

# Cancer Trends Progress Report – 2009/2010 Update



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## ▸ Director's Message

One of the National Cancer Institute's important duties is communicating our nation's progress against cancer to the public. This 2009/2010 update to the *Cancer Trends Progress Report* is an important part of that dissemination process. Here you will find a Web site that provides up-to-date information on a range of cancer control topics—from disease prevention to the impact of deaths from cancer—and data that track the successful application of cancer research into practice.

The *Cancer Trends Progress Report — 2009/2010 Update* draws on data from numerous federal departments and agencies, including the Environmental Protection Agency, the Department of Agriculture, and several offices and agencies within the Department of Health and Human Services, including the Centers for Disease Control and Prevention, the Office of Disease Prevention and Health Promotion, the Substance Abuse and Mental Health Administration, and the National Institutes of Health's National Institute on Alcohol Abuse and Alcoholism. The content, design, and production of this report are the results of a collaboration among federal and state agency partners, consumer advocates, the American Cancer Society, and others.

As the report details, the nation is making progress toward major cancer-related targets. Most prominently, death rates and incidence rates for the four most common cancers (prostate, breast, lung, and colorectal), as well as for all cancers combined, continue to decline. Because lung cancer is the country's number one cancer killer, smoking is a major focus of this update. Adult cigarette smoking prevalence has been slowly declining since 1991, and smoking prevalence among adolescents has declined since the late 1990s, but one in five adults and adolescents is still a smoker. Moreover, younger cancer survivors are smoking more than older cancer survivors and those in the general population. Non-melanoma skin cancers have continually led the list of incident cancers and I am happy to note that, perhaps due to ongoing campaigns, sun protective behaviors have increased—for example, teen indoor tanning has decreased. However, young adults, especially young men, show much lower levels of sun protective behaviors.

We have much work to do if we are truly to make significant progress in our fight against cancer, as this update notes. Lung cancer incidence rates in women continue to rise, but not as rapidly as before. This rising incidence is not surprising, given the fact that while more than 40 percent of smokers attempt to quit smoking each year, quitting rates have been low and are not improving for most of the population. The connection between cancer and obesity is a concern as more Americans are overweight or obese, and leisure time physical activity is not increasing. Other nutritional and dietary factors are also of concern: alcohol consumption has risen slightly since the mid 1990s, fruit and vegetable intake is not increasing, and red meat and fat consumption are not decreasing, all of which have been cited as possible links to increased risk of cancer. Unexplained cancer-related health disparities remain among population subgroups, and we must address this issue forcefully. For example, Blacks and people with low socioeconomic status have the highest rates of both new cancers and cancer deaths.

Finally, the economic burden of cancer is taking its toll. As the U.S. population ages and newer technologies and treatments become available, national expenditures for cancer continue to rise and could potentially exceed overall medical care expenditures combined.

We at NCI, along with our *Cancer Trends Progress Report* partners, hope that you will find this report to be a valuable reference tool and a stimulus for action. We must not forget that the numbers in this report reflect the lives and struggles of millions of our fellow citizens. NCI remains committed to its vital work, on behalf of each one of them.



Harold Varmus, M.D.  
Director, National Cancer Institute

## ➤ Introduction

The nation's investment in cancer research is making a difference.

- The U.S. cancer death rate first began to drop in 1992.
- The incidence rates of all new cancers combined has been falling since 1999, after adjusting for delayed reporting.
- Many people who have had cancer live longer and enjoy a better quality of life than was possible years ago.

However, cancer remains a major public health problem that profoundly affects the more than 1 million people diagnosed each year, as well as their families and friends.

- The incidence rates of melanoma of the skin, kidney cancer, thyroid cancer, and cancer of the liver are rising, along with non-Hodgkin lymphoma, childhood cancers, leukemia, pancreatic cancer, testicular cancer, and esophageal cancer. The burden of some types of cancer weighs more heavily on some groups than on others. The rates of both new cases and deaths from cancer vary by socioeconomic status, sex, and racial and ethnic group.
- The economic burden of cancer also is taking its toll. As our nation's population grows and ages, more people are expected to get cancer. Meanwhile, the costs of cancer diagnosis and treatment are on the rise. The combination of these trends will accelerate the national costs of cancer treatment.

### Why a Progress Report Is Needed

Since the signing of the National Cancer Act in 1971, our country has vigorously fought the devastating effects of cancer. Now it is time to see how far we have come. The *Cancer Trends Progress Report—2009/2010 Update* is the fifth in a series of reports that describe the nation's progress against cancer through research and related efforts. The report is based on the most recent data from the National Cancer Institute, the Centers for Disease Control and Prevention, other federal agencies, professional groups, and cancer researchers.

The *Cancer Trends Progress Report* was designed to help the nation review past efforts and plan future ones. The public can use the report to better understand the nature and results of strategies to fight cancer. Researchers, clinicians, and public health providers can focus on the gaps and opportunities identified in the report, paving the way for future progress against cancer. Policymakers can use the report to evaluate our progress relative to our investment in cancer research discovery, program development, and service delivery.

### What's in the Report

The *Cancer Trends Progress Report—2009/2010 Update* includes key measures of progress along the cancer control continuum.

- **Prevention.** The measures in this section cover behaviors that can help people prevent cancer, the most important of which is avoiding tobacco use and secondhand smoke exposure. This section also addresses red meat intake and exposure to sun and chemicals in the environment.
- **Early Detection.** Screening tests provide ways to find cancers early, when there is the best chance for cure. This section describes the proportion and types of people using recommended screening tests.
- **Diagnosis.** We can learn much about our progress against cancer by looking at the rates of new cancer cases (incidence) and cancers diagnosed at late stages. This section reviews both these areas.
- **Treatment.** This section explains the current status of treatment measures and describes the kinds of measures that are emerging from ongoing research and monitoring activities.
- **Life After Cancer.** This section addresses trends in the proportion of cancer patients who are alive 5 years after their diagnosis, the costs of cancer care, and smoking behavior among survivors.
- **End of Life.** This section includes the rate of deaths (mortality) from cancer and the estimated number of years of life lost (person-years of life lost) as a result of cancer.

Where possible, the *Cancer Trends Progress Report* shows changes in these data over time (trends). This report shows whether the trends are "rising" or "falling" using standard definitions and tests of the statistical significance of the trend (Appendix D). For some measures, differences in the cancer burden among various U.S. racial and ethnic groups, income groups, and groups by level of educational attainment, are also presented.

Most of the measures for age-adjusted cancer death rates in this report are identical to those presented in Healthy People 2010, a comprehensive set of 10-year health objectives for the nation sponsored by the U.S. Department of Health and Human Services. This enabled us to show the nation's progress relative to cancer-related targets for Healthy People 2010.

### **How Data Were Selected**

In selecting measures that would be meaningful to readers of this report, we relied largely on long-term national (rather than state or local) data collection efforts. State and local data are available online at State Cancer Profiles (<http://statecancerprofiles.cancer.gov>). The report includes more measures for prevention than for other segments of the continuum, because of the potential of prevention measures to positively impact national progress to reduce the burden of cancer. Some measures such as "quality of life" were not included in this report, even though they are important in assessing the cancer burden, because there is no current consensus on how best to track these measures on a population basis over time.

The data in the *Cancer Trends Progress Report—2009/2010 Update* come from a variety of systems and surveys with different collection techniques and reporting times, so time periods may vary. The starting point or baseline year against which to measure how well the nation is progressing toward the Healthy People 2010 targets depends on the data available. For example, data for most Diagnosis, Life After Cancer, and End of Life measures are available starting in 1975, while data for most Prevention, Early Detection, and Treatment measures are available beginning in the late 1980s or early 1990s.

*Cancer Trends Progress Report—2009/2010 Update*, National Cancer Institute, NIH, DHHS, Bethesda, MD, April 2010, <http://progressreport.cancer.gov>

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## Report Highlights

### Major Conclusions

#### **The nation is making progress toward major cancer-related Healthy People targets.**

- Death rates for the four most common cancers (prostate, breast, lung, and colorectal), as well as for all cancers combined, continue to decline.
- The rate of cancer incidence has declined since the early 2000s.
- Length of cancer survival has increased for all cancers combined. For All Sites, the percent of cases surviving five years from diagnosis in 2001 (most recent year with five-year follow-up) was 68.3%. Improvement in survival must continue in order to meet the Healthy People 2010 objective for five year survival of 70%.
- Adult cigarette smoking prevalence has been slowly declining since 1991, while smoking prevalence among adolescents has declined since the late 1990s. Despite these declines, one in five adults and adolescents is a smoker.
- Substantial decreases in secondhand smoke exposure have been realized since the beginning of the 1990's for all subgroups and across a variety of measures. This includes biological measures, as well as work place policies, rules about smoking in the home and, more recently through state and local smoke-free indoor air legislation.
- Sun protective behaviors have risen slightly but young adults, especially young men, show much lower levels of this behavior.
- Teen indoor tanning has decreased since 2005. However, recent usage by girls remains high with over 10% of all girls 14-17 years old and 16% of Non-Hispanic White girls of the same age reporting using an indoor tanning device in 2008.

#### **The nation is losing ground in other important areas that demand attention.**

- Incidence rates of some cancers are rising including melanoma of the skin, non-Hodgkin lymphoma, childhood cancer, cancers of the kidney and renal pelvis, leukemia, thyroid, pancreas, liver and intrahepatic bile duct, testis, and esophagus.
- Lung cancer incidence rates in women continue to rise, but not as rapidly as before.
- Death rates for cancer of the pancreas, esophagus, thyroid, and liver are increasing.
- While more than 40 percent of smokers attempt to quit smoking each year, successful quitting rates have been low and are not improving for most of the population.
- While progress has been made in all segments of the population, subgroups including children living in homes with smokers, young adults, subgroups of nonsmoking workers (for example, blue collar occupations and hospitality industry), and non-Hispanic Blacks have higher rates of exposure to secondhand smoke.
- Dentists are half as likely as physicians to advise their patients to quit smoking.
- More people are overweight and obese, and leisure time physical activity is not increasing.
- Alcohol consumption has risen slightly since the mid 1990s. Fruit and vegetable intake is not increasing. Red meat and fat consumption are not decreasing.
- Adult indoor tanning has increased slightly.
- Cancer treatment spending continues to rise along with total health care spending.

- Unexplained cancer-related health disparities remain among population subgroups. For example, Blacks and people with low socioeconomic status have the highest rates of both new cancers and cancer deaths.
- Mammography rates dropped slightly between 2003–2005, especially for women 50–64. This will be monitored when data for 2008 are released to see whether this trend continues. Screening for colorectal cancer remains low, despite its proven effectiveness, though use is increasing.

## Trends-at-a-Glance

The Trends-at-a-Glance offers an overview of trend direction measure by measure. Trends noted as stable or NSC (non-significant change) are not changing significantly. The difference between "stable" and "NSC" is based on statistical computations described in the [Methodology for Characterizing Trends](#) appendix.

The table below provides a snapshot of recent trends (as characterized by the Average Annual Percent Change (AAPC)) for measures included in this report. A light green background indicates that the recent trend is moving in the desired direction. A light red background indicates that the recent trend is **not** moving in the desired direction. There is no background color for trends that are stable or show a non-significant change in direction. Click on any trend to view the figure(s) associated with that measure. For a more complete summary of the measures, including their progress compared with the Healthy People 2010 target, see the [Summary Tables](#) by topic.

Measure	Recent Trend*	Desired Direction
<b>PREVENTION</b>		
Age at smoking initiation	<a href="#">Rising</a>	Rising
Youth smoking	<a href="#">Falling</a>	Falling
Adult smoking	<a href="#">Falling</a>	Falling
• Non-Hispanic whites	<a href="#">Falling</a>	Falling
• Non-Hispanic blacks	<a href="#">Falling</a>	Falling
• Hispanic	<a href="#">Falling</a>	Falling
Quitting smoking	<a href="#">Stable</a>	Rising
• Non-Hispanic whites	<a href="#">Stable</a>	Rising
• Non-Hispanic blacks	<a href="#">Stable</a>	Rising
• Hispanic	<a href="#">Rising</a>	Rising
Doctor advice to quit smoking	<a href="#">Rising</a>	Rising
Dentist advice to quit smoking	<a href="#">Rising</a>	Rising
Medicaid coverage of tobacco dependence treatments	<a href="#">Rising</a>	Rising
Fruit and vegetable consumption	<a href="#">Stable</a>	Rising
Red meat consumption	<a href="#">NSC</a>	Falling
Fat consumption	<a href="#">Stable</a>	Falling
Alcohol consumption	<a href="#">Rising</a>	Falling
No leisure-time physical activity	<a href="#">Stable</a>	Falling
• Non-Hispanic whites	<a href="#">Falling</a>	Falling
• Non-Hispanic blacks	<a href="#">Stable</a>	Falling
• Hispanic	<a href="#">Falling</a>	Falling
Weight (both sexes)		
• Healthy weight	<a href="#">Falling</a>	Rising
• Overweight	<a href="#">Rising</a>	Falling
• Obese	<a href="#">Rising</a>	Falling
Sun protection	<a href="#">Falling</a>	Rising
Secondhand smoke		
• Environmental tobacco smoke	<a href="#">NSC</a>	Falling
• Smoke-free work environment	<a href="#">Rising</a>	Rising
• Smoke-free indoor air laws	<a href="#">Rising</a>	Rising
Pesticide levels in the blood	<a href="#">Unavailable</a>	Falling
Dioxin levels in the human body	<a href="#">Unavailable</a>	Falling
Tobacco company marketing expenditures	<a href="#">NSC</a>	Falling



<b>EARLY DETECTION</b>		
Breast cancer screening	<u>Falling</u>	Rising
Cervical cancer screening	<u>Falling</u>	Rising
Colorectal cancer screening		
• Fecal Occult Blood Test (FOBT)	<u>Falling</u>	Rising
• Endoscopy	<u>Rising</u>	Rising
• Colorectal test use	<u>Rising</u>	Rising
<b>DIAGNOSIS</b>		
Incidence		
• All cancers	<u>Falling</u>	Falling
• Race/ethnicity		
• White	<u>Falling</u>	Falling
• Black	<u>Falling</u>	Falling
• Hispanics	<u>Falling</u>	Falling
• American Indian/Alaskan Natives	<u>Stable</u>	Falling
• Asian/Pacific Islanders	<u>Falling</u>	Falling
• Most common cancers		
• Breast (female)	<u>Falling</u>	Falling
• Colon and rectum (female)	<u>Falling</u>	Falling
• Colon and rectum (male)	<u>Falling</u>	Falling
• Lung and bronchus (female)	<u>Rising</u>	Falling
• Lung and bronchus (male)	<u>Falling</u>	Falling
• Prostate	<u>Falling</u>	Falling
• Cancers whose incidence rate is increasing by 2 percent or more per year		
• Hodgkin lymphoma	<u>Rising</u>	Falling
• Kidney and renal pelvis	<u>Rising</u>	Falling
• Liver and intrahepatic bile duct	<u>Rising</u>	Falling
• Melanoma of the skin	<u>Rising</u>	Falling
• Thyroid	<u>Rising</u>	Falling
• Cancers whose incidence rate is increasing by less than 2 percent per year		
• Childhood	<u>Rising</u>	Falling
• Esophagus	<u>Rising</u>	Falling
• Leukemia	<u>Rising</u>	Falling
• Non-Hodgkin lymphoma	<u>Rising</u>	Falling
• Pancreas	<u>Rising</u>	Falling
• Testis	<u>Rising</u>	Falling
• Cancers whose incidence rate is decreasing		
• Brain and other nervous system	<u>Falling</u>	Falling
• Corpus and uterus, NOS	<u>Falling</u>	Falling
• Oral cavity and pharynx	<u>Falling</u>	Falling
• Ovary	<u>Falling</u>	Falling
• Stomach	<u>Falling</u>	Falling
• Urinary bladder	<u>Falling</u>	Falling
Stage at diagnosis		
• Breast (female)	<u>Stable</u>	Falling
• Cervix	<u>Falling</u>	Falling
• Colon	<u>Falling</u>	Falling

• Prostate	<u>Falling</u>	Falling
• Rectum	<u>Falling</u>	Falling
<b>TREATMENT</b>		
Bladder cancer	<u>Rising</u>	Rising
Breast cancer treatment		
• Mastectomy	<u>Falling</u>	Rising
• No surgery	<u>Rising</u>	Rising
• BCS with radiation	<u>NSC</u>	Rising
• BCS without radiation	<u>Rising</u>	Rising
• Multiagent chemotherapy	<u>Rising</u>	Rising
Colorectal cancer treatment	<u>Rising</u>	Rising
Kidney cancer treatment	<u>Rising</u>	Rising
Lung cancer treatment	<u>Rising</u>	Rising
Ovarian cancer treatment	<u>Falling</u>	Rising
Prostate cancer treatment	<u>NSC</u>	Rising
<b>LIFE AFTER CANCER</b>		
Survival		
• All cancers	<u>Rising</u>	Rising
• Breast (female)	<u>Rising</u>	Rising
• Colon and rectum	<u>Rising</u>	Rising
• Lung and bronchus	<u>Rising</u>	Rising
• Prostate	<u>Rising</u>	Rising
Cancer survivors and smoking	<u>Falling</u>	Falling
<b>END OF LIFE (Mortality)</b>		
All cancers	<u>Falling</u>	Falling
Most common cancers		
• Female breast	<u>Falling</u>	Falling
• Colon and rectum (female)	<u>Falling</u>	Falling
• Colon and rectum (male)	<u>Falling</u>	Falling
• Lung and bronchus (female)	<u>Falling</u>	Falling
• Lung and bronchus (male)	<u>Falling</u>	Falling
• Prostate	<u>Falling</u>	Falling
Race/ethnicity		
• White	<u>Falling</u>	Falling
• Black	<u>Falling</u>	Falling
• Hispanic	<u>Falling</u>	Falling
• American Indian/Alaskan Natives	<u>Stable</u>	Falling
• Asian/Pacific Islander	<u>Falling</u>	Falling
Cancers whose mortality rate is increasing		
• Corpus and uterus (NOS)	<u>Rising</u>	Falling
• Liver and intrahepatic bile duct	<u>Rising</u>	Falling
• Pancreas	<u>Rising</u>	Falling
• Thyroid	<u>Falling</u>	Rising
Cancers whose mortality rate is decreasing		
• Brain and other nervous system	<u>Falling</u>	Falling
• Leukemia	<u>Falling</u>	Falling
• Non-Hodgkin lymphoma	<u>Falling</u>	Falling
• Ovary	<u>Falling</u>	Falling
• Stomach	<u>Falling</u>	Falling

• Urinary bladder

Falling

Falling

## ➤ Summary Tables by Topic

### How to Interpret the Graphs in the Summary Tables

The tables in this section summarize the measures that are described at greater length in the body of this report. A graph, which addresses two questions, is included for most measures:

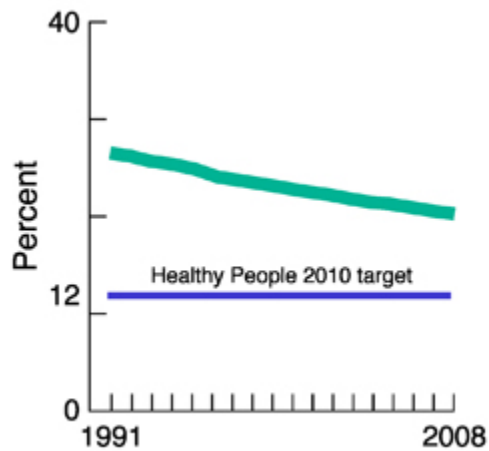
1. **Is the trend moving in the desired direction?**

- A graph shows the trend direction for the measure. The desired trend direction is shown above the graph.
- Each line in the graph is coded by color to indicate whether the trend is:
  - green - headed in the right direction
  - red - headed in the wrong direction
  - black - stable or non-significant change (NSC)
  - blue - Healthy People 2010 target

2. **How does the nation's progress compare to the Healthy People 2010 target?**

Not all measures have an associated Healthy People 2010 target. When there is a target for a specific measure, it is shown by a solid blue horizontal line labeled Healthy People 2010 target.

The example below demonstrates the Adult Smoking trend, which is heading in the right direction (green line) toward the Healthy People 2010 target (solid blue horizontal line).



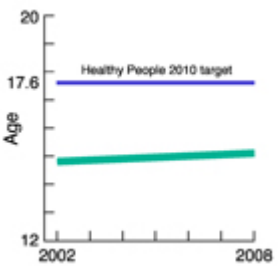
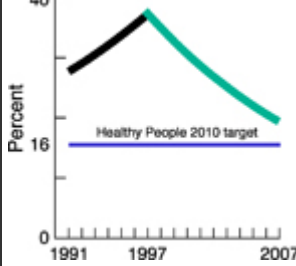
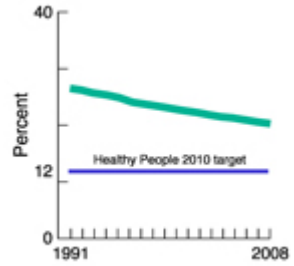
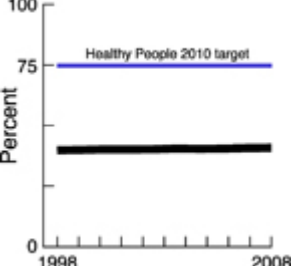
Next: [Prevention - Smoking](#)

## Summary Table: Prevention – Smoking

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**

- █ green - headed in the right direction
- █ red - headed in the wrong direction
- █ black - stable or non-significant change (NSC)
- █ blue - Healthy People 2010 target

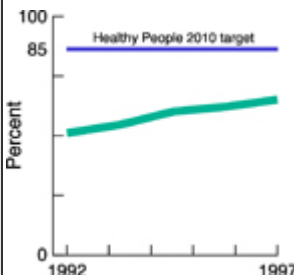
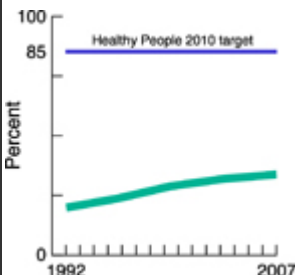
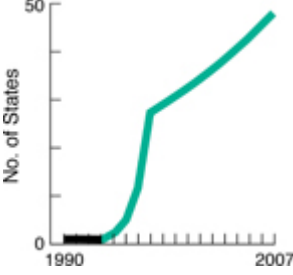
	Age at smoking initiation 2002–2008	Youth smoking 1991–2007	Adult smoking 1991–2008	Quitting smoking 1998–2008
<b>Measure</b>	Average age of first use of cigarettes, based on responses from people aged 12–17 years who said they had initiated smoking during the past 12 months.	Percentage of high school students grades 9–12 who were current users of cigarettes.	Percentage of adults aged 18 years and older who were current cigarette smokers (both sexes).	Percentage of current everyday smokers (aged 18 years and older) who quit smoking for one day or longer during the past 12 months.
<b>Recent summary trend*</b>	Rising 2004–2008	Falling 2003–2007	Falling 2004–2008	Stable 2004–2008
<b>Desired direction</b>	Rising ▲	Falling ▼	Falling ▼	Rising ▲
<b>Trend details</b>	Rising 	Non-significant change, then falling 	Falling 	Stable 
<b>Most recent estimate</b>	In 2008, the average age at first use among those aged 12–17 years was 15.1 years.	Among high school students in 2007, 20 percent were current cigarette smokers.	In 2008, 20.6 percent of adults were current cigarette smokers.	In 2008, 41.5 percent of smokers aged 18 years and older stopped smoking for one day or longer because they were trying to quit.
<b>Healthy People 2010 target</b>	Increase the average age at first use of cigarettes to 17.6 years of age for the 12–17-year age group.	Decrease to 16 percent the proportion of high school students who currently smoke cigarettes.	Reduce to 12 percent the proportion of adult current cigarette smokers.	Increase to 75 percent the proportion of adult smokers aged 18 years and older who stop smoking for a day or longer because they are trying to quit.
<b>More information</b>	<a href="#">Age at Smoking Initiation</a>	<a href="#">Youth Smoking</a>	<a href="#">Adult Smoking</a>	<a href="#">Quitting Smoking</a>

## Summary Table: Prevention – Clinicians’ Advice to Quit Smoking

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**

- █ green - headed in the right direction
- █ red - headed in the wrong direction
- █ black - stable or non-significant change (NSC)
- █ blue - Healthy People 2010 target

	<b>Doctor advice to quit smoking 1992–2007</b>	<b>Dentist advice to quit smoking 1992–2007</b>	<b>Medicaid coverage of tobacco dependence treatments 1990–2007</b>
<b>Measure</b>	Percentage of current smokers aged 18 years and older who were advised by a doctor in the past year to quit smoking (both sexes).	Percentage of current smokers aged 18 years and older who were advised by a dentist in the past year to quit smoking (both sexes).	Number of states that report providing coverage under Medicaid for any evidence-based tobacco dependence treatment (medication or counseling) either to their entire Medicaid population or to pregnant women only.
<b>Recent summary trend*</b>	Rising 2001/2002–2006/2007	Rising 2001/2002–2006/2007	Rising 2003–2006
<b>Desired direction</b>	Rising ▲	Rising ▲	Rising ▲
<b>Trend details</b>	Rising 	Rising 	Non-significant change, then rising, then non-significant change 
<b>Most recent estimate</b>	In 2006–2007, 65.1 percent of smokers aged 18 years and older who had seen a doctor during the past 12 months reported being advised by a doctor to quit smoking.	In 2006–2007, 33.6 percent of smokers aged 18 years and older who had seen a dentist during the past 12 months reported being advised by a dentist to quit smoking.	In 2007, 44 states and the District of Columbia (Washington, D.C.) provided Medicaid coverage for at least one tobacco-dependence treatment for at least some segment of their Medicaid-eligible population.
<b>Healthy People 2010 target</b>			

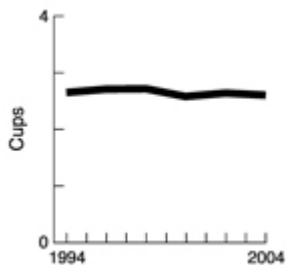
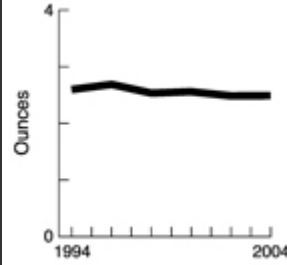
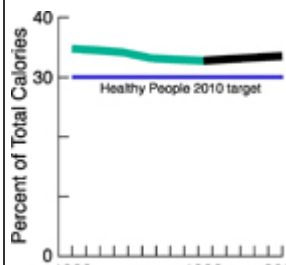
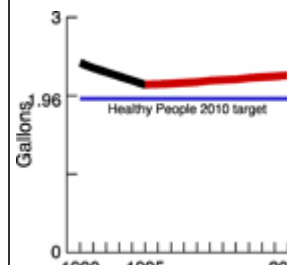
	<b>Doctor advice to quit smoking 1992–2007</b>	<b>Dentist advice to quit smoking 1992–2007</b>	<b>Medicaid coverage of tobacco dependence treatments 1990–2007</b>
	Increase to 85 percent the proportion of doctors and other clinicians who counsel their at-risk patients about tobacco use cessation.	Increase to 85 percent the proportion of dentists and other clinicians who counsel their at-risk patients about tobacco use cessation.	Medicaid programs in all 50 states and Washington, D.C., will include coverage of evidence-based treatment for nicotine dependency.
<b>More information</b>	<a href="#"><u>Clinicians' Advice to Quit Smoking</u></a>		<a href="#"><u>Medicaid Coverage of Tobacco Dependence Treatments</u></a>

## Summary Table: Prevention – Diet

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**

- █ green - headed in the right direction
- █ red - headed in the wrong direction
- █ black - stable or non-significant change (NSC)
- █ blue - Healthy People 2010 target

	Fruit and vegetable consumption 1994–2004	Red meat consumption 1994–2004	Fat consumption 1989–2004	Alcohol consumption 1990–2006
<b>Measure</b>	Average daily cups of fruits and vegetables for people aged 2 years and older. (Note: This measure includes fruits and vegetables from all sources. One serving is approximately ½ cup.)	Average daily ounces of red meat for people aged 2 years and older. (Note: Red meat includes beef, lamb, and pork from all sources and does not include processed poultry.)	Intakes of total fat, and of the major fatty acids—saturated, monounsaturated, and polyunsaturated—as a percentage of total calories.	The estimated number of gallons of pure alcohol drunk per person (aged 14 years and older), per year.
<b>Recent summary trend*</b>	Non-significant change 1999/2000–2003/2004	Non-significant change 1999/2000–2003/2004	Stable 1999/2000–2003/2004	Rising 2002–2006
<b>Desired direction</b>	Rising ▲	Falling ▼	Falling ▼	Falling ▼
<b>Trend details</b>	Non-significant change, then stable, then non-significant change 	Non-significant change, then stable, then non-significant change 	Falling, then stable 	Falling, then rising 
<b>Most recent estimate</b>	In 2003 to 2004, people aged 2 years and older had, on average, 1.0 cup of fruits and 1.6 cups of vegetables, for a total of 2.6 cups of fruits and vegetables.	In 2003 to 2004, people aged 2 years and older had, on average, 2.5 ounces of red meat per day.	Data collected in 2003 to 2004 show that total fat made up one-third (33 percent) of the calories people consumed, a level within the recommendations of the Dietary Guidelines.	In 2006, per capita alcohol consumption was 2.3 gallons for all beverages, including beer, wine, and liquor.
<b>Healthy People 2010 target</b>		There is no Healthy People 2010 target for red meat consumption.	No more than 30 percent of daily calories from fat.	Reduce annual per capita alcohol consumption to 2 gallons.



