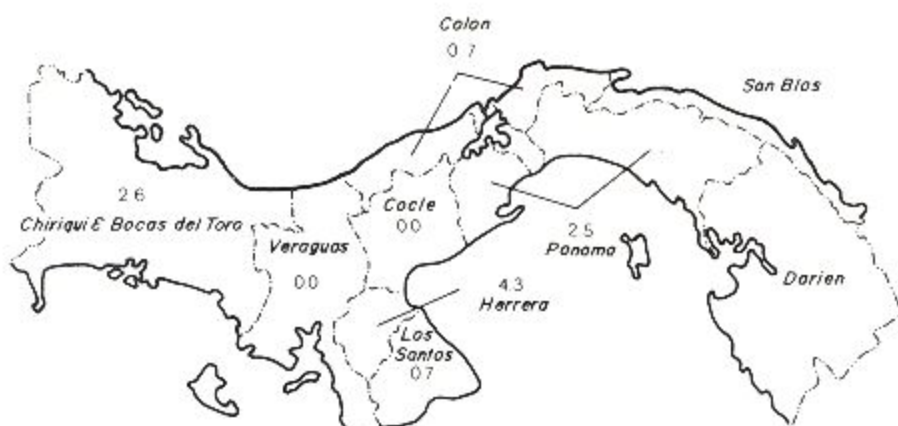
Age, yr	Incidence rate by province							Combined incidence, except Panama and Herrera
	Cocle	Colon	Chiriqui and Bocas del Toro	Herrera	Los Santos	Panama	Veraguas	
15-19	0.0	2.5	0.0	5.4	0.0	0.0	0.0	0.5
20-24	0.0	2.9	9.1	18.3	0.0	6.8	0.0	4.0
25-29	4.6	27.2	13.4	154.1	0.0	20.8	3.7	11.5
30-34	33.6	26.5	16.1	92.7	20.2	71.4	4.5	19.0
35-39	31.6	61.8	41.2	196.5	0.0	75.5	9.6	33.6
40-44	8.4	48.0	70.7	126.9	25.2	102.6	26.2	44.2
45-49	17.4	40.6	44.2	216.1	44.2	117.5	68.8	42.0
50-54	20.1	13.9	88.2	252.1	52.2	133.4	9.0	42.2
55-59	10.2	51.5	51.6	79.4	0.0	136.0	33.2	35.2
60+	16.3	70.4	74.8	151.7	15.6	152.2	37.3	51.6
Age adjusted ^a	9.0	38.1	26.8	84.7	9.7	53.1	12.7	18.8
Total No. of cases								
All ages	21	69	130	127	12	744	28	260
Unknown age	0	1	8	9	0	42	1	10

^a Average annual incidence per 100,000 adjusted to standard world population.

TABLE 6.—Summary of province and age-specific average annual incidence/100,000 of in situ cervical carcinoma, Panama 1974-78

Age, yr	Incidence rate by province							Combined incidence, except Panama and Herrera
	Cocle	Colon	Chiriqui and Bocas del Toro	Herrera	Los Santos	Panama	Veraguas	
15-19	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0
20-24	0.0	17.2	1.5	79.2	0.0	27.2	0.0	4.0
25-29	4.6	31.1	38.4	259.1	63.6	89.1	3.7	27.3
30-34	16.8	22.1	66.8	303.3	50.6	142.8	18.0	39.7
35-39	18.9	41.2	72.2	255.4	10.6	137.9	24.1	43.1
40-44	25.2	36.0	20.2	265.3	25.2	110.9	6.5	22.1
45-49	8.7	33.8	40.2	28.8	0.0	92.9	7.3	23.8
50-54	20.1	13.9	24.5	151.3	17.4	50.8	18.1	19.5
55-59	0.0	34.3	45.2	0.0	19.4	47.9	11.1	25.4
60+	5.4	3.7	10.7	75.8	0.0	34.3	0.0	5.2
Age adjusted ^a	6.1	14.3	19.4	94.1	11.9	46.9	5.0	12.8
Total No. of cases								
All ages	15	47	115	157	19	790	18	214
Unknown age	1	2	5	3	1	40	3	12

^a Average annual incidence per 100,000 adjusted to standard world population.



