Maryland 2007
Hospital Discharge Data from General Hospitals
For Maryland Residents with Cancer Diagnoses

Center for Cancer Surveillance and Control
Maryland Department of Health and Mental Hygiene
May 2012

Maya King, MPH
Ida Sahlu, MPH
Carmela Groves, RN, MS
Diane M. Dwyer, MD

Highlights of the 2007 Maryland hospital discharge data:

- 2.8% of all Maryland hospital discharges in 2007 had a primary diagnosis of cancer.

- Of the 707,097 Maryland hospital discharges in 2007, 35,127 (5.0%) had cancer listed in any one of the 15 discharge diagnostic categories. Of these 35,127 discharges, 20,033 (2.8% of all discharges) had cancer listed in the primary diagnostic category.

- 7,857 (39.0%) of hospital discharges for cancer in Maryland have one of the Cigarette Restitution Fund (CRF) targeted cancers (i.e., lung, colorectal, prostate, female breast, oral, melanoma, or cervical cancer) as the primary diagnosis.

- Of the seven targeted cancers, lung cancer had the highest number of hospital discharges in Maryland (2,535), compared to melanoma which had the lowest amount of hospital discharges (76).

- The total hospital cost for Maryland residents in whom the primary diagnosis on discharge was any type of cancer was $395,553,642 in 2007.

- For all targeted cancers combined, the median total hospital-specific costs (not including physician fees and laboratory fees) for all ages in 2007 was $13,014 per hospitalization.

- Of the seven targeted cancers, colorectal cancer had the highest median total hospital cost at $17,396; the second highest cost was for lung cancer with a median cost of $14,777, followed by oral cancer with a median cost of $14,602.

- For all targeted cancers combined, the mean total hospital-specific costs (not including physician fees and laboratory fees) for all ages in 2007 was $17,716 per hospitalization.

- Of the seven targeted cancers, oral cancer had the highest mean total hospital cost at $25,983; the second highest cost was for colorectal cancer with a mean cost of $23,207, followed by lung cancer with a mean cost of $18,224.

Background

The Cigarette Restitution Fund (CRF) in Maryland requires that funding be provided to local health departments in Maryland's 23 counties and to Baltimore City after the jurisdictions submit plans for the Cancer Prevention, Education, Screening, and Treatment Program. In Baltimore City, this has

been accomplished through the Johns Hopkins Medical Institutions, University of Maryland Medical Group, and Baltimore City Health Department. The CRF law also requires that the Maryland Department of Health and Mental Hygiene (DHMH) determine the "targeted cancers." The targeted cancers selected were lung and bronchus (called lung), colon and rectum (called colorectal), female breast, prostate, oral and pharyngeal (called oral), cervical, and melanoma.

The CRF law also requires that the local screening programs either pay for treatment of clients or link clients to treatment if they are diagnosed with a targeted or non-targeted cancer identified through the screening. Because of this requirement, determining the costs of cancer care is important for CRF planning in Maryland.

Maryland's hospital rates are regulated by the Health Services Cost Review Commission (HSCRC). Among other data, the HSCRC collects data from hospitals in Maryland about each hospital discharge and uses these data to determine the rates allowed for that facility. Because costs of hospitalization account for a major portion of the cost of cancer treatment, we sought to determine the number of hospitalizations and the cost of those hospitalizations among the residents of Maryland who have been discharged from reporting Maryland hospitals with a diagnosis of cancer.

The analysis presented in this document is designed to help planners at DHMH and the local programs allocate CRF funds for cancer prevention, education, screening, and treatment.

Methods

General hospitals in Maryland report a standard set of information to the HSCRC on each hospital discharge. The HSCRC makes available a database containing non-confidential (unidentified) discharge information for every year. In this report, DHMH staff analyzed the discharge data from the calendar year 2007, using SAS software.

DHMH examined the number of hospitalizations where cancer was listed as the primary diagnosis or among any of the 15 provided diagnoses, and compared the results to the total number of hospitalizations in 2007. The type of cancer for all 15 diagnostic positions was determined by the International Classification of Disease, Version 9 (ICD-9) Diagnostic Codes (for additional information on ICD codes, definitions and notes, see Attachments 1 and 2).

The number of general hospital discharges with cancer as the primary diagnosis was compared to the number of new cancer cases reported to the Maryland Cancer Registry diagnosed in that jurisdiction the same year. The cost of hospital discharges for every cancer as the primary diagnosis was also examined. Hospitalizations for which the total costs were zero dollars were

removed from the dataset for this analysis because they likely reflected patients who were not actually admitted.

Those discharged with cancer listed in the primary diagnostic position were most likely to be people hospitalized for that diagnosis. Discharges where cancer was listed in a 2nd through 15th position may have already had the same cancer listed as the primary diagnosis, had a different cancer as the primary diagnosis, or had a non-cancer primary diagnosis. Therefore, a **total** number of hospitalizations for that cancer could not be obtained. Determining whether the hospitalization was ***due to cancer*** was not possible when cancer was listed in the 2nd through 15th diagnostic category for the hospitalization.

The data were further stratified into three age groups: age 49 years and under; ages 50-64 years; and age 65 years and over.

For comparison across jurisdictions, the following measures were calculated: (1) crude rates for the population; (2) age-adjusted standardized rates using the 2000 U.S. standard million population, with age groups in 19 categories; and (3) ratio of the number of hospital discharges for cancer by the number of cancer cases reported in each jurisdiction. The population by county data used to calculate rates were obtained from the U.S. Census website (http://factfinder.census.gov).

Data obtained from HSCRC are secure from unauthorized access and disclosure. DHMH manages and releases this information in accordance with the HSCRC Data Use Agreement. Cells with counts of 0-5 hospital discharges are suppressed and presented as "<6." Complementary suppression of discharge counts in additional cell(s) is used, denoted by "s," to prevent back-calculation of numbers in those cells with primary suppression.

Results

Figure 1 (shown in Table 1) illustrates the distribution of cancer, defined as listed in any of the 15 diagnostic positions, and non-cancer general hospital discharges from Maryland hospitals in 2007. Of the 707,097 hospital discharges, 35,127 (5.0%) had a cancer listed in one or more of the diagnostic categories, and of those, 20,033 discharges (2.8%) had cancer listed as the primary diagnosis. Among discharges where cancer was listed as the primary diagnosis, Table 1 revealed that targeted cancers (lung, colorectal, prostate, female breast, oral, melanoma, and cervical) contributed a total of 7,857 (39.0%) of the 20,033 total cancer discharges primary diagnoses. By way of comparison, metastatic cancers are listed as the primary diagnosis in 4,379 (21.9%) of the 20,033 total cancer discharges.

Figure 2 (as depicted in Table 2) plots the total number of hospital discharges where cancer was listed as the primary diagnosis, by the jurisdiction of patient residence. The total number of hospital discharges

ranged from 89 discharges in Somerset County to 3,813 discharges in Baltimore County.

Figure 3 depicts the crude rate of general hospital discharges where cancer was listed as the primary diagnosis for each jurisdiction. Hospitalizations with a primary diagnosis of cancer ranged from 19.6 per 10,000 population in Charles County to 55.9 per 10,000 population in Talbot County.

Figure 4 shows the age-adjusted rate of hospital discharges by jurisdiction where cancer was listed as the primary diagnosis per 100,000 population. Hospital discharges ranged from 277.7 per 100,000 population in Garrett County to 534.9 per 100,000 population in Harford County.

Figure 5 shows the ratio of the number of hospital discharges where cancer is the primary diagnosis to the number of all new cancer cases reported for residents within each jurisdiction. Cecil County had the lowest ratio (0.49) and Baltimore City had the highest ratio (1.08). The ratio could be an indication of the burden of cancer in each jurisdiction. In Baltimore City, there were more hospital discharges (3,221) than new cancer cases (2,975) for 2007, which is why the ratio is greater than one. This could mean that some cases were diagnosed earlier, but hospitalized in 2007. The ratio was obtained by dividing the number of hospital discharges by the number of new cancer cases.

Figures 6 through 15 (as shown in Table 3) provide the number of hospital discharges by categorical costs for every type of cancer listed as the primary diagnosis. These figures show that among the targeted cancers, lung, colorectal and oral are the most expensive to treat. The total amount of hospital costs for Maryland residents, among whom the primary diagnosis on discharge was any type of cancer, was found to be $395,553,642. Table 3 further reveals information about the relative cost burden or cost of treatment among the seven targeted cancers. The total cost for all seven targeted cancers was $139,125,118 (35.2%) of the total for all cancers. The median of total hospital costs (not including physician fees and some laboratory fees) in 2007 for all targeted cancers combined was $13,014 per hospitalization. The three targeted cancers with the highest median hospital cost were: 1) colorectal ($17,396); 2) lung ($14,777); and 3) oral ($14,602). The median hospital cost for other cancers was $12,744. Hospital costs do *not* reflect physician and other costs that are billed separately. (See Attachment 2 for the definition of “total costs.”)

Tables 4, 5, and 6 display the total number of hospital discharges and hospital costs by cancer type, for three age groups: age 49 years and under; ages 50-64 years; and age 65 years and over. The median total hospital charges due to the seven targeted cancers fluctuated with age. For persons age 49 years and under, the median total cost in 2007 was $12,874 for all targeted cancers combined. For persons ages 50 to 64 years, the

median cost was $12,627; and for persons age 65 years and over, the median cost at discharge was $13,515.

Summary/Conclusion

Due to the requirement that local screening programs either pay for treatment of clients or link clients to treatment if they are diagnosed with a cancer identified through the screening, it is important to determine the financial impact of cancer care for Cigarette Restitution Fund (CRF) program planning in Maryland. While recognizing that cancer cases may be treated at either outpatient or inpatient facilities, the ideal method to evaluate the cost of cancer treatment is through Maryland hospital discharge data because costs of hospitalization account for a major portion of the cost of cancer treatment. The data also reflects the burden of cancer related to hospitalizations in each jurisdiction. A limitation is that this analysis includes hospital costs but excludes other costs that are not associated with the hospital bill (e.g., physician, internist, oncologist, or surgeon).