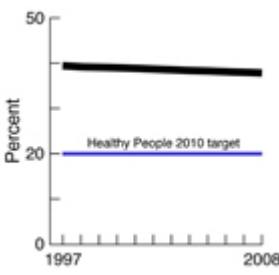
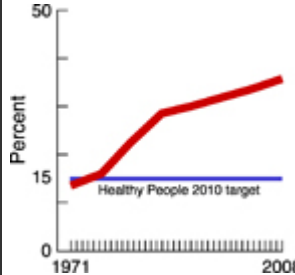
	<b>Fruit and vegetable consumption 1994–2004</b>	<b>Red meat consumption 1994–2004</b>	<b>Fat consumption 1989–2004</b>	<b>Alcohol consumption 1990–2006</b>
	There is no target for fruits and vegetables combined. The Healthy People 2010 targets call for 75 percent of the population to consume the minimum servings of fruits and 50 percent to consume the minimum servings of vegetables. However, the minimum number of servings in these targets predates the 2005 Dietary Guidelines for Americans, which recommend higher intakes.			
<b>More information</b>	<a href="#"><u>Fruit and Vegetable Consumption</u></a>	<a href="#"><u>Red Meat Consumption</u></a>	<a href="#"><u>Fat Consumption</u></a>	<a href="#"><u>Alcohol Consumption</u></a>

## Summary Table: Prevention – Weight and Physical Activity

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**

- ▬ green - headed in the right direction
- ▬ red - headed in the wrong direction
- ▬ black - stable or non-significant change (NSC)
- ▬ blue - Healthy People 2010 target

	Physical activity 1997–2008	Weight 1971–2008
<b>Measure</b>	Percentage of adults aged 18 years and older who reported no leisure-time physical activity during the past month.	Percentage of adults aged 20 years and older who were at a healthy weight, overweight, or obese (Example below is for obese.)
<b>Recent summary trend*</b>	Stable 2004–2008	Rising 2003/2004–2007/2008
<b>Desired direction</b>	Falling ▼	Falling ▼
<b>Trend details</b>	Stable 	Rising 
<b>Most recent estimate</b>	The 2008 National Health Interview Survey (NHIS), an in-person household survey, indicates that 36 percent of adults aged 18 years and older reported no physical activity in their leisure-time.	Among adults aged 20 years and older in 2007–2008, 31 percent were at a healthy weight, 34 percent were overweight or obese, and 34 percent were obese.
<b>Healthy People 2010 target</b>	Reduce to 20 percent the percentage of adults who engage in no leisure-time physical activity.	Increase to 60 percent the proportion of adults who are at a healthy weight and decrease to 15 percent the proportion of obese adults. There is no Healthy People 2010 target for overweight.
<b>More information</b>	<a href="#">Physical Activity</a>	<a href="#">Weight</a>

## Summary Table: Prevention – Sun Protection

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**





- ▬ green - headed in the right direction
- ▬ red - headed in the wrong direction
- ▬ black - stable or non-significant change (NSC)
- ▬ blue - Healthy People 2010 target

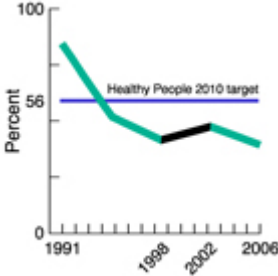
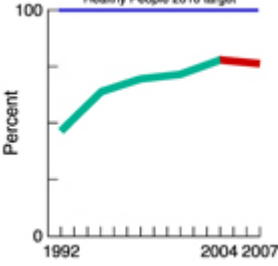
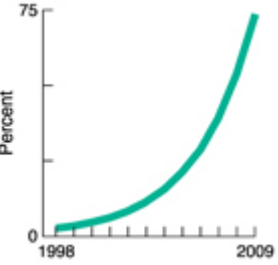
	<b>Sun protection 1992–2008</b>																					
<b>Measure</b>	Percentage of adults aged 18 years and older who reported that they usually or always practice at least one of three sun protection behaviors (using sunscreen, wearing protective clothing, or seeking shade) when going outside on a warm sunny day for more than 1 hour.																					
<b>Recent summary trend*</b>	Falling 2003–2008																					
<b>Desired direction</b>	<b>Rising ▲</b>																					
<b>Trend details</b>	<p>Falling, then rising, then stable, then falling, then rising</p> <table border="1"> <caption>Estimated Data from Sun Protection Trend Graph</caption> <thead> <tr> <th>Year</th> <th>Percent</th> <th>Trend</th> </tr> </thead> <tbody> <tr> <td>1992</td> <td>65</td> <td>Red</td> </tr> <tr> <td>1998</td> <td>60</td> <td>Red</td> </tr> <tr> <td>2000</td> <td>70</td> <td>Green</td> </tr> <tr> <td>2003</td> <td>70</td> <td>Black</td> </tr> <tr> <td>2005</td> <td>65</td> <td>Red</td> </tr> <tr> <td>2008</td> <td>68</td> <td>Green</td> </tr> </tbody> </table>	Year	Percent	Trend	1992	65	Red	1998	60	Red	2000	70	Green	2003	70	Black	2005	65	Red	2008	68	Green
Year	Percent	Trend																				
1992	65	Red																				
1998	60	Red																				
2000	70	Green																				
2003	70	Black																				
2005	65	Red																				
2008	68	Green																				
<b>Most recent estimate</b>	In 2008, 57.6 percent of adults said they usually or always protect themselves from the sun by practicing at least one of three sun protection behaviors.																					
<b>Healthy People 2010 target</b>	Increase to 75 percent the proportion of adults who are very likely to use sunscreen with an SPF of 15 or higher, wear protective clothing, or seek shade.																					
<b>More information</b>	<a href="#">Sun Protection</a>																					

## Summary Table: Prevention – Secondhand Smoke

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**





-  green - headed in the right direction
-  red - headed in the wrong direction
-  black - stable or non-significant change (NSC)
-  blue - Healthy People 2010 target

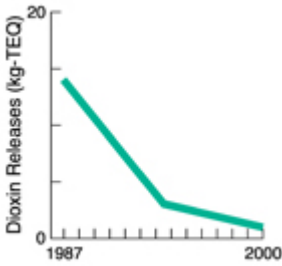
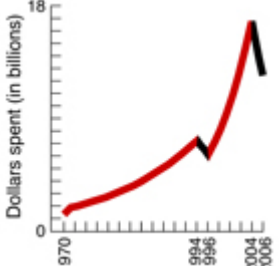
	<b>Environmental tobacco smoke 1988–2006</b>	<b>Smoke-free work environment 1992–2007</b>	<b>Smoke-free indoor air laws 1990–2009</b>
<b>Measure</b>	Percentage of non-smokers exposed to environmental tobacco smoke (both sexes).	Percentage of workers aged 18 years and older reporting a smoke-free work environment (both sexes).	Percentage of the population protected by local and state smoke-free indoor air laws in the workplace.
<b>Recent summary trend*</b>	Non-significant change 2001/2002–2005/2006	Rising 2001/2002–2006/2007	Rising 2005–2009
<b>Desired direction</b>	<b>Falling ▼</b>	<b>Rising ▲</b>	<b>Rising ▲</b>
<b>Trend details</b>	Falling, then non-significant change, then falling 	Rising, then falling 	Rising 
<b>Most recent estimate</b>	The estimate of U.S. non-smokers aged 4 years and older exposed to secondhand smoke in 2005–2006 was 39.4 percent.	During the period 2006 to 2007, 76 percent of the workforce aged 18 years and older reported that there was a smoke-free policy at their workplace.	As of October 2009, 22 states, as well as Puerto Rico and the District of Columbia have laws that provide complete or nearly complete protection from secondhand smoke, according to NCI's Smoke-free Meeting Policy.
<b>Healthy People 2010 target</b>	Reduce to 63 percent the proportion of non-smokers exposed to secondhand smoke.	Increase to 100 percent the proportion of persons covered by indoor worksite policies that prohibit smoking.	Increase to 51 the number of jurisdictions (50 states and the District of Columbia) with smoke-free indoor air laws for public places and work sites.
<b>More information</b>	<a href="#">Secondhand Smoke</a>		

## Summary Table: Prevention - Environmental Toxins

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**

-  green - headed in the right direction
-  red - headed in the wrong direction
-  black - stable or non-significant change (NSC)
-  blue - Healthy People 2010 target

	<b>Pesticides 1999–2002</b>	<b>Dioxins 1987–2000</b>	<b>Tobacco company marketing expenditures 1970–2006</b>
<b>Measure</b>	Possible carcinogens, pesticides chlordane and DDT and their metabolites, measured in human blood.	Measurement of tetrachlorodibenzo-p-dioxin (TCDD) in human blood adjusting for lipids and EPA estimates of dioxin releases in the environment.	Combined annual advertising and promotional expenditures by the five major U.S. cigarette manufacturers, adjusted to 2006 dollars, as reported by manufacturers to the U.S. Federal Trade Commission (FTC).
<b>Recent summary trend*</b>	AAPC is not available for this measure	AAPC is not available for this measure	NSC 2002–2006
<b>Desired direction</b>	<b>Falling ▼</b>	<b>Falling ▼</b>	<b>Falling ▼</b>
<b>Trend</b>	Trend details are not available for this measure  <b>(No trend graph is available for this measure)</b>	Falling  	Rising, then NSC, then rising, then NSC  
<b>Most recent estimate</b>	In 2001–2002, blood and urine concentrations (nanograms per gram) were 49.7 for oxychlordane, 78.2 for trans-nonachlor, 21.6 for heptachlor epoxide, and 2,320 for DDT (DDE).	95th percentile of TCDD concentration in the U.S. population: 5.2 pg/g.  Estimated dioxin releases to the environment in 2000: 1.42 kg-TEQ.	In 2006, adjusted combined annual expenditures for cigarette advertising and promotion was \$12.39 billion.
<b>Healthy People 2010 target</b>	Reduce blood and urine concentrations of: oxychlordane to 31.4 ng/g, trans-nonachlor to 55.6 ng/g, heptachlor epoxide to 16.7 ng/g, and DDT (DDE) to 1,250 ng/g.	Reduce air toxic emissions to decrease the risk of adverse health effects caused by airborne toxics. A specific numerical level for environmental concentration has not yet been set for dioxin.	There are no Healthy People 2010 targets for reducing tobacco company marketing expenditures.

	<b>Pesticides 1999–2002</b>	<b>Dioxins 1987–2000</b>	<b>Tobacco company marketing expenditures 1970–2006</b>
<b>More information</b>	<a href="#"><u>Pesticides</u></a>	<a href="#"><u>Dioxins</u></a>	<a href="#"><u>Tobacco Company Marketing Expenditures</u></a>

## Summary Table: Early Detection – Breast and Cervical Cancers

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**





- ▬ green - headed in the right direction
- ▬ red - headed in the wrong direction
- ▬ black - stable or non-significant change (NSC)
- ▬ blue - Healthy People 2010 target

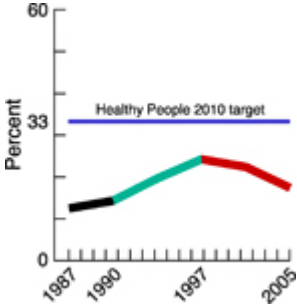
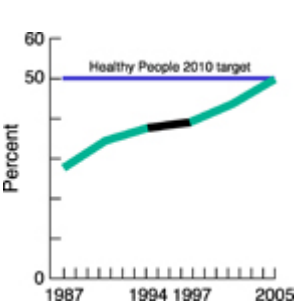
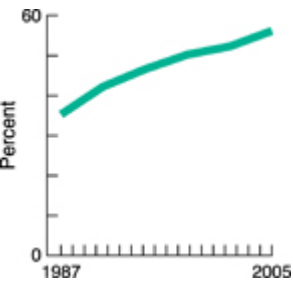
	Breast cancer screening 1987–2005	Cervical cancer screening 1987–2005
<b>Measure</b>	Percentage of women aged 40 years and older, by racial/ethnic, geographic, and low-income groups, who reported having had a mammogram within the past 2 years.	Percentage of women aged 18 years and older who reported they had a Pap test within the past 3 years.
<b>Recent summary trend*</b>	Falling 2000–2005	Falling 2000–2005
<b>Desired direction</b>	Rising ▲	Rising ▲
<b>Trend details</b>	<p>Rising, then stable, then falling</p> <p>The graph shows the percentage of women aged 40 and older who had a mammogram in the past 2 years from 1987 to 2005. The y-axis is labeled 'Percent' and ranges from 10 to 100. The x-axis shows years 1987, 1997, 2001, and 2005. A blue horizontal line represents the 'Healthy People 2010 target' at 70%. The data line starts at approximately 45% in 1987, rises to about 65% by 1997, reaches the 70% target by 2001, remains stable until 2003, and then falls to approximately 67% in 2005.</p>	<p>Rising, then falling</p> <p>The graph shows the percentage of women aged 18 and older who had a Pap test in the past 3 years from 1987 to 2005. The y-axis is labeled 'Percent' and ranges from 0 to 100. The x-axis shows years 1987, 1997, and 2005. A blue horizontal line represents the 'Healthy People 2010 target' at 90%. The data line starts at approximately 75% in 1987, rises to about 85% by 1997, and then falls to approximately 78% in 2005.</p>
<b>Most recent estimate</b>	In 2005, 67 percent of women aged 40 years and older had a mammogram within the past 2 years, a statistically significant drop from 70 percent in 2003.	In 2005, 78 percent of women aged 18 years and older had a Pap test within the past 3 years, down from 79 percent in 2003.
<b>Healthy People 2010 target</b>	Increase to 70 percent the proportion of women aged 40 years and older who have had a mammogram within the past 2 years.	Increase to 90 percent the proportion of women aged 18 years and older who have received a Pap test within the past 3 years.
<b>More information</b>	<a href="#">Breast Cancer Screening</a>	<a href="#">Cervical Cancer Screening</a>

## Summary Table: Early Detection – Colorectal Cancer

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**

-  green - headed in the right direction
-  red - headed in the wrong direction
-  black - stable or non-significant change (NSC)
-  blue - Healthy People 2010 target





	Fecal occult blood test 1987–2005	Colorectal endoscopy 1987–2005	Colorectal cancer test use 1987–2005
<b>Measure</b>	Percentage of adults aged 50 years and older, by racial/ethnic group, who reported that they had a fecal occult blood test (FOBT) within the past 2 years.	Percentage of adults aged 50 years and older who reported that they ever had an endoscopy (proctoscopy, sigmoidoscopy, or colonoscopy).	Percentage of adults aged 50 years and older who had a colorectal cancer test (home-based FOBT in the past 2 years and/or ever had a colorectal endoscopy).
<b>Recent summary trend*</b>	Falling 2000–2005	Rising 2000–2005	Rising 2000–2005
<b>Desired direction</b>	Rising ▲	Rising ▲	Rising ▲
<b>Trend details</b>	Non-significant change, then rising, then falling 	Rising, then non-significant change, then rising 	Rising 
<b>Most recent estimate</b>	In 2005, 25 percent of people aged 50 years and older had a home FOBT within the past 2 years.	In 2005, 50 percent of people aged 50 years and older had ever had a colorectal endoscopy.	In 2005, 59 percent of people aged 50 years and older had used a colorectal cancer test.
<b>Healthy People 2010 target</b>	Increase to 50 percent the proportion of adults aged 50 years and older who have had an FOBT within the past 2 years.	Increase to 50 percent the proportion of adults aged 50 years and older who have ever had a sigmoidoscopy.	There is no Healthy People 2010 target for the proportion of adults who should receive colorectal cancer screenings.
<b>More information</b>	<a href="#">Colorectal Cancer Screening</a>		

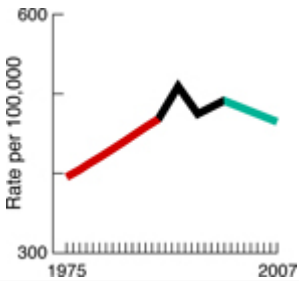
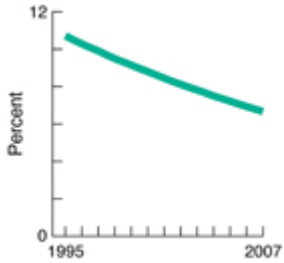


## Summary Table: Diagnosis

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

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-  green - headed in the right direction
-  red - headed in the wrong direction
-  black - stable or non-significant change (NSC)
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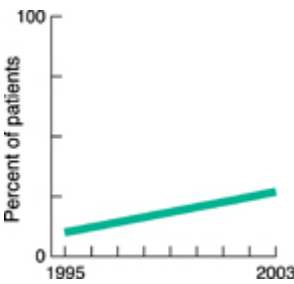
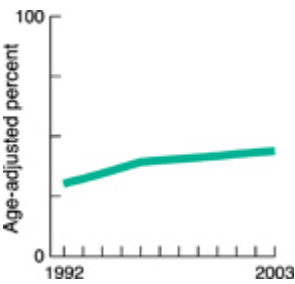
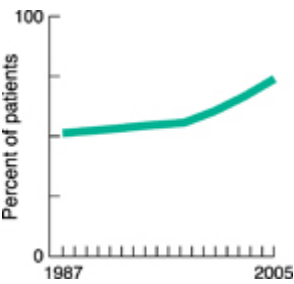
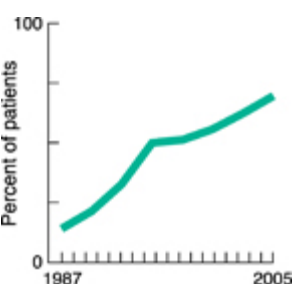
	<b>Incidence 1975–2007</b>	<b>Stage at Diagnosis 1995–2007</b>
<b>Measure</b>	The observed number of new cancer cases per 100,000 people per year is adjusted for cancer case reporting delays, based on data from approximately 10 percent of the U.S. population.	The number of new cancer cases diagnosed at a late (distant) stage, per 100,000 people per year. (Example below is for prostate cancer.)
<b>Recent summary trend*</b>	Falling 2003–2007	Falling 2002–2006
<b>Desired direction</b>	<b>Falling ▼</b>	<b>Falling ▼</b>
<b>Trend</b>	Rising, then non-significant change, then falling 	Falling 
<b>Most recent estimate</b>	In 2007, the rate of new cases of all cancers combined was 472.7 per 100,000 people per year.	In 2007, 6.7 new cases of prostate cancer per 100,000 men were diagnosed at a late stage.
<b>Healthy People 2010 target</b>	There is no Healthy People 2010 target for cancer incidence.	There is no Healthy People 2010 target for stage at diagnosis.
<b>More information</b>	<a href="#">Incidence</a>	<a href="#">Stage at Diagnosis</a>

## Summary Table: Treatment – Bladder, Breast, Colorectal

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**





- ▬ green - headed in the right direction
- ▬ red - headed in the wrong direction
- ▬ black - stable or non-significant change (NSC)
- ▬ blue - Healthy People 2010 target

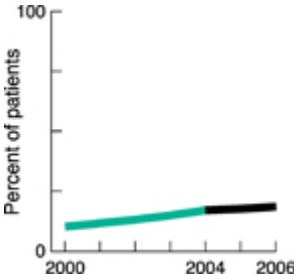
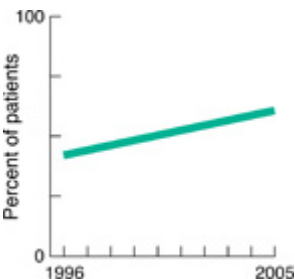
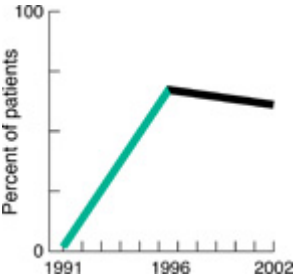
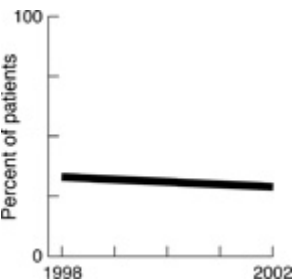
	<b>Bladder cancer treatment 1995 and 2003</b>	<b>Breast cancer treatment: Breast-conserving surgery and radiation 1992–2006</b>	<b>Breast cancer treatment: Multi-agent chemotherapy 1987–2005</b>	<b>Colorectal cancer treatment 1987–2005</b>
<b>Measure</b>	Percentage of individuals receiving intravesical therapy in non-muscle invasive bladder cancer.	Percentage of women aged 20 years and older, diagnosed with early-stage breast cancer (less than stage IIIA), receiving breast-conserving surgery and radiation treatment.	Percentage of women aged 20 years and older, diagnosed with node positive, stage IIIA breast cancer, receiving multi-agent chemotherapy.	Percentage of individuals, aged 20 years and older, diagnosed with stage III colon cancer who received chemotherapy or diagnosed with stage II or stage III rectal cancer who received chemotherapy with or without radiotherapy.
<b>Recent summary trend*</b>	Rising 1995–2003	Rising 1999–2003	Rising 2001–2005	Rising 2001–2005
<b>Desired direction</b>	Rising ▲	Rising ▲	Rising ▲	Rising ▲
<b>Trend</b>	Rising 	Rising 	Rising 	Rising 
<b>Most recent estimate</b>	In 2003, 27 percent of patients with non-muscle invasive disease received intravesical therapy.	In 2006, 35 percent of women aged 20 years and older diagnosed with early-stage breast cancer (less than stage IIIA) received mastectomy, 42 percent received breast-conserving surgery plus radiation, and 21 percent received breast-conserving surgery only.	In 2005, 67 percent of women aged 20 years and older, diagnosed with node positive breast cancer, received multi-agent chemotherapy.	In 2005, 60 percent of stage III colon and stage II and III rectal patients aged 65 years and older received adjuvant chemotherapy, while more than 85 percent of patients aged 20 to 64 received chemotherapy.
<b>Healthy People 2010 target</b>	There is no Healthy People 2010 target for bladder cancer treatment.	There is no Healthy People 2010 target for breast-conserving surgery and radiation treatment.	There is no Healthy People 2010 target for multi-agent chemotherapy treatment.	There is no Healthy People 2010 target for colorectal cancer treatment.
<b>More information</b>	<a href="#">Bladder Cancer Treatment</a>	<a href="#">Breast Cancer Treatment</a>		<a href="#">Colorectal Cancer Treatment</a>

## Summary Table: Treatment – Kidney, Lung, Ovarian, Prostate

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**





-  green - headed in the right direction
-  red - headed in the wrong direction
-  black - stable or non-significant change (NSC)
-  blue - Healthy People 2010 target

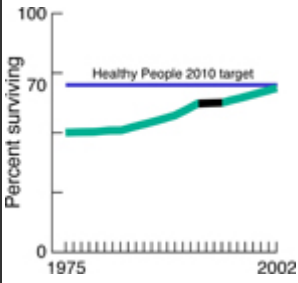
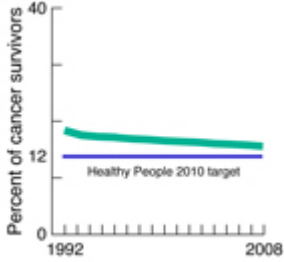
	Kidney cancer treatment 2000–2006	Lung cancer treatment 1996 and 2005	Ovarian cancer treatment 1991, 1996, 2002	Prostate cancer treatment 1998 and 2002
<b>Measure</b>	Partial nephrectomy (removal of the part of the kidney) or complete nephrectomy in patients with local-regional disease.	Chemotherapy following the diagnosis of stage IIIB or IV non-small cell lung cancer. (Example below is for ages 60–69.)	Percentage of women diagnosed with ovarian cancer who received Paclitaxol (Taxol) by stage of diagnosis. (Example below is for stage III or IV.)	Hormonal therapy following the diagnosis of prostate cancer. (Example below is for ages 60–69).
<b>Recent summary trend*</b>	Rising 2002–2006	Rising 1996–2005	Non-significant change 1996–2002	Non-significant change 1998–2002
<b>Desired direction</b>	Rising ▲	Rising ▲	Rising ▲	Rising ▲
<b>Trend</b>	Rising, then non-significant change 	Rising 	Rising, then non-significant change 	Non-significant change 
<b>Most recent estimate</b>	In 2006, the rate of partial nephrectomy was 19 percent. The rate of complete nephrectomy was 68 percent.	60 percent of patients diagnosed with stage IIIB or IV non-small cell lung cancer received chemotherapy.	In 2002, 61 percent of women with stage III or IV ovarian cancer received Paclitaxol compared to 49 percent with stage I or II disease.	29 percent of men aged 60–69 with localized/regional prostate cancer were given hormonal therapy.
<b>Healthy People 2010 target</b>	There is no Healthy People 2010 target for kidney cancer treatment.	There is no Healthy People 2010 target for the treatment of lung cancer.	There is no Healthy People 2010 target for ovarian cancer treatment.	There is no Healthy People 2010 target for prostate cancer treatment.
<b>More information</b>	<a href="#">Kidney Cancer Treatment</a>	<a href="#">Lung Cancer Treatment</a>	<a href="#">Ovarian Cancer Treatment</a>	<a href="#">Prostate Cancer Treatment</a>

## Summary Table: Life After Cancer

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**

-  green - headed in the right direction
-  red - headed in the wrong direction
-  black - stable or non-significant change (NSC)
-  blue - Healthy People 2010 target

	<b>Survival 1975–2002 (year diagnosed)</b>	<b>Costs of cancer care 2006</b>	<b>Cancer survivors and smoking 1992–2008</b>
<b>Measure</b>	The proportion of patients surviving cancer 5 years after diagnosis calculated in the absence of other causes of death.	Estimates of national expenditures for cancer care.	Rates of smoking among cancer survivors are based on the self-reporting of individuals with a cancer history who are interviewed as part of the annual, population-based National Health Interview Survey (NHIS). (Example below is based on SEER population.)
<b>Recent summary trend*</b>	Rising 1998–2002	No trend data are available for costs of cancer care.	Falling 2004–2008
<b>Desired direction</b>	Rising ▲	Falling ▼	Falling ▼
<b>Trend</b>	Rising, stable, then rising 	No trend data are available for costs of cancer care.  <b>(No trend graph is available for this measure)</b>	Falling 
<b>Most recent estimate</b>	Of the patients diagnosed with cancer (all sites) in 2002, 68.5 percent survived cancer for at least 5 years.	National expenditures were largest for female breast, colorectal, lung, and prostate cancers and lymphoma, reflecting prevalence of disease, treatment patterns, and costs for different types of care.	Based on estimates adjusted for the age distribution of cancer patients diagnosed in the SEER program, the percentage of adult cancer survivors who currently smoke is decreasing over time, and the rate of decline is similar for both men and women.
<b>Healthy People 2010 target</b>		There is no Healthy People 2010 target for costs of cancer care.	

	<b>Survival 1975–2002 (year diagnosed)</b>	<b>Costs of cancer care 2006</b>	<b>Cancer survivors and smoking 1992–2008</b>
	Increase to 70 percent the proportion of cancer survivors who are living 5 years or longer after diagnosis.		There is no Healthy People 2010 target for smoking rates among cancer survivors. However, it is reasonable to set this at the goal determined for the general population, which is to decrease to 12 percent the proportion of people who smoke.
<b>More information</b>	<a href="#"><u>Survival</u></a>	<a href="#"><u>Costs of Cancer Care</u></a>	<a href="#"><u>Cancer Survivors and Smoking</u></a>

## Summary Table: End of Life

Only one measure per topic is displayed in the summary table. A complete set of measures, where they exist, can be found in the report.

**Trend key:**

- ▬ green - headed in the right direction
- ▬ red - headed in the wrong direction
- ▬ black - stable or non-significant change (NSC)
- ▬ blue - Healthy People 2010 target

	<b>Mortality 1975–2007</b>	<b>Person-years of life lost (PYLL) 2007</b>
<b>Measure</b>	The number of cancer deaths per 100,000 people per year, age-adjusted to a U.S. 2000 standard population.	The difference between the actual age of death stemming from the disease/cause and the expected age of death.
<b>Recent summary trend*</b>	Falling 2003–2007	No trend data are available for person-years of life lost.
<b>Desired direction</b>	<b>Falling ▼</b>	<b>Falling ▼</b>
<b>Trend</b>	<p>Rising, then falling</p> <p>Rate per 100,000</p> <p>250</p> <p>158.6</p> <p>100</p> <p>1975</p> <p>2007</p> <p>Healthy People 2010 target</p>	<p>No trend data are available for person-years of life lost.</p> <p><b>(No trend graph is available for this measure)</b></p>
<b>Most recent estimate</b>	In 2007, the death rate for all cancers was 178.0 cancer deaths per 100,000 people per year.	In 2007, cancer deaths were responsible for more than 8.6 million PYLL. This is more than heart disease or any other cause of death. About 51 percent of the PYLL stemming from cancer death occurred among women. The number of PYLL stemming from causes other than cancer varied by gender, with more accidental deaths and suicides among men and more cerebrovascular and chronic lung disease-related deaths among women.
<b>Healthy People 2010 target</b>	Reduce the overall cancer death rate to 158.6 cancer deaths per 100,000 people per year.	There is no Healthy People 2010 target for PYLL.
<b>More information</b>	<a href="#">Mortality</a>	<a href="#">Person-years of Life Lost</a>

## Prevention

Cancer can be caused by a variety of different factors and may develop over a number of years. Some risk factors can be controlled. Choosing the right health behaviors and preventing exposure to certain environmental risk factors can help prevent the development of cancer. For this reason, it is important to follow national trends data to monitor the reduction of these risk factors. This section focuses on national trends data from three major groups of risk factors: Behavioral, Environmental, and Policy/regulatory.

### **Behavioral Factors**

Scientists estimate that as many as 50–75 percent of cancer deaths in the United States are caused by human behaviors such as smoking, poor diet quality, and physical inactivity. This section describes trends in the following behaviors that can influence the likelihood of getting cancer.

[Age at Smoking Initiation](#)

[Youth Smoking](#)

[Adult Smoking](#)

[Quitting Smoking](#)

[Clinicians' Advice to](#)

[Quit Smoking](#)

[Medicaid Coverage of Tobacco](#)

[Dependence Treatments](#)

### **Tobacco Use**

Smoking causes about 30 percent of all U.S. deaths from cancer. Avoiding tobacco use is the single most important step Americans can take to reduce the cancer burden in this country.

### **Diet, Physical Activity, and Weight**

[Fruit and Vegetable Consumption](#)

[Red Meat Consumption](#)

[Fat Consumption](#)

[Alcohol Consumption](#)

[Physical Activity](#)

[Weight](#)

Considerable evidence indicates that behavioral factors related to energy balance—such as diet and physical activity—as well as body weight that indicates the state of energy balance are known risk factors for many chronic diseases and conditions, including several forms of cancer. These combined factors may be the most significant, avoidable causes of cancer in the non-smoking population. Poor diet, physical inactivity, and overweight/obesity may account for about 25–30 percent of several of the major cancers in the United States. Obesity is estimated to cause 14 percent of cancer deaths in men and 20 percent of cancer deaths in women.

### **Sun Protection**

[Sun Protection](#)

The number of new cases of melanoma has increased between 1975 and 2006, with an estimated number of 68,720 new cases in 2009.

### **Environmental Factors**

Certain chemicals, biological agents, toxins, industry factors, etc., are associated with the development of cancer. In this section, national trends data associated with environmental exposures and their relationship to cancer are reported. The environmental measures highlighted in this report were chosen based on the availability of national trends data and their inclusion in the Healthy People 2010 Report.

## Secondhand Smoke

### [Secondhand Smoke](#)

Secondhand smoke (also known as environmental tobacco smoke) continues to be a leading environmental hazard. An expanded chapter on Secondhand smoke is presented in this year's report update.

## Chemical Exposures

### [Pesticides](#)

### [Dioxins](#)

Pesticides and dioxins were reported in the *Cancer Trends Progress Report – 2007 Update*. Both exposures again appear in this update, with a special focus on dioxins for which new data have been presented.

## Policy/Regulatory Factors

### [Tobacco Company](#)

### [Marketing Expenditures](#)

Tobacco advertising and promotion increases Americans' tobacco use.

[Next: Age at Smoking Initiation](#) ►



The average age at which people first begin smoking has risen slightly among the youngest cohort (those aged 12–17 years) but has not changed among young adults (those aged 18–25 years).

### Age at Smoking Initiation and Cancer

The younger a person starts smoking, the greater the lifelong risk of developing smoking-related cancers. That is because young smokers are more likely to become addicted, and the more years a person smokes, the greater the risk of cancer.

### Measure

Average age of first use of cigarettes, based on responses from people aged 12–17 and 18–25 who said they had initiated smoking during the past 12 months.

**Period** – 2002–2008

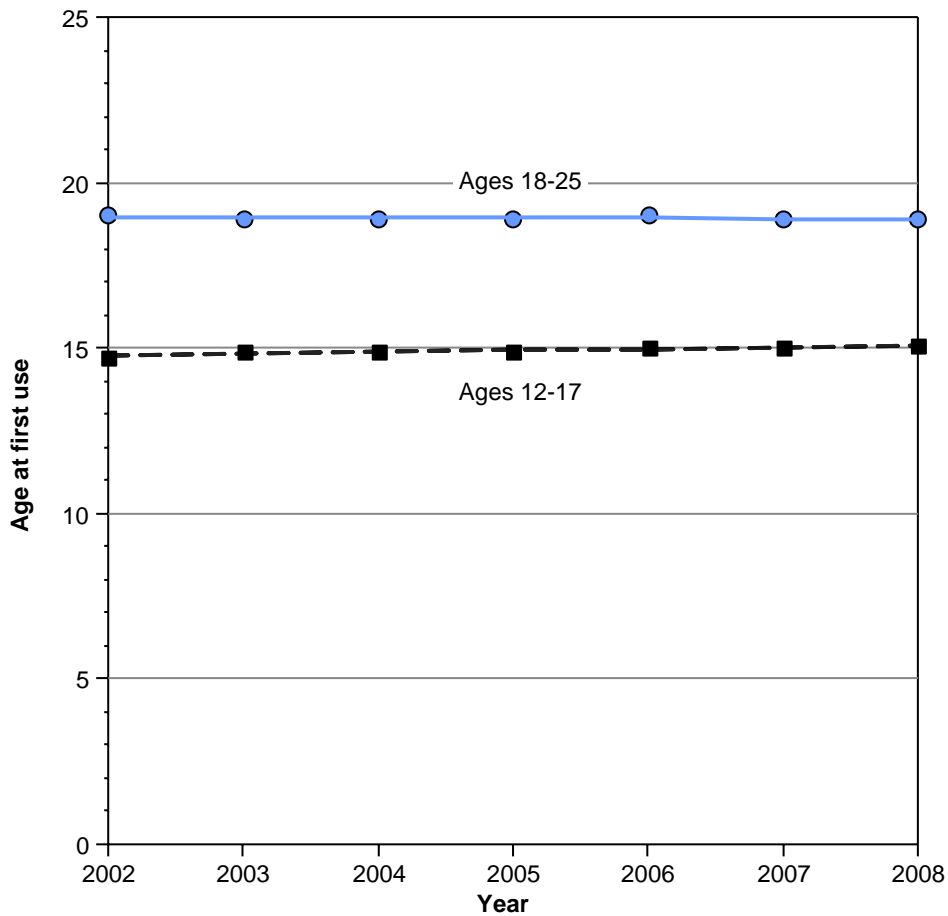
### Trends

**Age 12–17:** Rising slightly from 2002–2008 (data shown only for this period given change in methodology).

**Age 18–25:** Stable from 2002–2008 (data shown only for this period given change in methodology).

There is no change in trend by race/ethnicity, by gender, or by poverty level.

**Figure PSI1: Average age at first use of cigarettes by age of respondent: 2002-2008**



Source: Substance Abuse and Mental Health Services Administration, Office of Applied Studies, National Household Survey on Drug Abuse.  
Data are not age-adjusted.

### Most Recent Estimates

In 2008, the average age at first use among those aged 12–17 years was 15.1 years. Among those aged 18–25 years, the average age of first use was 18.9 years.

### Healthy People 2010 Targets

Increase the average age at first use of cigarettes to:

- 17.6 years of age for the 12–17 age group
- 20.9 years of age for the 18–25 age group

### Groups at High Risk for Beginning Smoking

Overall, Blacks have lower smoking initiation rates during adolescence than Whites and Hispanics. Blacks begin regular smoking primarily after the age of 18. Hispanics have an earlier onset of cigarette smoking than Asians/Pacific Islanders and Blacks, while they have a higher but similar age of initiation compared with Whites.

Young people who come from low-income families or families with less education are more likely to smoke. So are those who have less success and involvement in school and fewer skills to resist the pervasive pressures to use tobacco. Tendencies to take risks and rebel are among the other risk factors for beginning smoking.

## Key Issues

Most smokers try their first cigarette before the age of 18 and become addicted during adolescence. Studies of smokers have indicated that the younger the age of smoking initiation, the greater the risk for development of nicotine dependence. Efforts to help young people delay or, even better, avoid smoking should help to prevent many cancers.

A study examining high school graduates one year after graduation found that, among those who were “never smokers” in 12th grade, 25 percent had begun smoking. Among 12th grade smokers, 39 percent had increased their cigarette use. Efforts to reduce smoking among adolescents should be extended to young adults because smoking initiation extends into young adulthood. Particular attention needs to be paid to those young adults not enrolled in college since they have the higher smoking rates compared to those enrolled in college.

