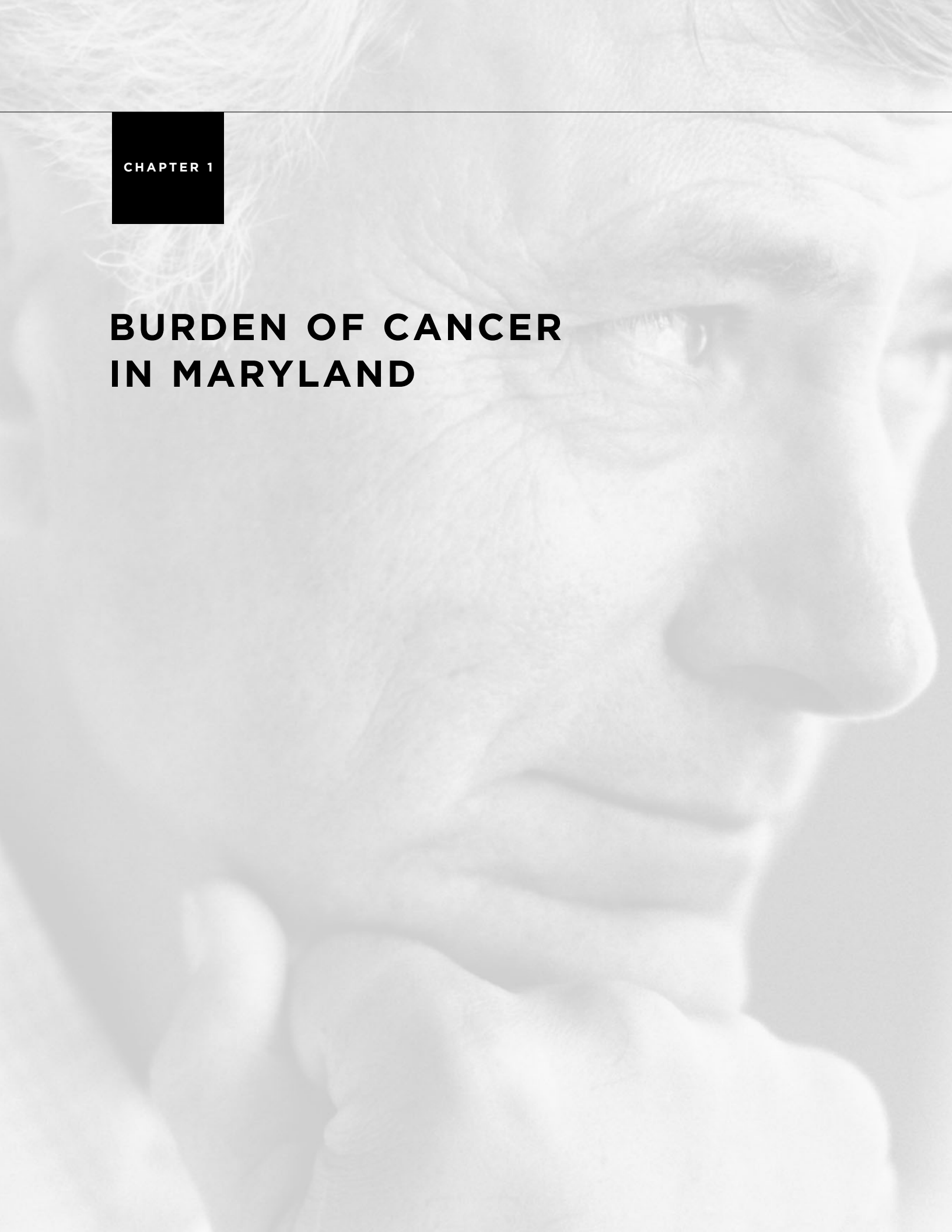
CHAPTER 1

BURDEN OF CANCER IN MARYLAND



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BURDEN OF CANCER IN MARYLAND

Cancer is the second leading cause of death in Maryland after heart disease and one in four deaths in Maryland are due to cancer (Table 1.1). Improvements in the prevention, early detection, and treatment of many types of cancer have led to a decline in the overall cancer death rate in Maryland and the nation.[1] Cancer mortality rates in Maryland had been increasing until 1990 when the mortality rates started to fall. Cancer mortality rates are falling across all sexes and races in Maryland (Figure 1.1).

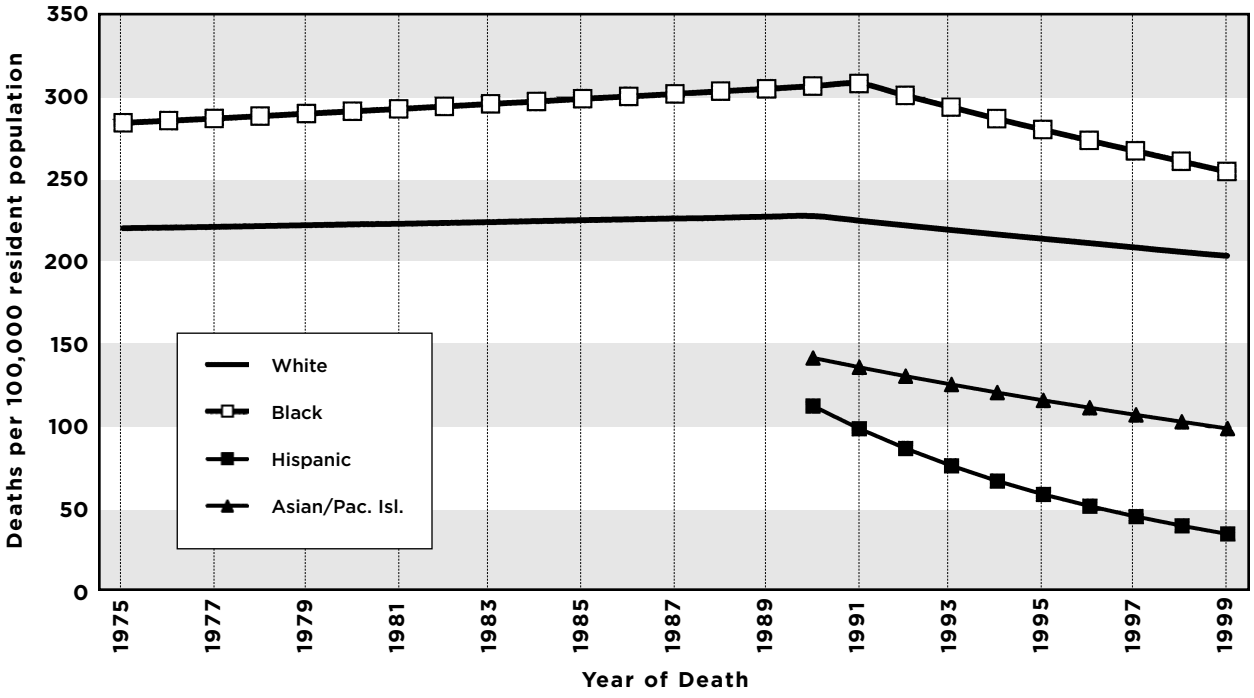
Despite these declines, the burden of cancer in Maryland remains formidable. The population in Maryland is aging and becoming demographically more diverse. Because cancer occurs more often in older persons, the burden of cancer is expected to grow. The total annual number of cancer cases and the number of persons living with cancer in the United States are expected to double by the year 2050.[2] The increased number of persons living with cancer will place a growing demand on the health care system for more supportive, palliative, and general medical services. A focus on the quality of life of cancer survivors will become more important as more

Table 1.1
The Seven Leading Causes of Death in Maryland, 1999

Rank	Cause of Death	Number of Deaths	Percent of Total Deaths
	All Causes	42,908	
1	Heart disease	12,014	28.0%
2	**Cancer**	**10,096**	**23.5%**
3	Cerebrovascular disease	2,860	6.7%
4	Chronic respiratory disease	1,941	4.5%
5	Diabetes	1,408	3.3%
6	Accidents	1,240	2.9%
7	Influenza and pneumonia	1,150	2.7%

Rates are per 100,000 population and are age-adjusted to the 2000 U.S. standard population.
Source: Maryland Vital Statistics, Annual Report, 1999; Maryland Cancer Registry, 1999.

Figure 1.1
Historical Trends in Cancer Mortality in Maryland for All Cancer Sites, Both Sexes, and All Ages (1975–1999)



Created by www.ims.nci.nih.gov on 3/3/2003.
Rates are age-adjusted by five-year age groups to the 2000 U.S. Population.
Regression lines reflect the estimate calculated using the "Joinpoint Regression Program."
Source: National Center for Health Statistics; data as analyzed by the National Cancer Institute.

and more persons are surviving cancer.[3,4]

The demographic makeup of Maryland's population continues to diversify. Overall, blacks suffer a disproportionately higher burden of cancer compared to whites. The Hispanic population in the state is growing, as are other minority populations. There is a need to better understand the magnitude of cancer incidence, survival, mortality, and the issues faced by these racial and ethnic groups, including access to care and a greater need for culturally appropriate prevention, early detection, and treatment. Not all segments of the population have benefited equally from cancer prevention and treatment control efforts; more efforts are needed to overcome health disparities. These efforts will require greater attention to education, costs, access, and cultural appropriateness.[5]

Advances in emerging cancer control technologies and the application of effective interventions, as well as improved access to state-of-the-art cancer care, should lead to further reductions in cancer death rates. However, even with these improvements, the aging of the population alone will increase the number of persons who are diagnosed with and treated for cancer, and who will survive longer at increasingly older ages.[6] The overall goals for this plan are to decrease overall cancer mortality, decrease overall cancer incidence, improve the quality of life for all cancer survivors, and reduce cancer disparities among ethnic minorities.