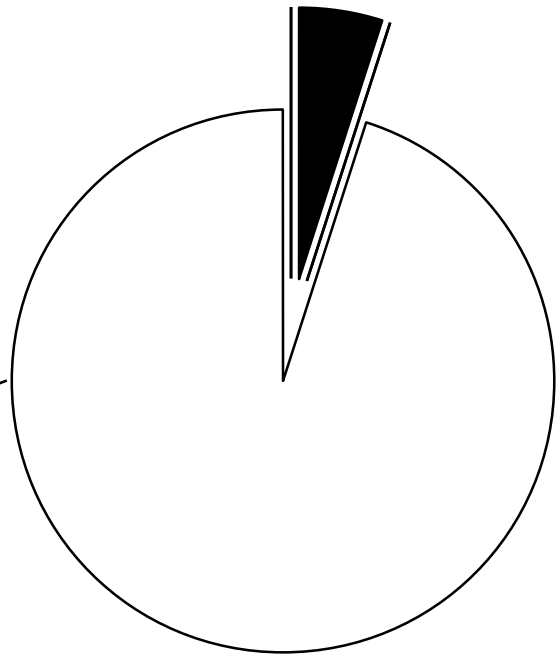
In the year 2007, there were 707,097 hospital discharges among Maryland residents. Of these 707,097 hospital discharges, 35,127 (5.0%) had cancer listed in at least one of the diagnostic categories and 20,033 discharges (2.8%) had cancer listed in the primary diagnosis.

Of the 20,033 discharges that had cancer in the primary diagnostic category, 7,857 (39.0%) of these discharges had one of the CRF targeted cancers (i.e., lung, colorectal, prostate, female breast, oral, melanoma, or cervical cancer) as the primary diagnosis. The median hospital cost for all seven targeted cancers was $13,014. Of the targeted cancers, the three highest median hospital costs were: colorectal cancer ($17,396), lung cancer ($14,777) and oral cancer ($14,602). Meanwhile, the median hospital cost for all other cancers was $12,744.

The mean hospital cost for all seven targeted cancers was $17,716. Of the targeted cancers, the three highest mean hospital costs were: oral cancer ($25,983), colorectal cancer ($23,207) and lung cancer ($18,224). Meanwhile, the mean hospital cost for all other cancers was $21,067. Due to the higher hospital cost to treat all targeted cancers compared to all other cancers, programs should focus their screening efforts towards reducing the incidence of these targeted cancers.

Figure 1.

Total General Hospital Discharges among Maryland Residents for Calendar Year 2007 (707,097)



Total Cancer General Hospital Discharges from Maryland Hospitals for 2007 where Cancer is listed in **any** diagnostic category = **35,127 (5.0%)**

Of these **35,127** discharges, **20,033 (2.8%** of all discharges**)** had Cancer in the primary diagnostic category

Total Non-Cancer General Hospital Discharges from Maryland Hospitals for 2007 = **671,970 (95.0%)**

Table 1.

Frequency of General Hospital Discharges in 2007 with Targeted and All Other Cancers Listed as the Primary Diagnosis* and Subsequent Diagnoses* among Maryland Residents

Hospital diagnosis position where cancer is listed	Type of Cancer										
	Lung	Colorectal	Female Breast	Prostate	Oral	Melanoma	Cervical	Total Targeted Cancer	Non-Targeted Cancer	Metastatic Cancer	Total Cancer
as Primary Dx	2,535	2,274	1,263	1,224	335	76	150	7,857	7,797	4,379	20,033
as 2nd Dx	317	96	47	21	18	s	<6	516	407	3,194	4,117
as 3rd Dx	151	50	69	38	s	21	<6	343	301	2,251	2,895
as 4th Dx	145	37	39	32	s	9	<6	271	247	1,719	2,237
as 5th Dx	169	39	45	32	10	<6	<6	302	198	1,303	1,803
as 6th Dx	103	25	41	26	7	<6	<6	208	188	892	1,288
as 7th Dx	49	14	32	20	<6	<6	<6	119	131	575	825
as 8th Dx	27	11	30	19	<6	<6	<6	95	100	400	595
as 9th Dx	15	<6	19	23	<6	<6	<6	70	84	269	423
as 10th Dx	9	<6	13	13	<6	<6	<6	43	64	142	249
as 11th Dx	9	<6	14	16	<6	<6	<6	43	52	133	228
as 12th Dx	<6	<6	13	18	<6	<6	<6	37	50	96	183
as 13th Dx	<6	<6	<6	9	<6	<6	<6	22	31	56	109
as 14th Dx	<6	<6	<6	<6	<6	<6	<6	15	18	46	79
as 15th Dx	<6	<6	<6	7	<6	<6	<6	15	29	19	63

<6 = Cells containing 0-5 hospital discharges are suppressed per HSCRC Data Use Agreement.

s = Data in a cell is suppressed to prevent disclosure of data in other cell(s).

*International Classification of Diseases, Version 9, Attachment 1

Figure 2.

Total of General Hospital Discharges in 2007 with Targeted and All Other Cancers Listed as the Primary Diagnosis by Jurisdiction of Residence

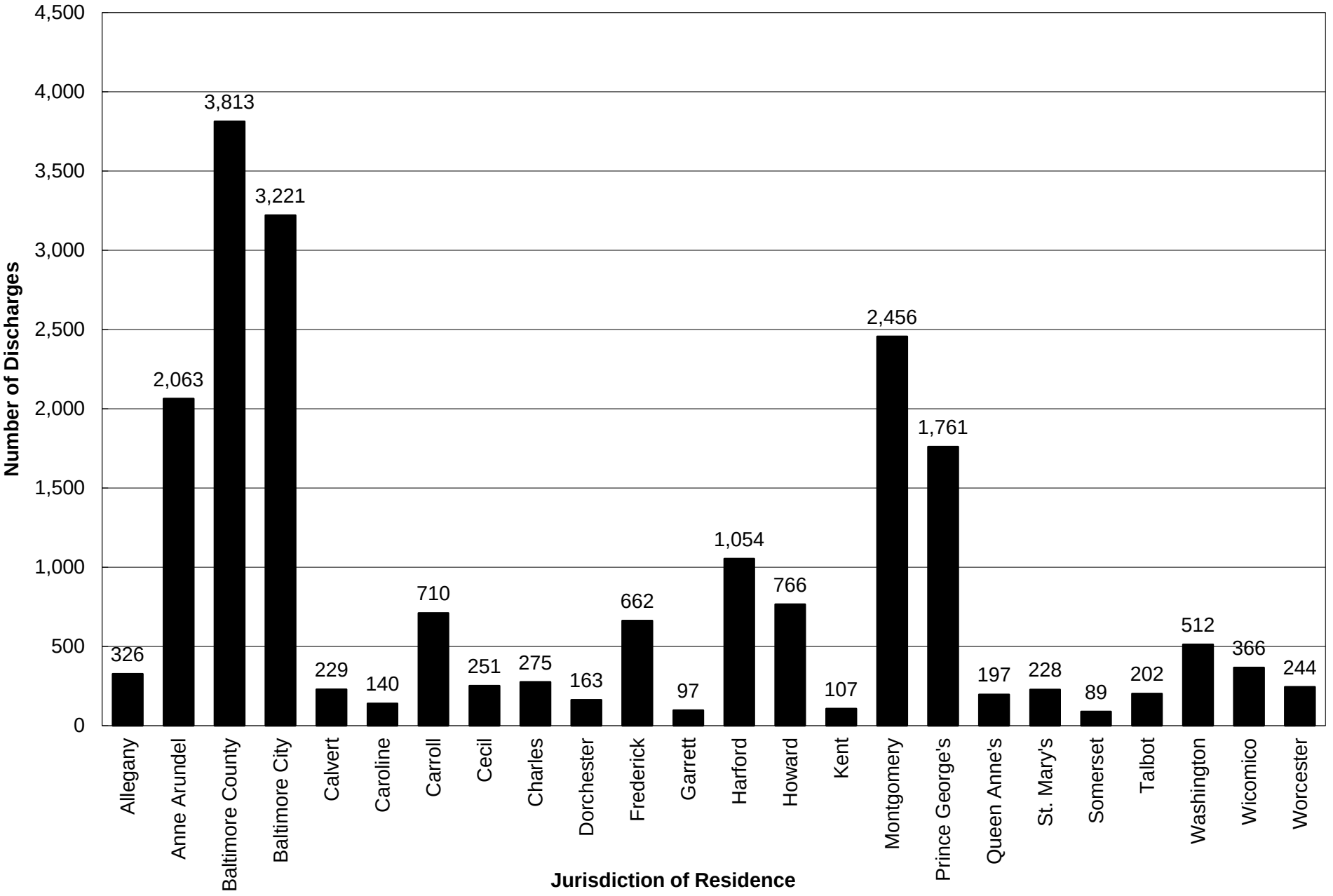


Table 2.

Number of General Hospital Discharges in 2007 with Targeted and All Other Cancers Listed as the Primary Diagnosis among Maryland Residents by Jurisdiction of Residence

Jurisdiction or County	Type of Cancer									
	Lung	Colorectal	Female Breast	Prostate	Oral	Melanoma	Cervical	Non-Targeted Cancer	Metastatic	Total
Allegany	42	56	11	15	<6	<6	<6	117	75	326
Anne Arundel	299	211	136	146	47	<6	s	767	437	2,063
Baltimore County	492	411	208	246	54	25	41	1,488	848	3,813
Baltimore City	449	348	209	160	61	7	39	1,212	736	3,221
Calvert	32	44	23	10	<6	<6	<6	64	52	229
Caroline	10	21	9	<6	<6	<6	<6	66	26	140
Carroll	81	70	47	27	16	<6	<6	309	157	710
Cecil	34	29	10	16	<6	<6	<6	92	67	251
Charles	34	32	23	24	6	<6	<6	102	52	275
Dorchester	23	19	9	11	<6	<6	<6	55	42	163
Frederick	82	82	41	29	7	s	<6	274	137	662
Garrett	6	17	13	6	<6	<6	<6	35	17	97
Harford	144	99	71	66	19	<6	<6	420	226	1,054
Howard	72	81	55	52	11	<6	<6	325	163	766
Kent	19	s	13	11	<6	<6	<6	36	16	107
Montgomery	232	266	190	133	34	6	13	1,045	537	2,456
Prince George's	223	246	108	128	32	6	10	618	390	1,761
Queen Anne's	30	32	9	12	<6	<6	<6	56	49	197
St. Mary's	36	26	28	8	9	<6	<6	77	43	228
Somerset	17	16	<6	<6	<6	<6	<6	32	18	89
Talbot	17	16	14	24	<6	<6	<6	79	47	202
Washington	56	57	11	36	6	<6	<6	240	104	512
Wicomico	65	49	10	30	6	<6	<6	132	72	366
Worcester	32	33	8	21	<6	<6	<6	99	47	244
Maryland, Unspecified	8	<6	<6	6	<6	<6	<6	57	21	101
Total	2,535	2,274	1,263	1,224	335	76	150	7,797	4,379	20,033

<6 = Cells containing 0-5 hospital discharges are suppressed per HSCRC Data Use Agreement.

s = Data in a cell is suppressed to prevent disclosure of data in other cell(s).