## Additional Information on Age at Smoking Initiation

- Changing Adolescent Smoking Prevalence: Smoking and Tobacco Control Monograph #14 (NCI)  
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- Fagan P, Moolchan ET, Lawrence D, Fernander A, Ponder PK. Identifying health disparities across the tobacco continuum. *Addiction* 2007;102 (Suppl. 2):5–29.
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<http://healthypeople.gov/data/midcourse/html/focusareas/FA27TOC.htm>
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- Kandel DB, Kiros GE, Schaffran C, Hu MC. Racial/ethnic differences in cigarette smoking initiation and progression to daily smoking: a multilevel analysis. *Am J Public Health* 2004;94:128–35.
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- Reducing Tobacco Use: A Report of the Surgeon General (Tobacco Information and Prevention Source, CDC)  
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<http://oas.samhsa.gov/nsduh.htm#NSDUHinfo>
- Trinidad DR, Gilpin EA, Lee L, Pierce JP. Do the majority of Asian-American and African-American smokers start as adults? *Am J Prev Med* 2004;26:156–8.

◀ [Back: Prevention](#)

[Next: Youth Smoking](#) ▶

**Cigarette smoking by high school students rose early and through the mid 1990s, but this rate has fallen more steeply since the end of the 1990s. The most recent data point in 2007 is consistent with a falling trend. Smokeless tobacco use by high school students is also falling.**

### Youth Tobacco Use and Cancer

From 1997–2007, the number of youth under 18 who became daily cigarette smokers (defined as smoking every day for at least 30 days) declined from 3,000 to about 1,000.

Other forms of tobacco used by young people include smokeless tobacco (chewing tobacco and snuff, also known as spit tobacco), cigars, and bidis (small, brown, hand-rolled, flavored cigarettes). Each of these can also cause cancer.

### Measure

Percentage of high school students who were current cigarette or smokeless tobacco users: Students (Grades 9–12) who reported having used cigarettes or smokeless tobacco in the 30 days before the survey.

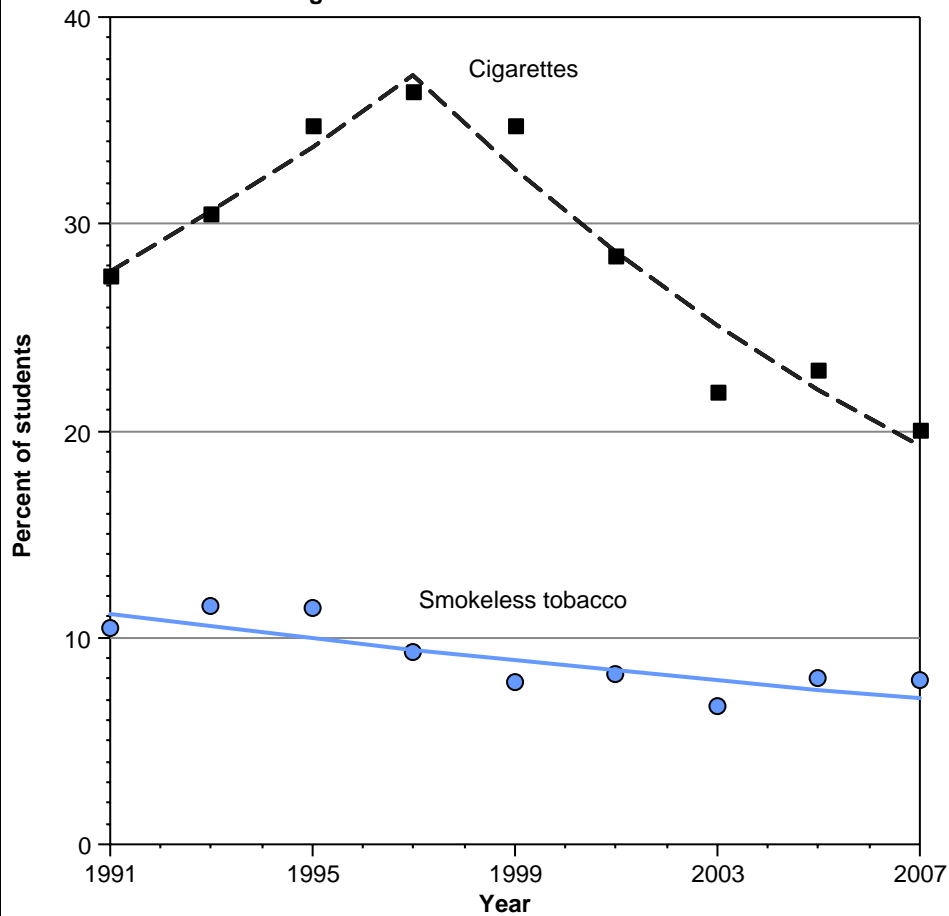
**Period** – 1991–2007

### Trends

**Cigarettes:** After a non-significant rise from 1991–1997, current cigarette smoking among youth has fallen. From 1997–2007, youth smoking showed a very large and statistically significant downward trend.

**Smokeless tobacco:** Current smokeless tobacco use has fallen over the entire 1991–2007 period.

**Figure PYS1: Percentage of high school students (grades 9-12) who were current users of cigarettes or smokeless tobacco: 1991-2007**



Source: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion. Youth Risk Behavior Surveillance System. Data are not age-adjusted.

### Most Recent Estimates

Among high school students in 2007:

- 20 percent were current cigarette smokers (18.7 percent for female, 21.3 percent for male)
- 8 percent were current users of smokeless tobacco
- 14 percent were current cigar smokers (including little cigars)
- 26 percent were current users of "any tobacco" product

### Healthy People 2010 Targets

Decrease the proportion of high school students who currently:

- Smoke cigarettes to 16 percent
- Use smokeless tobacco to 1 percent

- Smoke cigars to 8 percent
- Use any tobacco product to 21 percent

## Groups at High Risk for Tobacco Use

In 2007, cigarette use was higher among non-Hispanic White (23.2 percent) and Hispanic students (16.7 percent) than non-Hispanic Black students (11.6 percent). Male students' use of cigarettes was higher than female students' use (21.3 percent for males versus 18.7 percent for females). Cigarette use was higher among 12th graders (26.5 percent), 11th graders (21.6), and 10th graders (19.6 percent) than 9th grade students (14.3 percent). Overall, 8.1 percent of high school students had smoked on 20 or more of the preceding 30 days, and frequent use was more common among White than Black and Hispanic students. Among current smokers, 10.7 percent of students smoked more than 10 cigarettes per day on the days that they smoked, with this rate being higher for male students than female students.

High school males are far more likely than females to use smokeless tobacco (13.4 percent males, 2.3 percent females). Non-Hispanic White males reported a greater use of smokeless tobacco products (18.0 percent) than either non-Hispanic Black (2.0 percent) or Hispanic (6.7 percent) males.

Current cigar use was higher among male students (19.4 percent) than among female students (7.6 percent) and was higher among non-Hispanic White (22 percent) and Hispanic (16.3 percent) students than among non-Hispanic Black students (13.2 percent).

## Key Issues

In 2006, in her Final Opinion in the U.S. Department of Justice lawsuit against the cigarette industry, Federal District Judge Gladys Kessler determined that despite their denials, cigarette companies market to young people, and that their "marketing activities are intended to bring new, young, and hopefully long-lived smokers into the market in order to replace those who die (largely from tobacco-caused illnesses) or quit." She further noted that cigarette companies "intensively researched and tracked young people's attitudes, preferences, and habits...knew youth were highly susceptible to marketing and advertising appeals, would underestimate the health risks and effects of smoking, would overestimate their ability to stop smoking, and were price sensitive," and that the companies "used their knowledge of young people to create highly sophisticated and appealing marketing campaigns targeted to lure them into starting smoking and later becoming nicotine addicts."

Cigarettes are one of the most heavily marketed products in the United States. Between 1940 and 2005, U.S. cigarette manufacturers spent about \$250 billion (in 2006 dollars) on cigarette advertising and promotion. Much tobacco advertising targets the psychological needs of adolescents, such as popularity, peer acceptance, and positive self-image, and creates the perception that smoking will satisfy these needs. Even brief exposure to tobacco advertising influences adolescents' attitudes and perceptions about smoking and smokers, and adolescents' intentions to smoke. Strong and consistent evidence from longitudinal studies indicates that exposure to cigarette advertising influences adolescents to initiate smoking and to move toward regular smoking. Studies of tobacco advertising bans in various countries show that comprehensive bans reduce tobacco consumption. In addition, studies show that mass media campaigns designed to discourage tobacco use can change youth attitudes about tobacco use and curb youth smoking initiation. Children and adolescents are heavily exposed to entertainment media, averaging 5.5 person-hours of media use per day. Depictions of smoking are pervasive in movies, but are currently less common in television and music videos. The total weight of evidence from research indicates a causal relationship between exposure to movie smoking depictions and youth smoking initiation.

The Food and Drug Administration (FDA) was granted regulatory authority over tobacco by Congress through the Family Smoking Prevention and Tobacco Control Act, which was signed into law by the president on June 22, 2009. The new law gives the FDA authority to regulate tobacco product manufacturing, marketing and sale, including marketing and sale to youth. In September 2009, FDA banned fruit and candy-flavored cigarettes, widely viewed as appealing to youth.

The overall declining trend in cigarette use by youth is encouraging. However, reaching the Healthy People 2010 goal will require increased prevention efforts, including increasing taxes on cigarettes, sustained anti-tobacco media campaigns, expanded smoke-free indoor air laws, and community mobilization combined with other interventions to decrease youth's access to cigarettes.

In addition to preventing smoking initiation, efforts need to target smoking cessation among youth. Many adolescents who smoke would like to quit, and Healthy People 2010 Objective 27-7 focuses on increasing tobacco use cessation attempts among adolescent smokers. The 2008 PHS Guidelines note that smoking cessation counseling has been shown to be effective in the treatment of adolescent smokers, and recommends that adolescent smokers be provided with counseling interventions to aid them in quitting smoking (Strength of Evidence = B).

## Additional Information on Youth Smoking

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<http://www.healthypeople.gov/Document/html/volume2/27tobacco.htm>  
<http://www.healthypeople.gov/data/midcourse/default.htm#pubs>
- Centers for Disease Control and Prevention. [2006 National Youth Tobacco Survey and Key Prevalence Indicators](#)
- Cigarette Use Among High School Students—United States, 1991–2007  
MMWR June 27, 2008/57(25):689–91.  
<http://www.cdc.gov/mmwr/>
- Kessler G. U.S.A. v. Philip Morris USA inc. Final Opinion. August 17, 2006.
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- Youth Risk Behavior Surveillance—United States, 2007 pages 1207-1208. MMWR June 6, 2008 / 57(SS04): 1-131.  
<http://www.cdc.gov/mmwr/>
- Results from the 2007 NSDUH: National Findings, Substance Abuse and Mental Health Services Administration (SAMHSA)  
<http://oas.samhsa.gov/>
- The Role of the Media in Promoting and Reducing Tobacco Use: NCI Monograph 19  
<http://dcccps.nci.nih.gov/tcrb/monographs/19/docs/M19MajorConclusionsFactSheet.pdf>
- Tobacco Use, Access, and Exposure to Tobacco in Media Among Middle and High School Students—United States, 2004 MMWR  
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[http://www.cdc.gov/tobacco/data\\_statistics/sgr/sgr\\_2000/index.htm](http://www.cdc.gov/tobacco/data_statistics/sgr/sgr_2000/index.htm)
- Regulating Tobacco—An FDA Perspective  
<http://www.fda.gov/TobaccoProducts/GuidanceComplianceRegulatoryInformation/ucm171683.htm>

◀ [Back: Age at Smoking Initiation](#)

[Next: Adult Smoking](#) ▶

**Adult cigarette smoking has slowly fallen since 1991. While the percentage of current male smokers has constantly trended downward, the percentage of current female smokers has shown a slower downward trend over the first half of the period 1991–2008, followed by an accelerated decline from 2000 to 2006. Among 18–24-year-olds, there was a rise followed by a fall in smoking prevalence.**

### Smoking and Cancer

Cigarette smoking is the leading preventable cause of death in the United States. It causes approximately 30 percent of all U.S. cancer deaths each year (more than 168,000 estimated deaths in 2009).

Cigarette smoking causes cancers of the lung, larynx, mouth, esophagus, pharynx, bladder, pancreas, kidney, cervix, stomach, and acute myeloid leukemia.

### Measure

Percentage of adults who were current cigarette smokers: Adults aged 18 and older who reported smoking 100 or more cigarettes in their lifetimes and who, at the time of the interview, continued to smoke every day or some days.

**Period** – 1991–2008

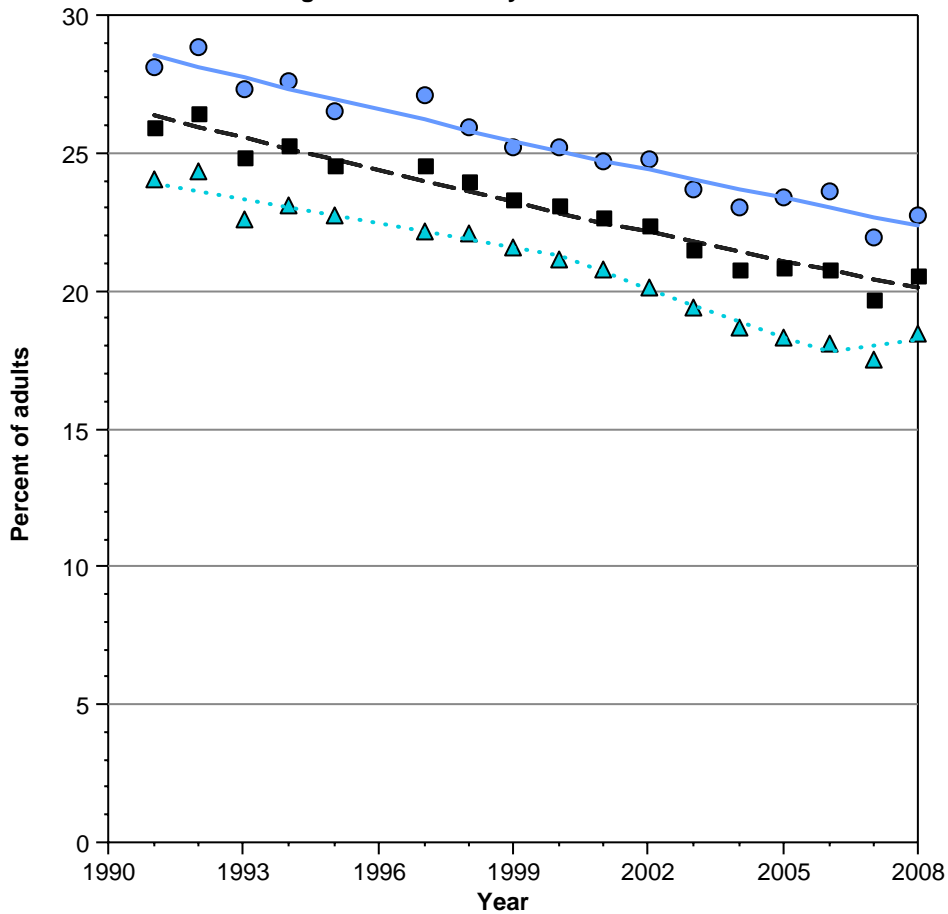
**Trends** –Long-term trend falling for both men and women aged 18 years and older. There is a more accelerated reduction in smoking among women from 2000 to 2006 in contrast to men, who had a more gradual trend downward from 1991 to 2008. The most recent data point (2008) is higher than the 2007 point for both males and females; however, the change in prevalence is only significant for females. Among 18–24-year-olds, smoking trends rose and then fell. The decline among women began in 1999, approximately 2 years later than among men. In contrast, men and women 25 years of age and older showed a steady fall over the entire time period.

Current cigarette smoking rates among Hispanics, which tend to be lower than both non-Hispanic White and non-Hispanic Black rates, fell more steeply than those for non-Hispanic Whites. The prevalence among non-Hispanic Blacks fell at the same rate as that for Hispanics.

Among adults 25 years of age and older, smoking rates declined significantly for all three levels of education. However, the rates for those with only a high school education declined the least when compared to rates for those with less than or greater than a high school education. Those above and below 200 percent of the poverty level experienced a similar falling trend.



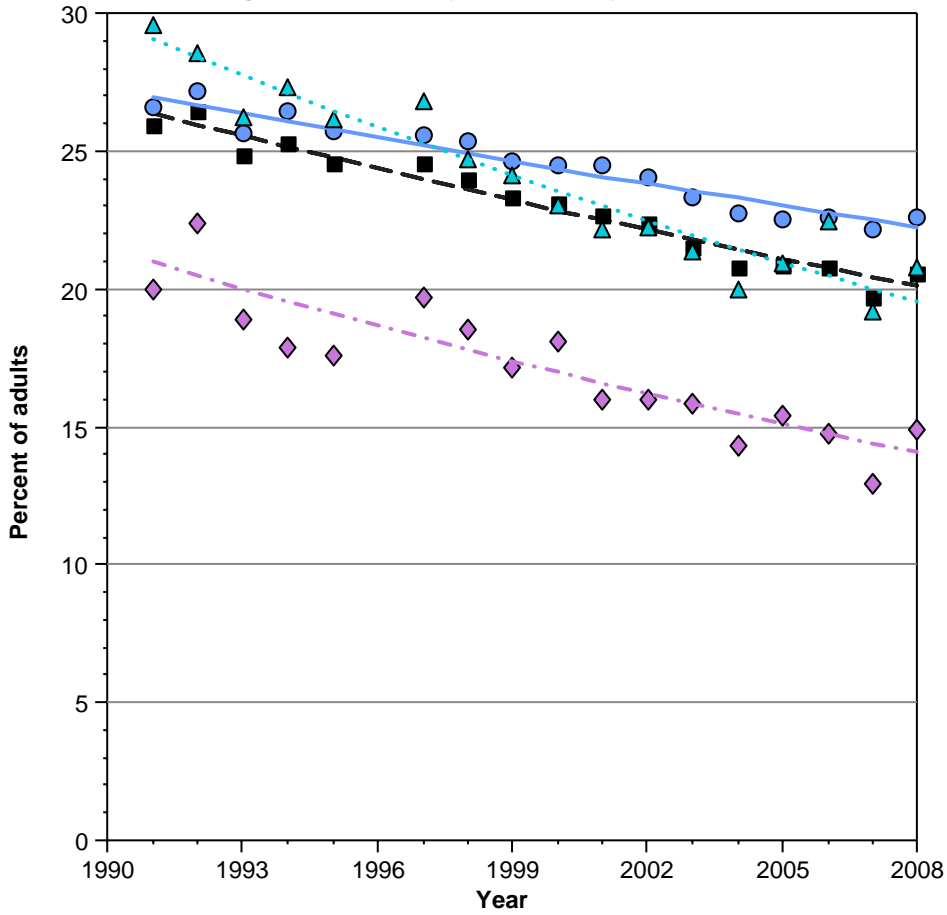
**Figure PAS1: Percentage of adults aged 18 years and older who were current cigarette smokers by sex: 1991-2008**



Both Sexes
  Males  
 Females

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

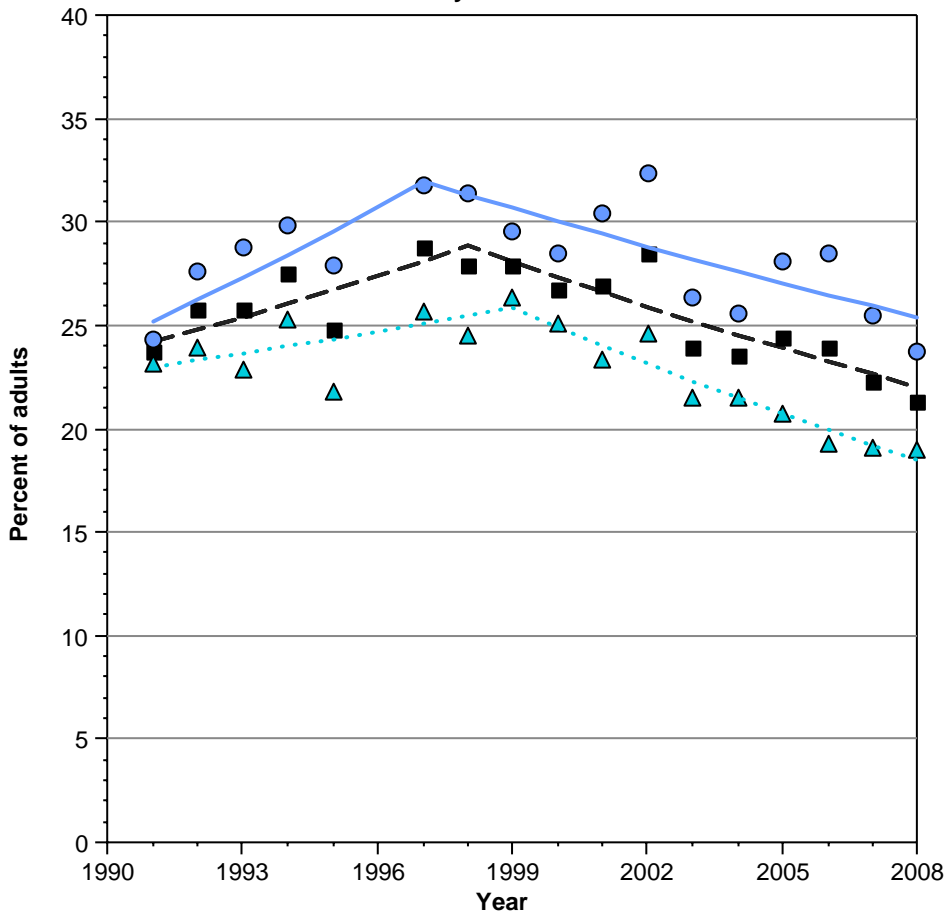
**Figure PAS2: Percentage of adults aged 18 years and older who were current cigarette smokers by race/ethnicity: 1991-2008**



All Races
  Non-Hispanic White  
 Non-Hispanic Black
  Hispanic

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

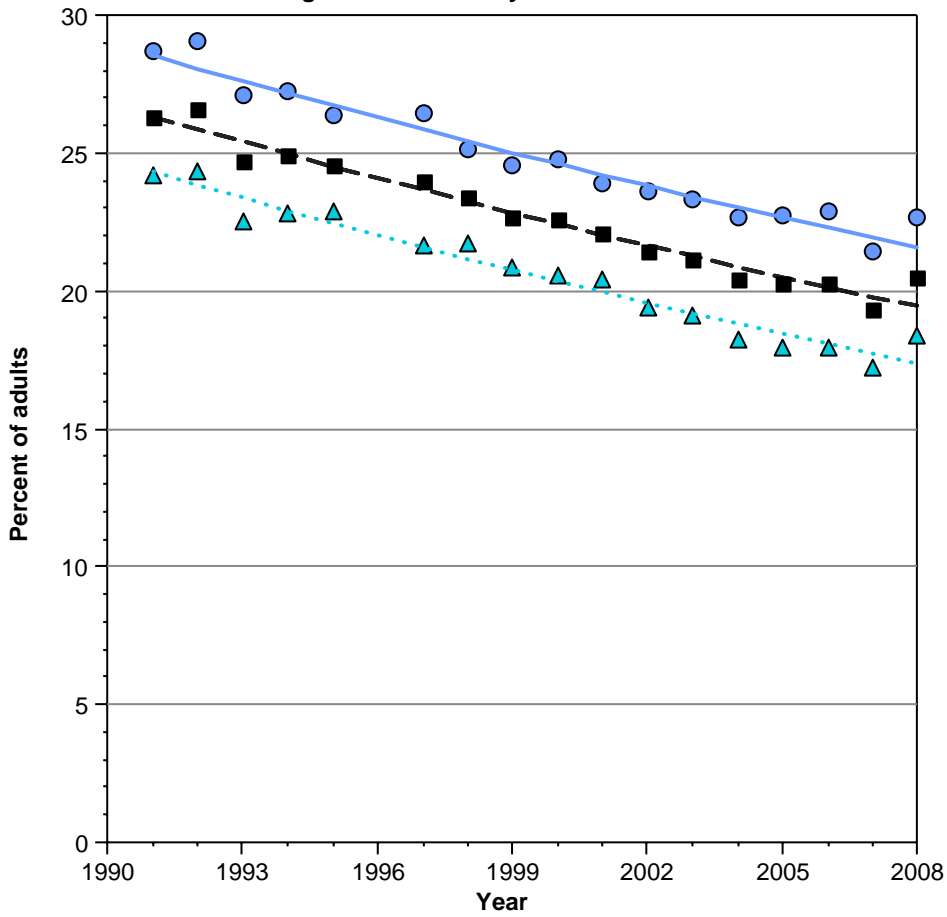
**Figure PAS3: Percentage of adults aged 18-24 years who were current cigarette smokers by sex: 1991-2008**



Both Sexes
  Males  
 Females

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 18-19, 20-24. Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

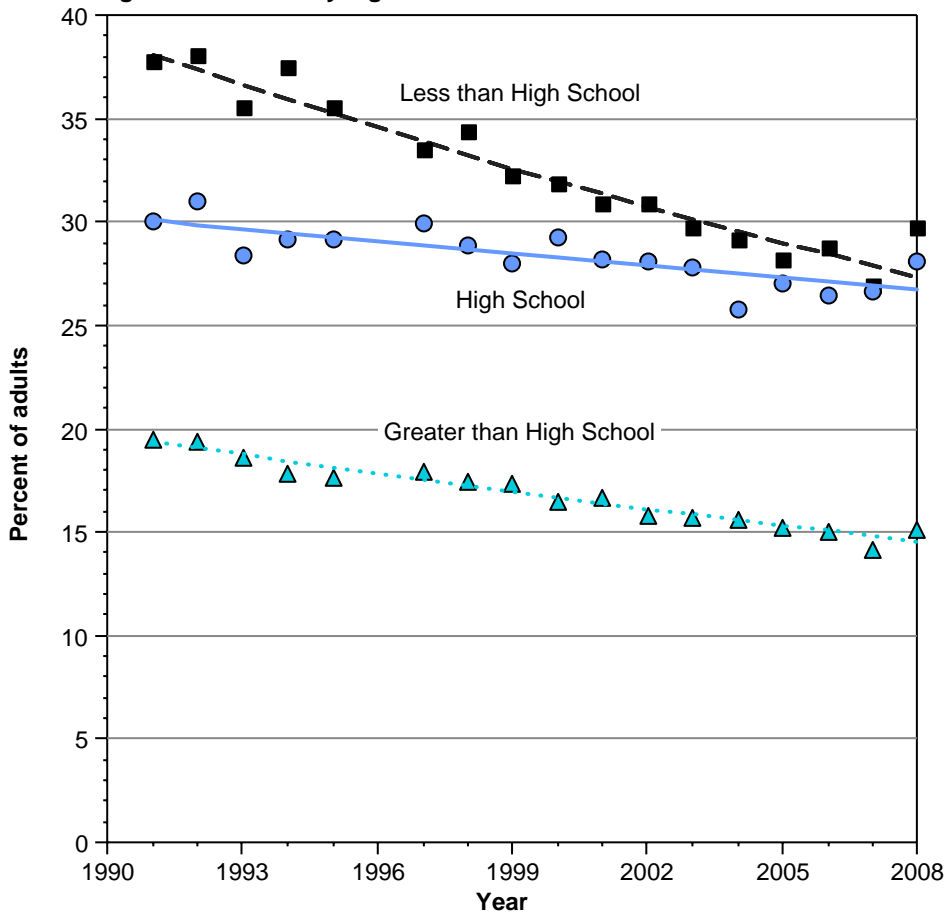
**Figure PAS4: Percentage of adults aged 25+ years and older who were current cigarette smokers by sex: 1991-2008**



Both Sexes
  Males  
 Females

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 25-34, 35-44, 45-64, 65+.  
 Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure PAS5: Percentage of adults aged 25+ years and older who were current cigarette smokers by highest level of education obtained: 1991-2008**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Most Recent Estimates

In 2008, 20.6 percent of adults aged 18 and older—22.8 percent of men and 18.5 percent of women—were current cigarette smokers. Cigarette smoking prevalence was 22.6 percent for non-Hispanic Whites, 20.8 percent for non-Hispanic Blacks, and 14.9 percent for Hispanics.

Among 18–24-year-olds, 21.4 percent—23.7 percent of men and 19.0 percent of women—were current cigarette smokers. Among adults 25 years of age and older, 20.5 percent smoked cigarettes—22.6 percent of men and 18.4 percent of women.

In 2008, 29.7 percent of adults aged 25 and older with less than a high school education and 28.1 percent with a high school education smoked cigarettes. Those with greater than a high school education smoked at the lowest level (15.1 percent) among the three education groups.

Among adults living below 200 percent of the federal poverty level, 28.6 percent smoked cigarettes, while among those living at or above 200 percent of the federal poverty level, 17.5 percent smoked cigarettes.

## Healthy People 2010 Targets

Reduce to 12 percent the proportion of adult current cigarette smokers.

## Groups at High Risk for Smoking

Men are more likely than women to smoke cigarettes. American Indian/Alaska Natives are more likely to smoke cigarettes than non-Hispanic Whites and non-Hispanic Blacks, who in turn are more likely to smoke cigarettes than Hispanics and Asians.

Persons living at or below 200 percent of the poverty level are also at higher risk of smoking.

## Key Issues







Although the rate of smoking has dropped by half since the Surgeon General's first report on smoking in 1964 (42 percent of adults were current smokers in 1965), progress has slowed over the past few years, especially for women. It appears that only a few subgroups will reach the Healthy People 2010 goal of 12 percent or fewer smokers. Thus far, Hispanic and non-Hispanic Asian women, those 65 years of age and older, and those with an undergraduate degree or higher level of education have reached the Healthy People 2010 goal. In addition, in 2009, no state funded tobacco control programs were at the level recommended by the Centers for Disease Control and Prevention (CDC). Further decreases in tobacco use could vastly improve the public's health.

Concurrent with the decrease in adolescent cigarette smoking since 1997 and general decreases in adult smoking, the tobacco industry has increased its tobacco promotion and advertising, targeting young adults who are price- and brand-sensitive consumers. Among adults aged 18 years and older, those aged 18–24 have the highest smoking prevalence in most years. Another recent phenomenon is the emergence of young adult use of water pipes to smoke tobacco, especially at specialty cafes near college campuses.

In 2005, cigar sales in the United States rose to 5.1 billion cigars, representing a 3-percent increase from the previous year and generating more than \$2.9 billion in retail sales. The production of little cigars went from 1.5 billion in 1997 to about 4.7 billion in 2005. Cigar smoking continues to be a popular trend in the United States, especially among young and middle-aged White men with higher-than-average incomes and education. The "cigar culture" is supported by cigar magazines, shops, bars and clubs.

## Additional Information on Adult Smoking

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- Healthy People 2010, Volume 2, Chapter 27 – Tobacco Use and Midcourse Review  
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<http://www.healthypeople.gov/data/midcourse/default.htm#pubs>
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<http://monographs.iarc.fr/ENG/Monographs/vol83/mono83.pdf> 
- National Cancer Institute's Tobacco and Cancer Homepage  
<http://www.cancer.gov/cancertopics/tobacco>
- National Health Interview Survey (NHIS) (NCHS)  
<http://www.cdc.gov/nchs/nhis.htm>
- Smoking and Tobacco Control Monograph 9 – Cigar Health Effects and Trends (NCI)  
<http://cancercontrol.cancer.gov/tcrb/monographs/9/index.html>
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[http://cancercontrol.cancer.gov/tcrb/monographs/9/m9\\_1.PDF](http://cancercontrol.cancer.gov/tcrb/monographs/9/m9_1.PDF)
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[http://www.cancer.org/docroot/PED/content/PED\\_10\\_13X\\_Quitting\\_Smokeless\\_Tobacco.asp?sitearea=PED](http://www.cancer.org/docroot/PED/content/PED_10_13X_Quitting_Smokeless_Tobacco.asp?sitearea=PED) 
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[http://www.cdc.gov/tobacco/Data\\_statistics/tables/index.htm](http://www.cdc.gov/tobacco/Data_statistics/tables/index.htm)
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[Next: Quitting Smoking ▶](#)

**Adult attempt-to-quit rates for both men and women, and for most subgroups, have not changed. In contrast to quitting attempts, recent successful quitting rates differed by gender. Women showed no change, while the rate for men declined.**

### The Effects of Quitting Smoking on Cancer Risk

Quitting smoking has major and immediate health benefits for men and women of all ages. Quitting smoking dramatically reduces the risk of lung and other cancers, coronary heart disease, stroke, and chronic lung disease. For example, ten years after a person quits smoking, his or her risk of lung cancer is decreased to about one-third to one-half that of a person who continues to smoke; with continued abstinence from smoking, the risk of lung cancer decreases even further.

While quitting smoking is beneficial at any age, the earlier in life a person quits, the more likely he or she will avoid the devastating health effects of continued tobacco use. Few smokers can quit successfully on their first attempt; most will require several attempts before they are able to permanently quit. This emphasizes the need for smokers to begin trying to quit as early in life as possible.

### Measures

**Attempt to quit:** Percentage of current everyday smokers (aged 18 years and older) who quit smoking for one day or longer during the past 12 months.

**Successful quitting:** Percentage of current smokers and recent former smokers (aged 25 years and older) who quit for 3 months or more during the past 12 months and are not currently smoking.

**Period** – 1998–2008

### Trends

#### *Quit Attempts of One Day or Longer*

Between 1998 and 2008, adult attempt-to-quit rates have not changed for men and women overall. There has also been no change in rates among adults aged 18–24 years or among those aged 25 years and older, and among population subgroups considered by level of education and by poverty status.