Cancer Mortality (Deaths)

Over 10,000 Marylanders die from cancer each year. Maryland's overall cancer mortality rate of 211.7 deaths per 100,000 population in 1999 was statistically significantly higher than the 1999 U.S. cancer mortality rate of 202.8 deaths per 100,000 population (Table 1.2).

Maryland's rank in overall cancer mortality rates has been steadily improving compared to other states in the nation and the District of Columbia. For the time period 1986–1990, Maryland had the third highest cancer mortality rate in the nation; for the time period 1991–1995, Maryland ranked 6th highest; and for the time period 1996–2000, Maryland's rank dropped to the 11th highest cancer mortality rate in the nation.[7]

Table 1.2
Overall Cancer Incidence and Mortality by Sex and Race in Maryland and the United States, 1999

Incidence 1999	Total	Males	Females	Whites	Blacks	Other
New cases (#)	23,267	11,964	11,300	17,313	4,807	592
Incidence rate	476.8	569.3	414.8	469.7	468.1	370.2
U.S. SEER rate	476.1	555.8	422.3	478.3	519.1	N/A
Mortality	**Total**	**Males**	**Females**	**Whites**	**Blacks**	**Other**
MD Deaths (#)	10,096	5,208	4,888	7,560	2,394	142
MD Mortality rate	211.7	266.2	177.3	204.0	257.9	105.1
U.S. Mortality rate	202.8	252.6	169.6	199.8	256.5	N/A

Rates are per 100,000 population and are age-adjusted to the 2000 U.S. standard population.
Source: Maryland Cancer Registry, 1999; Maryland Division of Health Statistics, 1999; SEER, National Cancer Institute, 1999.

Cancer mortality increases with age for all races and sexes (Figure 1.2).

Overall cancer mortality rates are higher in males than females, with black males having the highest overall cancer mortality rate. Black males have higher mortality rates than white males, and black females have higher overall cancer mortality rates than white females in Maryland (Figure 1.3).

Although cancer occurs more frequently with advancing age, it is also the second leading cause of death in children aged 5–14 years and the leading cause of death in adults aged 25–64 years (Table 1.3).

Overall cancer mortality rates from 1995 to 1999 were statistically higher than the U.S. in 12 Maryland jurisdictions (Anne Arundel, Baltimore, Baltimore City, Caroline, Cecil, Charles, Dorchester, Harford, Prince George's, Somerset, Wicomico, and Worcester counties), comparable to the U.S. in 10 jurisdictions (Allegany, Calvert, Carroll, Frederick, Howard, Kent, Queen Annes, St. Mary's, Talbot, and Washington counties), and statistically lower than the U.S. in two jurisdictions (Garrett and Montgomery counties) (Figure 1.4).

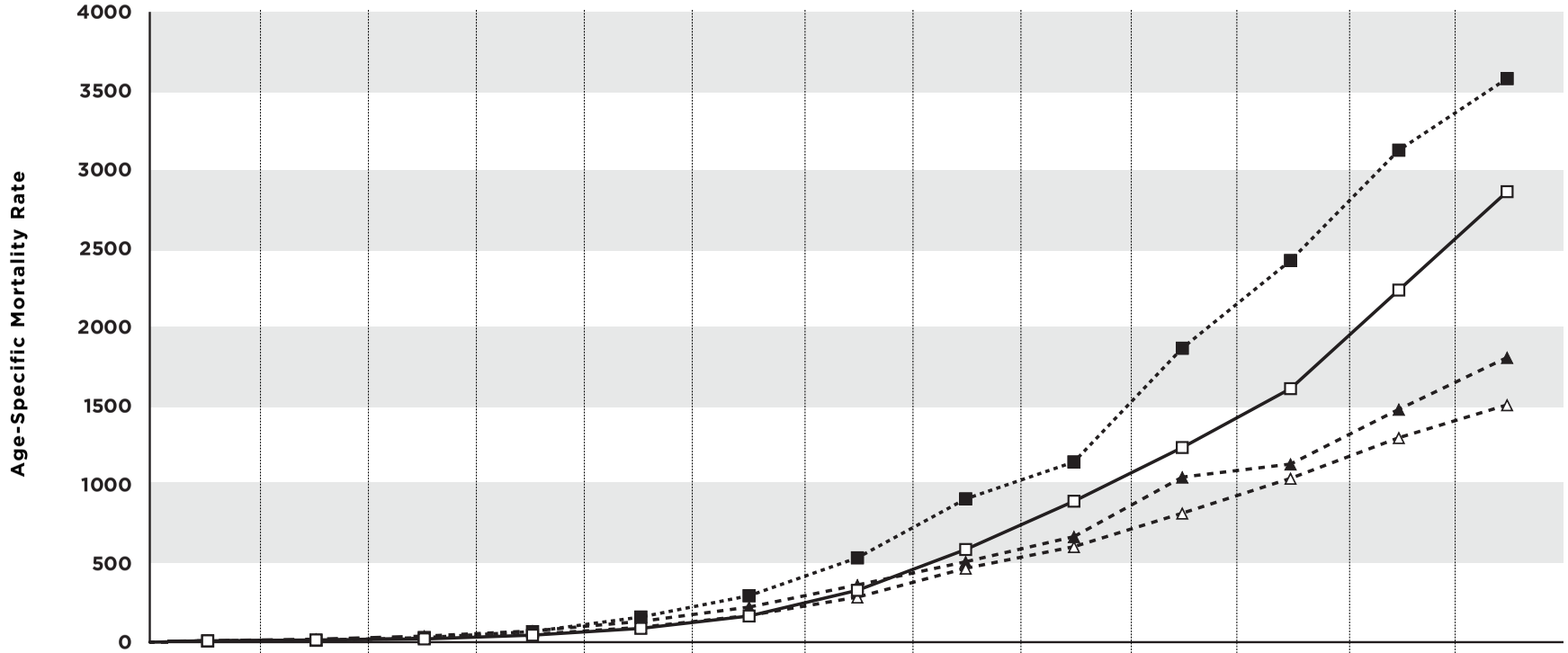
There are over 100 different types of cancer that are classified according to the organ or tissue of origin and histologic features. Lung cancer is the leading cause of cancer deaths, accounting for almost one-third (28.6%) of all cancer deaths in Maryland. Colorectal cancer follows, accounting for 10.9% of all cancer deaths in the state. Breast cancer accounts for 8.3% and prostate cancer accounts for 6.0% of all cancer deaths in Maryland. Together, cancers of the lung and bronchus, colon and rectum, breast, and prostate account for over half (53.8%) of deaths due to cancer in Maryland (Figure 1.5).

There have been notable trends in cancer mortality among different cancer sites in the last seventy years. In the United States, lung cancer became the leading cause of cancer death among males in the mid-1950s and the leading cause of cancer death among females by the late 1980s. Lung cancer mortality in Maryland has started to decrease among males, but, unfortunately, is still increasing in females. Lung cancer remains, by far, the leading cause of cancer deaths in both men and women (Figures 1.6 and 1.7). Any significant efforts to improve cancer mortality rates will need to address the primary causes of lung cancer, especially tobacco use among Marylanders.

Mortality due to the three most common cancer sites (colon and rectum, breast, and prostate) is decreasing overall in Maryland. From 1995 to 1999, Maryland experienced a decrease in cancer mortality rates for cancer overall, for these three major cancer sites, and among all races and both sexes. However, cancer mortality rates are increasing for leukemias and cancers of the bladder, corpus uterus, and pancreas (Figure 1.8).