Figure 3.

Crude Rate of General Hospital Discharges per 10,000 Jurisdiction Population with Targeted and All Other Cancers Listed as the Primary Diagnosis by Jurisdiction of Residence in 2007

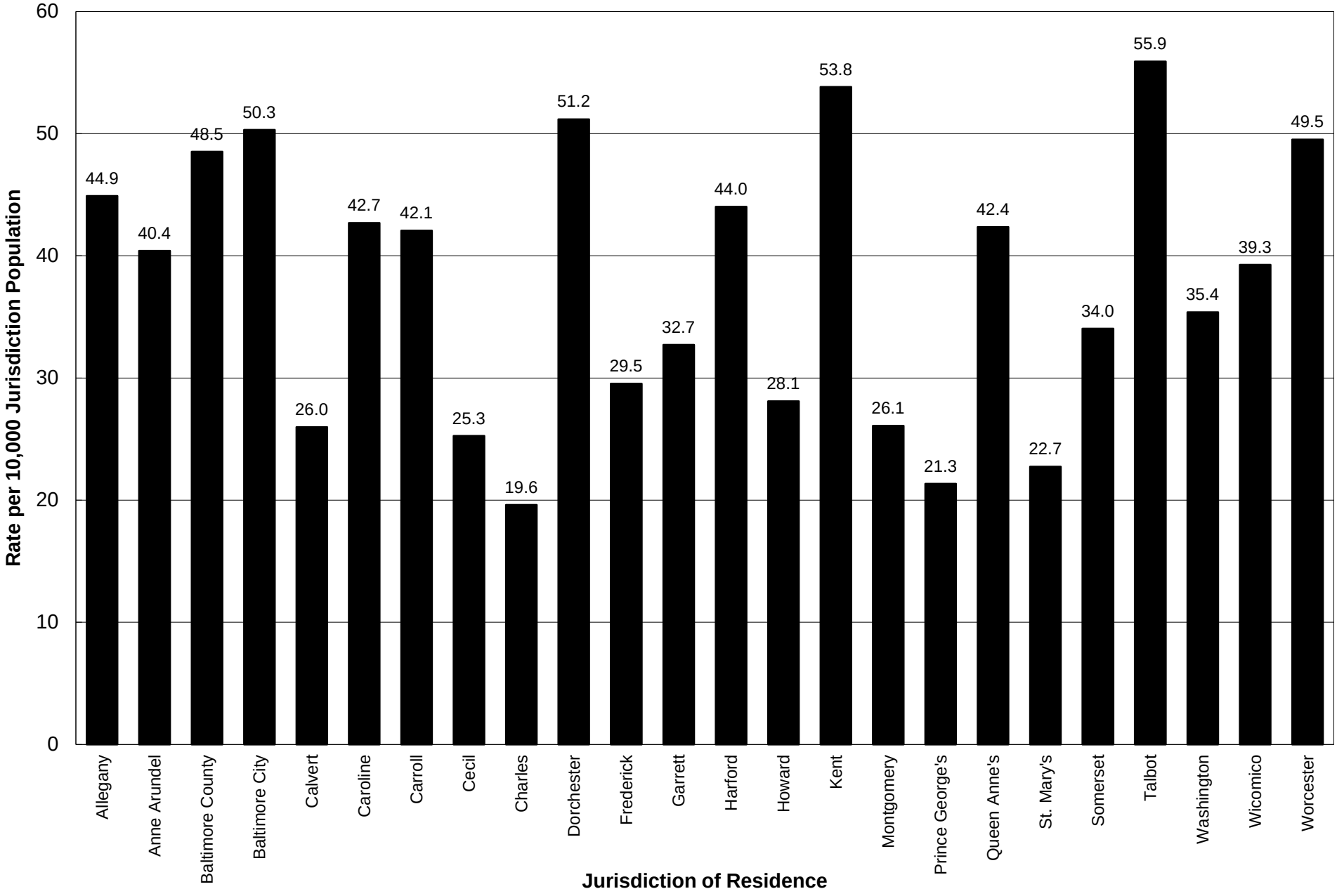
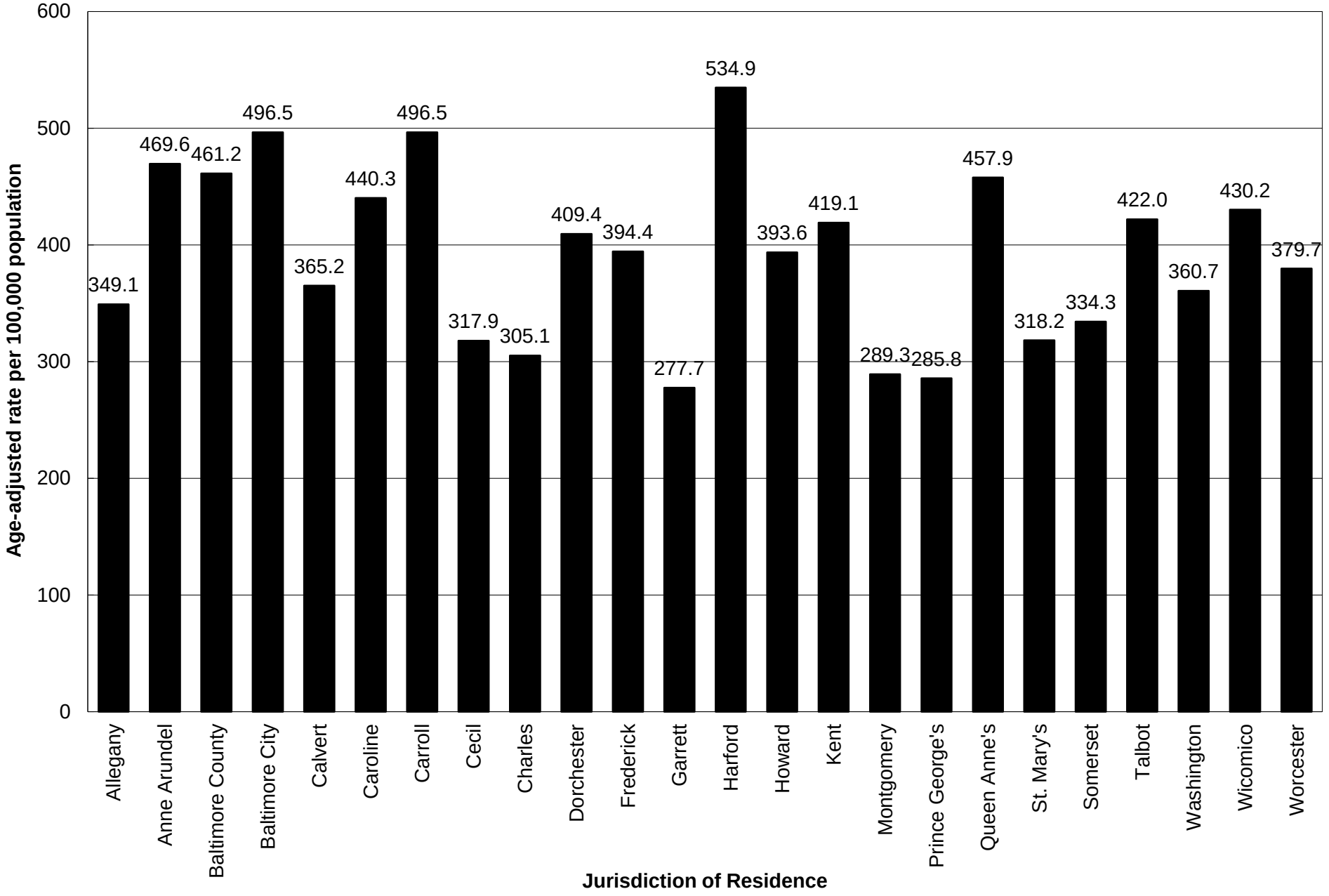


Figure 4.

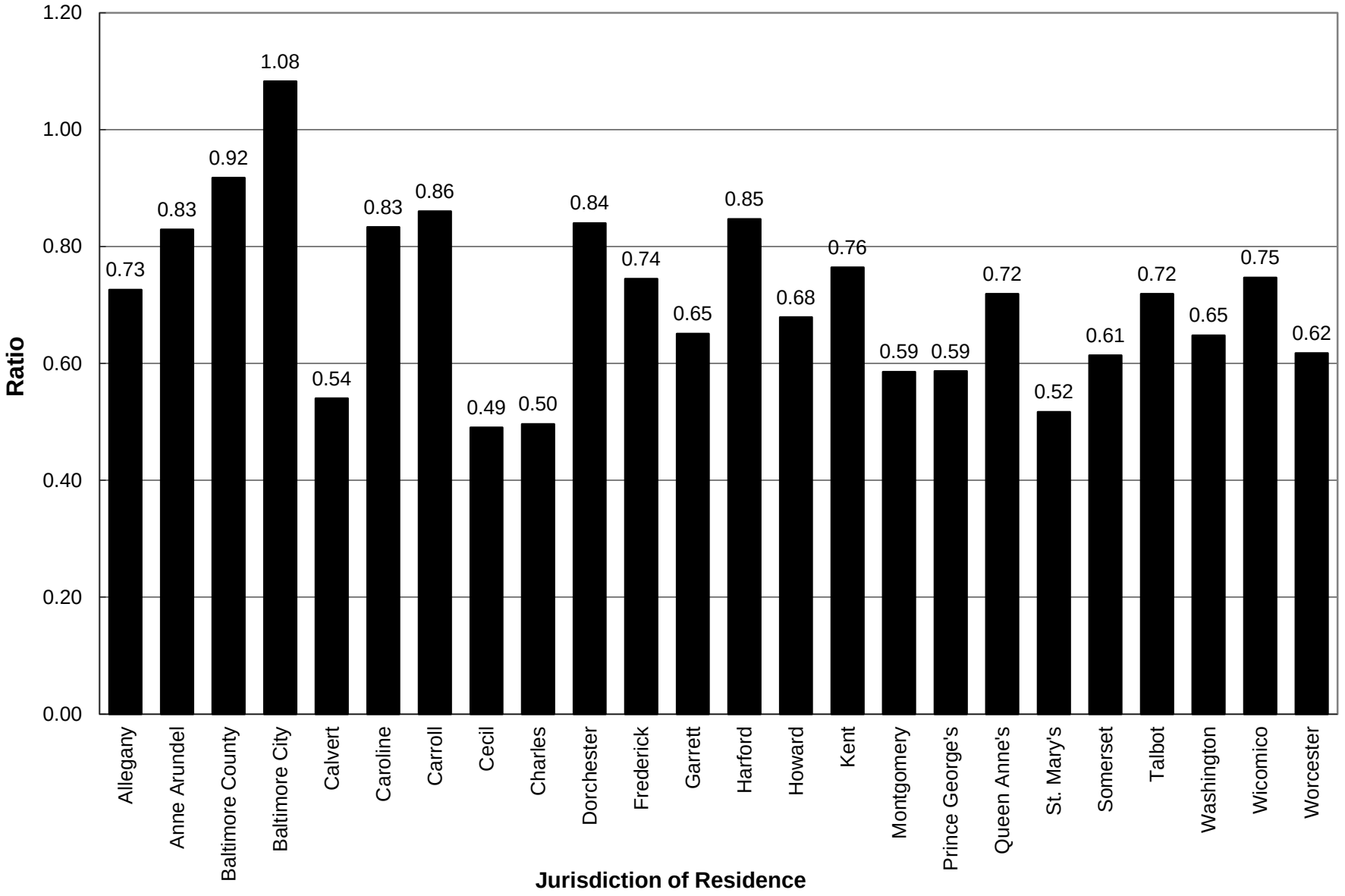
Age-adjusted* Rate of General Hospital Discharges per 100,000 Jurisdiction Population with Targeted and All Other Cancers Listed as the Primary Diagnosis by Jurisdiction of Residence in 2007