Attempt-to-quit rates have also not changed among non-Hispanic Whites and non-Hispanic Blacks. However, Hispanic attempt-to-quit rates rose significantly from 35.5 percent in 1998 to 41.8 percent in 2008.

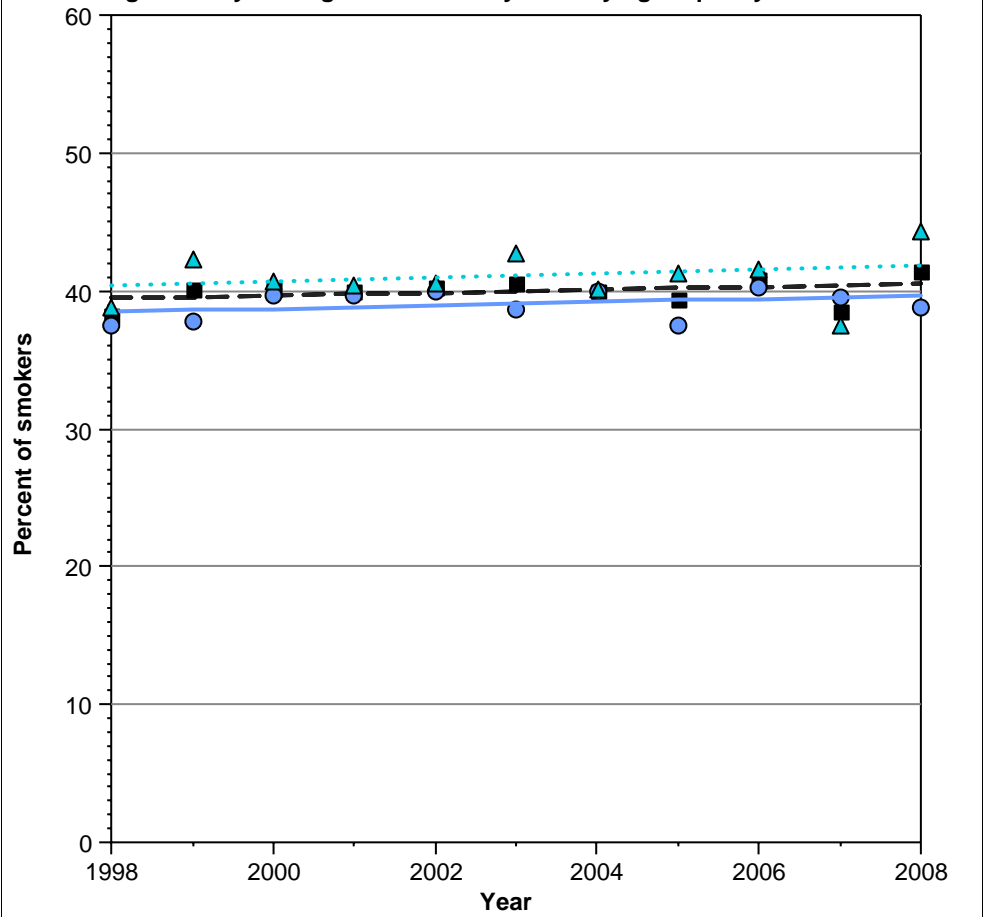
#### *Recent Successful Quitting of 3 Months or Longer*

Between 1998 and 2008, there was no significant change among those aged 25 years and older in the rate of successful quitting for 3 months or longer. However, while women showed no significant change, the rate for men fell significantly over this period, from 11.6 percent in 1998 to 8.6 percent in 2008.

During this period, there were also no significant changes in the rate of successful quitting for 3 months or longer by race/ethnicity, poverty level, or level of education.



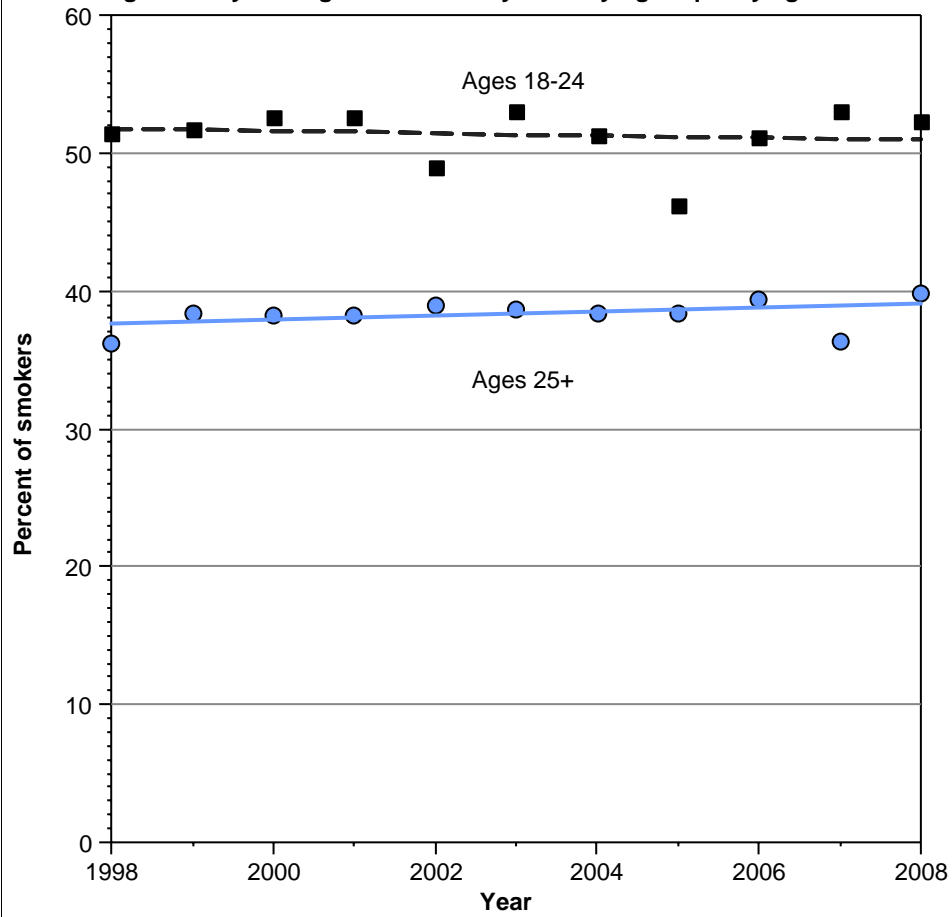
**Figure PQS1: Percentage of everyday smokers aged 18 years and older who stopped smoking for a day or longer because they were trying to quit by sex: 1998-2008**



Both Sexes
  Males
  Females

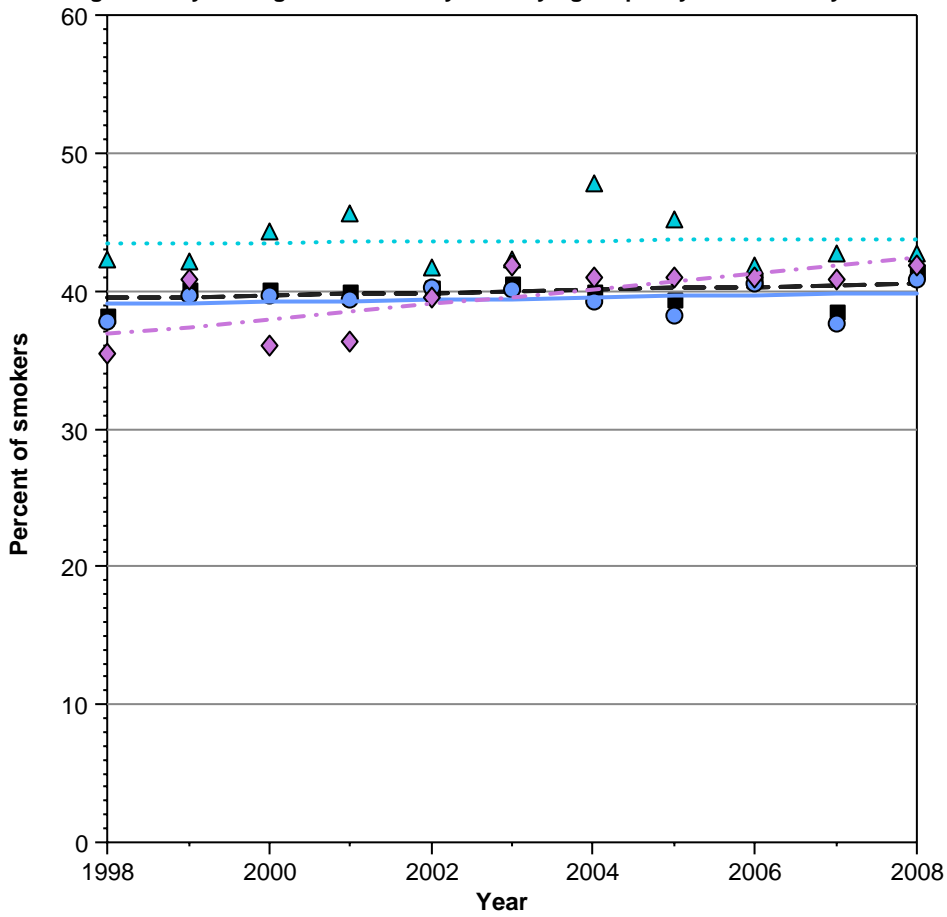
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

Figure PQS2: Percentage of everyday smokers aged 18 years and older who stopped smoking for a day or longer because they were trying to quit by age: 1998-2008



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

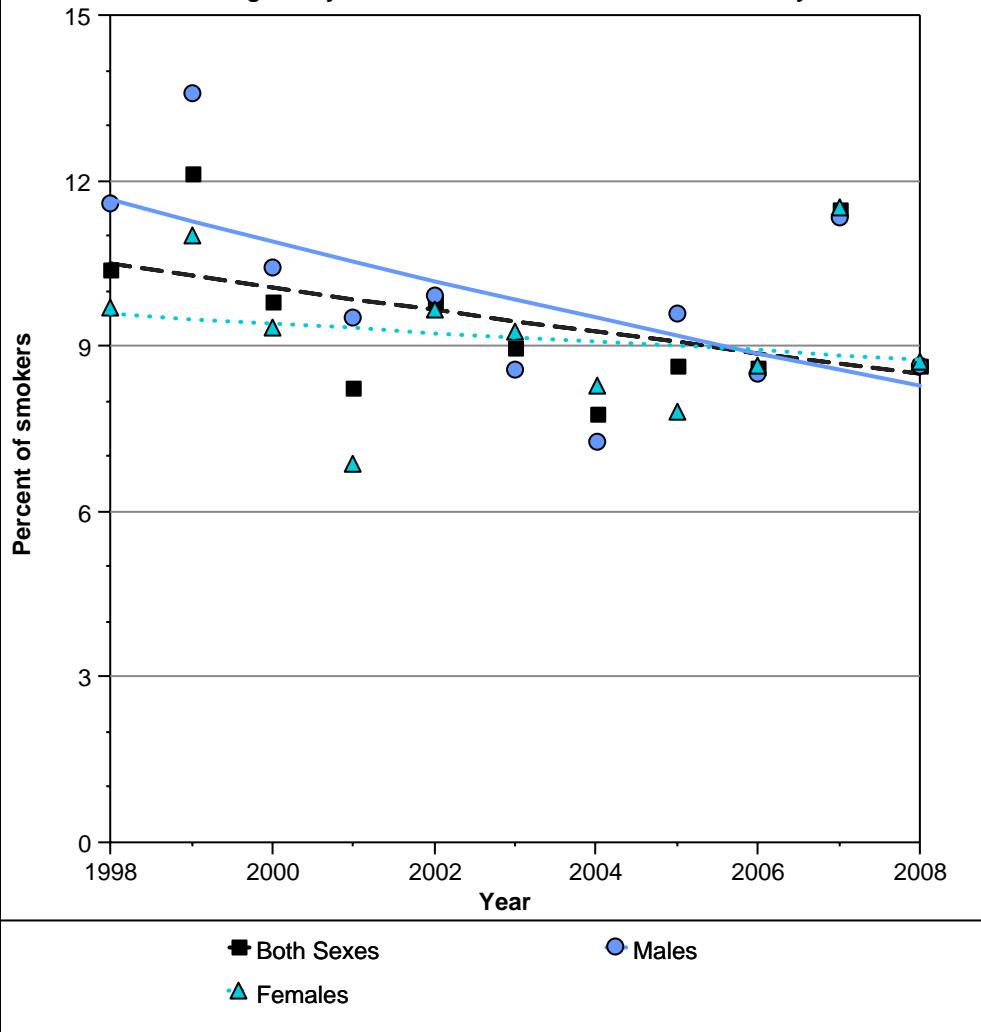
**Figure PQS3: Percentage of everyday smokers aged 18 years and older who stopped smoking for a day or longer because they were trying to quit by race/ethnicity: 1998-2008**



All Races
  Non-Hispanic White
  Non-Hispanic Black
  Hispanic

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure PQS4: Percentage of smokers a year ago who successfully quit during the past 12 months and were aged 25 years or older at the time of the interview by sex: 1998-2008**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Successfully quitting means having stopped smoking completely for 3-12 months at the time of the NHIS interview. Current smokers a year ago assumes that all current smokers at time of interview were smoking one year ago and those former smokers who completely quit smoking less than 12 months ago were smokers 12 months ago.  
 Data are age-adjusted to the 2000 standard using age groups: 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Most Recent Estimates**

*Quit Attempts of One Day or Longer*

In 2008, 41.5 percent of smokers aged 18 years and older (38.8 for men, 44.4 for women) stopped smoking for one day or longer because they were trying to quit. Attempt-to-quit rates were higher among 18–24-year-olds (52.3 percent) than those aged 25 years and older (39.9 percent).

The proportion of those attempting to quit was very similar among Hispanics (41.8 percent), Non-Hispanic Whites (40.9 percent), and non-Hispanic Blacks (42.8 percent). These proportions by poverty level were also similar (40.7 percent for greater than or equal to 200 percent of the poverty level and 42.2 percent for less than 200 percent of the poverty level). By education level for those aged 25 years and older, the corresponding percentages were 40.1 for those with less than a high school education, 37.2 for those with a high school education, and 42.1 for those with greater than a high school education.

*Recent Successful Quitting of 3 Months or Longer*

In 2008, 8.6 percent of current smokers aged 25 years and older successfully quit smoking during the past 12 months (8.6 percent for men, 8.7 percent for women).

The corresponding percentages for successful quitting were 11.8 for Hispanics, 9.3 for non-Hispanic Whites, and 4.5 for non-Hispanic Blacks.

By poverty level these percentages were 10.2 for those greater than or equal to 200 percent of the poverty level and 5.6 for those less than 200 percent of the poverty level. By education these percentages were 11.1 for those with greater than high school education, 6.5 for those with less than a high school education, and 5.7 for those with a high school education.

### **Healthy People 2010 Target**

Increase to 75 percent the proportion of adult everyday smokers (aged 18 years and older) who stopped smoking for a day or longer because they were trying to quit.

There are no Healthy People 2010 targets for successful quitting for 3 months or longer.

**Clinicians' advice to current smokers to quit smoking continues to rise.**

### **The Effects of Clinical Advice on Quitting Smoking**

Clinicians' advice to quit smoking can by itself contribute 5 to 10 percentage points toward quitting among smoking patients, and much more if coupled with behavioral therapy and pharmacological treatment of nicotine addiction. In addition, minimal clinical interventions have been shown to be cost effective in increasing smokers' motivation to quit.

If a patient wants to quit, the national guidelines recommend that the clinician follow the "5 A's" (Ask, Advise, Assess, Assist, and Arrange). For patients who do not want to quit, the clinician should instead provide a motivational intervention. The Public Health Service-sponsored "Clinical Practice Guideline: Treating Tobacco Use and Dependence 2008 update" expert panel's analysis suggests that a wide variety of clinicians, including dentists, physicians, and other health professionals, can successfully implement brief strategies effectively.

### **Measures**

Among adult smokers (aged 18 years and older) who have seen a physician and/or dentist in the past 12 months, the percentage of adult smokers who report that a physician and/or dentist advised them to quit smoking.

**Period** – 1992–2007

### **Trends**

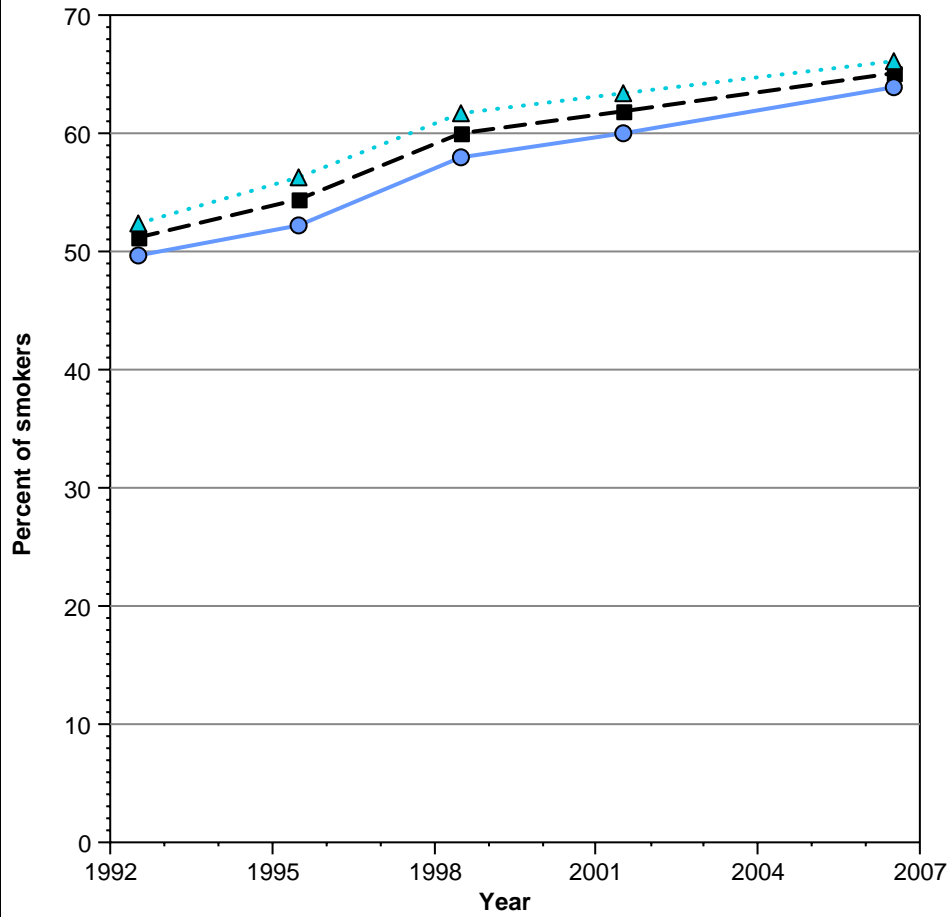
The percentage of smokers advised by a physician to quit shows a steep rise from 1993 to 1999 and then a more gradual rise from 1999 to 2007. The rise for each period of time is similar for both males and females.

For smokers aged 25 years and older, both males and females had a rise in receiving advice to quit through the entire period 1992 to 2007. The period from 2001 to 2007 shows a shallower rise; however, the pattern for young adults aged 18 to 24 years is less positive. Only the early part of the period prior to 1999 showed any rise. Since 1999, the percentage receiving advice to quit from a physician has changed little. While the trend is similar for both adult men and women, the percentage of young adult men receiving advice to quit is much lower than that for young women, older men, and older women.

Similar to the results for physicians' advice to quit smoking, both male and female smokers tended to show rises in receipt of advice from dentists to quit smoking over most of the time period studied. However, women did not show much change between 2002 and 2007, especially among those aged 25 years and older. Both men and women aged 18–24 years showed increases from 1999 to 2007.

The percentage of adults who were advised to quit smoking by either a physician or a dentist during the past year did not vary by race/ethnicity, education level, or poverty status.

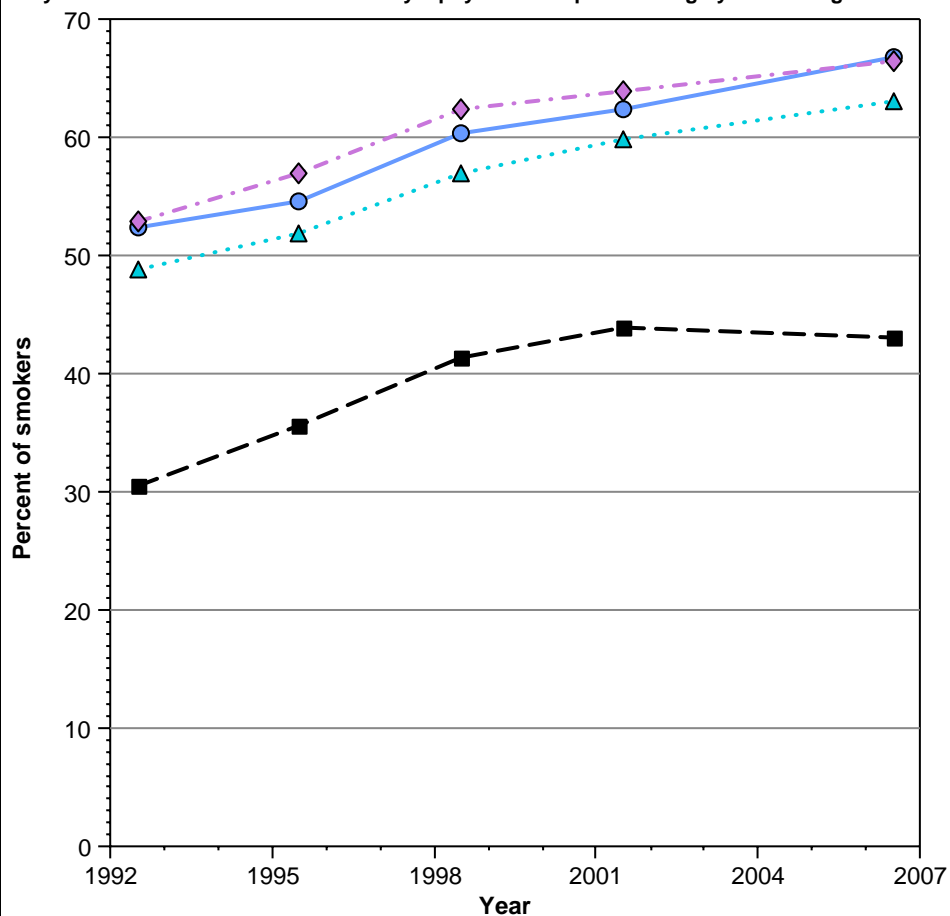
Figure PCA1: Percentage of current smokers (who have seen a physician in the past year) aged 18 years and older who were advised by a physician to quit smoking by sex: 1992-2007



■ Both Sexes      ● Male  
▲ Female

Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute.  
Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

Figure PCA2: Percentage of current smokers (who have seen a physician in the past year) aged 18 years and older who were advised by a physician to quit smoking by sex and age: 1992-2007

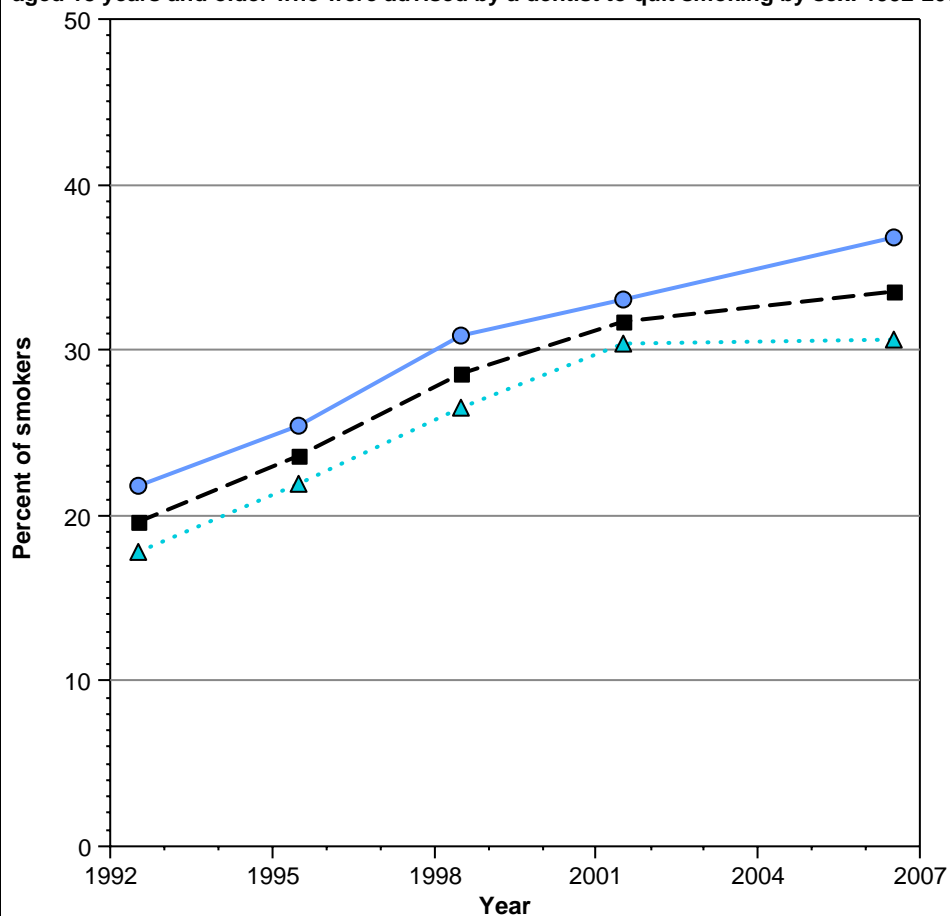


Males, ages 18-24
  Males, ages 25+
  Females, ages 18-24
  Females, ages 25+

Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute. Data are age-adjusted to the 2000 standard. Ages 18-24 are age-adjusted using age groups: 18-19, 20-24. Ages 25+ are age-adjusted using age groups: 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).



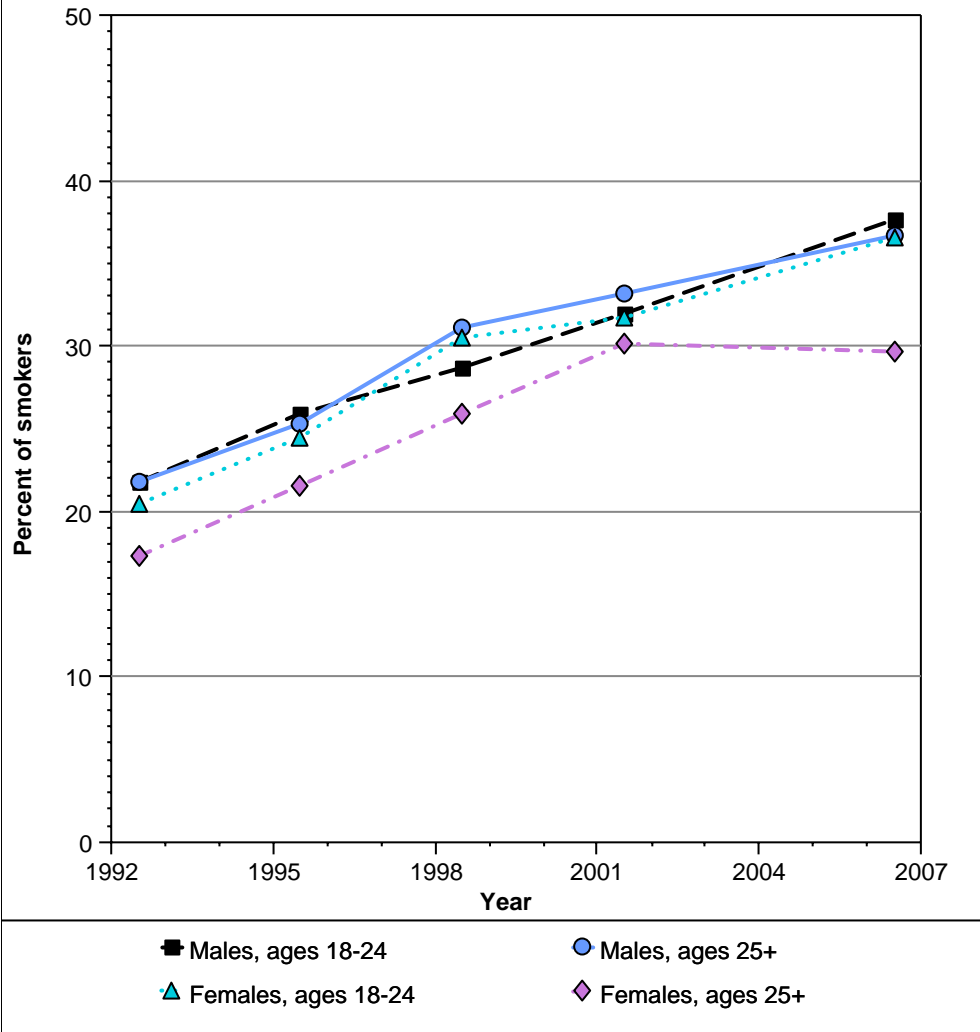
Figure PCA3: Percentage of current smokers (who have seen a dentist in the past year) aged 18 years and older who were advised by a dentist to quit smoking by sex: 1992-2007



■ Both Sexes      ● Male  
▲ Female

Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute.  
Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure PCA4: Percentage of current smokers (who have seen a dentist in the past year) aged 18 years and older who were advised by a dentist to quit smoking by sex and age: 1992-2007**



Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute. Data are age-adjusted to the 2000 standard. Ages 18-24 are age-adjusted using age groups: 18-19, 20-24. Ages 25+ are age-adjusted using age groups: 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Most Recent Estimates**

In 2006 to 2007, 65.1 percent of smokers aged 18 years and older (63.8 percent of males, 66.0 percent of females) who had seen a physician during the past 12 months reported being advised by that physician to quit smoking. For females and males aged 18–24 years, the percentages were 63.1 and 43.1 respectively. Among smokers aged 25 years or older, 79.6 percent of females and 73.7 percent of males were advised by a physician to quit smoking.

In contrast, the 2006 to 2007 estimates for receipt of advice from a dentist to quit smoking were much lower than the comparable estimates for receipt of advice from a physician. For those aged 18 years or older, only 33.6 percent received advice to quit from a dentist (36.9 percent of males and 30.7 percent of females). Among those aged 18–24 years, 37.7 percent of males and 36.5 percent of females received advice to quit from a dentist. Among those aged 25 years or older, 36.7 percent of males and 29.7 percent of females received advice to quit from a dentist.

**Healthy People 2010 Target**

Increase the percentage of physicians, dentists, and other health professionals who counsel their at-risk patients about tobacco use cessation to 85 percent.

## Groups at High Risk for Not Being Advised to Quit

Young adult males aged 18–24 years are far less likely to receive advice to quit from their physician than older men or women aged 18–24 and 25+ years.

By contrast, females aged 25 years and older had the lowest rate of advice from dentists among the four age/gender groups. In 2006 to 2007 this was about 30 percent for females aged 25 years or older versus 37 to 38 percent for the other three age/gender groups.

In 2006 to 2007, non-Hispanic Whites report the highest percentage of receiving physician advice (65.7 percent), followed by Hispanics (63.2 percent) and non-Hispanic Blacks (60.9 percent). By contrast, the three race/ethnicity groups are more closely clustered for receipt of advice from a dentist.

## Key Issues

Studies show that most smokers want to quit. The success of clinicians' advice to quit and subsequent counseling increases with the intensity of the program and may be improved by increasing the frequency and duration of contact.

In addition to physicians' and dentists' advice, efforts to reduce smoking are most effective when multiple techniques are used, including educational, regulatory, and economic interventions, as well as media campaigns and other social strategies.

While the long-term increase in both physicians' and dentists' advice to quit smoking is encouraging, it is clear that improvement is still needed, especially for dentists. Given physicians', dentists', and other health professionals' combined access to 70 to 80 percent of smokers each year, clinicians can play a major role in smoking cessation by advising all of their patients who smoke to quit.

Progress needs to be made to remove barriers to clinicians providing advice and further treatment, as well as barriers to patients in seeking treatment. An important barrier for both groups is lack of medical insurance coverage for counseling and pharmacological treatment for tobacco dependence.

## Additional Information on Clinicians' Advice to Quit Smoking

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<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4916a1.htm>
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- U.S. Department of Commerce, Census Bureau (2004). National Cancer Institute and Centers for Disease Control and Prevention Co-sponsored Tobacco Use Supplement to the Current Population Survey (2001–2002)  
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<http://riskfactor.cancer.gov/studies/tus-cps/>
  - Data files and/or technical documentation  
<http://www.census.gov/aprd/techdoc/cps/cps-main.html>
- U.S. Preventive Services Task Force - Counseling and Interventions to Prevent Tobacco Use and Tobacco-Caused Disease in Adults and Pregnant Women  
<http://www.ahrq.gov/clinic/uspstf/uspstbac2.htm>

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[Next: Medicaid Coverage of Tobacco Dependence Treatments](#) ▶

## ➤ Medicaid Coverage of Tobacco Dependence Treatments

Prevention: Behavioral Factors

**Most state Medicaid programs provide at least some coverage of tobacco dependence treatments, but coverage is still limited in most states.**

### Medicaid Coverage of Tobacco Dependence Treatments

Providing tobacco users access to evidence-based tobacco dependence treatments can reduce morbidity and mortality from cancers caused by tobacco use. Low-income Americans are more likely than other Americans to be addicted to tobacco products. Most state Medicaid programs provide at least some coverage of tobacco dependence treatment to at least some tobacco users. However, expansion of coverage to more treatments, expansion of the groups eligible for treatment, and a reduction of barriers to accessing treatment is needed.