Among Maryland men, the five leading causes of cancer deaths are cancers of the lung and bronchus, prostate, colon and rectum, pancreas, and non-Hodgkins lymphoma. Among Maryland women, the

Figure 1.2
All Sites Age-Specific and Cancer Mortality Rates by Race and Sex in Maryland, 1995–1999



	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–85	85+
MD WHITE MALE	8.5	14.0	20.5	44.5	87.5	166.0	329.0	588.1	894.6	1235.3	1609.0	2234.6	2859.1
MD BLACK MALE	7.7	11.8	29.1	67.2	159.4	294.7	535.5	909.2	1143.7	1865.7	2421.9	3122.3	3576.9
MD WHITE FEMALE	8.8	12.8	25.3	49.7	94.4	169.1	285.7	468.9	606.0	818.5	1039.6	1297.6	1505.9
MD BLACK FEMALE	9.1	19.0	38.5	71.3	131.8	222.7	363.1	510.4	669.8	1047.5	1130.3	1477.7	1806.7

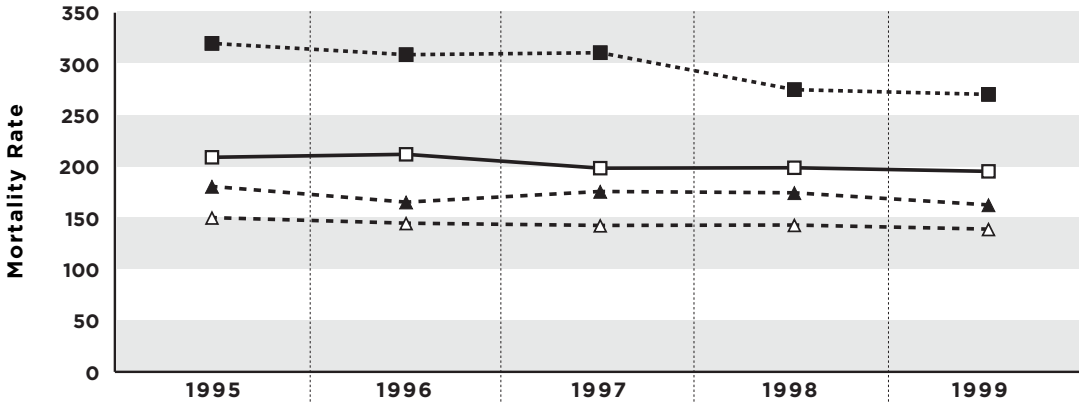
Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.
Source: Maryland Division of Health Statistics, 1995–1999.

Table 1.3
Leading Causes of Deaths by Age in Maryland, 1999

Age	Cause of Death	Number of Deaths	Percent of Deaths
5–14 years	Accidents	42	33.1%
	Cancer	21	16.5%
15–24 years	Assault	196	31.3%
	Accident	193	30.8 %
	Suicide	63	10.1%
25–44 years	**Cancer**	415	13.8%
	Human Immunodeficiency Virus (HIV)	369	12.3%
	Diseases of the heart	344	11.5%
45–64 years	**Cancer**	2,659	34.7%
	Diseases of the heart	1,879	24.5%
	Diabetes	299	3.9%
65 years & older	Diseases of the heart	9,727	31.6%
	Cancer	6,967	22.6%
	Cerebrovascular disease	2,521	8.2%

Source: Maryland Vital Statistics, Annual Report, 1999.

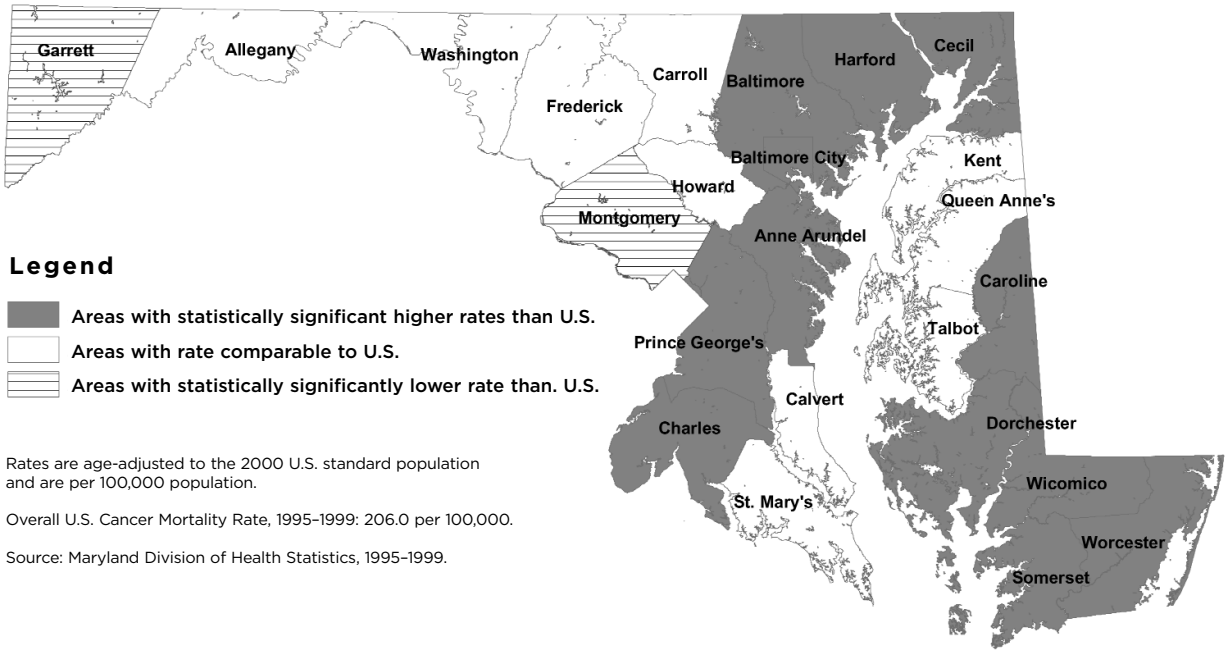
Figure 1.3
All Sites Cancer Mortality Rates by Race and Sex in Maryland, 1995–1999



	1995	1996	1997	1998	1999
MD WHITE MALE	209.1	212.0	198.5	198.9	195.4
MD BLACK MALE	320.1	309.1	311.0	275.0	270.4
MD WHITE FEMALE	150.3	144.9	142.7	143.1	139.1
MD BLACK FEMALE	180.7	165.4	175.8	174.5	162.7

Rates are per 100,000 population and age-adjusted to the 2000 U.S. standard population.
Source: Maryland Division of Health Statistics, 1995–1999.

Figure 1.4
Overall Maryland Cancer Mortality Rates by Geographical Area: A Comparison to Rates in the United States, 1995–1999

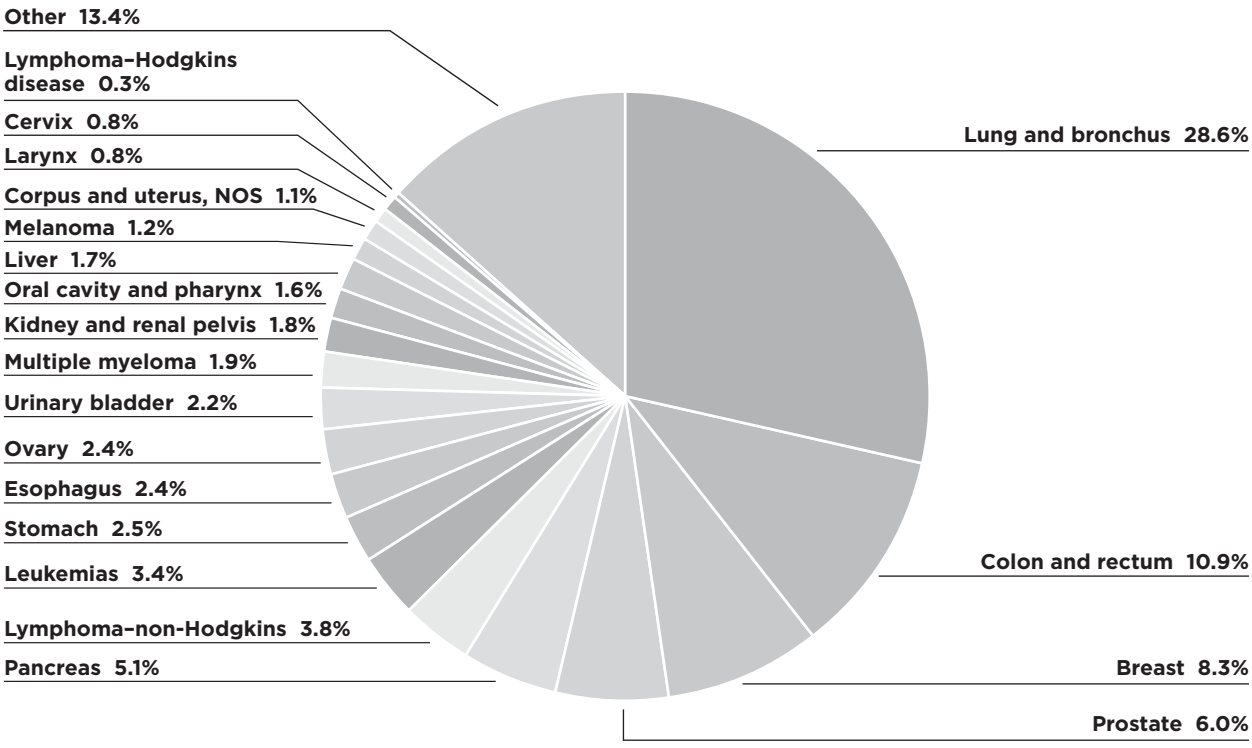


Rates are age-adjusted to the 2000 U.S. standard population and are per 100,000 population.

Overall U.S. Cancer Mortality Rate, 1995–1999: 206.0 per 100,000.