TEXT-FIGURE 2.—Penis cancer incidence in Panama, by province, age adjusted to standard world population.

that the histopathologically based Panama National Cancer Register not only underenumerated the actual number of cases but also was biased to classify many women from Herrera as residents of Panama Province.

Cancer of the penis also presented an extremely high incidence in Panama between 1974 and 1978 and was clustered in Herrera Province. Although rare in most of the world, cancer of the penis constitutes a public health problem in several developing countries of South America and the Caribbean (6, 13).

A relationship between carcinoma of the cervix and that of the penis was suggested by data from Puerto Rico (14) but has not been verified in other studies (15, 16). Some investigators (17, 18) have hypothesized a relationship between "high risk males" and cervical cancer, and this may be related to the occurrence of penile cancer. However, cancer of the penis and perhaps of the cervix may reflect other factors such as general hygiene.

We have evaluated several possible confounding factors but none of them seemed to account for this provincial clustering. Errors in enumerating the denominator, the population at risk, do not account for our findings. As stated previously, the Republic of Panama maintains an extremely complete and current census. The government has a special interest in delineating the rural population, which is stable and has not been affected by large-scale immigration. In addition, we eliminated Panama's two isolated undeveloped provinces from our analysis.

Similarly, the high invasive cervical cancer rate observed in Herrera was not due to bias in interpreting the tissue specimens. Since only Panama, Colon, and Chiriqui Provinces had pathology laboratory services between 1974 and 1978 (19), all histologic material from Herrera and the other outlying provinces was sent to Panama City and was evaluated (irrespective of origin) at either Santo Tomas or Seguro Social Hospital. Both hospitals have active pathology residency programs and maintain frequent interchange with pathologists at major U.S., South American, and European medical schools. The higher cancer incidence rates attributed to Panama Province were due to the many patients who were referred to hospitals in the capital for diagnosis and treatment.

Finally, differences in medical care could not have accounted for the extremely high rates of cervix and penis cancer seen in Herrera. Herrera was similar to other rural provinces with respect to physicians' services: physician-to-population ratio, availability of primary health care facilities, and overall patient utilization of such facilities (19). Moreover, if an unusually high awareness of cancer as a problem had prevailed, or an exceptionally aggressive group of gynecologists had worked in Herrera, the rates of other cancers should have been high also, but this was not the case (table 7).

Women living in Herrera were more likely to have Papanicolaou's (Pap) smears than women from other provinces. Between 1974 and 1978, an average of 9.9 per 100 Herrera women over 20 years of age had a Pap smear as contrasted to 6.4 per 100 in Panama Province and 4.6 per 100 in the combined other provinces. The extent to which Herrera's more intensive Pap smear program accounted for

TABLE 7.—Incidence per 100,000 adjusted to the standard world population of the most common cancers in males and females, Panama 1974-78

Site	Males			Females		
	Entire country	Herrera province	Panama province	Entire country	Herrera province	Panama province
Skin	16.9	11.5	26.8	14.7	13.2	23.5
Breast	—	—	—	14.4	5.5	24.8
Prostate	14.4	6.5	25.8	—	—	—
Stomach	10.4	9.4	17.2	6.1	5.2	10.3
Corpus uteri	—	—	—	4.1	1.7	6.7
Ovary	—	—	—	3.1	2.1	5.3
Other female genitals	—	—	—	2.4	3.1	3.8

the increased invasive cervical cancer incidence cannot be estimated using currently available data (20).

Herrera also demonstrated a unique age-specific cervical cancer profile. Herrera women between 20 and 39 years of age had a disproportionately high invasive cervical cancer risk. In the remainder of Panama, and the rest of the world, women older than 40 manifest the highest rates. This may imply that young women from Herrera were exposed to unique risk factors (21, 22). An understanding of these risk factors would not only contribute to the basic epidemiology of cervical cancer but would also allow development of effective local cancer prevention programs.

To explore this problem in more detail, we are currently updating the histologic National Cancer Registry to an expanded internationally standardized format similar to that recommended by the IARC (23). This will include the cancers diagnosed clinically as well as histologically, and contain information such as birthplace, town of residence, racial-ethnic group, occupation-socioeconomic status, and obstetric-gynecologic history.

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