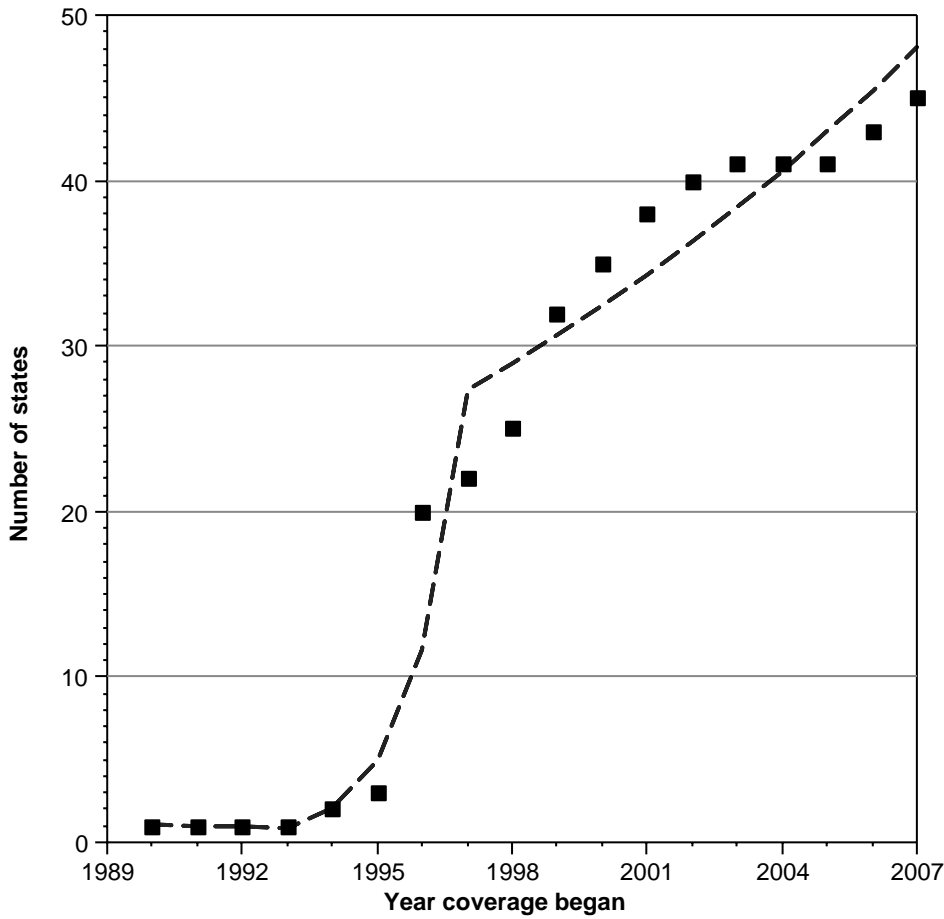
#### Measure

Number of states that report providing coverage under Medicaid for any evidence-based tobacco dependence treatment (medication or counseling), either to their entire Medicaid population or to pregnant women only.

**Period** – 1990–2007

**Trends** – State Medicaid programs have steadily increased their coverage of tobacco dependence treatments over time. They have also expanded the number of treatments for which coverage is provided, over time.

**Figure PMC1: Medicaid coverage of smoking cessation aids in the 50 states and DC: 1990-2007**



Source: McMenamin SB, Haplin HA, Bellows MN, Husten CG, Rosenthal A. State Medicaid coverage for tobacco-dependence treatments - United States, 2007. *Morbidity and Mortality Weekly Report* 2009;58(43):1199-1204.  
 Note: Iowa is included beginning in 2003 when cessation coverage for pregnant women was first reported. Iowa's exact start date is unknown.

**Most Recent Estimates**

In 2007, 44 states and the District of Columbia (Washington, D.C.) provided Medicaid coverage for at least one tobacco dependence treatment for at least some segment of their Medicaid eligible population. In 2007, 42 states and Washington, D.C., offered coverage for at least one form of tobacco dependence treatment for their entire Medicaid population. In addition, two states reported offering coverage to pregnant women only.

**Healthy People 2010 Target**

Medicaid programs in all 50 states and Washington, D.C., will include coverage of evidence-based treatment for nicotine dependency.

**Why is Medicaid Coverage of Tobacco Dependence Treatments Important to Reducing Cancer?**

Approximately one-half of all long-term smokers, especially those who began smoking as teenagers, will die prematurely from a disease caused by smoking. Quitting smoking, as early in life as possible is the only proven way to reduce the enormous health risk incurred by smoking. Smoking is more common among Americans of low socio-economic status, and smoking contributes significantly to health disparities. In addition, the proportion of smokers is significantly higher among Medicaid recipients than among the general population; in 2007, 33 percent of Medicaid enrollees reported being current smokers. This highlights the importance of providing tobacco dependence treatment to Medicaid recipients in all states.


## Key Issues

Tobacco-dependence treatment is highly cost-effective, and is cost-saving in certain populations. Effective tobacco dependence treatments include both medication and counseling.

As of 2007, only six state Medicaid programs reported providing no Medicaid coverage for tobacco dependence treatments, and two states reported providing tobacco-dependence treatment to pregnant women only. In addition, many states employ measures that limit access such as copayments, limitations on number of treatment courses, requiring prior authorization, and requiring enrollment in a behavioral modification program to gain coverage for pharmacotherapy. In 2007, only six states provided coverage for all FDA-approved medications and individual and group counseling, and only two states reported access to tobacco-dependence treatments without any limitations or restrictions.

Enhanced access to tobacco dependence treatment among the Medicaid population will assist more low-income tobacco users to quit and will contribute to reducing cancer deaths and cancer-related health disparities in this population.

## Additional Information

- U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. State Medicaid coverage for tobacco-dependence treatments – United States, 2007. MMWR November 6, 2009; 58: 1199-1204.
- Fiore MC, Jaen CR, Baker TB et al. Treating Tobacco Use and Dependence: 2008 Update. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service. May 2008.
- Giovino GA, Chaloupka FJ, Hartman AM, et.al. Cigarette Smoking Prevalence and Policies in the 50 States: An Era of Change – The Robert Wood Johnson Foundation ImpacTeen Tobacco Chart Book. Buffalo, NY: University at Buffalo, State University of New York; 2009. <http://www.impacteen.org/tobaccodata.htm> 
- Jha P, Peto R, Zatonski W, Boreham J, Jarvis MJ, Lopez AD. Social inequalities in male mortality, and in male mortality from smoking: indirect estimation from national death rates in England and Wales, Poland, and North America. Lancet 2006; 368: 367-370.

[◀ Back: Clinicians' Advice to Quit Smoking](#)

[Next: Fruit and Vegetable Consumption ▶](#)

**Fruit and vegetable intake remained relatively stable between 1994 and 2004.**

### Limited Fruit and Vegetable Consumption is a Cancer Risk

People whose diets are rich in plant foods such as fruits and vegetables have a lower risk of getting cancers of the mouth, pharynx, larynx, esophagus, stomach, lung, and there is some suggested evidence for a lower risk of cancers of the colon, pancreas, and prostate. They are also less likely to get diabetes, heart disease, and hypertension. A diet high in fruits and vegetables helps to reduce calorie intake and may help to control weight.

To help prevent these cancers and other chronic diseases, experts recommend 4 to 13 servings of fruits and vegetables daily, depending on energy needs. This includes 2 to 5 servings of fruits and 2 to 8 servings of vegetables, with special emphasis on dark-green and orange vegetables and legumes. There is no evidence that the popular white potato protects against cancer.

### Measure

Average daily cups of fruits and vegetables for people aged 2 years and older. This measure includes fruits and vegetables from all sources. One serving is approximately ½ cup.

**Period** – 1989–2004

We used the My Pyramid Equivalents Database to estimate food group intake (available at <http://www.ars.usda.gov/Services/docs.htm?docid=8498>). Please note that these data are currently available only through 2003-2004 NHANES. We will update as new data become available.

### Trends

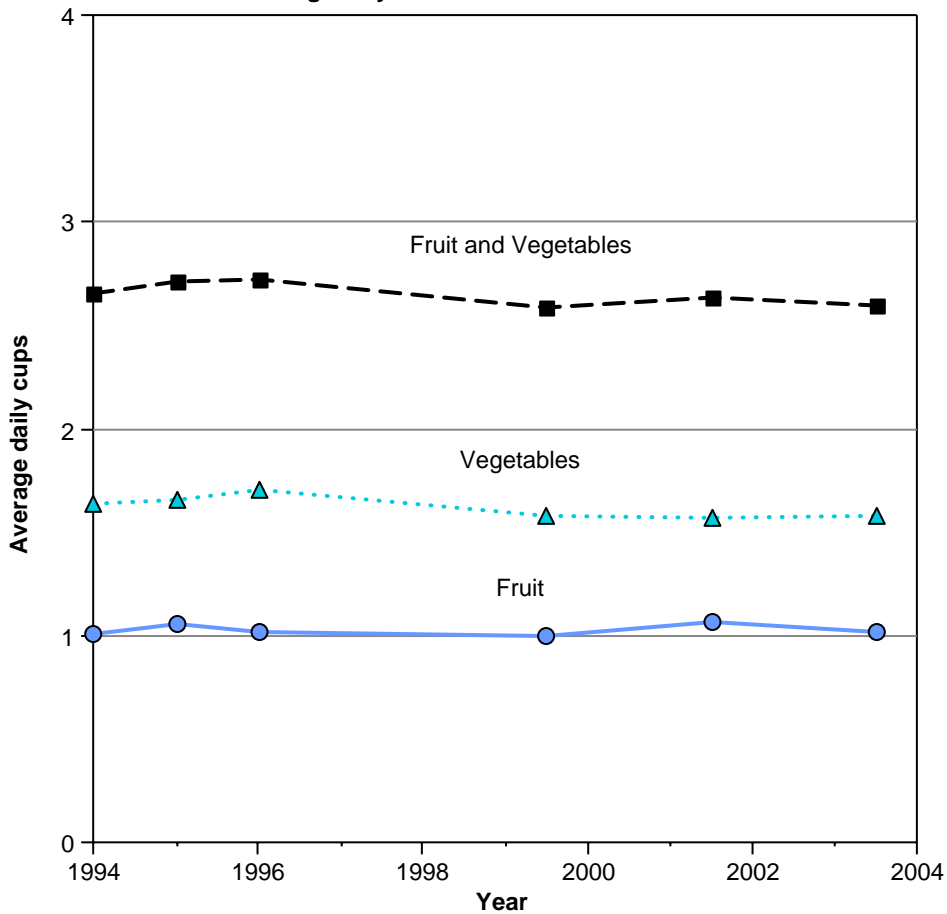
**Total fruits and vegetables:** Relatively stable

**Fruits:** Relatively stable

**Vegetables:** Relatively stable



**Figure PFV1: Average daily cups of fruit and vegetables consumed by individuals aged 2 years and older: 1994-2004**



Source (1994-1996): U.S. Department of Agriculture. Continuing Survey of Food Intakes by Individuals.

Source (1999+ Data): National Center for Health Statistics. National Health and Nutrition Examination Survey.

Data are age-adjusted to the 2000 standard using age groups: 2-5, 6-11, 12-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Most Recent Estimates

In 2003 to 2004, people aged 2 years and older had, on average, 1.0 cup of fruit and 1.6 cups of vegetables, for a total of 2.6 cups of fruits and vegetables. Total vegetable servings included:

- Dark green/orange: 0.14 cups
- Starchy: 0.45 cups (largely comprising fried potatoes)
- Tomatoes and other vegetables: 0.88 cups

Among racial and ethnic groups, non-Hispanic Blacks had 2.3 total cups of fruits and vegetables per day, while non-Hispanic Whites had 2.6 and Mexican Americans had 2.9.

### Healthy People 2010 Targets

At least two daily servings of fruits.

At least three daily servings of vegetables, with at least one-third being dark-green/orange.

(The Healthy People 2010 targets call for 75 percent of the population to consume the minimum servings of fruits and 50 percent to consume the minimum servings of vegetables. However, the minimum number of servings in these targets predates the 2005 Dietary Guidelines for Americans, which recommend higher intakes.)



## Groups at High Risk for Not Eating Enough Fruits and Vegetables

Fruit consumption is highest among the youngest and oldest segments of the population. Total fruit and vegetable consumption tends to increase with age, education, and income. Among racial and ethnic groups, Blacks have the lowest intake and Mexican Americans have the highest.

## Key Issues

New dietary guidance released in 2005 recommended increased intake of fruits and vegetables based on evolving evidence of the benefit of eating a diet rich in fruits and vegetables. The average combined recommendation for fruits and vegetables of 10 servings (5 cups) is twice the level targeted by Healthy People 2010 and about twice the current average intake. Additional servings of fruits and vegetables should replace sources of "empty calories" in the diet, such as added sugars (honey, syrup, soft drinks) and solid fats (butter, sour cream), to avoid taking in too many calories. Individuals should be especially encouraged to consume dark green/orange varieties of vegetables such as broccoli or carrots, and legumes or dried beans, such as pinto beans or lentils.

## Additional Information on Fruit and Vegetable Consumption

- Usual Dietary Intakes: Food Intakes, US Population, 2001–04 (NCI)  
<http://riskfactor.cancer.gov/diet/usualintakes/pop/>
- Choose a Variety of Fruits and Vegetables Daily: Understanding the Complexities  
<http://jn.nutrition.org/cgi/content/abstract/131/2/487S> 
- Dietary Guidelines for Americans 2005  
<http://www.healthierus.gov/dietaryguidelines/>
- Food, Nutrition, Physical Activity, and the Prevention of Cancer: A Global Perspective, (WCRF/AICR)  
<http://www.dietandcancerreport.org/> 
- Healthy People 2010, Volume 2, Chapter 19—Nutrition and Overweight  
<http://www.healthypeople.gov/Document/html/volume2/19Nutrition.htm>
- MyPyramid  
<http://mypyramid.gov/>
- State Cancer Profiles, Latest Rates, Percents, and Counts  
<http://statecancerprofiles.cancer.gov/micromaps/>

◀ [Back: Medicaid Coverage of Tobacco Dependence Treatments](#)

[Next: Red Meat Consumption](#) ▶

**Red meat consumption has been relatively stable between 1996 and 2004.**

### Red Meat and Cancer

Red meat and processed meat are associated with an increased risk of colorectal cancer, and there is also suggested evidence for some other cancers, such as prostate cancer. Red meat refers to beef, pork, and lamb, although some studies have included all processed meats (such as bacon, sausage, hot dogs, and cold cuts) in their definition, regardless of animal origin. Some research has suggested that processed, but not fresh, meat may increase risk. More research is needed to understand how these meats influence cancer risk. The increased risk may be due to the iron and fat in red meat, and/or the salt and nitrates/nitrites in processed meat. Additionally, when meat is cooked at high temperatures, substances are formed that may be mutagenic or carcinogenic.

### Measure

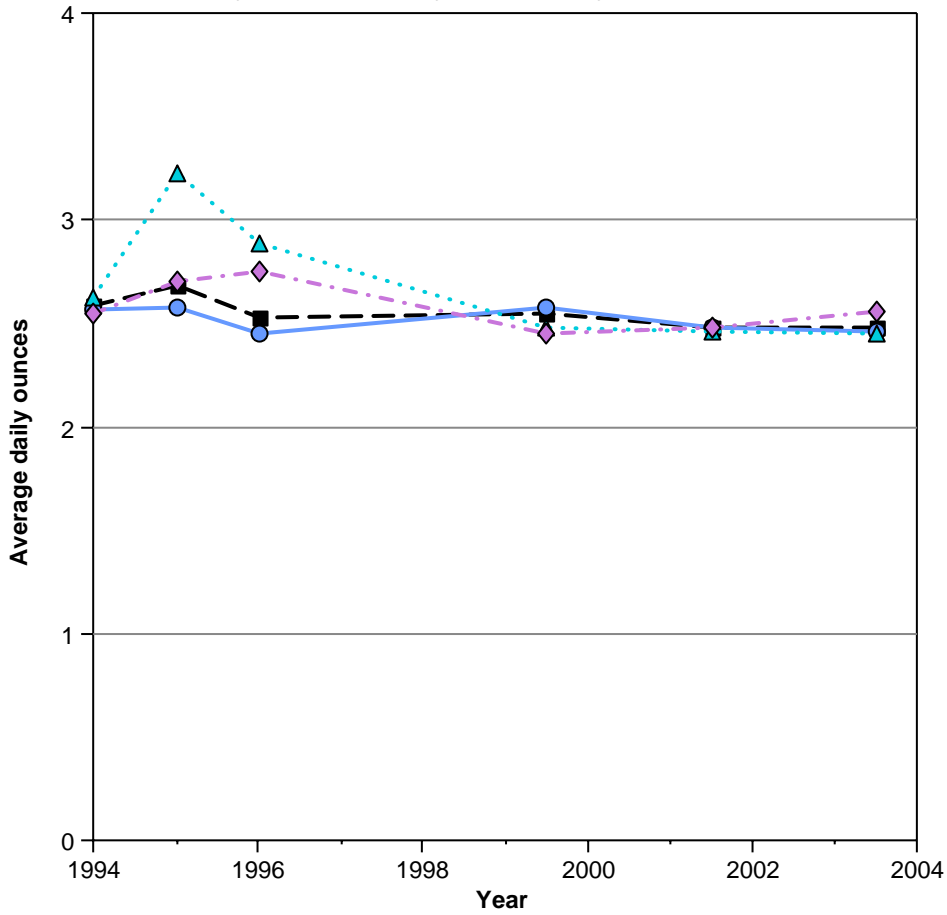
Average daily ounces of red meat for people aged 2 years and older. Red meat includes beef, lamb, and pork from all sources and does not include processed poultry.

**Period** – 1994–2004

We used the My Pyramid Equivalents Database to estimate food group intake (available at <http://www.ars.usda.gov/Services/docs.htm?docid=8498>). Please note that these data are currently available only through 2003-04 NHANES. We will update as new data become available.

**Trends** – Stable.

**Figure PRM1: Average daily ounces of red meat consumed by individuals aged 2 years and older by race/ethnicity: 1994-2004**



All Races
  Non-Hispanic White
  Non-Hispanic Black
  Hispanic

Source (1994-1996): U.S. Department of Agriculture. Continuing Survey of Food Intakes by Individuals.  
 Source (1999+ Data): National Center for Health Statistics. National Health and Nutrition Examination Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 2-5, 6-11, 12-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Most Recent Estimates**

In 2003 to 2004, people aged 2 years and older had, on average, 2.5 ounces of red meat per day.

**Healthy People 2010 Target**

There is no Healthy People 2010 target for red meat consumption.

**Key Issues**

The World Cancer Research Fund/American Institute for Cancer Research Expert Report “Food, Nutrition, Physical Activity, and the Prevention of Cancer: A Global Perspective” recommends limiting consumption of red meat and avoiding processed meat. The recommendation is to limit intake to no more than 18 ounces a week, very little if any of which is to be processed. The Dietary Guidelines for Americans also recommend that choices be lean, portions be small, and meat be prepared by baking, broiling, or poaching, rather than by frying or charbroiling.

One area of active research is examining how risk differs for processed meats, such as salami, compared to fresh or frozen unprocessed meats, such as roasts.

### **Additional Information on Red Meat Consumption**

- Usual Dietary Intakes: Food Intakes, U.S. Population, 2001–04 (NCI)  
<http://riskfactor.cancer.gov/diet/usualintakes/pop/>
- Eating Lots of Red Meat Linked to Colon Cancer (ACS)  
[http://www.cancer.org/docroot/NWS/content/NWS\\_1\\_1x\\_Eating\\_Lots\\_of\\_Red\\_Meat\\_Linked\\_to\\_Colon\\_Cancer.asp](http://www.cancer.org/docroot/NWS/content/NWS_1_1x_Eating_Lots_of_Red_Meat_Linked_to_Colon_Cancer.asp)
- American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention: Reducing the Risk of Cancer with Healthy Food Choices and Physical Activity  
<http://caonline.amcancersoc.org/cgi/reprint/56/5/254>
- Dietary Guidelines for Americans 2005  
<http://www.healthierus.gov/dietaryguidelines/>
- Food, Nutrition, Physical Activity, and the Prevention of Cancer: A Global Perspective (WCR/AICR)  
<http://www.dietandcancerreport.org/>
- Meat Consumption among Black and White Men and Risk of Prostate Cancer  
<http://cebp.aacrjournals.org/cgi/content/abstract/15/2/211>
- World Health Organization Report (2003)—Diet, Nutrition and the Prevention of Chronic Diseases  
[http://www.who.int/hpr/NPH/docs/who\\_fao\\_expert\\_report.pdf](http://www.who.int/hpr/NPH/docs/who_fao_expert_report.pdf)

◀ [Back: Fruit and Vegetable Consumption](#)

[Next: Fat Consumption](#) ▶

**The percentage of total calories from fat remained relatively stable between 1989 and 2004.**

### Fat Consumption and Cancer

Some studies suggest that high-fat diets or high intakes of different types of fat in the diet may be linked to several cancers, including colon, lung, and postmenopausal breast cancer, as well as heart disease and other chronic diseases.

More research is needed to better understand which types of fat should be avoided and how much of each type alters cancer risk. Although monounsaturated and polyunsaturated fatty acids have been studied for a number of years, their effects are still unclear. More recent research on the effects of trans fatty acids also has yet to reach definitive conclusions.

The 2005 Dietary Guidelines for Americans recommend getting less than 10 percent of calories from saturated fatty acids and keeping trans fatty acid consumption as low as possible for general health and the prevention of chronic disease, including cancer and heart disease. The Guidelines also recommend keeping total fat intake between 20 and 35 percent of calories, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils.

### Measure

Intakes of total fat, and of the major fatty acids—saturated, monounsaturated, and polyunsaturated—as a percentage of total calories.

### Period – 1989–2004

We used the My Pyramid Equivalents Database to estimate food group intake (available at <http://www.ars.usda.gov/Services/docs.htm?docid=8498>). Please note that this data are currently available only through 2003-04 NHANES. We will update as new data becomes available.

**Trends** – Relatively stable overall.

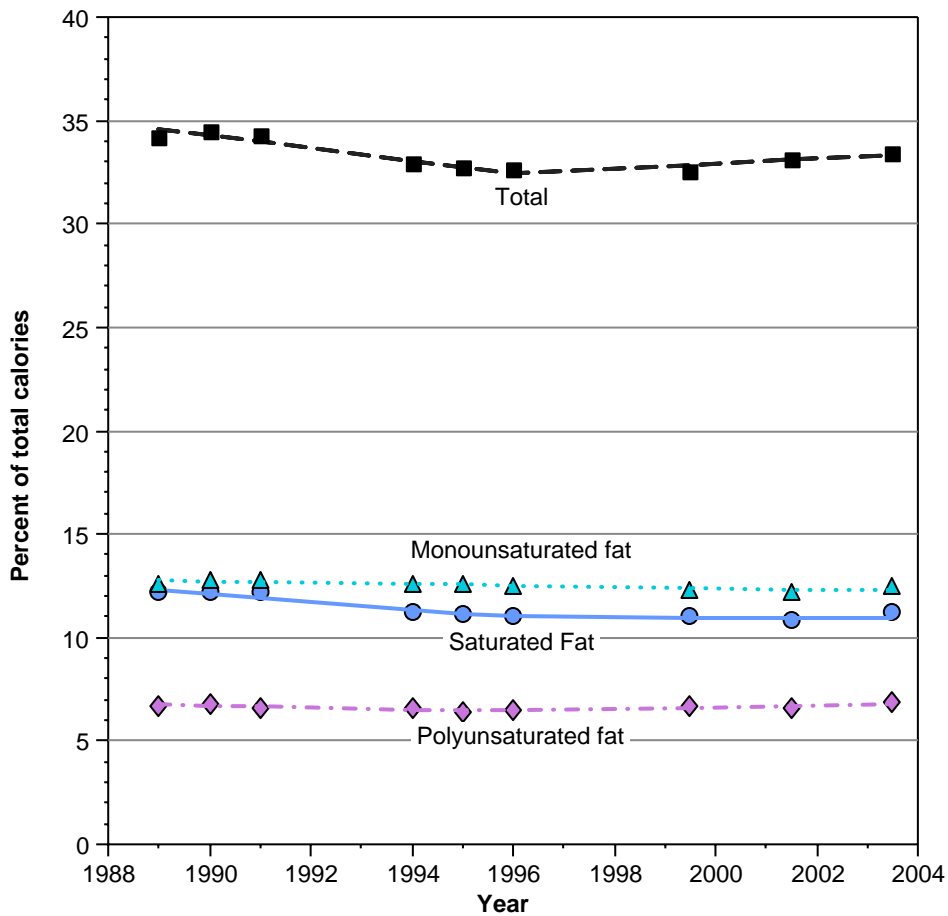
**Total fat:** Falling slightly, then stable

**Saturated fat:** Falling slightly, then stable

**Monounsaturated fat:** Falling slightly

**Polyunsaturated fat:** Stable

**Figure PFC1: Fat intake as a percentage of total calories: 1989-2004**



Source (1989-1996): U.S. Department of Agriculture. Continuing Survey of Food Intakes by Individuals.

Source (1999+ Data): National Center for Health Statistics. National Health and Nutrition Examination Survey.

Data are age-adjusted to the 2000 standard using age groups: 2-5, 6-11, 12-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Most Recent Estimates

Data collected in 2003 to 2004 show that total fat made up one-third (33 percent) of the calories people consumed, a level within the recommendations of the Dietary Guidelines. In the same period, saturated fatty acids accounted for 11 percent of calories; monounsaturated, 13 percent; and polyunsaturated, 7 percent.

### Healthy People 2010 Target

No more than 30 percent of daily calories from fat.

(The Healthy People 2010 target calls for 75 percent of the population to reach this level. However, this recommended level pre-dates the 2005 Dietary Guidelines for Americans.)

### Groups at High Risk for Eating Too Much Fat



Non-Hispanic Whites, non-Hispanic Blacks, and Mexican Americans all have average total fat intakes between 20 and 35 percent of calories, though their saturated fat intakes are slightly above current dietary recommendations.

## Key Issues

Researchers are studying how fat and fatty acids alter cancer risk. Precise and reliable measures of the amount and type of fat are needed—such as improved self-reported measures and biological indicators of fat intake that might be determined from a blood test.

Trans fatty acids account for only about 2 to 3 percent of energy intake, but most of these come from sources that are not clearly labeled. Major food sources of trans fatty acids are cakes, cookies, crackers, animal products, margarine, fried potatoes, chips, and shortenings. Some manufacturers have recently discontinued the use of trans fatty acids.

## Additional Information on Fat Consumption

- Usual Dietary Intakes: Food Intakes, US Population, 2001–04 (NCI)  
<http://riskfactor.cancer.gov/diet/usualintakes/pop/>
- Choose a Diet That Is Low in Saturated Fat and Cholesterol and Moderate in Total Fat: Subtle Changes to a Familiar Message  
<http://jn.nutrition.org/cgi/content/full/131/2/510S> 
- Dietary Guidelines for Americans 2005  
<http://www.healthierus.gov/dietaryguidelines/>
- Healthy People 2010, Volume 2, Chapter 19—Nutrition and Overweight  
<http://www.healthypeople.gov/Document/html/volume2/19Nutrition.htm>
- Food, Nutrition, Physical Activity, and the Prevention of Cancer: A Global Perspective (WCRF/AICR)  
<http://www.dietandcancerreport.org/> 

[!\[\]\(fa6f3af6bfa46c5d4a2d362681095beb\_img.jpg\) Back: Red Meat Consumption](#)

[Next: Alcohol Consumption !\[\]\(17acf1afa8cdf0b67c53d4865a5ed469\_img.jpg\)](#)



**Per capita alcohol consumption was relatively stable between 1995 and 2006.**

### **Alcohol and Cancer**

Drinking alcohol increases the risk of cancers of the mouth, esophagus, pharynx, larynx, and liver in men and women, and of breast cancer in women. In general, these risks increase after about one daily drink for women and two daily drinks for men. (A drink is defined as 12 ounces of regular beer, 5 ounces of wine, or 1.5 ounces of 80-proof liquor.)

The chances of getting liver cancer increase markedly with five or more drinks per day. Heavy alcohol use may also increase the risk of colorectal cancer and leads to greater increases in risk for most of the alcohol-related cancers. The earlier long-term, heavy alcohol use begins, the greater the cancer risk. Also, using alcohol with tobacco is riskier than using either one alone because it further increases the chances of getting cancers of the mouth, throat, and esophagus.

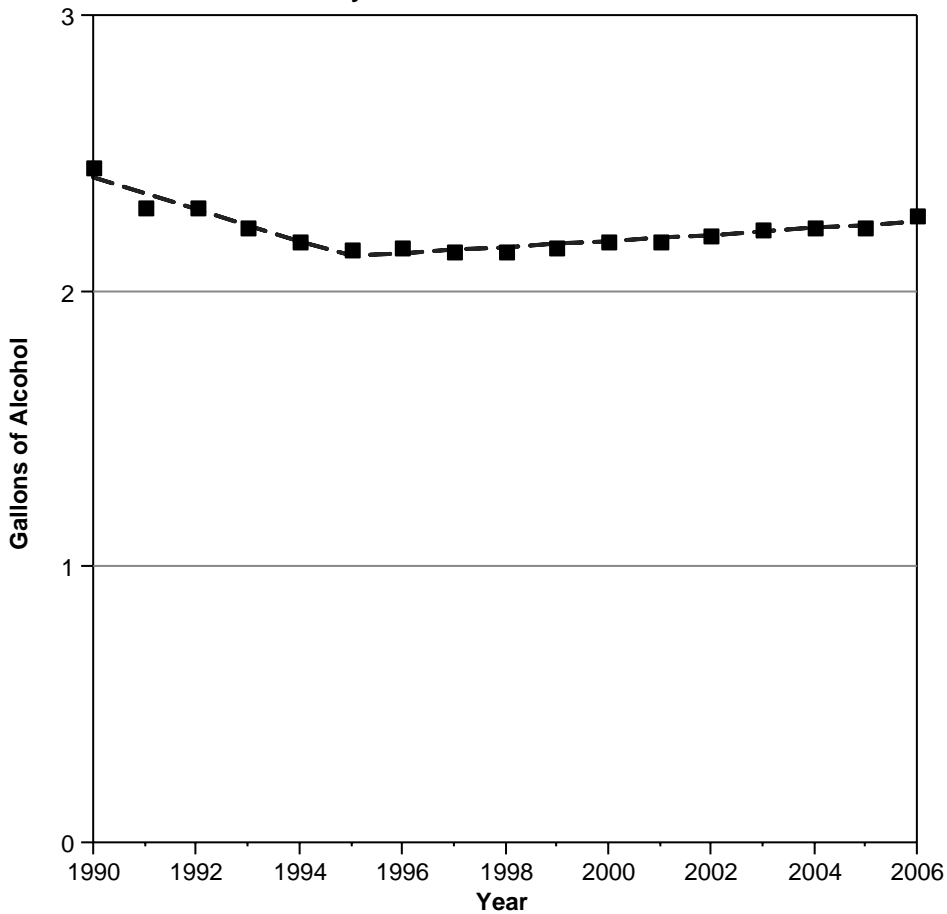
### **Measure**

Per capita alcohol consumption: The estimated number of gallons of pure alcohol drunk per person (aged 14 years and older), per year. This measure accounts for the varying alcohol content of wine, beer, and liquor. People as young as 14 are included because a large number of adolescents begin drinking at an early age.

**Period** – 1990–2006

**Trends** – Falling from 1990 to 1995, then rising from 1995 to 2006.

**Figure PAC1: Annual per capita alcohol consumption in gallons by individuals aged 14 years and older: 1990-2006**



Source 1: Alcohol Epidemiologic Data System. Lakins, N.E.; Williams, G.D.; and Yi, H. Surveillance Report #78: Apparent Per Capita Alcohol Consumption: National, State, and Regional Trends, 1970-2004. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism, Division of Epidemiology and Prevention Research (August 2006).

Source 2: Alcohol Epidemiologic Data System. Nephew, T.M., Yi, H., Williams, G.D., Stinson, F.S., and Dufour, M.C. U.S. Alcohol Epidemiologic Data Reference Manual, Vol. 1, 4th ed. U.S. Apparent Consumption of Alcoholic Beverages Based on State Sales, Taxation, or Receipt Data. Washington, DC: NIAAA. NIH Publication No. 04-5563 (June 2004).

Data are not age-adjusted.

### **Most Recent Estimate**

In 2006, per capita alcohol consumption was 2.3 gallons for all beverages, including beer, wine, and liquor.

### **Healthy People 2010 Target**

Reduce annual per capita alcohol consumption to 2 gallons.

### **Groups at High Risk for Using Alcohol**

The 2005 Dietary Guidelines for Americans state that alcoholic beverages should not be consumed by some individuals, including those who cannot restrict their alcohol intake, women of childbearing age who may become pregnant, pregnant and lactating women, children and adolescents, individuals taking medications that can interact with alcohol, and those with certain medical conditions.

Many people start drinking as early as middle school (aged 13–14 years). Among those aged 12–17 years, Whites and Hispanics are more likely than Blacks to use alcohol. Among alcohol drinkers, those aged 18–25 years consume greater quantities than any other group.