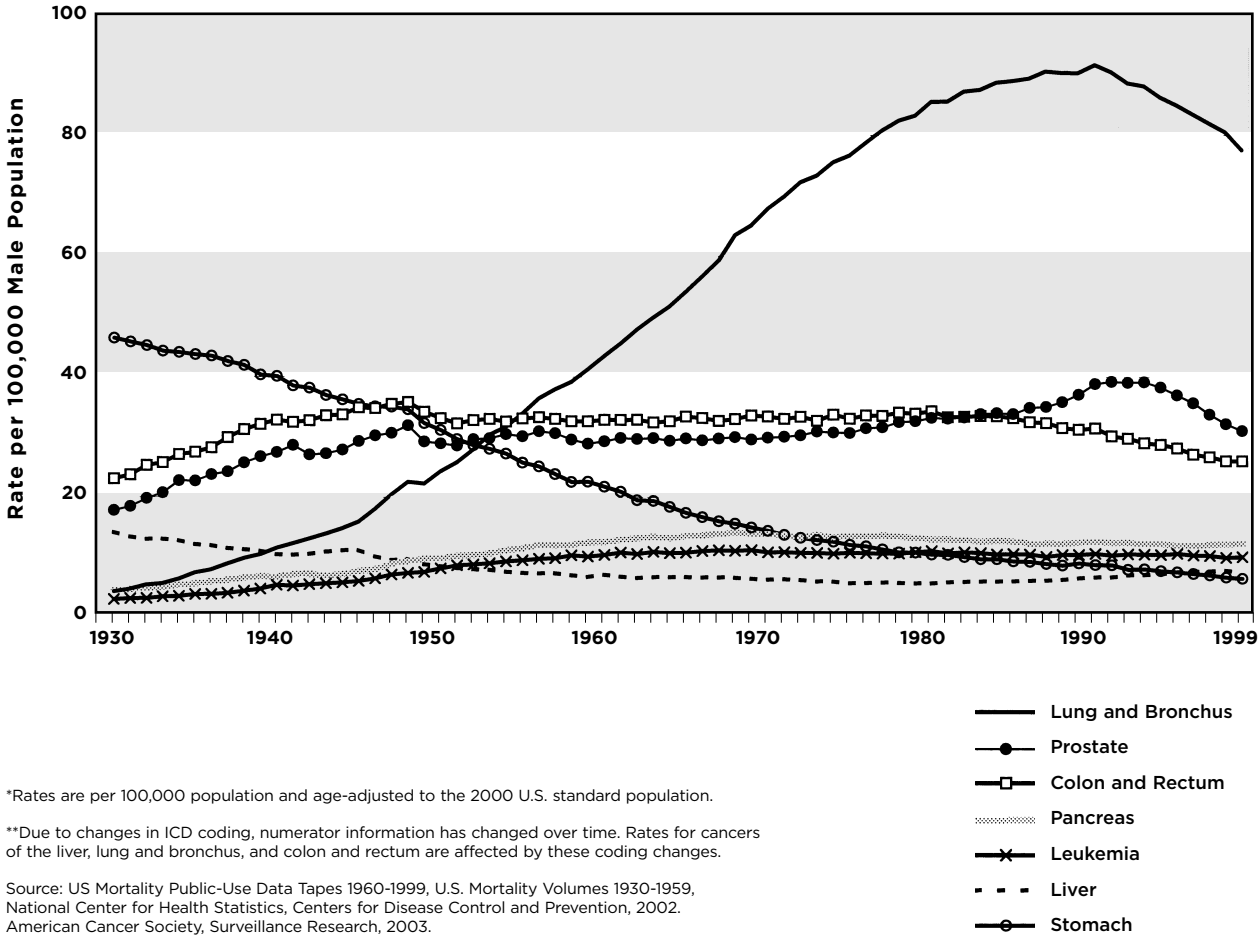
Source: Maryland Division of Health Statistics, 1995–1999.

Figure 1.5
Percent of Cancer Deaths by Type of Cancer in Maryland, 1995–1999*



*Total deaths reported 1995–1999 = 50,694
Source: Maryland Division of Health Statistics, 1995–1999.

Figure 1.6
Age-Adjusted Cancer Death Rates* of U.S. Males by Site, 1930–1999



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

**Due to changes in ICD coding, numerator information has changed over time. Rates for cancers of the liver, lung and bronchus, and colon and rectum are affected by these coding changes.

Source: US Mortality Public-Use Data Tapes 1960-1999, U.S. Mortality Volumes 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2002. American Cancer Society, Surveillance Research, 2003.

five leading causes of cancer death are cancers of the lung and bronchus, breast, colon and rectum, pancreas, and ovary (Table 1.4).

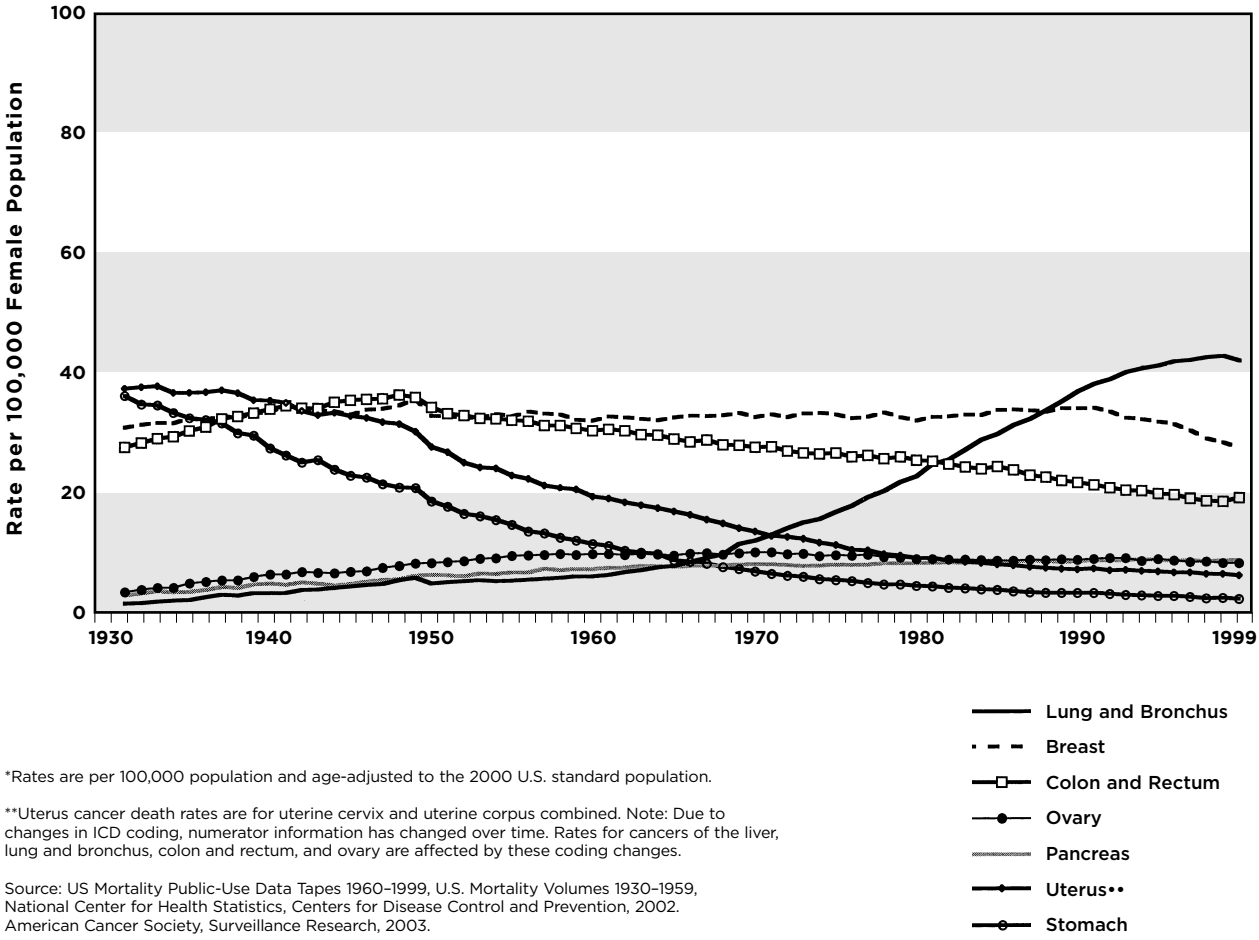
Cancer mortality varies by age. Leukemia, brain and central nervous cancers, and non-Hodgkins lymphoma are the most common causes of cancer deaths among children under 19 years of age; cancers of the lung and bronchus, breast, colon and rectum, pancreas, and non-Hodgkins lymphoma are the most common causes of cancer death among adults aged 20–49 in Maryland; and cancers of the lung, colon and rectum, breast, and prostate are the most common causes of cancer death among persons aged 50 and older in Maryland.

Cancer Incidence (New Cases)

Each year, over 23,000 Marylanders are diagnosed with cancer. The age-adjusted cancer incidence rate for Maryland in 1999 of 476.8 cancer cases per 100,000 population is comparable to (i.e., not significantly different from) the 1999 U.S. SEER cancer incidence rate of 476.1 cancer cases per 100,000 population (Table 1.2). The overall age-adjusted cancer incidence rate for men in Maryland, however, is statistically significantly higher than the rate for men in the U.S. In addition, Maryland men have higher age-adjusted cancer incidence rates for lung and bronchus and prostate cancers compared to men in the U.S. The age-adjusted cancer incidence rate for Maryland females is comparable to the rate for females in the U.S.[8]

Total cancer incidence rates in Maryland decreased an average of 3.4% per year from 1995 to 1999.[9] During this time period, overall cancer incidence rates declined in black men and white men, remained relatively stable in black females, and increased slightly in white females (Figure 1.9).