*Rates are per 100,000 and are age-adjusted to 2000 U.S. standard million population

Figure 5.

Ratio of General Hospital Cancer Discharges in 2007 with Targeted and All Other Cancers Listed as the Primary Diagnosis to the Number of All New Cancer Cases Reported* by Jurisdiction of Residence



*Total cancer cases reported to the Maryland Cancer Registry for 2007

Figure 6.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007 Where Lung Cancer is Listed as the Primary Diagnosis

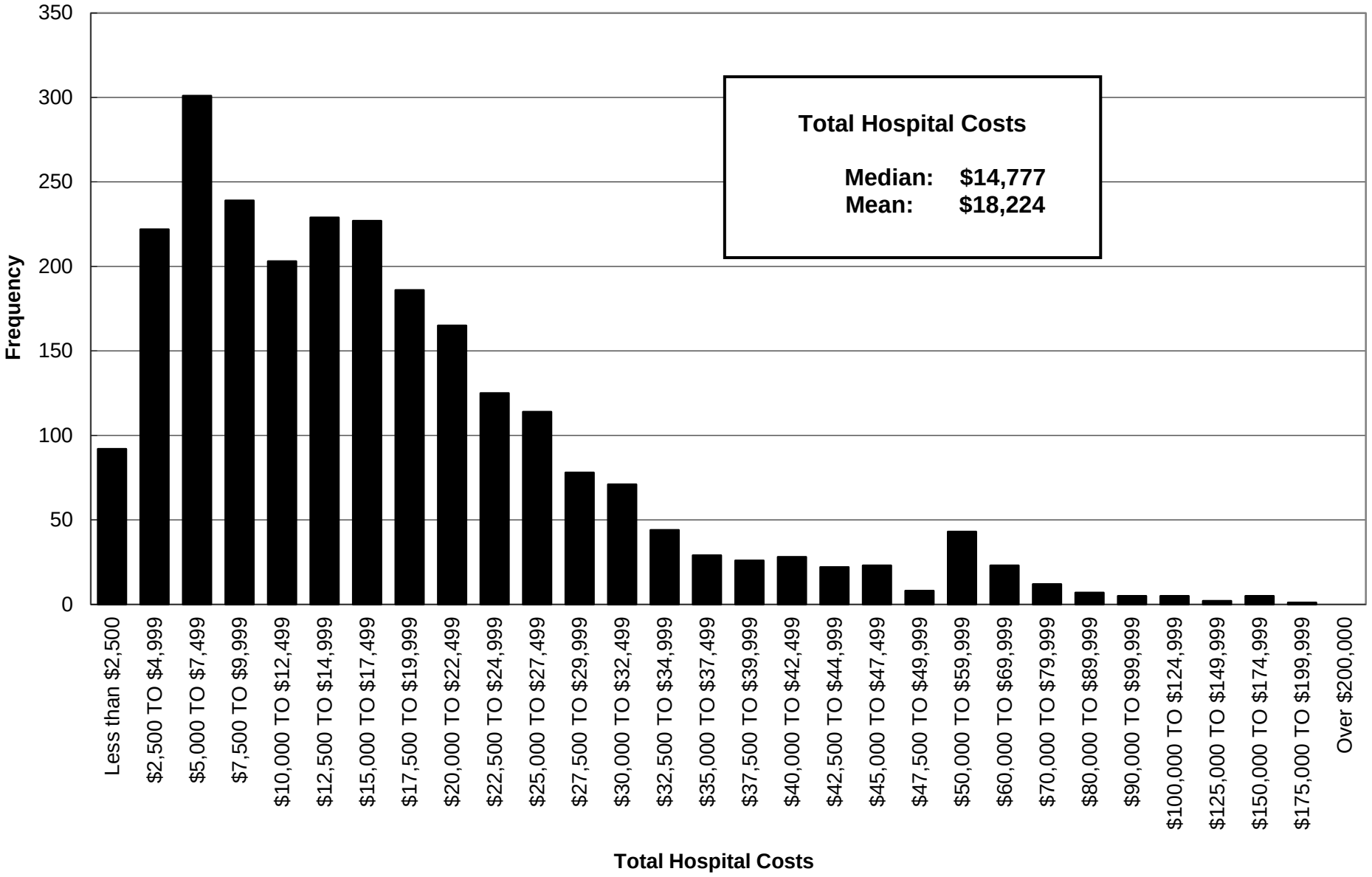


Figure 7.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007
Where Colorectal Cancer is Listed as the Primary Diagnosis

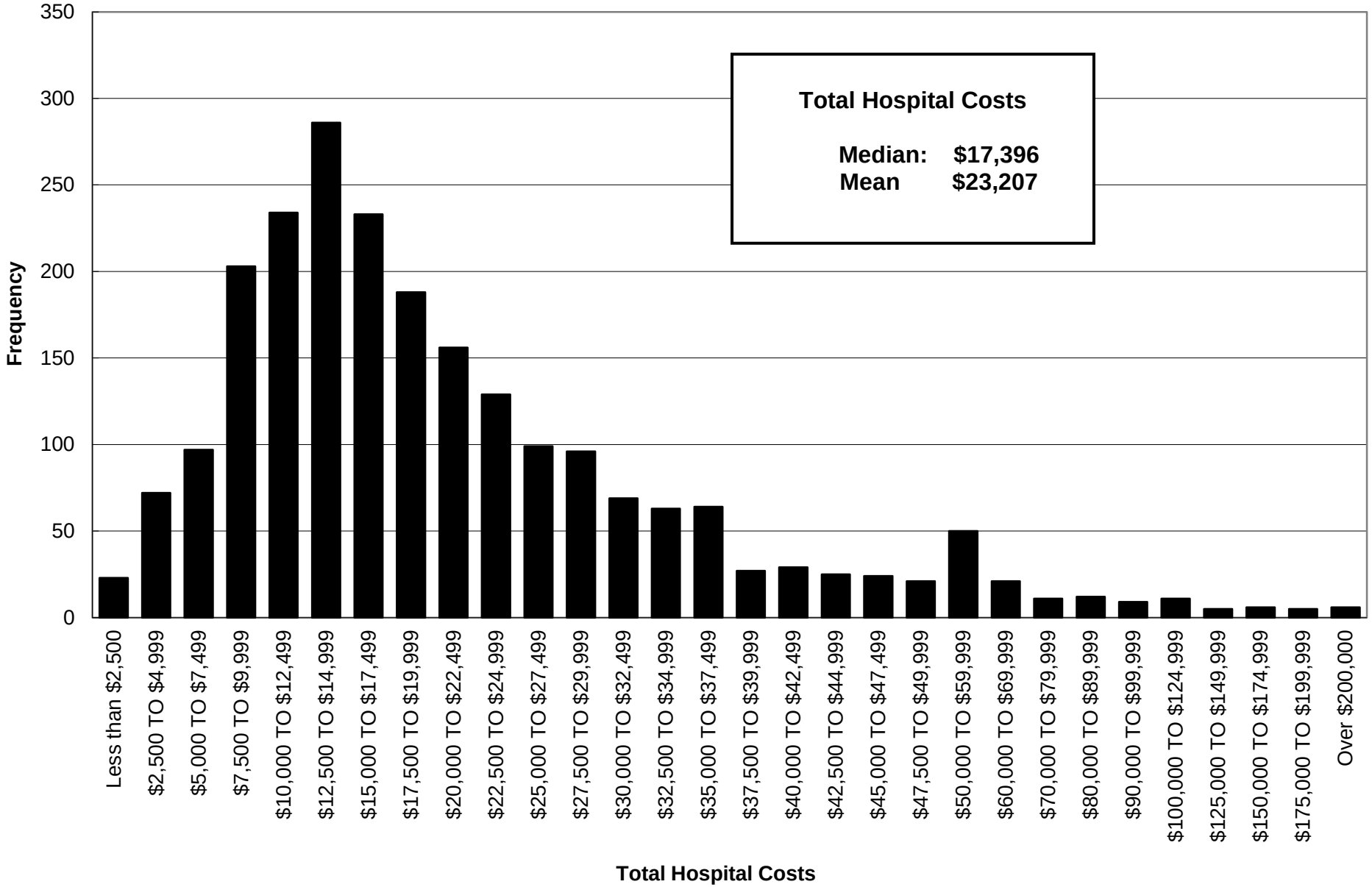


Figure 8.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007 Where Female Breast Cancer is Listed as the Primary Diagnosis