## Key Issues

Some studies suggest that alcohol consumption is associated with a lower risk of some non-cancer health conditions. However, it is not recommended that anyone begin drinking or drink more frequently on the basis of health considerations.

## Additional Information on Alcohol Consumption

- Usual Dietary Intakes: Food Intakes, US Population, 2001–04 (NCI)  
<http://riskfactor.cancer.gov/diet/usualintakes/pop/>
- Alcohol Alert (NIAAA)  
<http://pubs.niaaa.nih.gov/publications/aa39.htm>
- Alcohol and Youth (NIAAA)  
<http://pubs.niaaa.nih.gov/publications/arh22-2/toc22-2.htm>
- Alcohol Increases Hormone Levels, Raising Breast Cancer Risk (ACS)  
[http://www.cancer.org/docroot/nws/content/update/nws\\_1\\_1xu\\_alcohol\\_increases\\_hormone\\_levels\\_raising\\_breast\\_cancer\\_risk.asp](http://www.cancer.org/docroot/nws/content/update/nws_1_1xu_alcohol_increases_hormone_levels_raising_breast_cancer_risk.asp)
- Apparent per capita ethanol consumption for the United States, 1850–2007 (NIAAA)  
<http://www.niaaa.nih.gov/Resources/DatabaseResources/QuickFacts/AlcoholSales/consum01.htm>
- Food, Nutrition, Physical Activity, and the Prevention of Cancer: A Global Perspective (AICR)  
<http://www.dietandcancerreport.org>
- Healthy People 2010, Volume 2, Chapter 26—Substance Abuse  
<http://www.healthypeople.gov/Document/html/volume2/26Substance.htm>
- What is Moderate Drinking? Defining "Drinks" and Drinking Levels (NIAA)  
<http://pubs.niaaa.nih.gov/publications/arh23-1/05-14.pdf>
- United States Preventive Services Task Force, Screening and Behavioral Counseling Interventions in Primary Care to Reduce Alcohol Misuse  
<http://www.ahrq.gov/clinic/uspstf/uspstfdrin.htm> April 2004.

◀ [Back: Fat Consumption](#)

[Next: Physical Activity](#) ▶

**Fewer than two-thirds of adults get any physical activity in their leisure time.**

### Physical Activity and Cancer

Physical activity at work or during leisure-time is linked to a 30 percent lower risk of getting colon cancer. Both vigorous and moderate levels of physical activity appear to reduce this risk. Physical activity is also connected to a lower risk of breast cancer and possibly lung and endometrial cancers. Studies continue to examine whether physical activity has a role in reducing the chances of getting other cancers.

Physical activity improves quality of life among cancer patients and survivors. Studies are beginning to explore the potential for physical activity to improve cancer survival. Studies have not yet determined if any specific types of physical activity, such as aerobic, strength, or flexibility training, have different effects on cancer outcomes.

Several national groups have recommended that people engage in regular physical activity. In late 2008, the U.S. Department of Health and Human Services issued Physical Activity Guidelines for Americans that recommend at least 1 hour of physical activity every day for children and adolescents and 2.5 hours of moderate intensity aerobic activity or one hour and 15 minutes of vigorous activity for adults each week. This was a slight departure from former physical activity recommendations, which focused on a daily routine rather than a cumulative weekly total for adults. Previous recommendations suggested engaging in at least 30 minutes per day of moderate physical activity for most (5 or more) days of the week.

### Measure

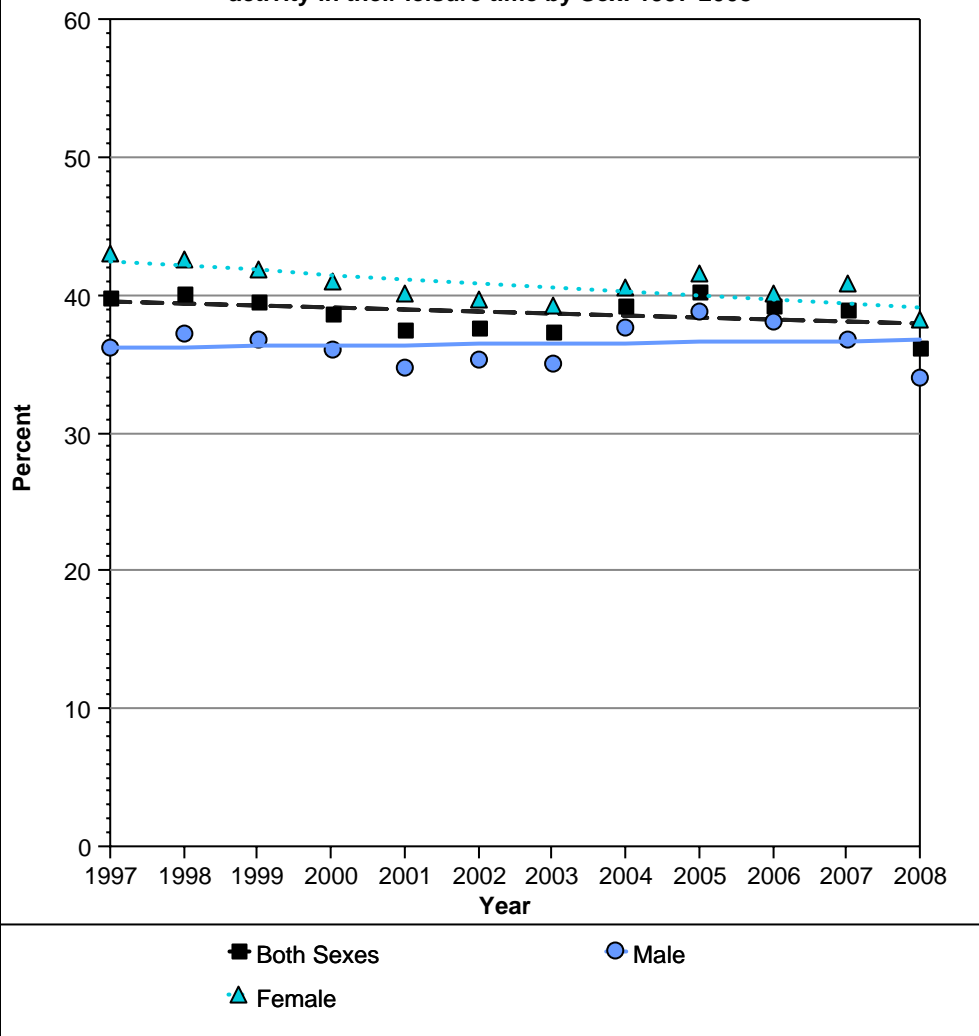
Percentage of adults aged 18 and older who reported no leisure time physical activity during the past month.

**Period** – 1997–2008

**Trends** – Stable from 1997–2008 for both sexes combined and for males; falling for females.

Despite minor changes, the percentage of the population reporting no physical activity was approximately the same in 2008 as it was in 1997.

**Figure PPA1: Percentage of adults aged 18 years and older reporting no physical activity in their leisure time by Sex: 1997-2008**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Most Recent Estimates**

The 2008 National Health Interview Survey (NHIS), an in-person household survey, indicates that 36 percent of adults aged 18 and older reported no physical activity in their leisure time.

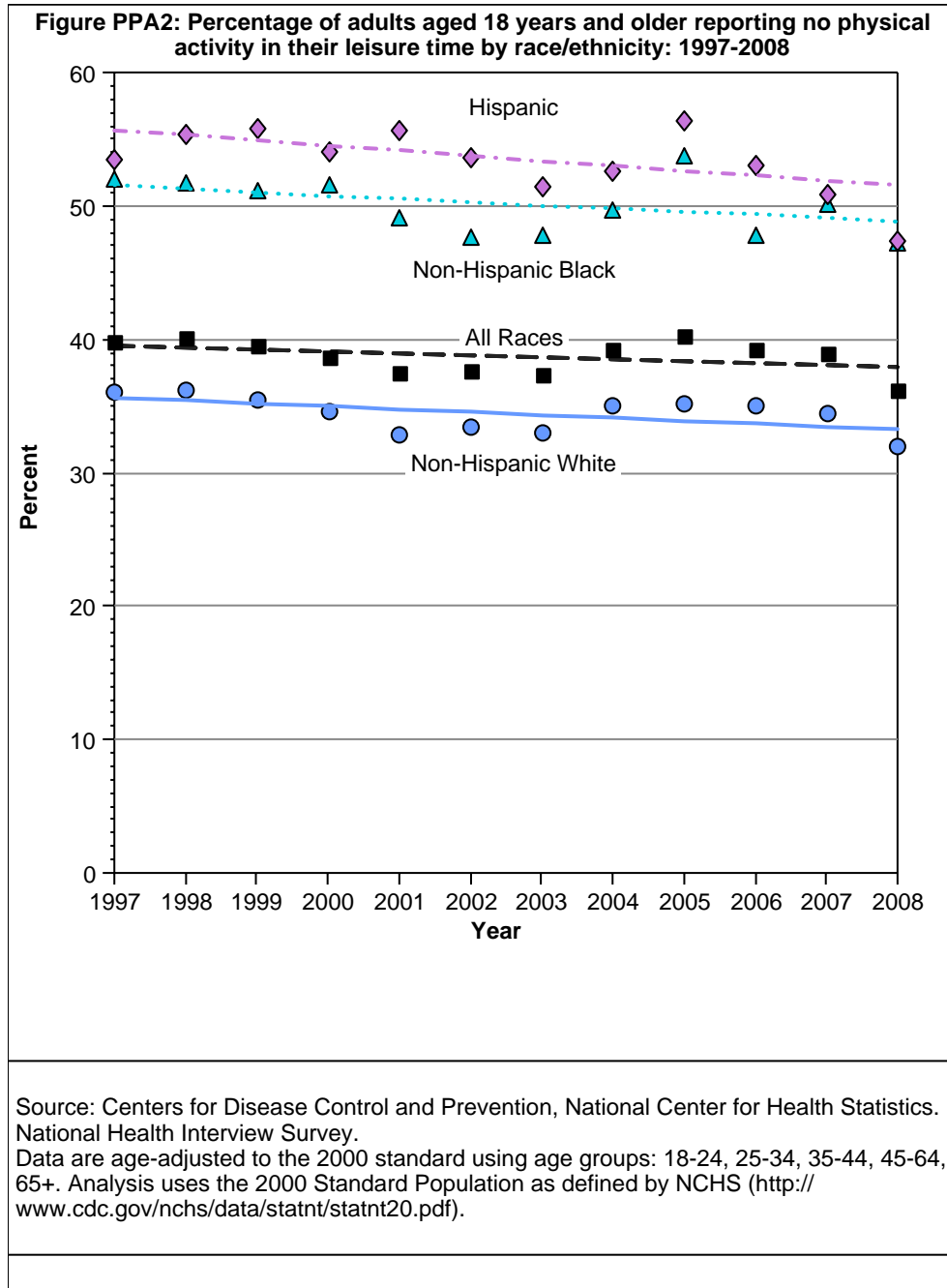
**Healthy People 2010 Target**

Reduce to 20 percent the percent of adults who engage in no leisure-time physical activity.

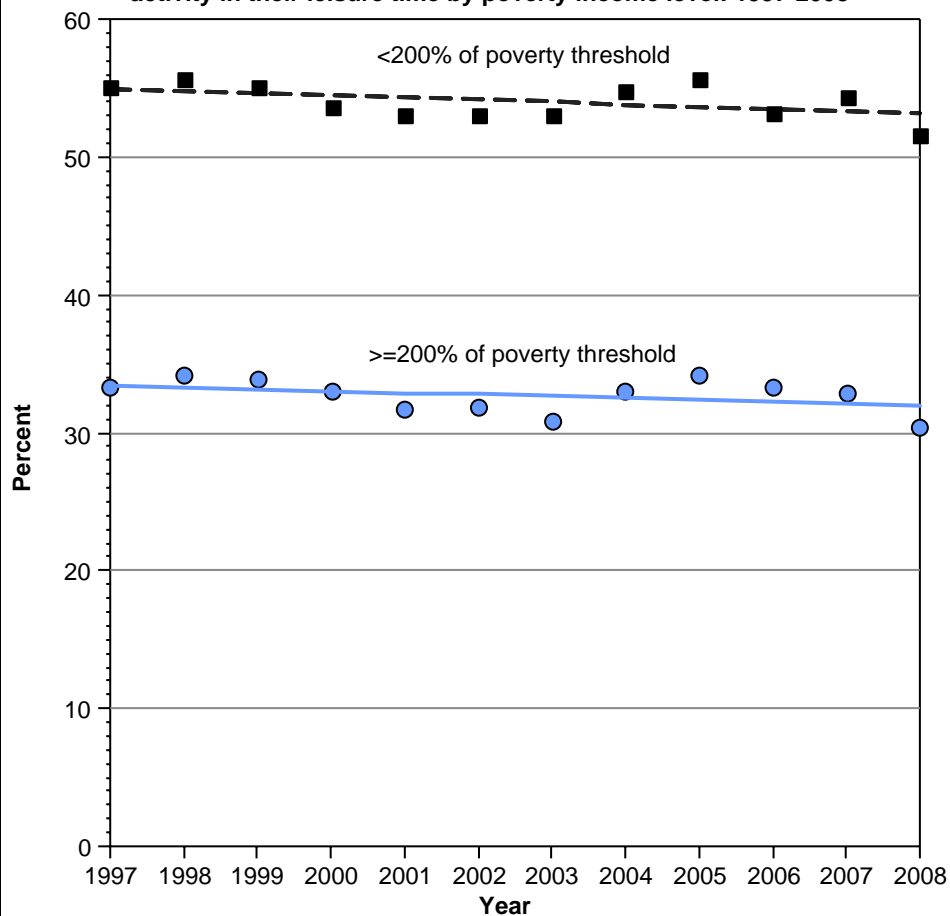
**Groups at High Risk for Being Inactive in Their Leisure Time**

Women are more likely than men, and blacks and Hispanics are more likely than whites, to report no leisure-time physical activity. Lack of physical activity is also more common among those with lower incomes.

For youth, physical activity is lower among females, especially black females. Physical activity also decreases as children get older.



**Figure PPA3: Percentage of adults aged 18 years and older reporting no physical activity in their leisure time by poverty income level: 1997-2008**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>). Poverty Income Footnote.

## Key Issues

Since the mid 1980s, fewer high school students have taken part in physical education classes.

Removing barriers (such as lack of physical education classes) and setting up supports (such as bicycle and walking paths) can help promote physically active lifestyles.

Physical activity appears to be effective in reducing the amount of weight gained during and after treatment of breast cancer.

## Additional Information on Physical Activity

- CDC, Behavioral Risk Factor Surveillance System (BRFSS) <http://www.cdc.gov/brfss>
- Healthy People 2010, Volume 2, Chapter 22 — Physical Activity and Fitness <http://www.health.gov/healthypeople/Document/HTML/Volume2/22Physical.htm>

- Morbidity and Mortality Weekly Report (MMWR)  
<http://www.cdc.gov/mmwr/>
- National Health Interview Survey (NHIS) (NCHS)  
<http://www.cdc.gov/nchs/nhis.htm>
- Physical Activity Guidelines for Americans (U.S. Department of Health and Human Services)  
<http://www.health.gov/PAGuidelines/>
- Physical Activity Trends – United States, 1998–2007 (2009 Health United States, Table 71)  
<http://www.cdc.gov/nchs/data/hus/hus09.pdf#071>
- State Cancer Profiles, Latest Rates, Percents, and Counts  
<http://statecancerprofiles.cancer.gov/micromaps/>

◀ [Back: Alcohol Consumption](#)

[Next: Weight](#) ▶



**More adults are becoming obese.**

## **Overweight, Obesity, and Cancer**

Compelling evidence exists that prevention of obesity reduces the risk for several types of cancer, such as colon, postmenopausal breast, uterine, esophageal, and renal cell cancers. It is estimated that 20 to 30 percent of these cancers—some of the most common cancers in the United States—may be related to being overweight and/or lack of physical activity.

Recent studies indicate that obesity and being overweight may increase the risk of death from many cancers, accounting for up to 14 percent of cancer deaths in men and 20 percent of cancer deaths in women.

### **Measure**

Percentage of adults (aged 20 and older) who are at a healthy weight, overweight, or obese.

These weight groups are defined by a measurement called body mass index (BMI). BMI is found by dividing weight (in kilograms) by height (in meters) squared. Category definitions used here are:

- Healthy weight: BMI between 18.5 and 24.9
- Overweight: BMI between 25.0 and 29.9
- Obese: BMI equal to or greater than 30.0

**Period** – 1971–2008

**Note:** Data from 1971–1974 and 1976–1980 are for ages 20–74, but the age difference does not appear to affect the prevalence, as seen from later survey years where data are plotted for both age groupings (20–74 and 20+).

### **Trends**

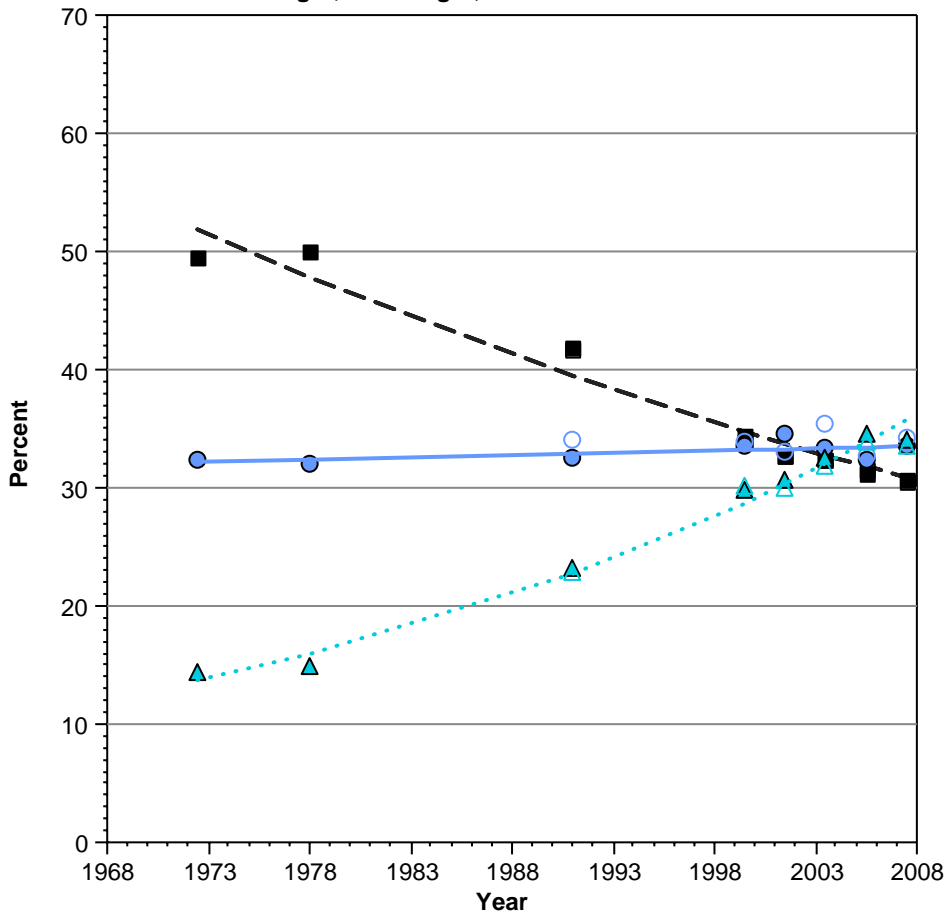
**Healthy weight:** Falling

**Overweight:** Stable

**Obese:** Rising

Note: These trends do not indicate that individuals are moving from healthy weight to obese. Rather, the observed trends are due to a similar number of persons moving from healthy weight to overweight and from overweight to obese. Ogden et al. (2007) have suggested a leveling off of the increase in obesity, particularly for females, but this is not indicated by the overall trend analysis conducted here.

**Figure PWT1: Percent of adults aged 20 years and older who were at a healthy weight, overweight, or obese: 1971-2008**



■ Healthy Weight (Ages 20-74)      □ Healthy Weight (All Ages)  
 ● Overweight (Ages 20-74)        ○ Overweight (All Ages)  
 ▲ Obese (Ages 20-74)              △ Obese (All Ages)

Source: National Center for Health Statistics. National Health and Nutrition Examination Survey. Data are age-adjusted to the 2000 standard using age groups: for 20+ data 20-39, 40-59, 60+; for 20-74 data: 20-39, 40-59, 60-74. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Most Recent Estimates

Among adults aged 20 and older in 2007–2008:

- 31 percent were at a healthy weight
- 34 percent were overweight
- 34 percent were obese

Values do not add to 100 percent because underweight (BMI less than 18.5) is not included.

When data after 1999 are examined by gender, it appears that the increases in obesity among women have leveled off, while the prevalence for men is still rising.

### Healthy People 2010 Target

Increase to 60 percent the proportion of adults who are at a healthy weight.

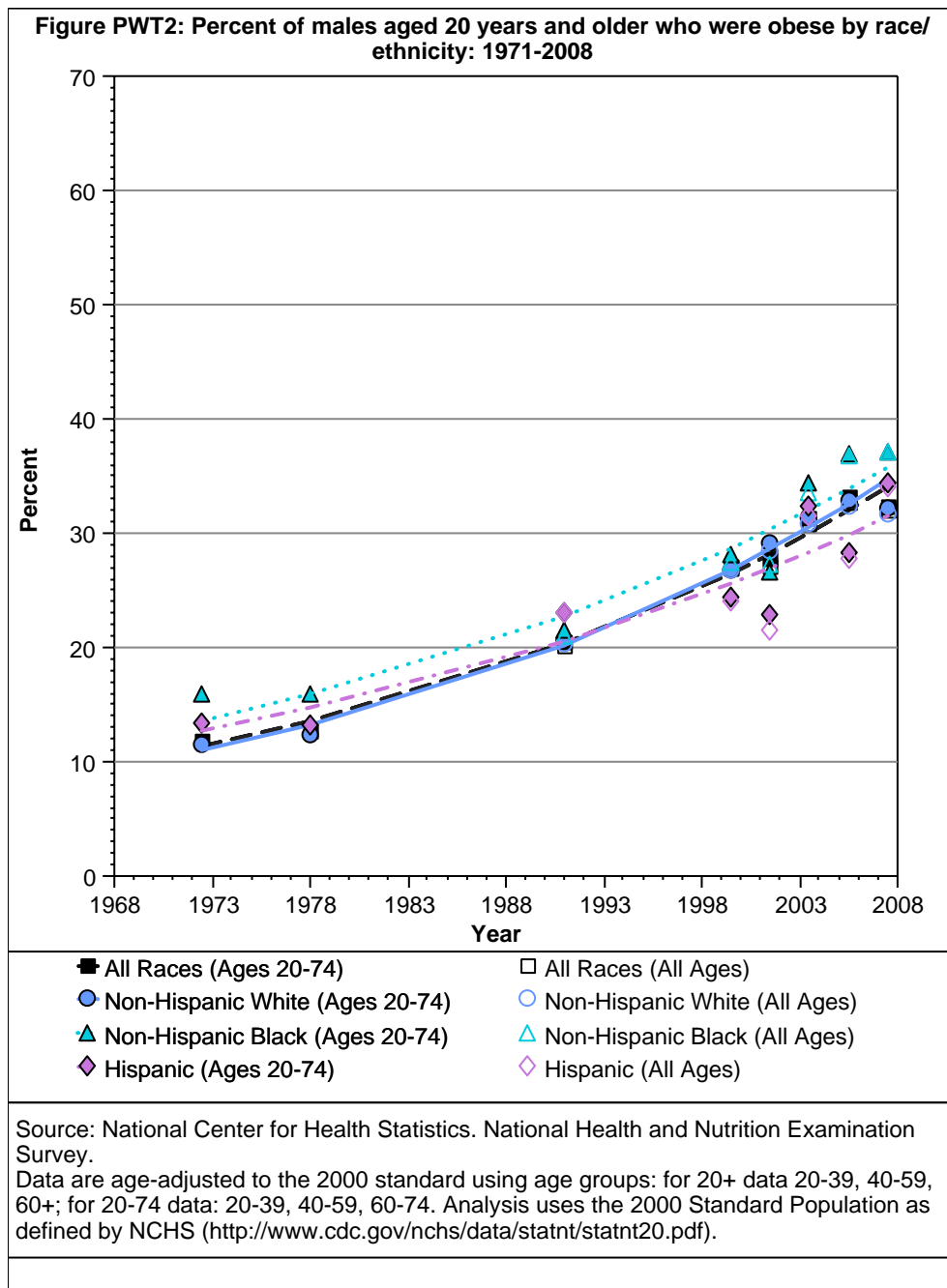
There is no Healthy People 2010 target for overweight.

Decrease to 15 percent the proportion of obese adults.

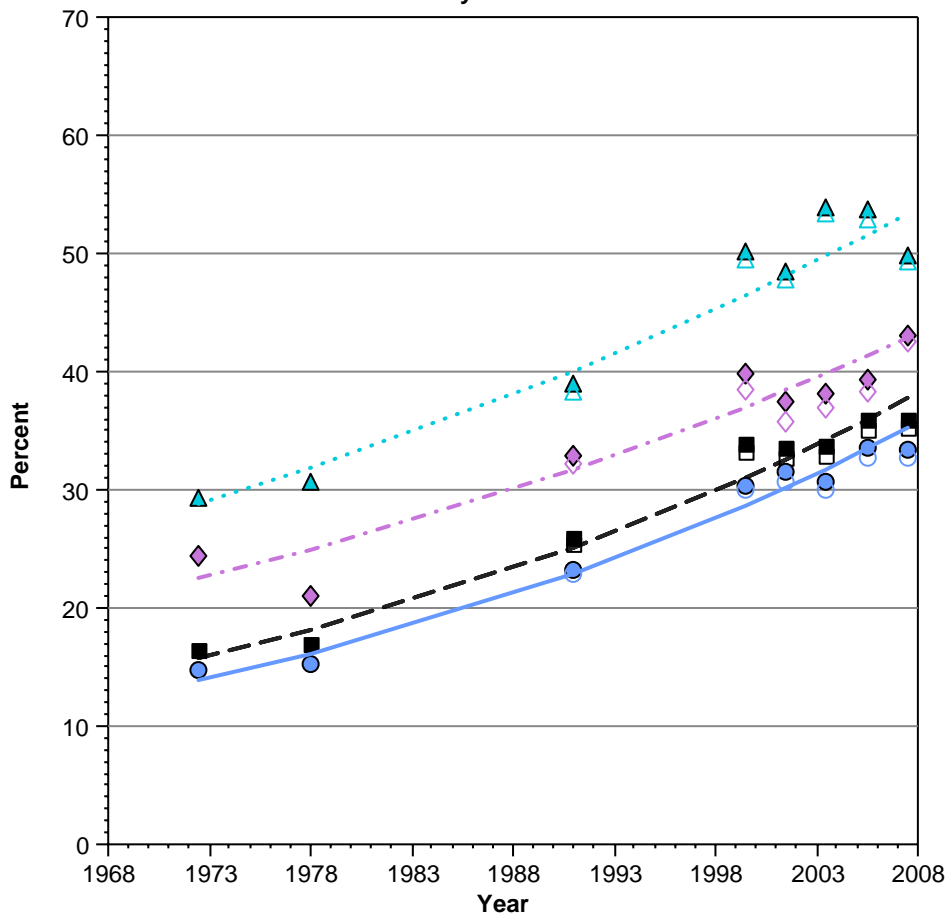
### Groups at High Risk for Being Overweight or Obese

Overweight and obesity are most common among Black and Mexican American women. The same patterns are seen for children and teens in these groups.

Overweight children are more likely to become overweight adults and to suffer from associated illnesses, as well as premature death. As with adults, the trend toward excess weight among children has greatly increased in recent years.



**Figure PWT3: Percent of females aged 20 years and older who were obese by race/ethnicity: 1971-2008**



■ All Races (Ages 20-74)      □ All Races (All Ages)  
 ● Non-Hispanic White (Ages 20-74)      ○ Non-Hispanic White (All Ages)  
 ▲ Non-Hispanic Black (Ages 20-74)      △ Non-Hispanic Black (All Ages)  
 ◆ Hispanic (Ages 20-74)      ◇ Hispanic (All Ages)

Source: National Center for Health Statistics. National Health and Nutrition Examination Survey.  
 Data are age-adjusted to the 2000 standard using age groups: for 20+ data 20-39, 40-59, 60+; for 20-74 data: 20-39, 40-59, 60-74. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Key Issues**

Daily physical activity, balanced with appropriate calorie intake, is one of the most effective ways to avoid weight gain. Lack of activity is believed to contribute to the increase in overweight among U.S. youth and adults.

Increased TV watching and similar sedentary activity is linked with excess weight.

See Physical Activity for trends in physical activity.

**Additional Information on Weight**

- Agency for Healthcare Research and Quality, Staying Healthy <http://www.ahrq.gov/consumer/healthy.html>
- Body Mass Index Table (National Heart, Lung, and Blood Institute) [http://www.nhlbi.nih.gov/guidelines/obesity/bmi\\_tbl.htm](http://www.nhlbi.nih.gov/guidelines/obesity/bmi_tbl.htm)

- Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ. [Overweight, obesity, and mortality from cancer in a prospectively studied cohort of U.S. adults.](#) N Engl J Med. 2003 Apr 24;348(17):1625-38.
- Healthy People 2010, Volume 2, Chapter 19 – Nutrition and Overweight <http://www.health.gov/healthypeople/Document/html/volume2/19Nutrition.htm>
- National Health and Nutrition Examination Survey (NHANES) (NCHS) <http://www.cdc.gov/nchs/nhanes.htm>
- Ogden CL, Carroll MD, McDowell MA, Flegal KM. Obesity among adults in the United States—no change since 2003–2004. NCHS data brief no 1. Hyattsville, MD: National Center for Health Statistics. 2007.
- 2008 Physical Activity Guidelines for Americans (U.S. Department of Health and Human Services) <http://www.health.gov/PAGuidelines/>
- Relationship of Physical Activity and Television Watching With Body Weight and Level of Fatness Among Children: Results From the Third National Health and Nutrition Examination Survey <http://jama.ama-assn.org/cgi/content/abstract/279/12/938> 
- Robinson, TN. Television viewing and childhood obesity. Pediatric Clinics of North America 48 (4), 1017-1025, 2001.
- State Cancer Profiles, Latest Rates, Percents, and Counts <http://statecancerprofiles.cancer.gov/micromaps/>
- United States Preventive Services Task Force, Screening for Obesity in Adults, December 2003. <http://www.ahrq.gov/clinic/uspstf/uspsobes.htm>
- United States Preventive Services Task Force, Screening for Obesity in Children and Adolescents, January 2010. <http://www.ahrq.gov/clinic/uspstf/uspschobes.htm>

◀ [Back: Physical Activity](#)

[Next: Sun Protection](#) ▶

**Only 58 percent of adults say they protect themselves from the sun. Adults 25 years of age and older have increased their use of indoor tanning devices, while teens' indoor tanning has declined.**

### Sun Protection and Cancer

The number of new cases of melanoma skin cancer increased between 1975 and 2006, with an estimated number of 68,720 new cases in 2009. More than one million people are diagnosed with basal cell and squamous cell (non-melanoma) skin cancer in the United States every year. Basal and squamous cell cancers are the two most common types of skin cancers in the country. Although 40–50 percent of Americans who live to age 65 will have non-melanoma at least once, most of these cancers, as well as melanoma skin cancers, can be prevented. Studies suggest that reducing unprotected exposure to the sun and artificial light from tanning beds, tanning booths, and sun lamps can lower the risk of skin cancer. Avoiding sunburns, intermittent high-intensity exposure, and other damage from these sources—especially in children and teens—reduces the chances of getting melanoma skin cancer. All of these types of skin cancers are most common in light-skinned people, although they also occur in people with darker skin.

### Measure

Percentage of adults aged 18 and older who reported that they usually or always practice at least one of three sun protection behaviors (using sunscreen, wearing protective clothing, or seeking shade) when going outside on a sunny day for more than one hour.

Beginning in 2005, the question on hat use (as part of protective clothing) was supplemented and modified to more accurately distinguish baseball caps (which do not fully protect the face, neck, and ears) from other types of fully protective hats. Graphic illustrations of different hats were used, and respondents were asked a separate question about baseball cap and sun visor use.

The National Health Interview Survey Cancer Control Supplement data in 2005 for the first time tracked indoor tanning use by both adults and adolescents. The percentage of teens aged 14–17 years who have used an indoor tanning device one or more times during the past 12 months is reported here. This was reported by a knowledgeable adult household respondent. Self-reports of use of the same devices by adults aged 18 years and older are also tracked.

**Period** – 1992–2008

### Trends

From 1992 to 2008, there were some decreases and increases in the percentage of adults reporting use of one or more sun protective behaviors. Overall, by 2008, reporting of one or more sun protective behaviors in which the sun protective clothing component was more loosely defined (i.e., including partially protective baseball caps and sun visors) increased about 12 percentage points from 1992, when the percentage was 53.7. Also, the percentage of those reporting one or more sun protective behaviors in 2008 still represents a 4 percentage point increase over the 1992 value even after differentiating the use of fully sun protective hats from the use of baseball caps in 2005.