Figure 1.7
Age-Adjusted Cancer Death Rates* of U.S. Females by Site, 1930–1999



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

**Uterus cancer death rates are for uterine cervix and uterine corpus combined. Note: Due to changes in ICD coding, numerator information has changed over time. Rates for cancers of the liver, lung and bronchus, colon and rectum, and ovary are affected by these coding changes.

Source: US Mortality Public-Use Data Tapes 1960–1999, U.S. Mortality Volumes 1930–1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2002. American Cancer Society, Surveillance Research, 2003.

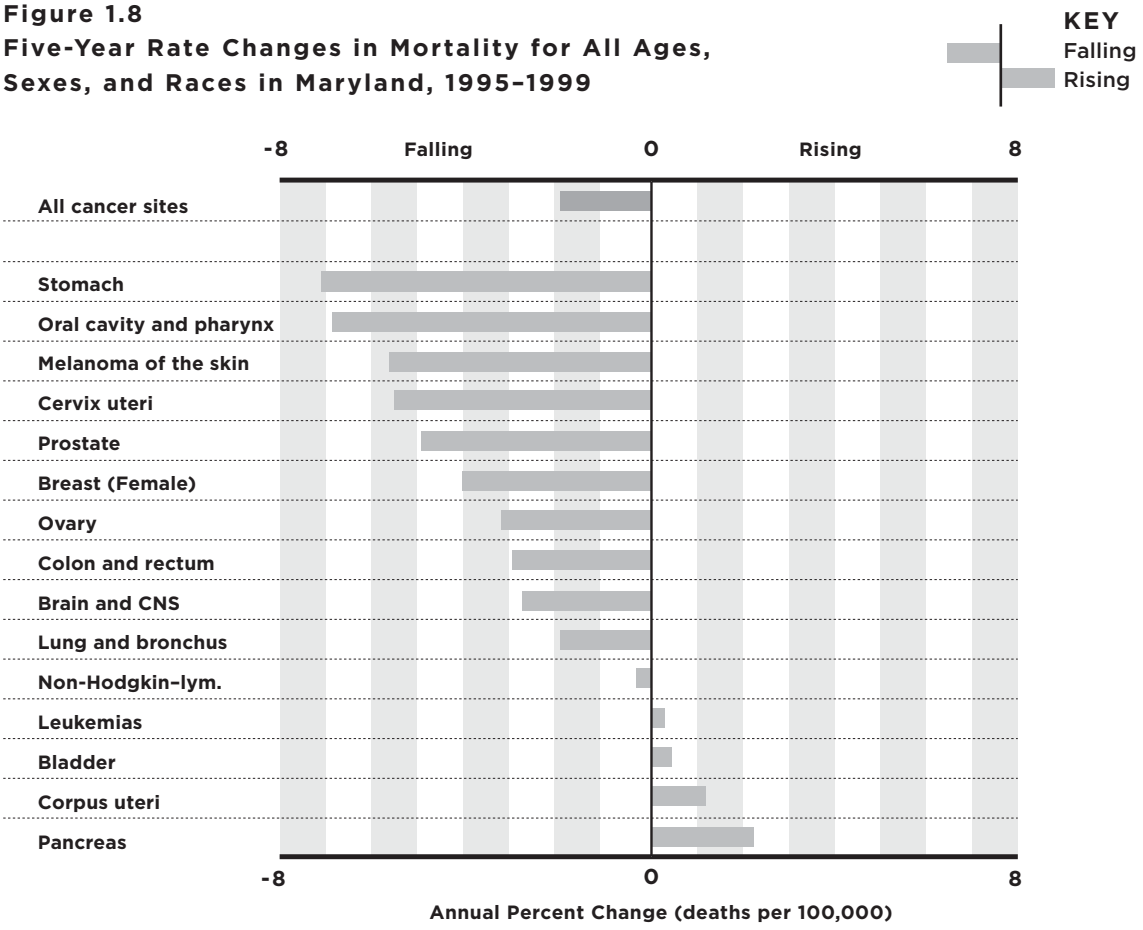
Cancer occurs predominantly in older persons, with a median age at diagnosis of 68 years.[10] Cancer incidence increases with age across all races and sexes. One in 12 males and 1 in 11 females aged 40–59 years of age will develop cancer, whereas 1 in 3 men and 1 in 5 women aged 60 to 79 years of age will develop cancer.[11] Cancer incidence rates are higher in males than females over age 54 in Maryland. Below the age of 50, white women have the highest cancer incidence rates (Figure 1.10).

The most frequently diagnosed cancers among persons under 20 years of age differ from those occurring in older age groups. Leukemia and cancer of the brain and central nervous system account for approximately 37% of cancers among persons under the age of 20. Among persons aged 20–49 years, breast cancer incidence is substantially higher than any other cancer site, representing over 27% of all cancers diagnosed in this age group. Melanoma, lung and bronchus, thyroid, and colorectal cancer ranked high in frequency for this age group after breast cancer. Among persons 50 years of age and older, prostate, lung and bronchus, breast, and colorectal cancer were the most frequently occurring cancers.

The most commonly diagnosed cancers among Marylanders are prostate (15.8%), breast (15.6%), lung and bronchus (15.1%), and colon and rectum (11.4%) cancers. Combined, these cancers comprise 57.98% of all cancers diagnosed (Figure 1.11).

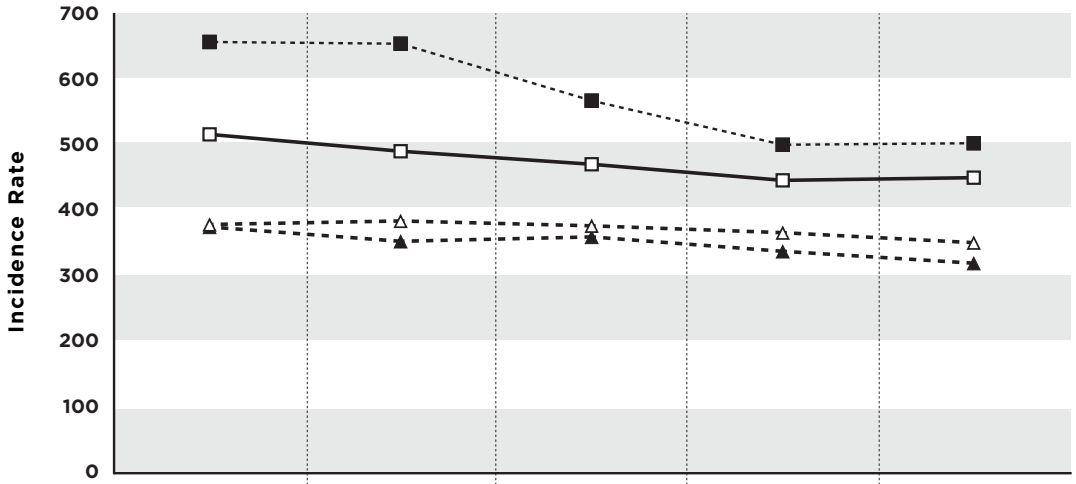
Among Maryland men, cancers of the prostate, lung and bronchus, and colon and rectum comprise over 58% of all newly diagnosed cancers. Among Maryland women, cancers of the breast, lung and bronchus, and colon and rectum comprise 57% of all newly diagnosed cancer cases. (Table 1.5).

Figure 1.8
Five-Year Rate Changes in Mortality for All Ages, Sexes, and Races in Maryland, 1995–1999



Created by www.ims.nci.gov on 02/04/2003.
Trend: Five-year Annual Percent Change (APC) as calculated by SEER*Stat.
Source: National Center for Health Statistics as analyzed by the National Cancer Institute.