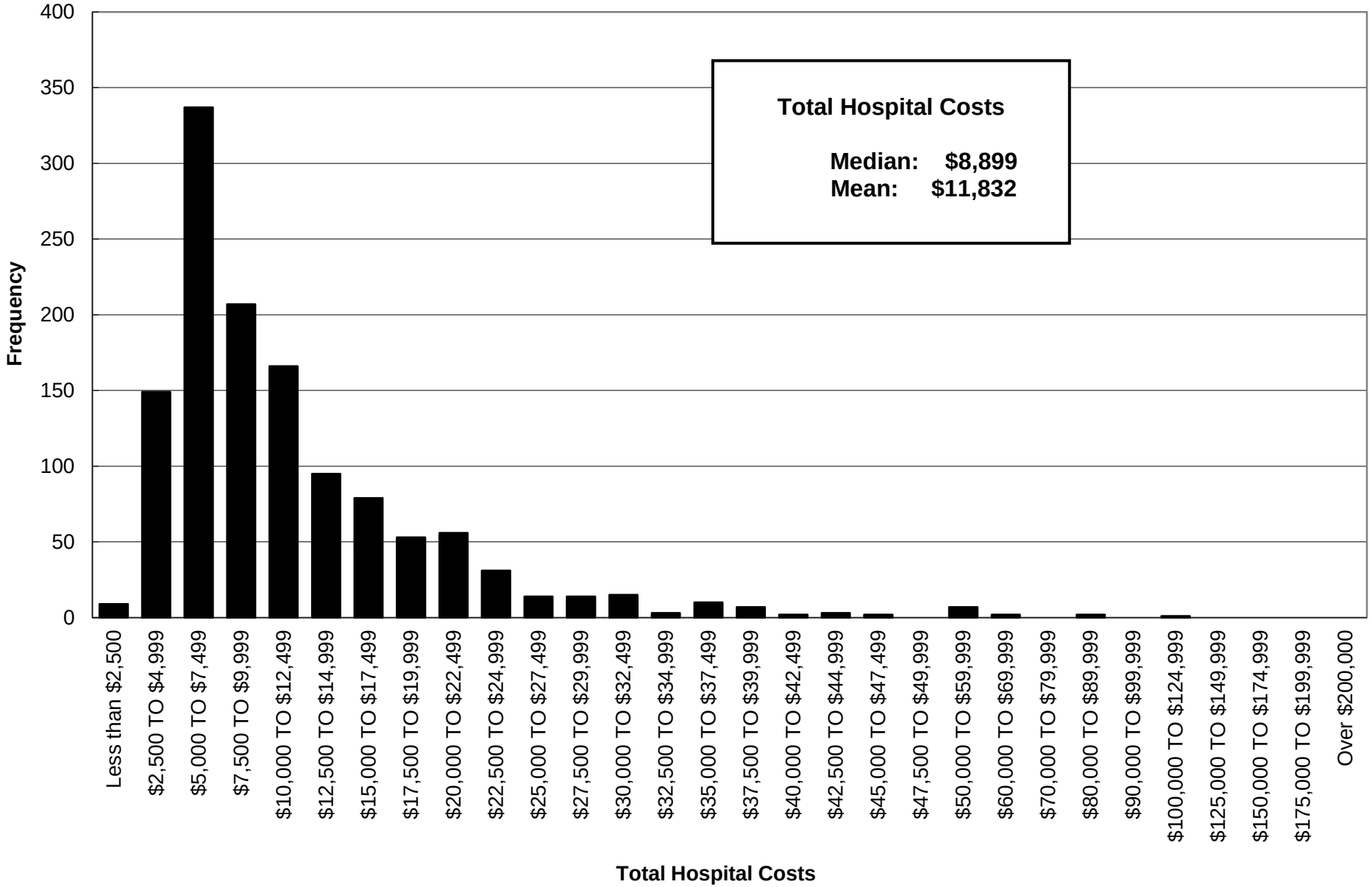


Figure 9.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007
Where Prostate Cancer is Listed as the Primary Diagnosis

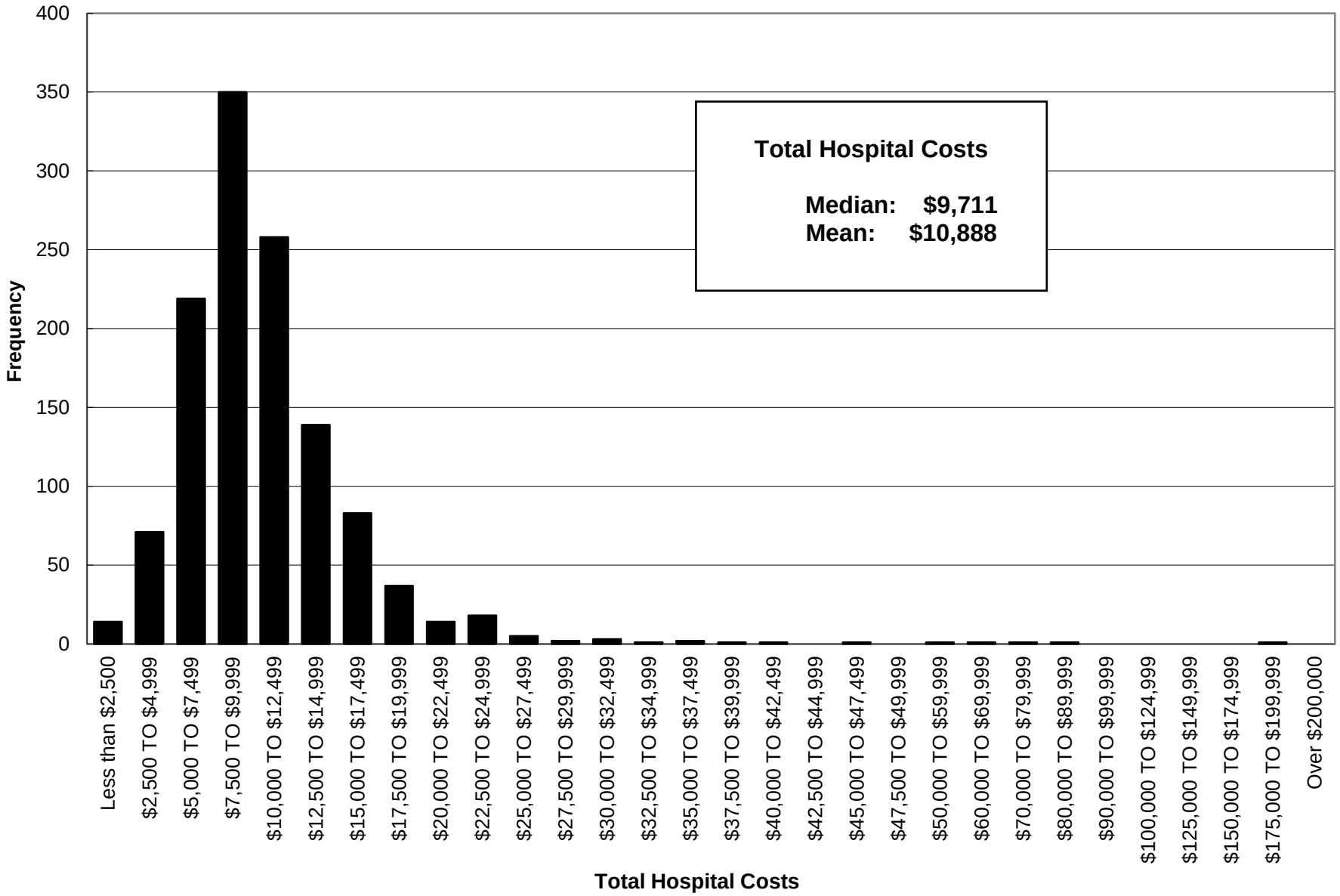


Figure 10.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007
Where Oral Cancer is Listed as the Primary Diagnosis

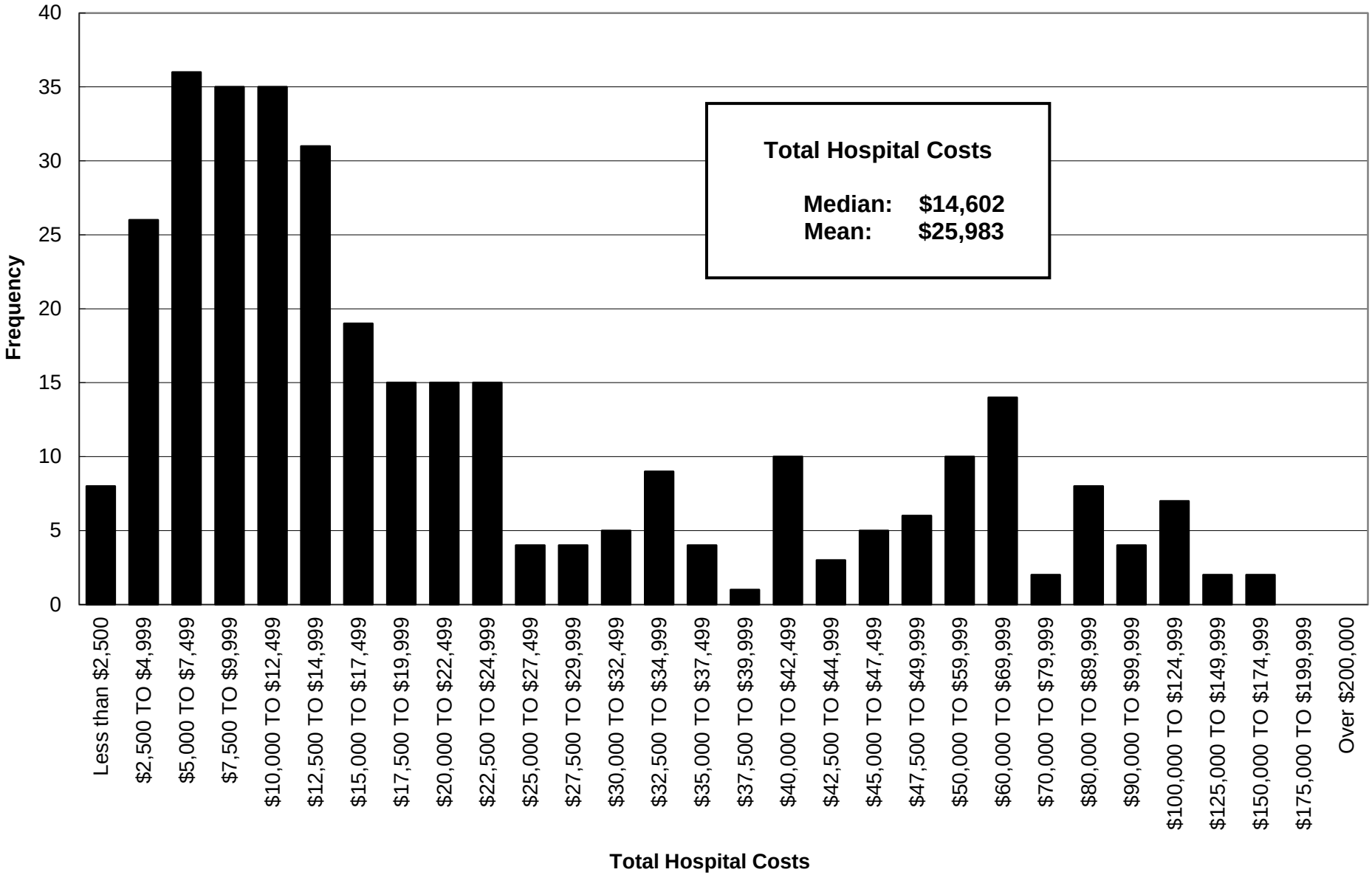


Figure 11.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007 Where Melanoma is Listed as the Primary Diagnosis