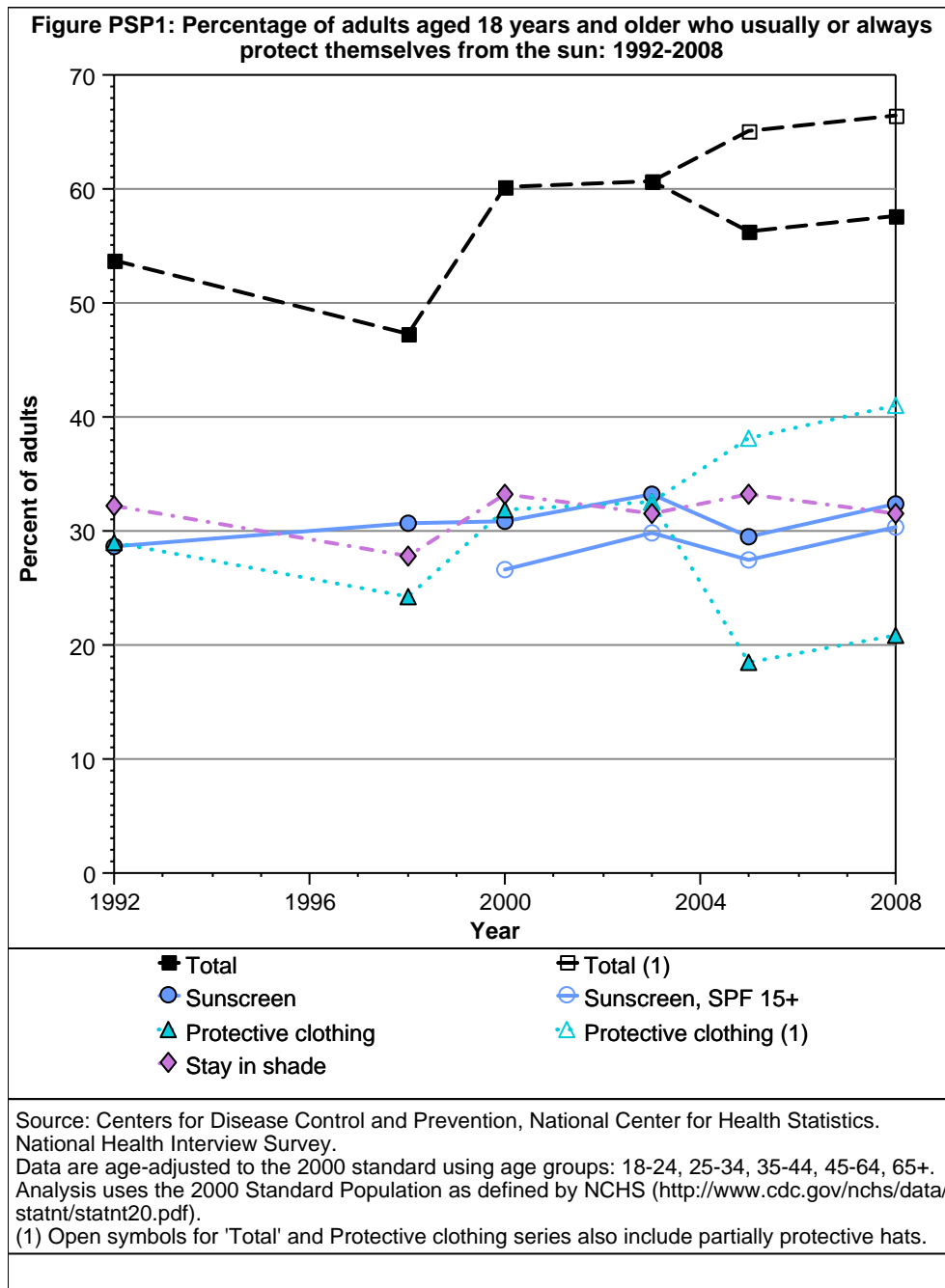
**Protective clothing:** The percentage of people who usually or always wear at least one sun protective article of clothing (fully sun protective hat or long-sleeved shirt) increased over the last period of 2005 to 2008.

Women's practices of these behaviors were stable from 2000 to 2005 and then rose during the most recent period of 2005 to 2008. Men's practices of these behaviors decreased between 2003 and 2005, likely as a result of the adjustment in not counting baseball caps as fully protective. Men continue to show a far greater use of baseball caps for protection than the more fully protective type of hat that shades the ears, face, and neck. Women wear a fully protective hat more often than men do. There are no differences in trend by race/ethnicity, age, or poverty level.

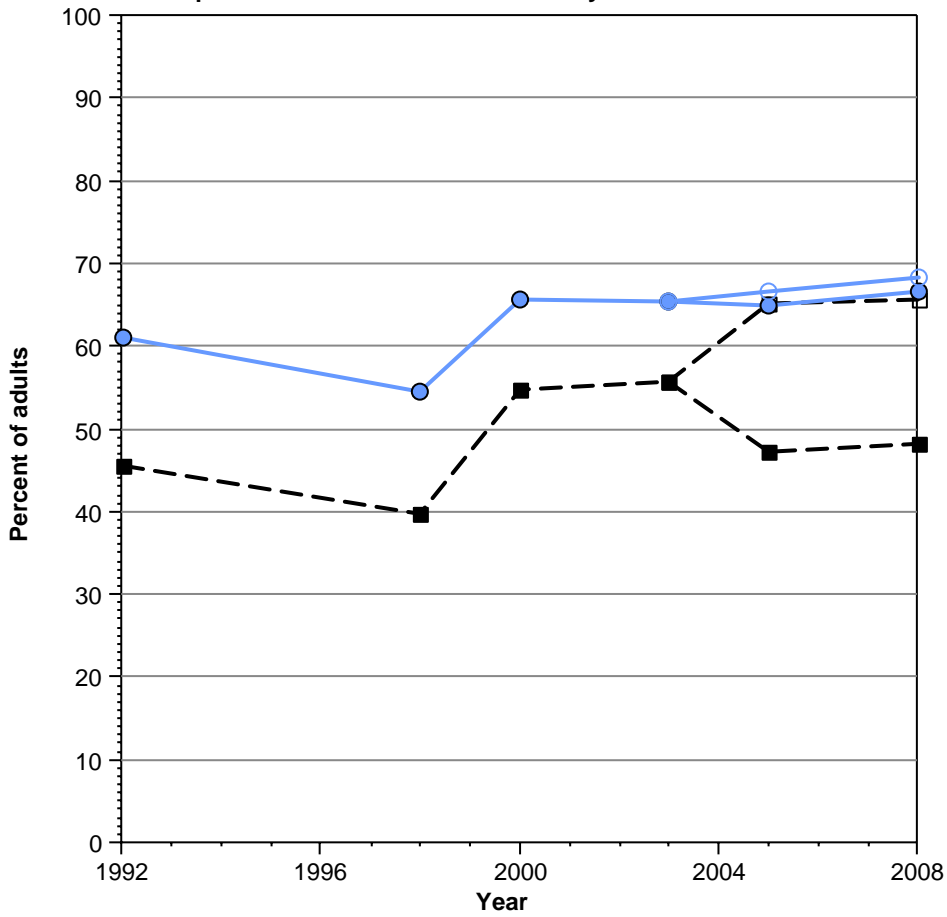
**Shade:** The percentage of people who usually seek shade has shown little change overall, beginning with 32.3 percent in 1992. Similar trend patterns are seen among men and women, among various race/ethnicity groups, among younger and older adults, and by poverty level.

**Sunscreen:** Overall, the percentage of people who usually use sunscreen rose slightly from 1992 to 2008. There was only one statistically significant period of falling, between 2003 and 2005. The level of sun protective factor (SPF), which is more in line with the intent of the Healthy People 2010 goal for sunscreen use, was tracked beginning in 2000. There was a statistically significant rise between 2000 and 2008 for both use of any sunscreen and use of sunscreen with the recommended SPF of 15 or higher. The latter trend appears steeper, suggesting greater compliance with SPF guidelines.

Trends at first appear similar for both males and females except that females had a greater increase in sun protective behaviors over the period than did males. However, further interpretation by gender and age reveals the greatest increases for 18–24-year-old females and the least change for 18–24-year-old males. Non-Hispanic Whites show the greatest increase among races/ethnicities examined.



**Figure PSP2: Percentage of adults aged 18 years and older who usually or always protect themselves from the sun by sex: 1992-2008**

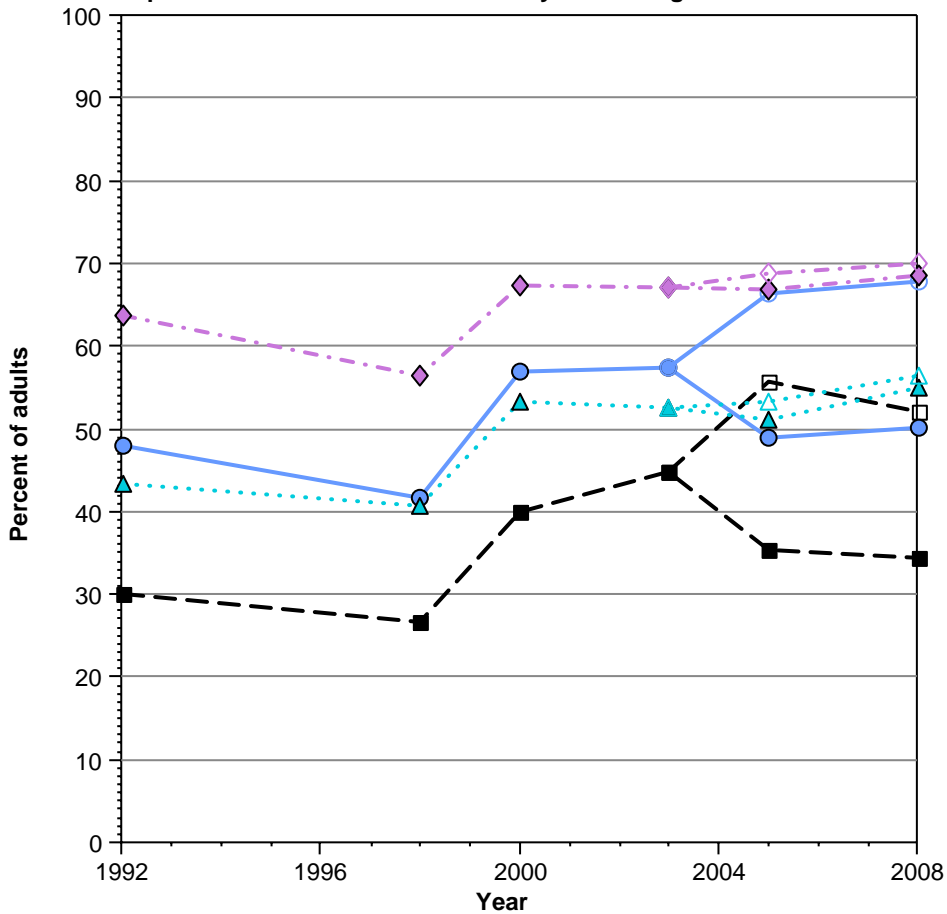


Male  
 Male (1)  
 Female  
 Female (1)

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).  
 (1) Series using open symbols also includes partially protective hats.



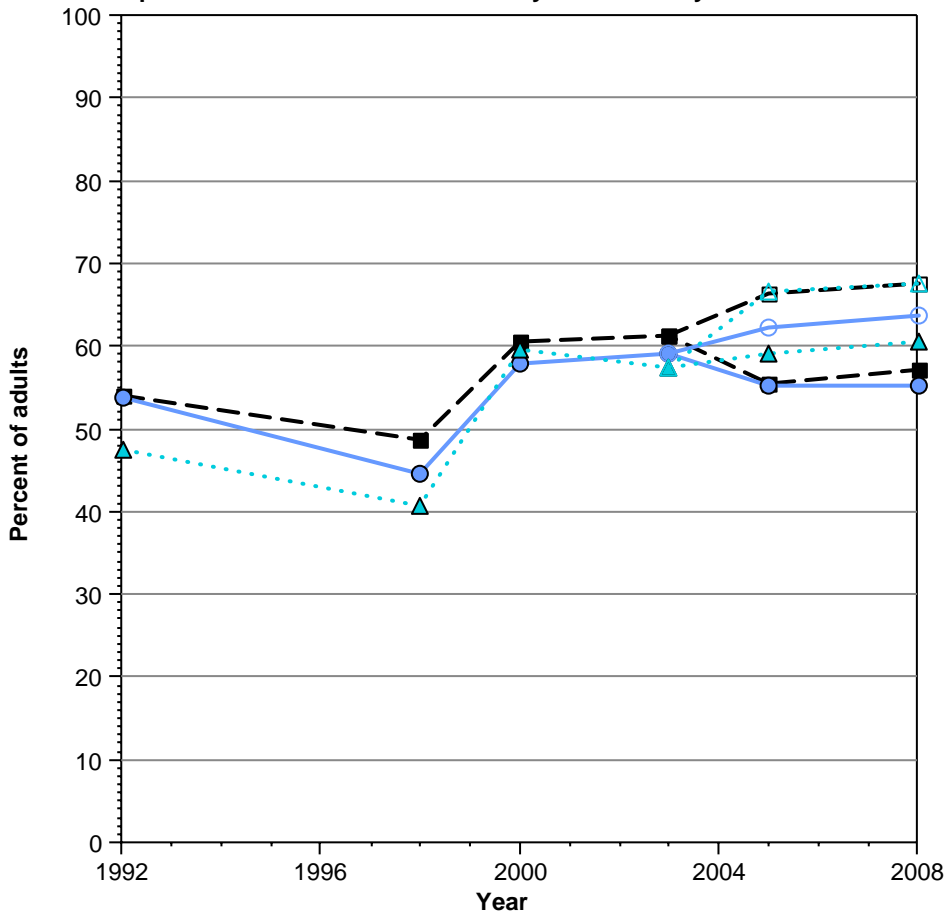
**Figure PSP3: Percentage of adults aged 18 years and older who usually or always protect themselves from the sun by sex and age: 1992-2008**



- Males Ages 18-24
- Males Ages 25+
- ▲ Females Ages 18-24
- ◆ Females Ages 25+
- ◻ Males Ages 18-24 (any hat or long sleeves)
- ◉ Males Ages 25+ (any hat or long sleeves)
- ◕ Females Ages 18-24 (any hat or long sleeves)
- ◊ Females Ages 25+ (any hat or long sleeves)

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+.  
 Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).  
 (1) Series using open symbols also includes partially protective hats.

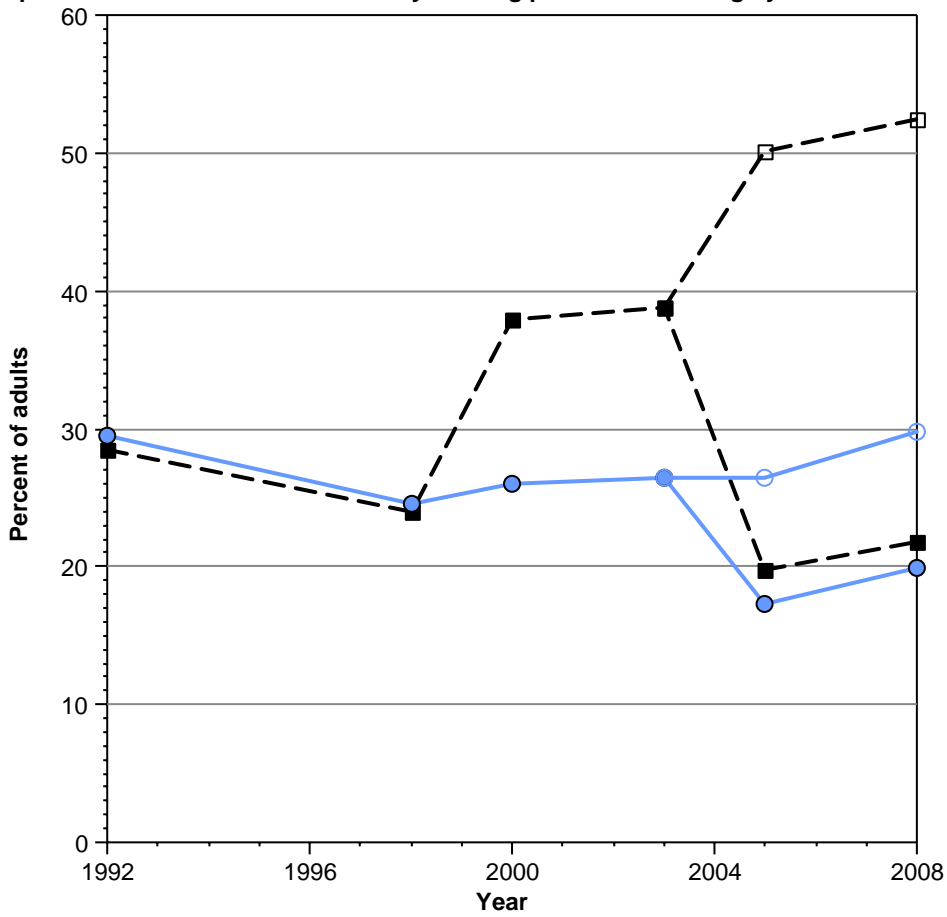
**Figure PSP4: Percentage of adults aged 18 years and older who usually or always protect themselves from the sun by race/ethnicity: 1992-2008**



- Non-Hispanic White
- Non-Hispanic Black
- ▲ Hispanic
- ◻ Non-Hispanic White (any hat or long sleeves)
- Non-Hispanic Black (any hat or long sleeves)
- △ Hispanic (any hat or long sleeves)

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+.  
 Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).  
 (1) Series using open symbols also includes partially protective hats.

**Figure PSP5: Percentage of adults aged 18 years and older who usually or always protect themselves from the sun by wearing protective clothing by sex: 1992-2008**

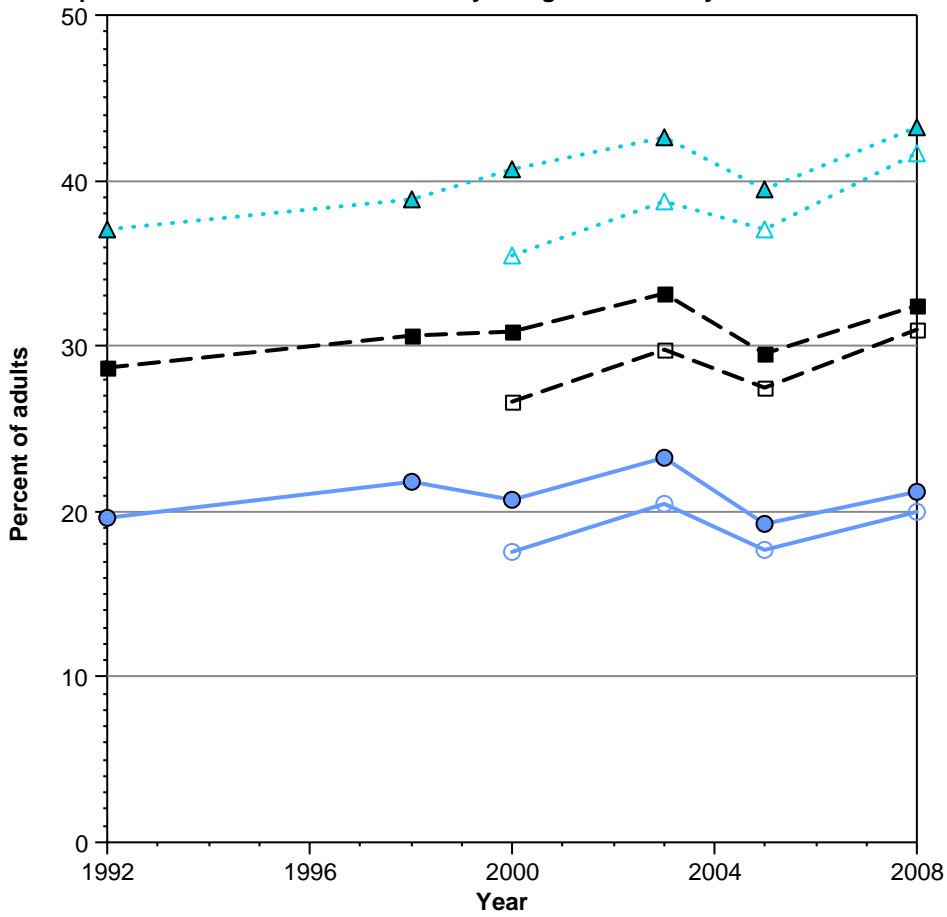


Male
  Male (1)

Female
  Female (1)

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).  
 (1) Series using open symbols also includes partially protective hats.

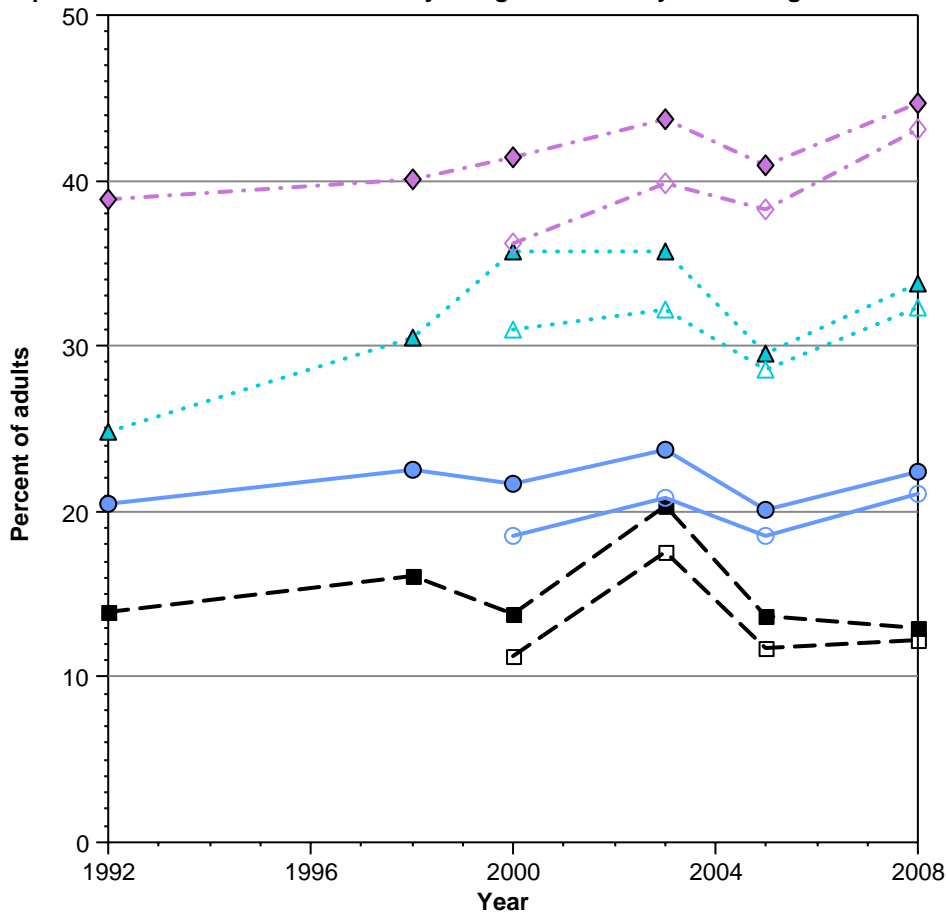
**Figure PSP6: Percentage of adults aged 18 years and older who usually or always protect themselves from the sun by using sunscreen by sex: 1992-2008**



Both Sexes  
 Male  
 Female  
 Both Sexes (SPF 15+)  
 Male (SPF 15+)  
 Female (SPF 15+)

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

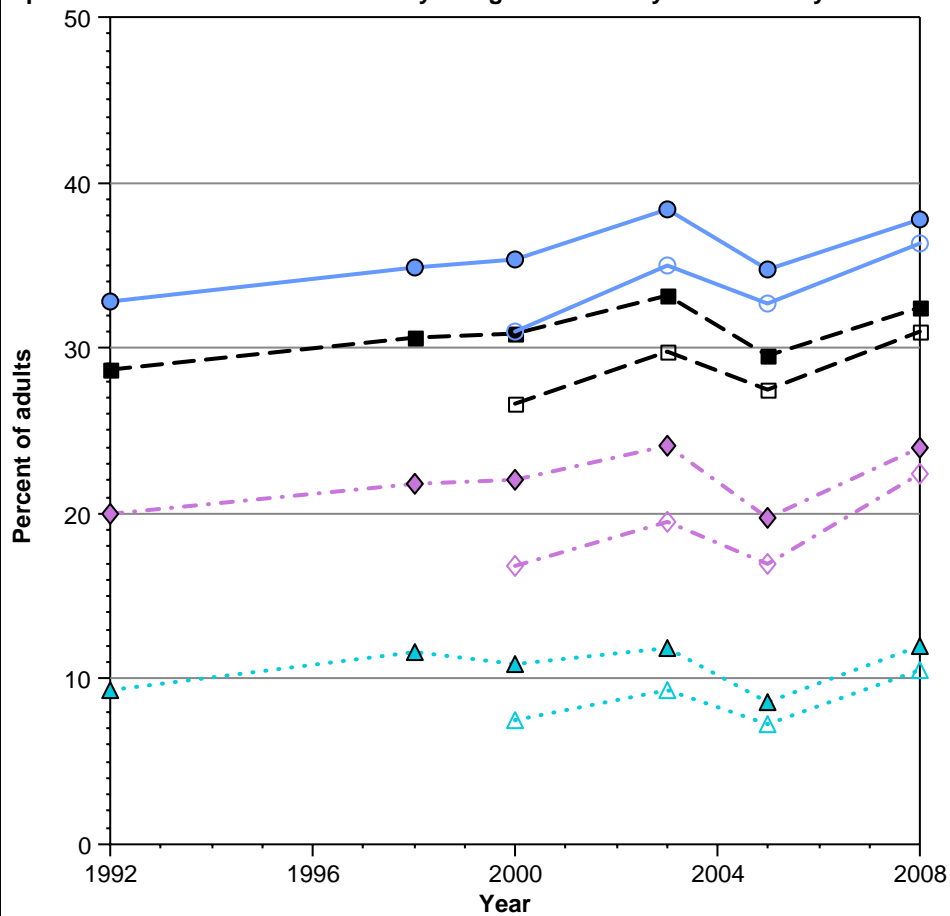
**Figure PSP7: Percentage of adults aged 18 years and older who usually or always protect themselves from the sun by using sunscreen by sex and age: 1992-2008**



- Males Ages 18-24
- Males Ages 25+
- ▲ Females Ages 18-24
- ◆ Females Ages 25+
- ▣ Males Ages 18-24 (SPF 15+)
- ◌ Males Ages 25+ (SPF 15+)
- ◌ Females Ages 18-24 (SPF 15+)
- ◌ Females Ages 25+ (SPF 15+)

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure PSP8: Percentage of adults aged 18 years and older who usually or always protect themselves from the sun by using sunscreen by race/ethnicity: 1992-2008**

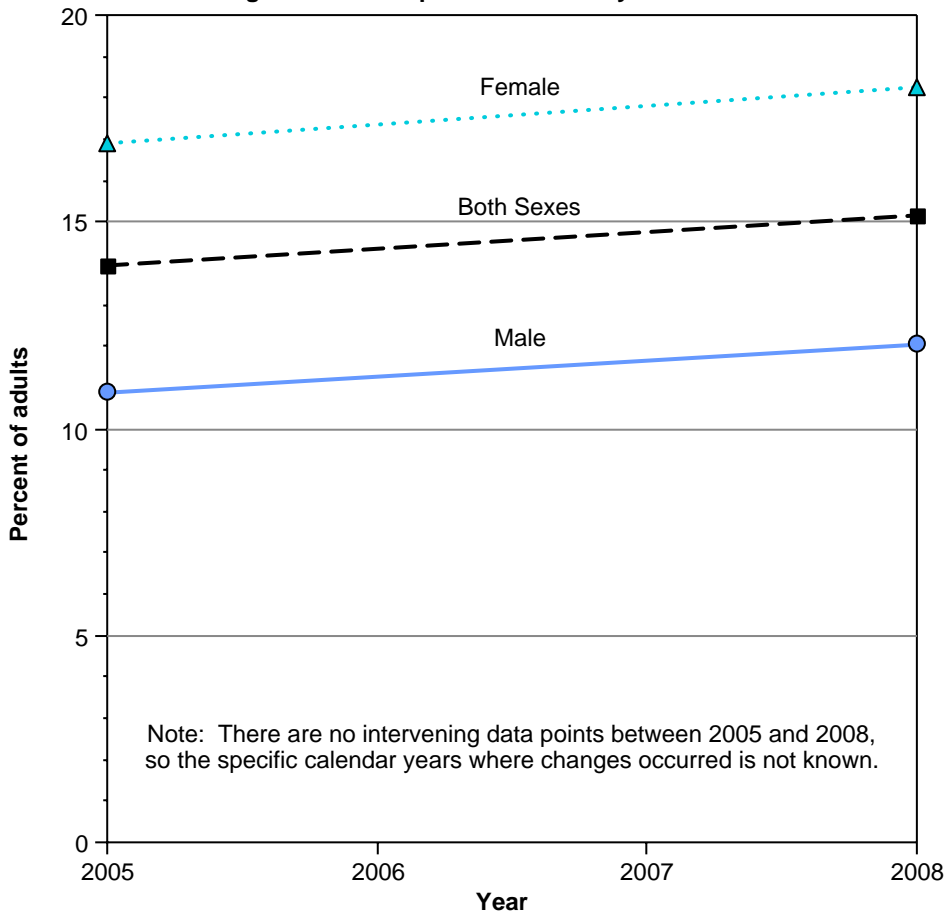


- All Races
- Non-Hispanic White
- ▲ Non-Hispanic Black
- ◆ Hispanic
- ◻ All Races (SPF 15+)
- Non-Hispanic White (SPF 15+)
- △ Non-Hispanic Black (SPF 15+)
- ◇ Hispanic (SPF 15+)

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

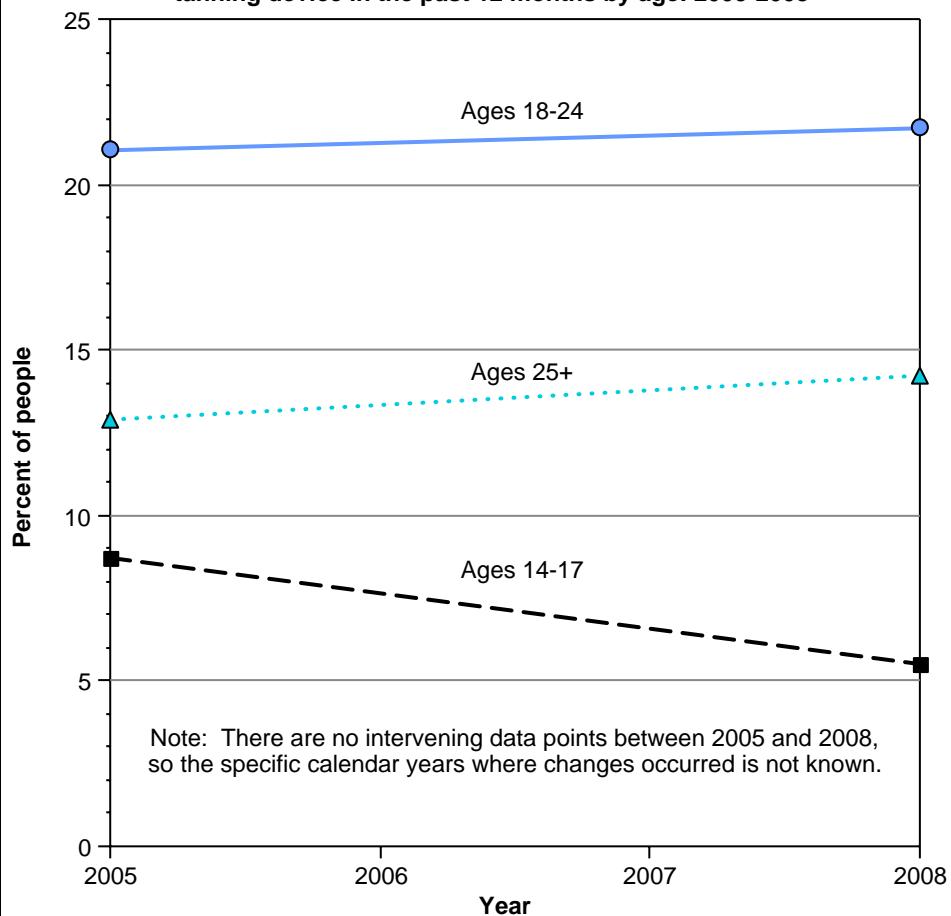
**Indoor tanning:** There was an increase in adult indoor tanning among both men and women from 2005 to 2008. There was a fall in this practice among teens between the ages of 14 to 17 years of age. This decrease was significant among females.