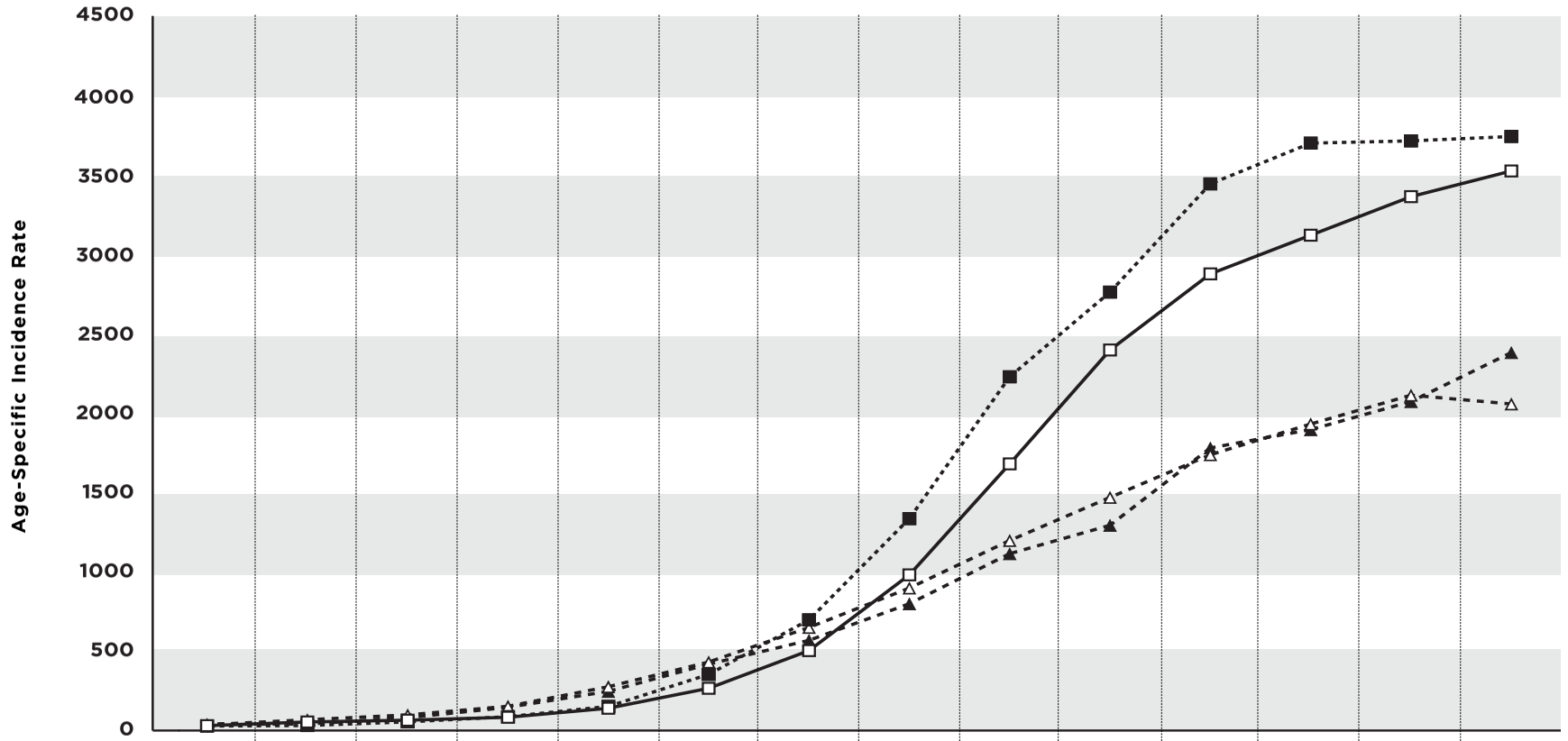
Figure 1.9
All Sites Cancer Incidence Rates by Race and Sex in Maryland, 1995–1999



	1995	1996	1997	1998	1999
MD WHITE MALE	518.1	492.3	472.4	447.8	451.9
MD BLACK MALE	659.4	656.7	569.6	502.2	504.6
MD WHITE FEMALE	380.3	385.7	378.3	367.8	352.5
MD BLACK FEMALE	376.5	354.6	361.3	339.3	321.1

Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.
Source: Maryland Cancer Registry, 1995–1999.

Figure 1.10
All Sites and Age-Specific Cancer Incidence Rates by Race and Sex in Maryland, 1995–1999



	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–85	85+
MD WHITE MALE	31.0	54.2	65.6	84.1	141.2	267.5	506.2	985.7	1688.5	2409.6	2891.6	3136.5	3380.7	3543.2
MD BLACK MALE	28.5	31.7	54.7	87.9	152.9	355.5	701.0	1341.7	2239.9	2776.1	3461.4	3719.4	3733.7	3761.5
MD WHITE FEMALE	36.7	68.4	99.0	153.8	277.5	434.0	652.8	902.3	1203.3	1476.3	1746.4	1941.0	2123.4	2067.8
MD BLACK FEMALE	29.6	41.0	80.8	147.2	248.1	420.1	571.3	803.1	1119.9	1299.7	1789.6	1905.4	2083.2	2393.3

Rates are per 100,000 population.
Source: Maryland Cancer Registry, 1995–1999.

Table 1.4
Five Leading Causes of Cancer Mortality in Maryland by Sex, 1995–1999

MALES		FEMALES	
Cancer Site	**Percent of Deaths**	**Cancer Site**	**Percent of Deaths**
Lung and bronchus	32.2%	Lung and bronchus	24.8%
Prostate	11.7%	Breast	16.8%
Colon and rectum	10.4%	Colon and rectum	11.4%
Pancreas	4.8%	Pancreas	5.4%
Non-Hodgkins lymphoma	3.9%	Ovary	4.9%

Source: Maryland Cancer Registry, Maryland Vital Statistics, 1995–1999.

Table 1.5
Seven Leading Cancer Incident Sites by Sex in Maryland, 1995–1999

MALES		FEMALES	
Cancer Site	**Percent of New Cases**	**Cancer Site**	**Percent of New Cases**
Prostate	30.9%	Breast	31.8%
Lung and bronchus	16.6%	Lung and bronchus	13.5%
Colon and rectum	11.0%	Colon and rectum	11.9%
Bladder	5.7%	Corpus uterus	5.0%
Non-Hodgkins lymphoma	3.7%	Ovary	3.6%
Melanoma of the skin	3.6%	Non-Hodgkins lymphoma	3.4%
Oral cavity	3.1%	Melanoma	2.9%

Source: Maryland Cancer Registry, DHMH, 1995–1999.

Table 1.6
Trends in Five-Year Relative Survival Rates by Year of Diagnosis in the United States, 1974 to 1998

Cancer Type	1974 to 1976	1983 to 1985	1992 to 1998
All cancers	50%	52%	62%
Lung and bronchus	12%	14%	15%
Colon cancer	50%	58%	62%
Rectum cancer	49%	55%	62%
Breast cancer	75%	78%	86%
Prostate cancer	67%	75%	97%

Source: American Cancer Society Facts and Figures, 2003.

Stage of Disease and Survival

Staging is the process of determining the extent of disease progression at the time of diagnosis. Blacks are less likely to be diagnosed with cancer at the localized stage, when the disease may be more easily and successfully treated, and more likely to be diagnosed at regional and distant stages.[12]

The five-year relative survival rate represents the proportion of persons who are living five years after a diagnosis of cancer. There have been notable improvements in U.S. five-year relative survival rates for the most common cancers. (Survival data is not available for Maryland.) Five-year relative survival rates for all cancers increased from 50% in 1974–1976 to 62% in 1992–1998 (Table 1.6). For nearly every cancer type, blacks have lower five-year relative survival rates than whites at each stage of diagnosis.[13]

Economic Impact: Costs for Cancer Care

The economic impact of cancer is large. The National Institutes of Health estimates that the overall cost for cancer in the year 2002 was $171.6 billion, of which $60.9 billion was for direct medical costs (i.e., the total of all health expenditures), $15.5 billion was for indirect morbidity costs (i.e., the cost of lost productivity due to illness), and $95.2 billion was for indirect mortality costs (i.e., the cost of lost productivity due to premature death). Maryland's population represents approximately 1.88% of the total U.S. population. Using this proportion of the national annual direct costs for cancer, it is estimated that the total annual cost for cancer in Maryland in the year 2002 was $3.2 billion, and the total direct medical cost was $1.1 billion (Table 1.7).

Risk Factors

Cancer can be attributed to a variety of factors. These factors may act together or in sequence to initiate or promote the development of cancerous cells.[14] Various estimates have been made regarding the proportion of cancer deaths attributable to certain factors (Table 1.8). It is estimated that nearly two-thirds of cancer deaths in the United States can be linked to the use of tobacco, dietary factors, obesity, and lack of exercise.[15]

The most effective means of preventing cancer is to reduce the use of tobacco products since an estimated 30% of all cancer deaths can be attributed to tobacco use. Scientific studies have shown that involuntary exposure of non-smokers to smoke from tobacco products (i.e. environmental tobacco smoke) poses a health risk for non-smokers, including an increased risk of lung cancer. Tobacco is causally related to cancers of the lung and bronchus, mouth, larynx, esophagus, bladder, kidney, and pancreas and may be related to cancers of the colon and cervix.[16]

An estimated 30%–35% of all cancer deaths can be attributed to nutrition and its effect on obesity and lack of physical activity.[17] Evidence indicates that a diet that reduces cancer risk should be high in vegetables and fruits, and low in red meat and salt.

An estimated 4%–5% of all cancer deaths can be attributed to occupational exposure to carcinogens. Some chemicals (e.g., benzene, asbestos, vinyl chloride, arsenic, aflatoxin) show evidence of causing cancer in humans. Other chemicals are considered "probable" human carcinogens based on evidence from animal experiments (e.g., chloroform, DDT, formaldehyde, PCBs).[18]

Approximately 5% of cancer deaths are attributed to heredity. That is, certain individuals are more susceptible to developing cancer due to family history and/or because they have inherited genetic changes.[19]

Viruses and other infectious agents are estimated to cause 5% of cancer deaths. For example, the human papilloma virus (HPV) types 16 and 18 cause cervical cancer and are associated with oral cancer, and the hepatitis B virus may cause cancer of the liver.[20]

Reproductive factors such as early age of menarche, late age at first birth, and late age at menopause may increase the risk for breast cancer. Women who have not had children are at greater risk for developing cancers of the endometrium and ovary.[21]

Alcohol use interacts with tobacco in the causation of oral cancer and cancers of the upper respiratory system and gastrointestinal tract.[22] The combination of alcohol and tobacco use increases the risk significantly more than the use of tobacco or alcohol alone in the upper respiratory system and gastrointestinal tract.