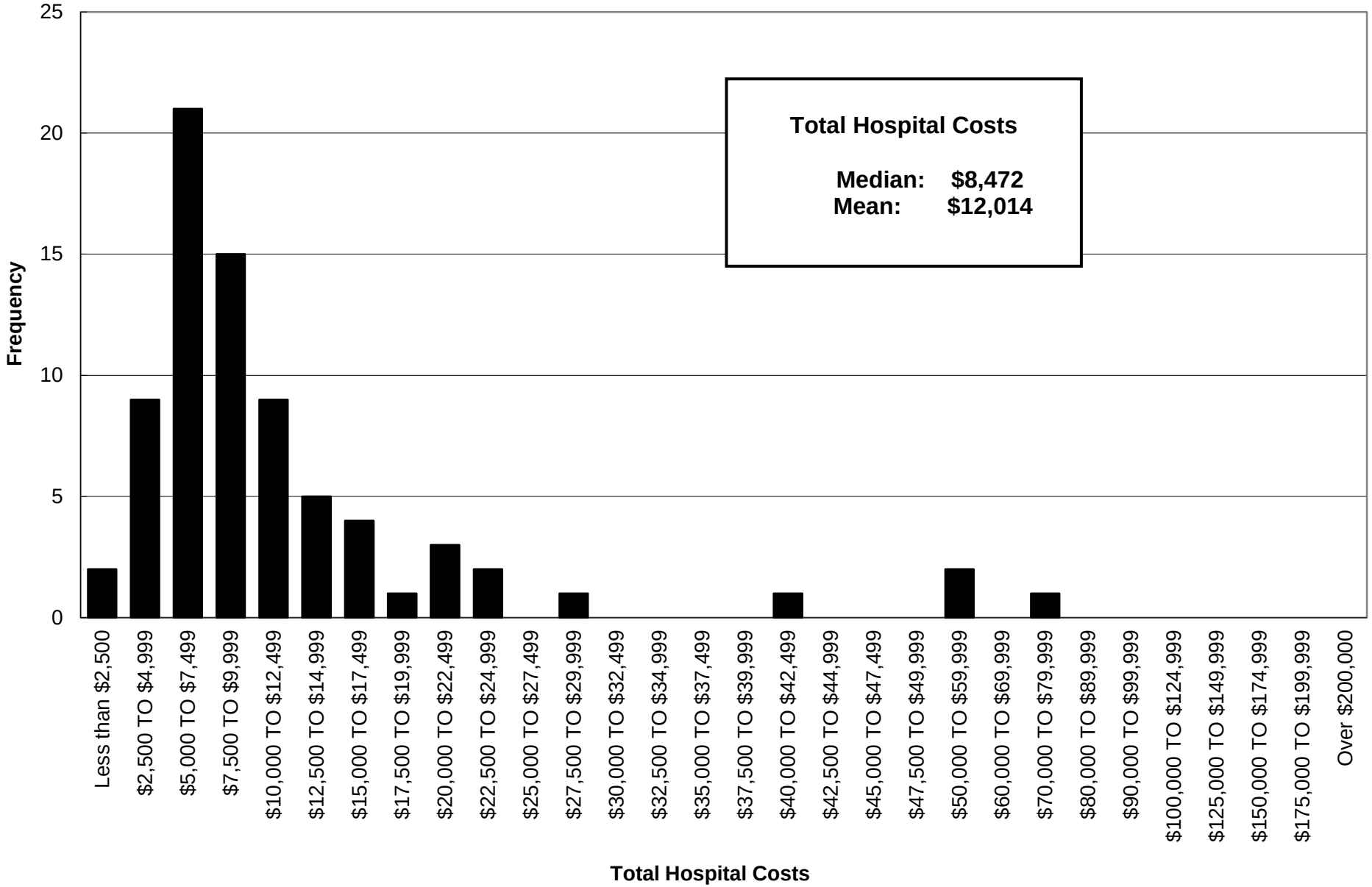


Figure 12.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007
Where Cervical Cancer is Listed as the Primary Diagnosis

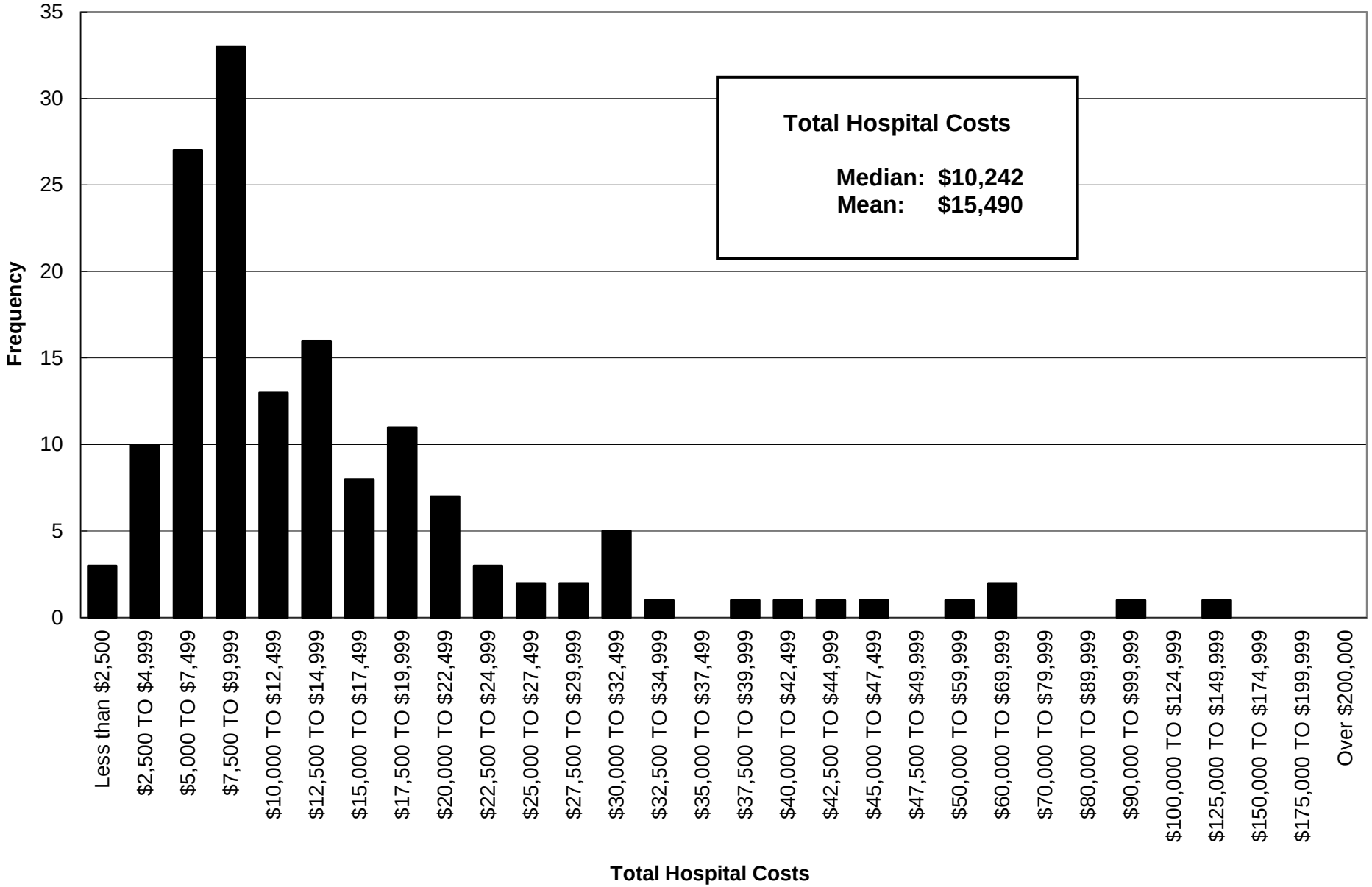


Figure 13.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007
Where Other Non-Targeted Cancers are Listed as the Primary Diagnosis