Exposure to ultraviolet radiation from the sun is responsible for over 90% of skin cancers, including

Table 1.7
Estimated Annual Costs of Cancer Care in the United States and Maryland, 2002

Cancer Type	Estimated Annual Costs in the U.S.	Estimated Annual Costs in MD
Total cancer care	$171.6 billion	$3.2 billion
Total direct medical costs	$60.9 billion	$1.1 billion
Direct Medical Costs by Cancer Type		
Breast cancer	$5.45 billion	$102.5 million
Colorectal cancer	$5.45 billion	$102.5 million
Lung and bronchus	$5.00 billion	$94.0 million
Prostate cancer	$4.68 billion	$88.0 million
Cervical cancer	$1.68 billion	$31.6 million
Head and neck cancers	$1.61 billion	$30.3 million
Melanoma	$ .70 billion	$13.2 million

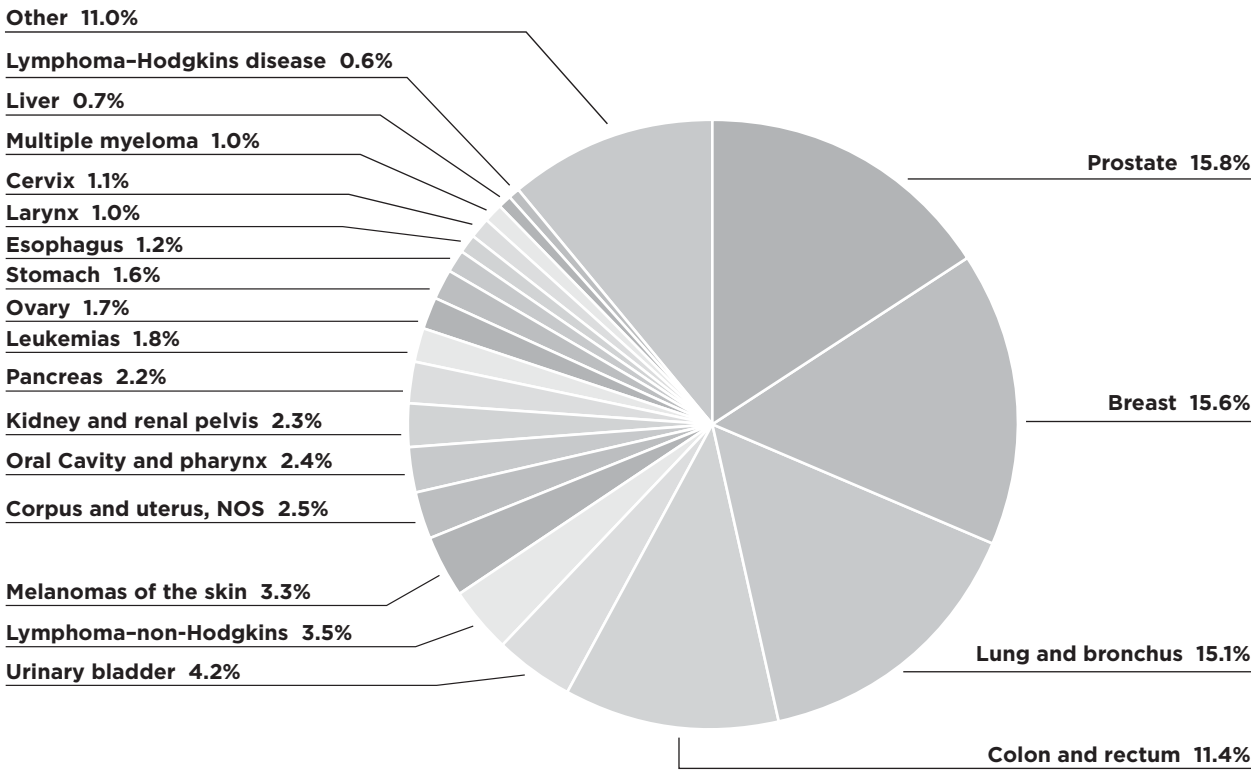
Source: American Cancer Society, Facts and Figures, 2003 (for U.S. data for total cancer care and total direct medical costs); SEER-Medicare database, personal communication, Martin L. Brown, Ph.D., Applied Research Program, National Cancer Institute (for U.S. data on direct medical costs by cancer type); Maryland DHMH, Center for Cancer Surveillance and Control (estimated annual costs in Maryland are based on the assumption that Maryland represents 1.88% of the U.S. population).

Table 1.8
Estimated Proportion of Cancer Deaths Attributable to Various Risk Factors

Risk Factor	Doll and Peto Estimate	Harvard Estimate
Tobacco	30%	30%
Adult diet/obesity	35%	30%
Sedentary lifestyle	-	5%
Occupational factors	4%	5%
Family history of cancer	-	5%
Viruses/other biologic agents	10%	5%
Perinatal factors/growth	-	5%
Reproductive factors	7%	3%
Alcohol	3%	3%
Socioeconomic status	-	3%
Environmental pollution	2%	2%
Ionizing/ultraviolet radiation	3%	2%
Prescription drugs/medical procedures	1%	1%
Salt/other food additives/contaminants	-	1%

Source: Doll R, Peto R. The Causes of Cancer. Quantitative Estimates of Avoidable Risks of Cancer in the United States Today. New York, NY: Oxford University Press. Inc.; 1981 and the Harvard Center for Cancer Prevention. Harvard Report on Cancer Prevention. Volume 1: Causes of human cancer. http://www.hsph.harvard.edu/cancer/publications/reports.html.

Figure 1.11
Percent of All Incident Cancer Cases by Type of Cancer in Maryland, 1995–1999*



*Total incident cases reported 1995-1999 = 120,182.
Source: Maryland Cancer Registry, 1995–1999.

melanoma. Prolonged sun exposure, a history of severe sunburns, and sunburns during childhood have been implicated in the development of skin cancer. Radon exposure in homes can increase lung cancer risk, and cigarette smoking greatly increases the effect of radon exposure on lung cancer risk.[23]

Risk factors vary for different cancer sites (Table 1.9).

Disparities

Blacks are more likely to die from cancer than persons from any other racial or ethnic group in Maryland. In 1999, the overall cancer mortality rate for blacks in Maryland was 257.9 deaths per 100,000 population compared to a rate of 204.0 deaths per 100,000 population for whites in the state (Table 1.2). These data show that the cancer mortality rate for Maryland blacks is 26% higher than the cancer mortality rate for Maryland whites.[24] Black males have the highest overall cancer incidence and mortality rates compared to black females, white males, and white females (Figure 1.3).

Despite these high rates among blacks, cancer incidence and mortality decreased more among blacks than whites in Maryland from 1995 to 1999. Between 1995 and 1999, overall cancer incidence rates declined an average of 3.4% for all races, 6.2% for blacks, and 2.8% for whites in Maryland. Similarly, the death rate for all cancers in Maryland decreased an average of 1.9% per year for all races, 3.0% for blacks, and 1.5% for whites.[25] These data show that gains are being made to lessen the disparities in cancer incidence and mortality in Maryland, but much more work remains to be done.

Cancer Control Model for Maryland

A Cancer Control Model has been developed in Maryland to provide a framework for decisionmaking regarding cancer control policies and services in the state. (Figure 1.12.) The underlying principle of the Cancer Control Model is the importance of using scientific evidence to guide the development and imple-

Table 1.9
Select Cancer Types and Associated Risk Factors

Cancer Type	Risk Factors
Breast cancer	Age; personal and family history of breast cancer; atypical hyperplasia; early menarche; late menopause; obesity after menopause; recent use of oral contraceptives or postmenopausal estrogens and progestins; never giving birth to children or giving birth after age 30; alcohol; inherited genes.
Colon and rectum	Age; personal and family history of colorectal cancer or polyps; inflammatory bowel disease; smoking; alcohol consumption; obesity; physical inactivity; high fat and low fiber diet; inadequate intake of vegetables and fruits.
Leukemia	The causes of most leukemia are unknown. Some risk factors are genetic abnormalities (Down's syndrome); cigarette smoking; benzene; ionizing radiation; human T-cell leukemia/lymphoma retrovirus (HTLV-1).
Lung and bronchus	Cigarette smoking is by far the most important risk factor in the development of lung cancer. Other risk factors: occupational or environmental exposure to arsenic and some organic chemicals like radon and asbestos (particularly among smokers); radiation exposure from occupational, medical, and environmental sources; air pollution; tuberculosis; and for non-smokers, environmental tobacco smoke.
Lymphoma	Risk factors are largely unknown, but may involve reduced immune function (e.g., organ transplants) and exposure to infectious agents (HIV, HTLV-1); age; occupational exposure to herbicides.
Oral cavity and pharynx	Cigarette, cigar, or pipe smoking; use of smokeless tobacco; excessive consumption of alcohol.
Ovary	Age; never giving birth; use of fertility drugs; hormone replacement therapy; personal history of breast cancer; family history of breast or ovarian cancer; hereditary nonpolyposis colon cancer.
Pancreas	Cigarette and cigar smoking; obesity; physical inactivity; chronic pancreatitis; diabetes; cirrhosis; a diet high in fat.
Prostate	Age; black race; and family history of prostate cancer.