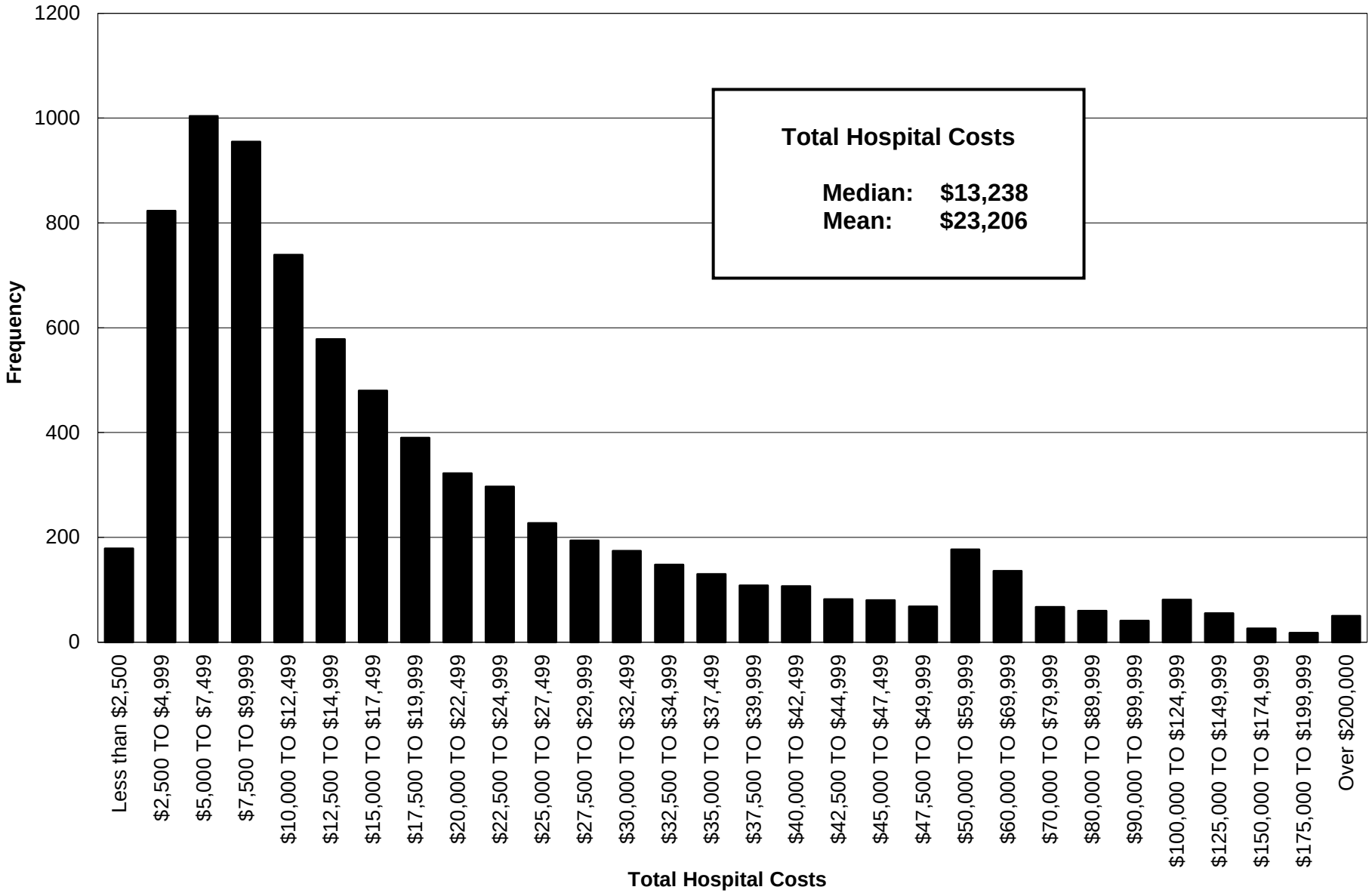


Figure 14.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007 Where Metastatic Cancer is Listed as the Primary Diagnosis

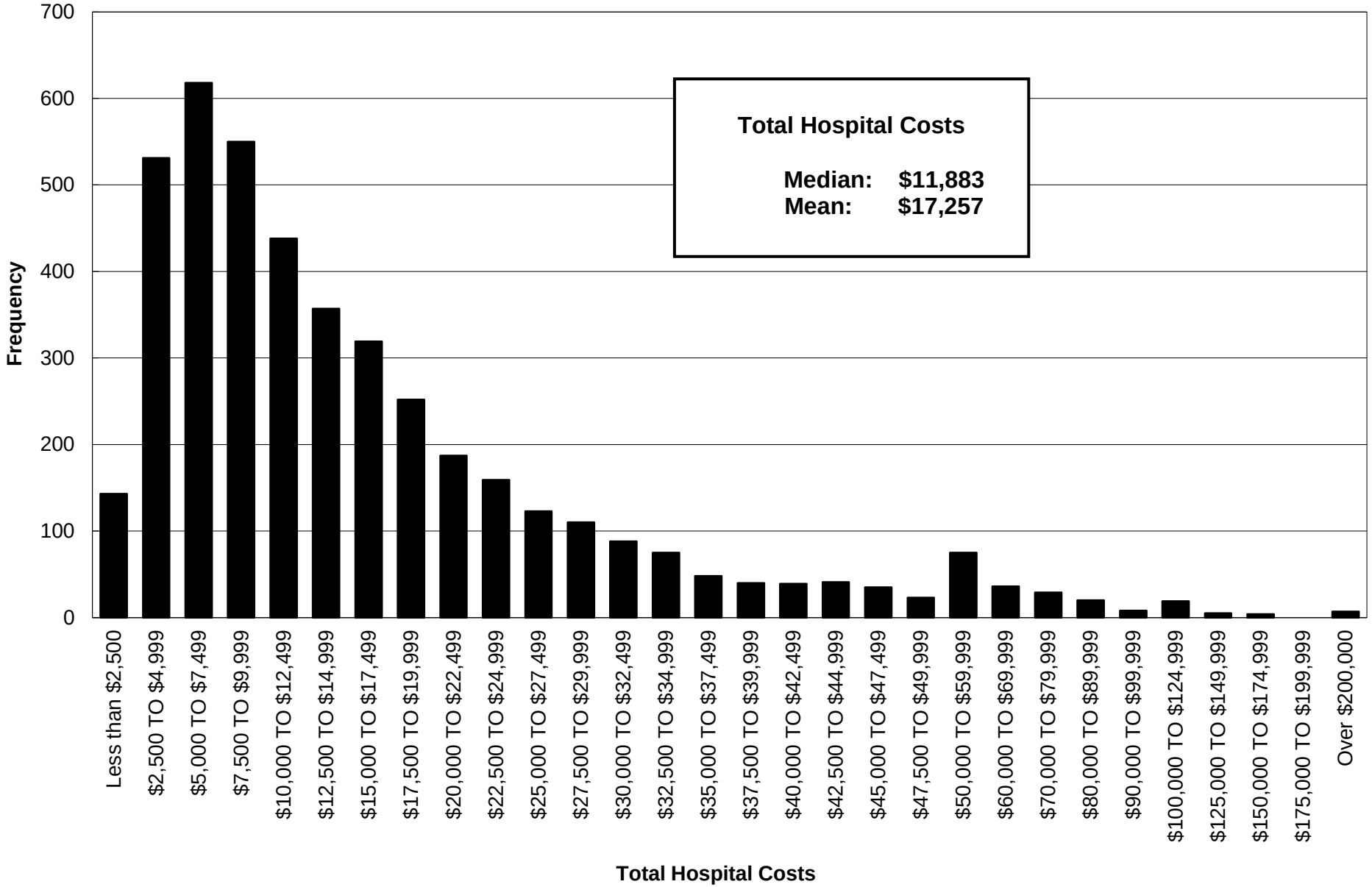


Figure 15.

Frequency of Hospital Discharges by Category of Total Hospital Costs for 2007
Where Any Type of Cancer is Listed as the Primary Diagnosis

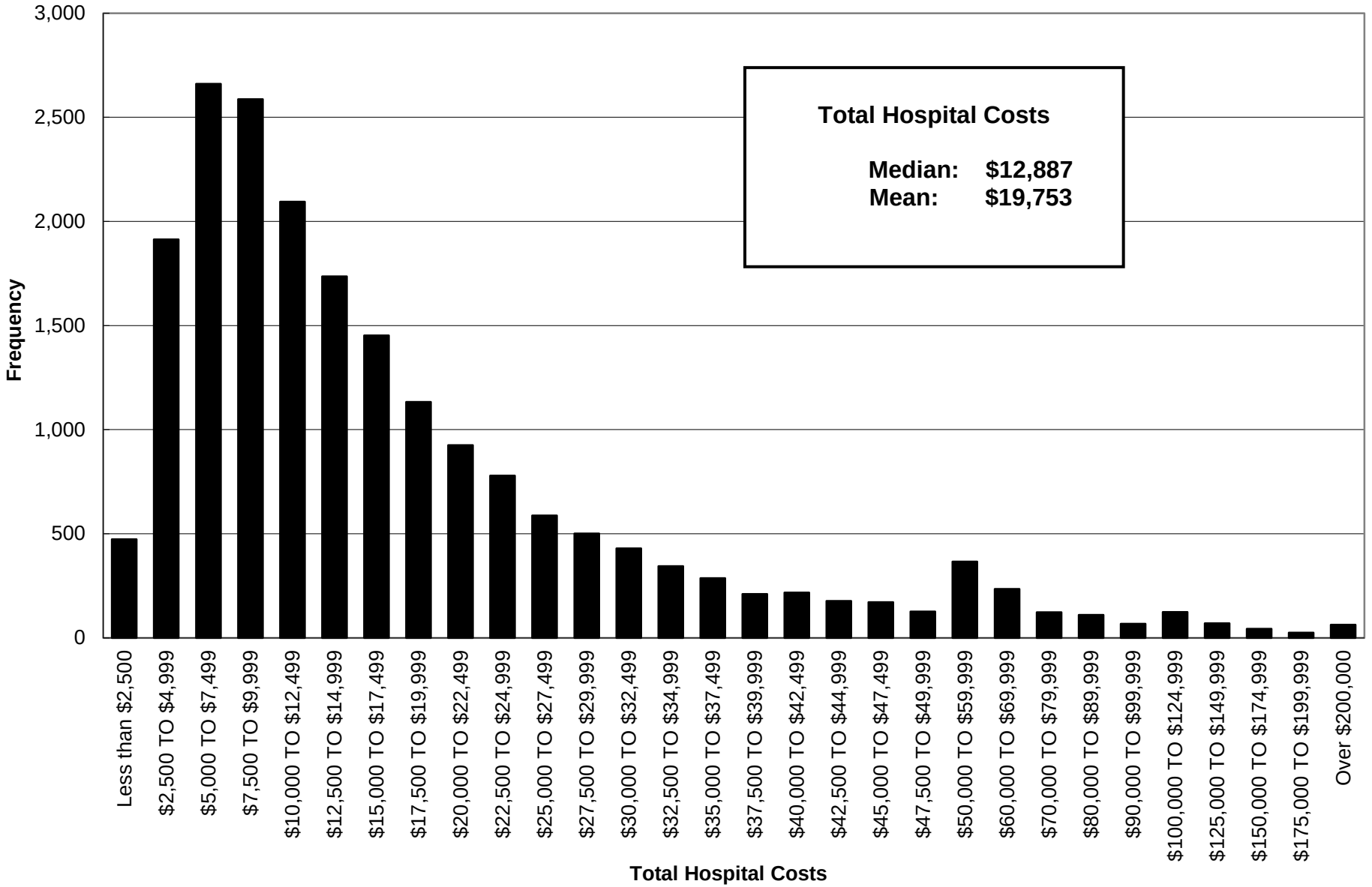


Table 3.