Table 1.9
Select Cancer Types and Associated Risk Factors

Cancer Type	Risk Factors
Skin	Excessive exposure to ultraviolet radiation from sunlight or tanning lamps; fair complexion; occupational exposure to coal tar, pitch, creosote, arsenic compounds, or radium; family history; and multiple or atypical moles.
Urinary bladder	Smoking is the greatest risk factor for bladder cancer. Other risk factors include: living in an urban area; workers in dye, rubber, or leather industries.
Uterine cervix	Human papilloma virus (HPV); having sex at an early age; many sexual partners; cigarette smoking.
Uterine corpus (endometrium)	High cumulative exposure to estrogen is the major risk factor for endometrial cancer, the most common type of cancer of the uterine corpus (e.g., estrogen from estrogen replacement therapy, tamoxifen, early menstruation, late menopause, never giving birth, a history of failure to ovulate, and obesity). Other risk factors for uterine corpus cancer include infertility and hereditary nonpolyposis colorectal cancer.

Source: American Cancer Society, Facts and Figures, 2003.

mentation of cancer control policies and services in the state. Focusing policies and services on those that are evidence-based maximizes the use of limited resources in the most effective way to reduce the burden of cancer among the citizens of Maryland.

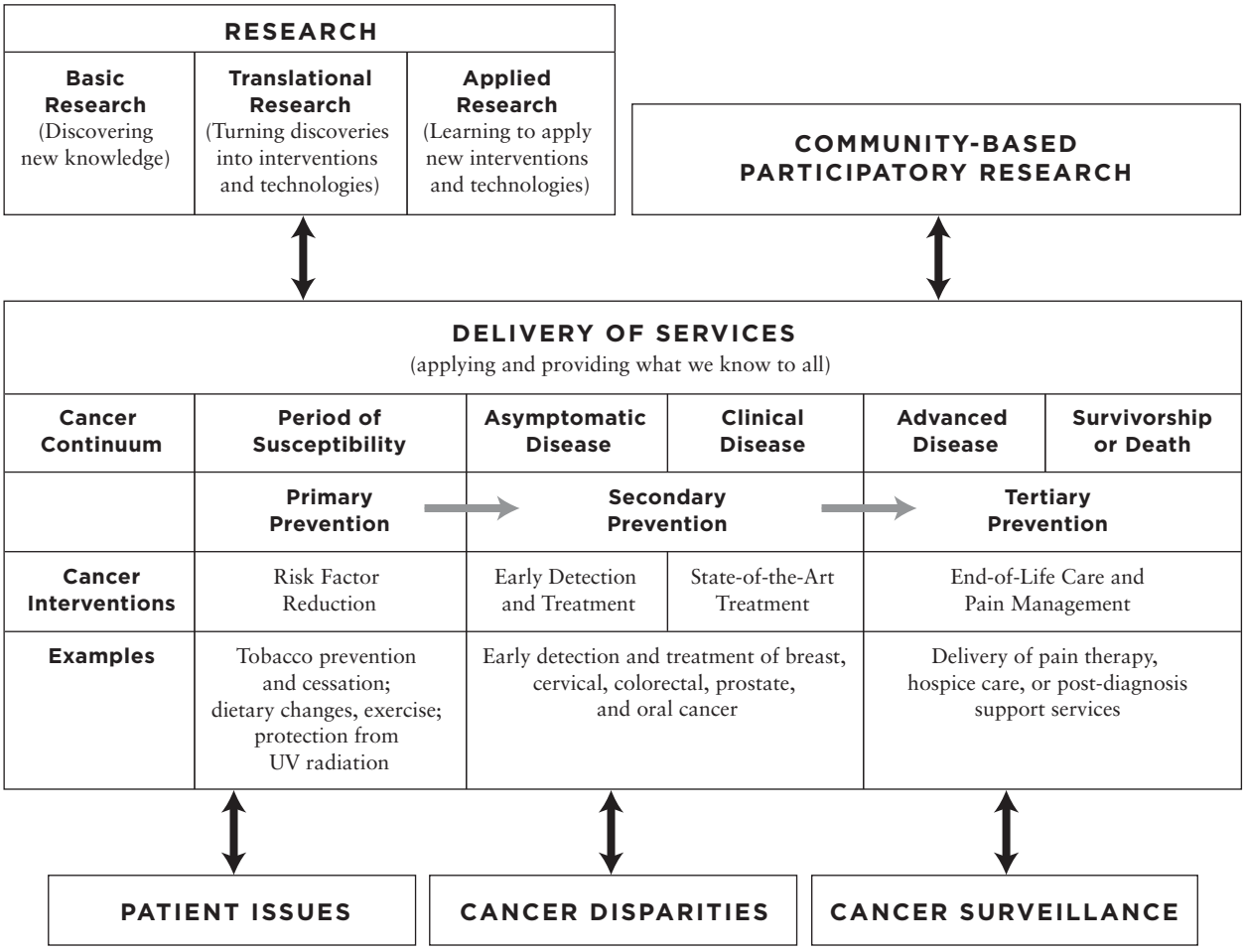
Cancer control starts with research. Basic research involves discovering new knowledge about the causes and etiology of cancer as well as new ways to detect, diagnose, and treat cancer effectively. Basic research is translated into interventions and technologies that can then be applied to individual patients, communities, and the general population. Research demonstrates which interventions are most effective in reducing incidence, morbidity, and mortality. For example, the results of clinical trials provide information on the best methods to detect, diagnose, and treat individuals with different types of cancer. Cancer research is of the utmost importance in furthering our knowledge in cancer control.

Community-based participatory research is a collaborative approach to research in which communities are actively engaged in the research process through partnerships with academic institutions. Community-based participatory research recognizes the unique strengths that each partner brings. It begins with a research topic of importance to the community and aims to combine knowledge with action to achieve social change, improve health outcomes, and eliminate health disparities.[26]

In recent years, national organizations, funding agencies, and researchers have called for a renewed focus on community-based participatory research, recognizing the importance of social, political, and economic systems to health behaviors and outcomes. This renewed focus is due to many converging factors, including our increased understanding of the complex issues that affect health, the importance of both qualitative and quantitative research methods, and the need to translate the findings of basic, interventional, and applied research into changes in practice and policy.[27]

For an individual, the Cancer Control Model follows a

Figure 1.12
Cancer Control Model for Maryland



Source: Adapted from: 1999 Annual Cancer Report for the President's Panel and unpublished writings of John W. Southard, M.D., M.P.H., formerly with the Office of Chronic Disease Prevention, MD DHMH.

continuum from a period of susceptibility to asymptomatic disease, clinical disease, advanced disease, and survivorship or death. During the period of susceptibility, a person is healthy and has not developed cancer. During this period, primary prevention or risk reduction activities should be undertaken. Primary prevention refers to approaches to prevent or reduce the occurrence of disease (e.g., cancer) among individuals who are susceptible to developing the disease. Examples of evidence-based primary prevention interventions in cancer control are tobacco prevention and cessation, dietary changes and increased physical activity, and reduction of sun exposure.

During the period of asymptomatic disease, a person has developed cancer but has not developed any signs or symptoms of the disease. During the period of clinical disease, a person has developed cancer and has signs or symptoms of the disease. During these periods, early detection and state-of-the-art treatment (secondary prevention) are vital. Clinical trials have demonstrated that the early detection and treatment of breast cancer and colorectal cancer can significantly reduce mortality due to these cancers. The early detection of cervical cancer has resulted in a reduction in both the incidence of, and mortality from, this disease. Research has improved treatment of many types of cancer, resulting in improved survival and reduced mortality. Clinical trials are ongoing to learn better ways to detect, diagnose, and treat different types of cancers.

During the period of advanced disease, efforts are needed to improve quality of life and survival as well as reduce morbidity, disability, and death. This can be

accomplished through state-of-the-art treatment, end-of-life-care, and pain management. These approaches are termed tertiary prevention.

Throughout the cancer continuum, there are issues that warrant special consideration. Patients, their families, and their significant others are affected in a myriad of ways throughout the entire cancer control process and have special needs warranting attention. In addition, cancer disparities exist at each step in the cancer continuum and they too must be addressed.

Lastly, cancer surveillance is needed to collect, analyze, and report data and information to inform policy makers about interventions that are working and those that are not.

At the state level, the first step in the Cancer Control Model is to identify those interventions that have been proven, through research, to reduce death, disability, and incidence, and/or improve survival of cancer along the cancer continuum (Appendix B, Table 1). The next step is to determine if these proven interventions are being used by all racial and ethnic groups and in all geographic areas of the state. Gaps in the provision of these proven interventions should be identified, and evidence-based public health policies and services should be implemented to assure the provision of these proven interventions among communities that are not being reached, filling gaps in services, education, and access to care (Appendix B). In this way, the Cancer Control Model can help guide interventions and policies in the state to help reduce the burden of cancer among Maryland's citizens.

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