General Hospital Discharges in Maryland in 2007:
Costs by Type of Cancer among Maryland Residents,
Where Cancer is Listed as the Primary Diagnosis for All Ages

		Total Cost for Hospitalization				
Cancer	**Total Discharges***	**Mean**	**Median**	**Minimum**	**Maximum**	**Total**
Lung	2,533	$18,224	$14,777	$459	$177,195	$46,162,459
Colorectal	2,274	$23,207	$17,396	$997	$480,773	$52,772,506
Female Breast	1,263	$11,832	$8,899	$961	$118,996	$14,943,794
Prostate	1,222	$10,888	$9,711	$921	$189,642	$13,305,574
Oral	335	$25,983	$14,602	$878	$170,843	$8,704,229
Melanoma	76	$12,014	$8,472	$963	$72,417	$913,046
Cervical	150	$15,490	$10,242	$1,102	$142,053	$2,323,512
Total of Targeted Cancers	7,853	$17,716	$13,014	$459	$480,773	$139,125,118
Total Other Cancers	12,172	$21,067	$12,744	$72	$834,257	$256,428,524
Total of All Cancers	20,025	$19,753	$12,887	$72	$834,257	$395,553,642

*Discharges where the total costs was zero dollars were removed from this analysis.

Table 4.

General Hospital Discharges in Maryland in 2007:
Costs by Type of Cancer among Maryland Residents,
Where Cancer is Listed as the Primary Diagnosis for Ages 49 Years and Under

		Total Cost for Hospitalization				
Cancer	**Total Discharges***	**Mean**	**Median**	**Minimum**	**Maximum**	**Total**
Lung	187	$17,479	$15,474	$990	$74,507	$3,268,605
Colorectal	246	$22,256	$17,040	$997	$480,773	$5,475,050
Female Breast	352	$13,553	$11,423	$1,040	$64,583	$4,770,740
Prostate	87	$11,311	$10,632	$5,428	$25,818	$984,025
Oral	47	$23,901	$17,569	$4,202	$81,597	$1,123,361
Melanoma	13	$21,528	$17,047	$6,067	$72,417	$279,866
Cervical	78	$14,195	$9,289	$1,641	$92,311	$1,107,248
Total of Targeted Cancers	1,010	$16,840	$12,874	$990	$480,773	$17,008,894
Total Other Cancers	2,317	$25,277	$13,300	$1,061	$834,257	$58,567,862
Total of All Cancers	3,327	$22,716	$13,067	$990	$834,257	$75,576,756

*Discharges where the total costs was zero dollars were removed from this analysis.

Table 5.

General Hospital Discharges in Maryland in 2007:
Costs by Type of Cancer among Maryland Residents,
Where Cancer is Listed as the Primary Diagnosis for Ages 50 to 64 Years

		Total Cost for Hospitalization				
Cancer	**Total Discharges***	**Mean**	**Median**	**Minimum**	**Maximum**	**Total**
Lung	800	$19,090	$15,608	$671	$177,195	$15,272,344
Colorectal	666	$21,554	$16,360	$1,042	$175,861	$14,354,809
Female Breast	459	$13,014	$10,063	$993	$118,996	$5,973,255
Prostate	700	$11,102	$9,911	$3,159	$189,642	$7,771,588
Oral	151	$27,720	$14,299	$2,028	$170,022	$4,185,773
Melanoma	19	$7,851	$6,874	$1,675	$22,411	$149,165
Cervical	38	$18,549	$13,493	$2,476	$142,053	$704,853
Total of Targeted Cancers	2,833	$17,089	$12,627	$671	$189,642	$48,411,788
Total Other Cancers	4,106	$20,843	$12,941	$805	$381,249	$85,584,330
Total of All Cancers	6,939	$19,311	$12,745	$671	$381,249	$133,996,118

*Discharges where the total costs was zero dollars were removed from this analysis.

Table 6.

General Hospital Discharges in Maryland in 2007:
Costs by Type of Cancer among Maryland Residents,
Where Cancer is Listed as the Primary Diagnosis for Ages 65 Years and Over

		Total Cost for Hospitalization				
Cancer	**Total Discharges***	**Mean**	**Median**	**Minimum**	**Maximum**	**Total**
Lung	1,546	$17,866	$14,453	$459	$165,522	$27,621,511
Colorectal	1,362	$24,187	$17,737	$1,106	$360,157	$32,942,647
Female Breast	452	$9,292	$7,109	$961	$84,015	$4,199,799
Prostate	435	$10,460	$8,988	$921	$89,012	$4,549,961
Oral	137	$24,782	$15,264	$878	$170,843	$3,395,094
Melanoma	44	$11,000	$8,849	$963	$55,252	$484,015
Cervical	34	$15,041	$10,131	$1,102	$69,055	$511,411
Total of Targeted Cancers	4,010	$18,380	$13,515	$459	$360,157	$73,704,436
Total Other Cancers	5,749	$19,523	$12,501	$72	$659,246	$112,276,332
Total of All Cancers	9,759	$19,057	$12,897	$72	$659,246	$185,980,768

*Discharges where the total costs was zero dollars were removed from this analysis.

Attachment 1: International Classification of Diseases, Version 9 (ICD-9) Diagnostic Codes Used to Define "Targeted Cancers" in the Preparation of this Report

Targeted Cancer	ICD-9 Codes Included
Breast (female)	174.00 174.99
Cervix, Invasive	180.00 - 180.99
Colon and Rectum	153.00 - 154.19, 154.40 - 154.89
Lung and Bronchus	162.20 - 162.99
Melanoma	172.00 - 172.99
Oral	140.00 - 149.99
Prostate	185.00 - 185.99
All Other (Primary)	150.00 - 152.99, 154.20 - 154.39, 154.90 - 162.19, 163.00 - 171.99, 173.00 - 173.99, 175.00 - 179.99, 181.00 - 184.99, 186.00 - 195.99, 199.00 - 208.99
Metastatic (Secondary)	196.00 - 198.99
Total	140.00 - 208.99

Attachment 2: Definitions and Notes

"Any cancer" - Having an International Classification of Disease (ICD-9) code denoting cancer in the hospital discharge dataset. ICD-9 codes that denote primary or secondary cancer are found in Attachment 1.

"Diagnostic position" or "Diagnosis category" - Upon discharge from a hospital, the hospital codes each individual discharge by up to 15 diagnostic ICD-9 codes that reflect the patient's diagnoses. The coding instructions to the hospital state that the *primary diagnosis* is the "condition established after study to be chiefly responsible for occasioning the admission of the patient to the hospital."

When an ICD-9 code appears in a "secondary," "tertiary," or subsequent diagnostic category, it is less certain whether the patient was admitted *because of* that diagnosis or whether this is another diagnosis the patient has that is *unrelated to* this hospitalization. For example, a patient admitted for a heart attack will have "myocardial infarction" coded as the primary diagnosis. If the patient *also* has colorectal (CRC) cancer, colorectal cancer may be coded in one of the subsequent diagnostic categories. Having a cancer diagnosis in a secondary, tertiary, or subsequent diagnostic category may or may not indicate that the hospitalization was *due to* the cancer.

When data are analyzed using "cancer as primary diagnosis," the hospitalization is highly likely to be due to that cancer. If "cancer in any diagnostic category" is used for analysis or tally, it *overestimates* the number of hospitalizations due to cancer by attributing the reason for the hospitalization to cancer when, in fact, there were other diagnoses more likely to have caused the hospitalization.

When only "cancer as primary diagnosis" is used for analysis, however, it *underestimates* the total number of hospitalizations due to that cancer. For example, hospitalizations were analyzed in which CRC is the *second* diagnosis (and therefore not included in hospitalizations in which CRC is the primary diagnosis), to see what the primary diagnosis was. Many of the diagnoses were related to CRC, such as "liver metastases" "colostomy closure," "volume depletion," etc.

"Cancer as primary diagnosis" was used in most of the tables and figures based upon the certainty that those represented a hospitalization *due to* that cancer. By using "cancer as primary diagnosis", the data is an *underestimate* of the total number of hospitalizations due to that cancer. Ideally, it would have been better to include the cancer-related causes of hospitalization but the exact number of these is difficult or impossible to determine.

"General hospital"- Any of Maryland's 66 general hospitals. These exclude specialty hospitals such as chronic care, rehabilitation, psychiatric, Veterans, or orthopedic hospitals.

"Hospital discharge" versus "Patient discharge" - In one year of HSCRC hospital discharge data, each hospital discharge is listed as a separate record. The analyses contained in this document looked at *hospital discharges*. Some patients may have been hospitalized more than once during the period and are thus counted more than once in the analysis. Because the HSCRC database does not have identifiers, it is not possible to determine whether a patient had one or multiple hospital discharges within that year and data analysis based on the number of *patients* discharged from Maryland hospitals in that period could not be performed.

"ICD-9" codes - Codes from the International Classification of Disease 9th Revision, Clinical Modification 2001 code book (AMA Press, July, 2000).

"Jurisdiction of residence" - The Maryland location where the hospitalized patient was noted to reside when admitted to the hospital. These include Maryland's 23 counties and Baltimore City.

"Non-targeted cancers" or "All other cancers" - All other cancers found in the list in Attachment 1, other than the targeted cancers. Secondary cancers are included.

Number of hospital discharges—confidentiality considerations - Because of confidentiality restrictions on the use of the non-confidential dataset, all cells in the tables with a number less than 6 (i.e., 0-5) were suppressed and presented as "<6." Complementary suppression of discharge counts in additional cell(s) is used, denoted by "s," to prevent back-calculation of numbers in those cells with primary suppression.

"Primary source of payment" and "Secondary source of payment" - The first and second sources of payment for the hospitalization, as declared by the patient at the time of admission. Because this is declared on admission, it may not accurately reflect who actually is billed for the hospitalization after discharge. For example, a patient may lose insurance coverage, or may have said "self-pay" but be found eligible for Medical Assistance and therefore not be billed for the hospitalization.

"Secondary cancer" - Having an ICD-9 code of 197.0—198.99 that denotes secondary cancer in various sites.

“Targeted cancer” - One of seven cancers selected as “targeted” under the Cigarette Restitution Fund program. These include lung, colorectal, female breast, prostate, cervical, oral, and melanoma. Their ICD-9 codes are found in Attachment 1.

“Total costs” - The total costs billed for the hospitalization, such as room, pharmacy, radiology, laboratory, operating room, and central supply costs, but excluding costs that are not part of the hospital bill (e.g., physician, internist, oncologist, or surgeon).