**Figure PSP9: Percentage of adults aged 18 years and older who used an indoor tanning device in the past 12 months by sex: 2005-2008**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

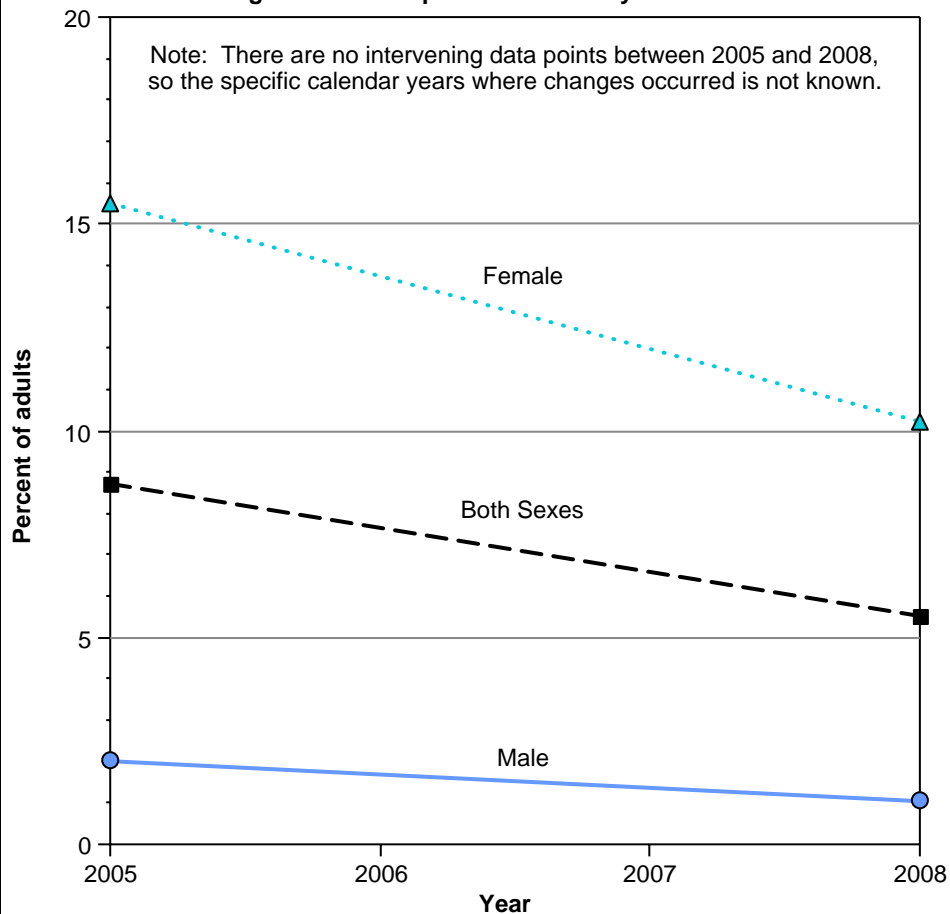
**Figure PSP10: Percentage of people aged 14 years and older who used an indoor tanning device in the past 12 months by age: 2005-2008**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
Data for ages 14-17 are not age adjusted. Data for ages 18-24 are age-adjusted to the 2000 standard using age groups: 18-19, 20-24. Data for ages 25+ are age-adjusted to the 2000 standard using age groups: 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).



**Figure PSP11: Percentage of teenagers aged 14 to 17 years who used an indoor tanning device in the past 12 months by sex: 2005-2008**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are not age-adjusted.

### Most Recent Estimates

**Sun protective behaviors:** In 2008, 57.6 percent of adults said they usually or always protected themselves from the sun by practicing at least one of three sun protective behaviors:

- 30.4 percent reported usually applying sunscreen with an SPF of 15 or higher
- 20.9 percent reported usually wearing sun protective clothing
- 31.54 percent usually sought shade

Only 44.5 percent of young adults aged 18–24 reported usually or always protecting themselves from the sun, whereas 59.5 percent of those 25 years of age and older reported usually or always protecting themselves. Among men aged 18 years and older, only 48.2 percent reported usually or always protecting themselves from the sun, in contrast to 66.7 percent of women aged 18 years and older. Women aged 25 years and older were the subgroup with the highest use of one or more sun protective behaviors (68.4 percent).

57.2 percent of non-Hispanic Whites, 55.1 percent of non-Hispanic Blacks, and 60.5 percent of Hispanics usually use some form of sun protection. Among those whose income is less than 200 percent of the poverty level, 55.4 percent use some form of sun protection. Among those with higher incomes, 58.2 percent use some form of sun protection.

**Indoor tanning:** In 2008, 15.2 percent of adults 18 years of age and older (12.0 percent of males and 18.3 percent of females) used indoor tanning devices in the past 12 months. Those using indoor tanning devices were primarily non-Hispanic Whites (17.8 percent), followed by Hispanics (11.0 percent), and then non-Hispanic Blacks (9.0 percent). Although 16.2 percent of those with incomes more than 200 percent of the poverty level used these devices, 12.9 percent of those within 200 percent of the poverty level also used these devices.

In 2008, nearly 6 percent of those aged 14 to 17 years used tanning devices during the past 12 months. Girls' use (10.2 percent) of such devices was ten times more than boys' use (1.1 percent). Use among non-Hispanic Whites was 8.6 percent, while the use of these devices was 1.4 percent among Hispanics and 0.4 percent among non-Hispanic Blacks. Teen use was highest among non-Hispanic White girls with an estimate of 16 percent.

## **Healthy People 2010 Target**

Increase to 75 percent the proportion of adults who usually or always apply sunscreen with an SPF of 15 or higher, wear protective clothing, or seek shade.

## **Groups at High Risk for Getting Too Much Sun**

Younger adults and men of any age are less likely to protect themselves from the sun. However, females seek shade far less than males. Adults with incomes below 200 percent of the poverty level are less likely to use sunscreen. Young adult women are most likely to get too much exposure to artificial light through indoor tanning.

## **Key Issues**

### **Vitamin D**

In general, increased exposure to the sun—especially without adequate use of sunscreen and protective clothing—increases the chances of getting skin cancer. Recently, however, the competing need for vitamin D for bone health, general health, and possibly helping to prevent certain other forms of cancer has been raised. Vitamin D is most efficiently produced through exposure to sunlight, but it can also be obtained through the diet, primarily through fortified foods and supplementation.

Key messages of the First North American Conference on UV, Vitamin D and Health, held on March 8, 2006, and a Position Statement released on June 16, 2007, by the Cancer Council Australia along with several other organizations include guidelines for when sun protection is required. These two sets of guidelines still conform with the present World Health Organization (WHO) guidelines that recommend sun protection when the UV index is 3 (moderate) or higher. The First North American Conference on UV, Vitamin D and Health further noted, "The known risks associated with unprotected UVB exposure must be weighed against its benefits as a source of vitamin D. For example, it is possible that just a few minutes a day of unprotected sun exposure will increase vitamin D status, but for some may also increase the risk of skin damage. Factors such as age, diet, skin pigmentation, geographic location and intensity of the sun will affect the amount of sun exposure needed to produce adequate vitamin D. More research is needed in this area before any more specific recommendations can be made."

In 2007, two National Institutes of Health—sponsored conferences were held, and an NCI study and an American Institute for Cancer Research (AICR) World Cancer Research Fund (WCRF) Expert Panel report were published with information pertaining to the effects of vitamin D on cancer and other diseases. The NCI study found a protective effect of vitamin D status on colorectal cancer mortality, but no effect on total cancer mortality. An editorial by co-sponsors of one of the NIH conferences cautioned that although vitamin D likely has many health benefits besides its benefits for bone health, health professionals and the public should not rush to judgment that vitamin D is a solution for good health. The AICR-WCRF report concluded that their review of cohort studies provided limited evidence suggesting that foods containing vitamin D or vitamin D status are protective against colorectal cancer. Most recently, a 2008 IARC Working Group report, "Vitamin D and Cancer," concluded that hypotheses on vitamin D status and colorectal cancer, cardiovascular diseases, and all-cause mortality should be tested in appropriately designed randomized controlled trials. They cautioned against hastily recommending widespread supplementation of vitamin D, given the lack of knowledge of its long-term side effects and past experience from studies of vitamins, antioxidants, and hormones.

## **Sunscreens**

Some research suggests that people often apply less than an adequate amount of sunscreen and fail to reapply it appropriately. This, coupled with research showing that those who use sunscreen for intentional sun exposure tend to increase their time spent in the sun, is likely to result in more skin damage rather than sun protection. A recent Australian randomized clinical trial, the Nambour Skin Cancer Study, showed that 4.5 years of daily sunscreen application resulted in a statistically significant 38 percent reduction in incidence of squamous cell carcinoma, compared with discretionary use. Although an additional 8 years of follow-up did not yield a statistically significant difference for basal cell carcinoma (BCC) with daily sunscreen use, the late follow-up period showed a non-significant 25 percent decrease in BCC tumor incidence in the former sunscreen treatment group with confidence intervals narrowing.

The Food and Drug Administration (FDA) has pending regulation to improve labeling on sunscreen about UVA and UVB, because current labeling misleads the public about the protection they are getting from the sun. For example, a sunscreen must contain ingredients that block both UVA and UVB sun rays. Also, the SPF factor relates only to blockage of UVB rays, and not to the sunscreen's ability to block UVA.



### Indoor tanning

According to industry estimates in the United States, there are roughly 20,000 professional indoor tanning salons. In addition, 15,000 to 20,000 sites, such as health clubs, spas, video stores, and beauty salons, have one or two tanning units. In most states, indoor tanning facilities are unregulated, with no age restriction for usage. Adolescence and childhood are particularly vulnerable periods for future development of skin cancer. WHO recommends that access to tanning beds be restricted for those under 18 years of age. As of June 30, 2008, 21 states had enacted laws restricting minors' access to tanning facilities. Of these states, four have enacted bans: California, New Jersey, and New York prohibit minors under 14 years of age from using tanning facilities, and Wisconsin prohibits use by minors under 16 years of age (State Cancer Legislative Database, August 2008 Fact Sheet on Skin Cancers). Adults could also be protected by future FDA regulations proposed for indoor tanning equipment/facilities, given the increase shown for those aged 25 years and older.

Pichon et al. recently published data from the U.S. City 100 Project showing less than 30 percent compliance with FDA's recommended practices for indoor tanning sessions. These data highlight the need for enforceable requirements. Bans on minors' access to tanning facilities may both reduce youth access in a direct way, and also more forcefully educate parents about the dangers of indoor tanning. Another report from the U.S. City 100 Project found that there was an average of 42 salons per city. This exceeded the average number of Starbucks and McDonald's per city. The density of tanning salons highlights the importance of regulation of this fast-growing industry so that we do not see further increases in the rate of melanoma incidence.

Data presented in this section showing a decline in teen indoor tanning prevalence over a 3-year period are loosely consistent with the overall increase in localities and states that have enacted laws restricting indoor tanning for minors. Further direct analysis of this relationship would be useful in understanding the exact nature of the type of restriction, enforcement, and subsequent use of indoor tanning by youth. The finding from Australia by Makin et al. that the states with the earliest and most comprehensive legislation to restrict the use of tanning facilities have seen the largest reduction in the number of tanning salons provides direct support for the relationship between legislation and demand for tanning facilities. The reduction in demand for tanning facilities yielding less indoor tanning exposure would be expected to ultimately result in less melanoma incidence, unless compensated for by direct sunlight exposure.

### Additional Information on Sun Protection

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◀ [Back: Weight](#)

[Next: Secondhand Smoke](#) ▶

**Much progress has been made in reducing secondhand smoke exposure over the past decade. More than a 50-percent reduction has occurred among nonsmokers.**

### Secondhand Smoke and Cancer

Secondhand smoke (SHS), also known as environmental tobacco smoke, is a mixture of the sidestream smoke released by the smoldering cigarette and the mainstream smoke exhaled by the smoker. Like mainstream smoke, SHS is a complex mixture containing thousands of chemicals, including formaldehyde, cyanide, carbon monoxide, ammonia, and nicotine. At least 250 chemicals in SHS are known to be toxic and/or cancer-causing agents.

Conclusive scientific evidence documents that SHS causes premature death and disease in children and in adults who do not smoke. Exposure of adults to SHS has immediate adverse effects on the cardiovascular system and causes coronary heart disease and lung cancer. Children exposed to SHS are at increased risk for sudden infant death syndrome (SIDS), acute respiratory infections, middle ear disease, more severe asthma, respiratory symptoms, and slowed lung growth. In 2005, the California Environmental Protection Agency estimated that SHS exposure causes approximately 3,400 lung cancer deaths and approximately 46,000 heart disease deaths among nonsmoking adults in the United States annually, as well as causing 430 SIDS deaths annually among U.S. infants. There is no risk-free level of exposure to SHS, and only eliminating smoking in indoor spaces fully protects nonsmokers from exposure to SHS. In 2009, the Institute of Medicine conducted a comprehensive review of the impact of smoke-free legislation and determined that “data consistently demonstrate that SHS exposure increases the risk of coronary heart disease and heart attacks, and that smoking bans reduce heart attacks.”

### Measure

Presented here are four measures of progress in this area:

1. Percentage of nonsmokers exposed to SHS. (The percentage of nonsmokers aged 4 years and older with a serum cotinine level between 0.05 ng/mL and 11 ng/mL.)
2. Percentage of indoor workers reporting a smoke-free work environment.
3. Percentage of respondents reporting a smoke-free home policy.
4. Percentage of the population protected by local and state smoke-free indoor air laws covering workplaces, restaurants, and bars.

The fourth measure, smoke-free laws, draws on data collected and analyzed by the Americans for Nonsmokers' Rights Foundation. Use of this information provides inclusion of both local and state laws and ensures consistency with the NCI Smoke-free Meeting Policy. For more information, see <http://dccps.nci.nih.gov/tcrb/smokefreemeetingpolicy.html>.

### Period –

1. Secondhand smoke: 1988–2006
2. Smoke-free work environment: 1992–2007
3. Smoke-free home policy: 1992–2007
4. Smoke-free indoor air laws: 1992–2009

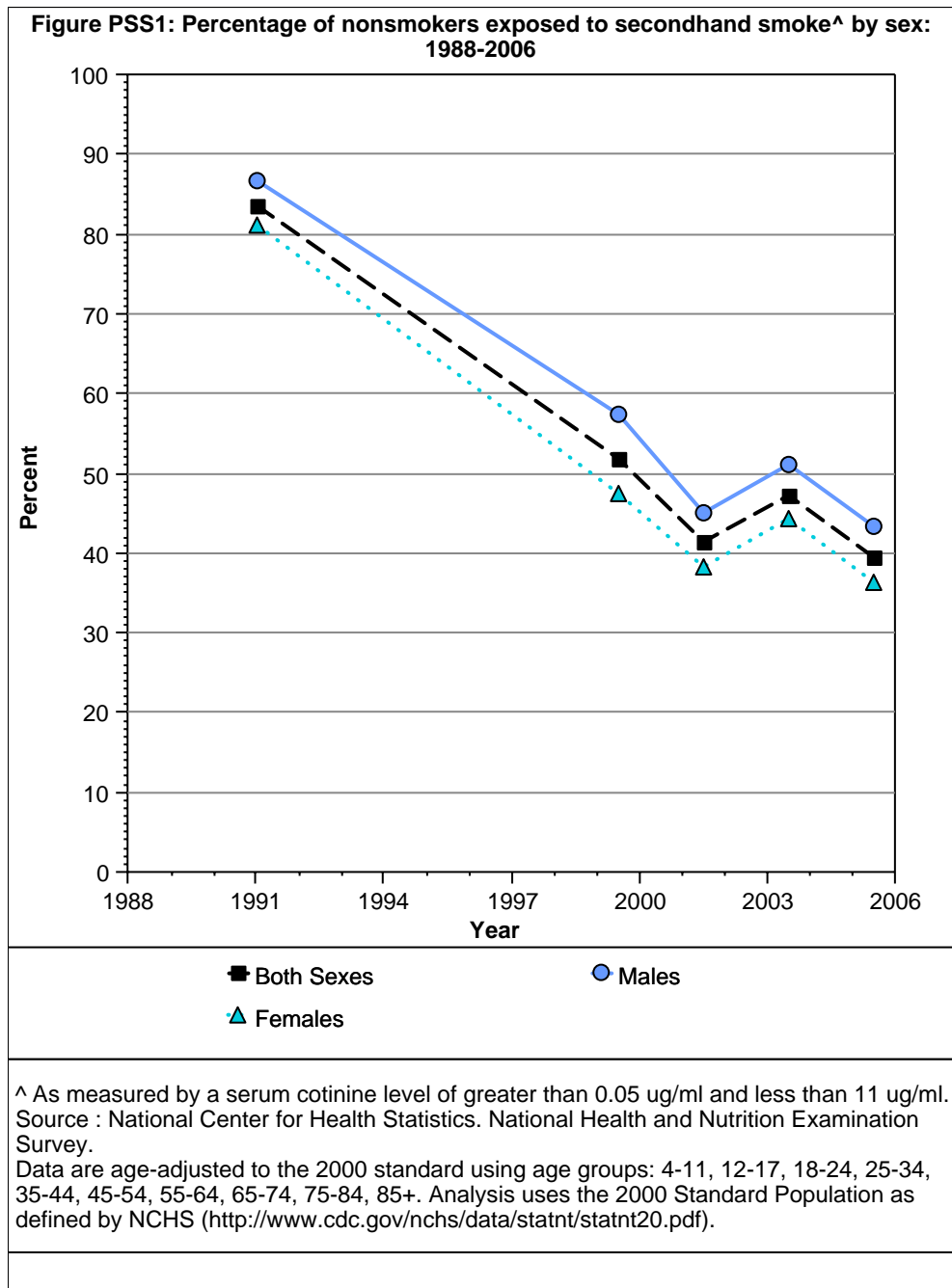
### Trends

#### *Secondhand Smoke Exposure*

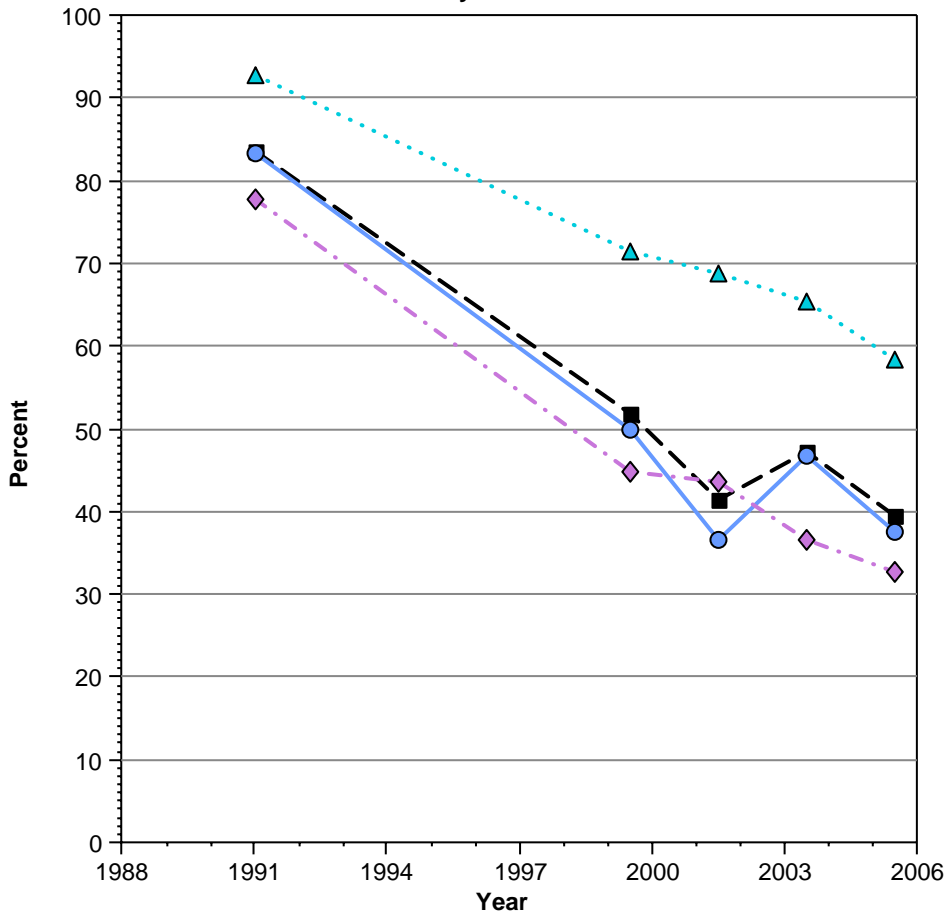
Over the past few decades, the nation has made enormous progress in reducing nonsmokers' SHS exposure. The first graph shows that the percentage of nonsmokers exposed to SHS has been declining during the period 1988–2006. The proportion of nonsmokers (4 years of age and older) with detectable levels of cotinine, a marker for SHS, in their blood has been more than halved—from 83 percent (during the period 1988–1994) to 39 percent (during the period 2005–2006).

This downward trend slowed between 2002 and 2006. Both the long-term steep falling trend and the more recent stability are seen for both males and females. While all three race/ethnicity categories show a downward trend, the Black non-Hispanic decline has been shallower and has resulted in only about a 37-percent decline in comparison to the 53-percent and 58-percent declines seen for White non-Hispanics and Hispanics, respectively over the period 1988–1994 to 2005–2006.

Trends in serum cotinine levels are similar by age, education, and poverty status, although older, more highly educated, and higher-income populations seem to show somewhat larger declines.



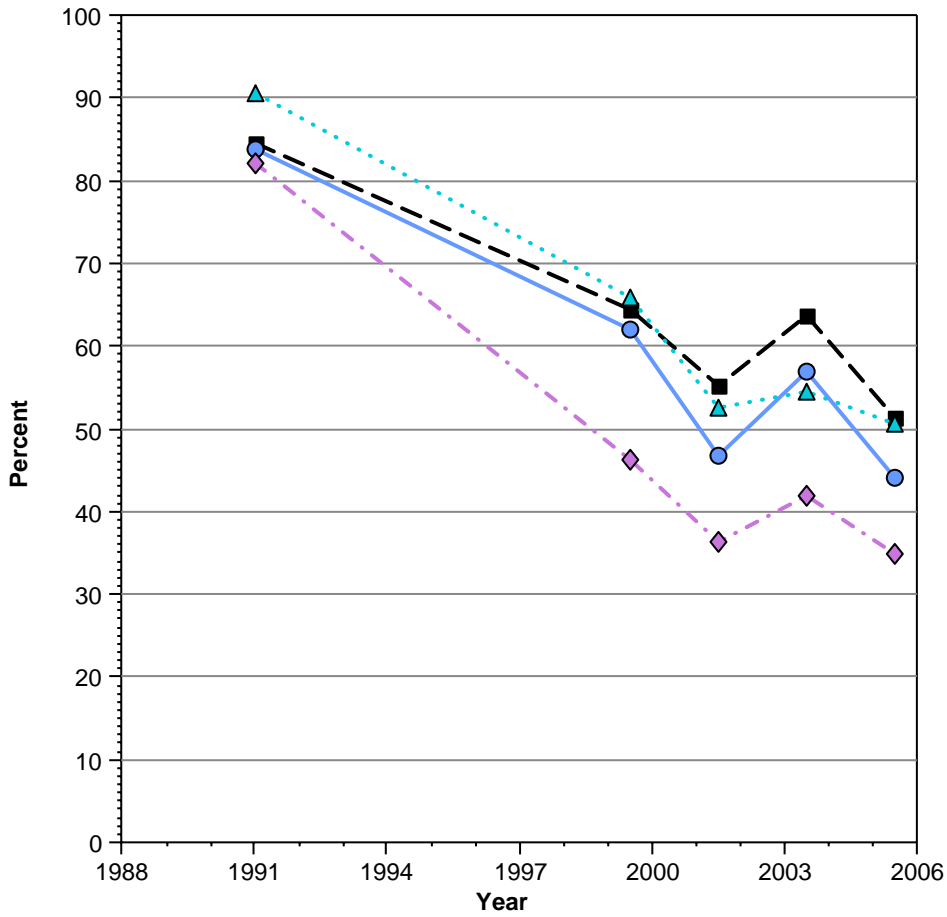
**Figure PSS2: Percentage of nonsmokers exposed to secondhand smoke^ by race/ethnicity: 1988-2006**



All Races
  Non-Hispanic White
  Non-Hispanic Black
  Hispanic

^ As measured by a serum cotinine level of greater than 0.05 ug/ml and less than 11 ug/ml.  
 Source : National Center for Health Statistics. National Health and Nutrition Examination Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 4-11, 12-17, 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure PSS3: Percentage of nonsmokers exposed to secondhand smoke^ by age: 1988-2006**

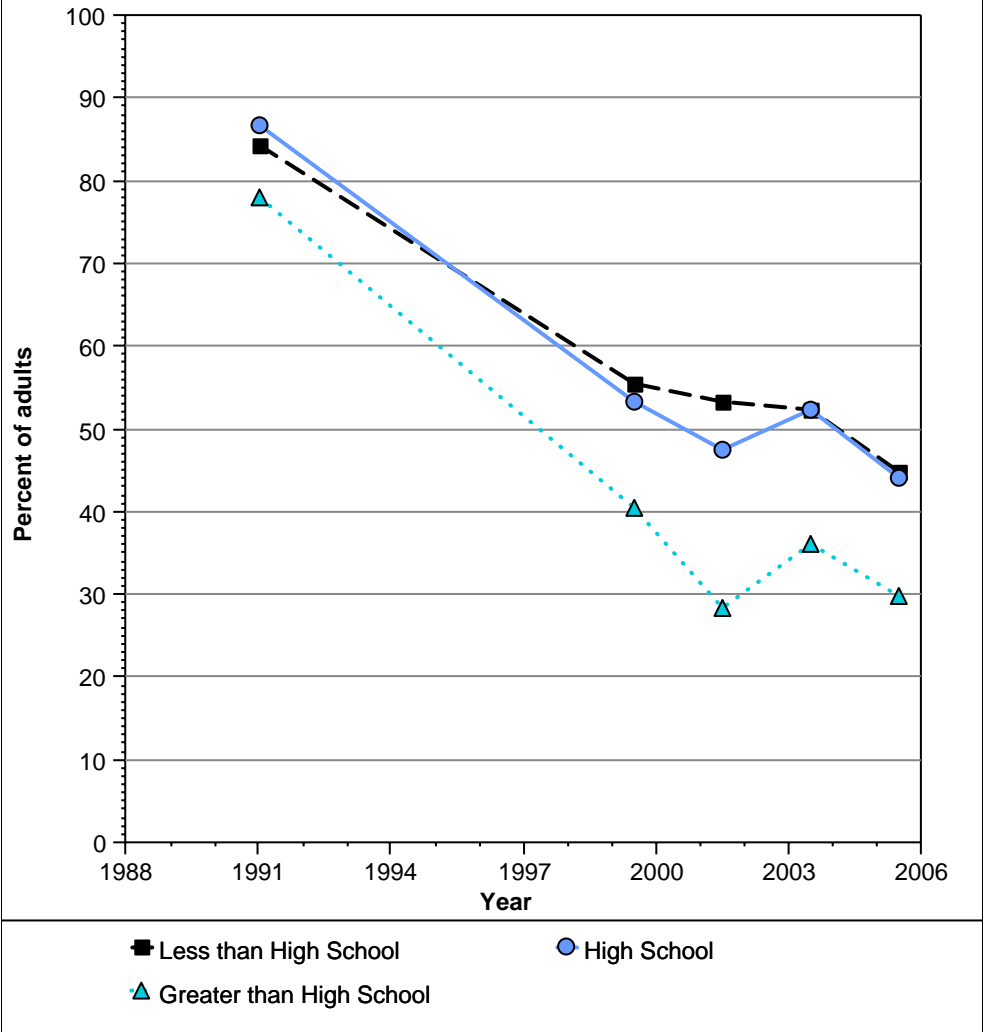


Ages 4-11
  Ages 12-17  
 Ages 18-24
  Ages 25+

^ As measured by a serum cotinine level of greater than 0.05 ug/ml and less than 11 ug/ml.  
 Source : National Center for Health Statistics. National Health and Nutrition Examination Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 4-11, 12-17, 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

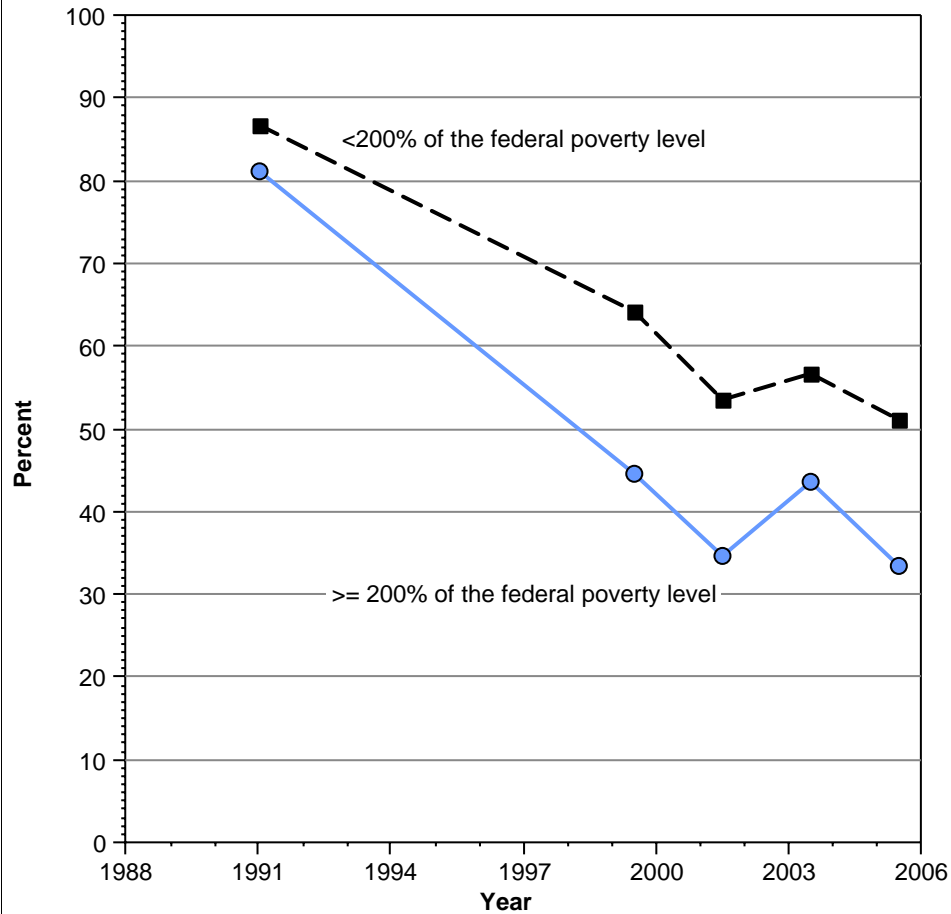


**Figure PSS4: Percentage of nonsmokers exposed to secondhand smoke^ by highest level of education obtained: 1988-2006**



^ As measured by a serum cotinine level of greater than 0.05 ug/ml and less than 11 ug/ml.  
 Source : National Center for Health Statistics. National Health and Nutrition Examination Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 25-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80+.  
 Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure PSS5: Percentage of nonsmokers exposed to secondhand smoke<sup>^</sup> by poverty income level: 1988-2006**



<sup>^</sup> As measured by a serum cotinine level of greater than 0.05 ug/ml and less than 11 ug/ml. Source : National Center for Health Statistics. National Health and Nutrition Examination Survey. Data are age-adjusted to the 2000 standard using age groups: 4-11, 12-17, 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

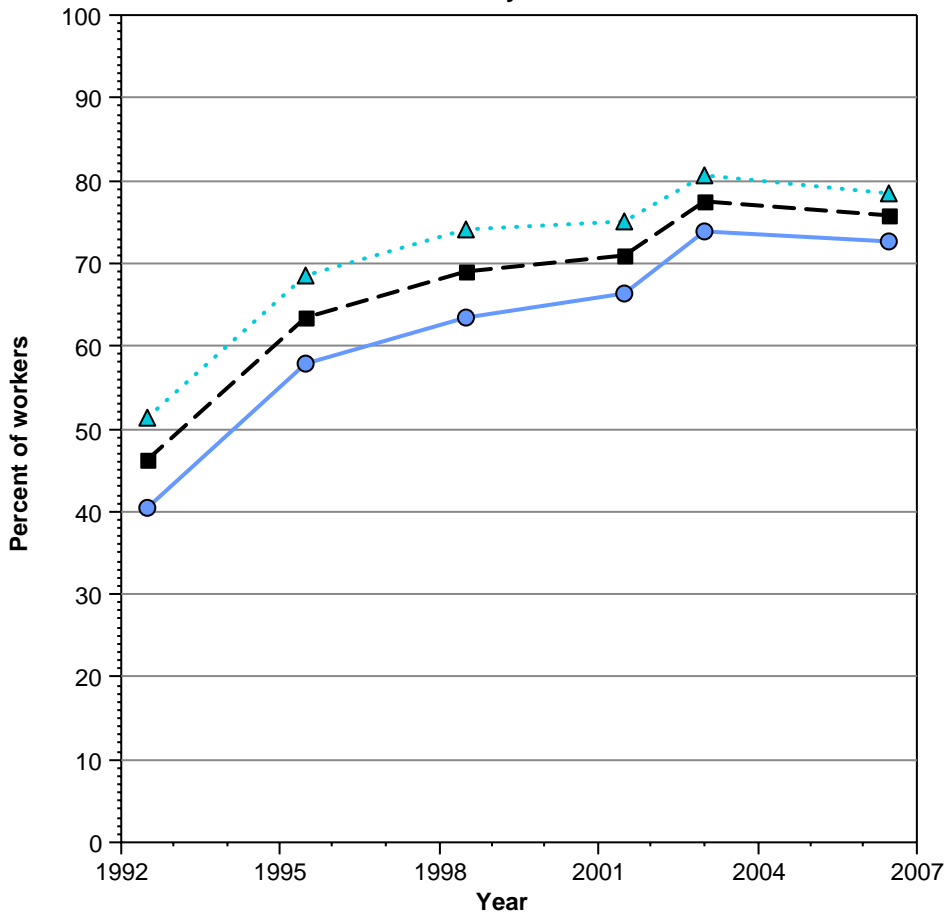
### Smoke-free Work Environment

Overall, indoor workers have reported large increases in smoke-free worksites over the period 1992–2007. In particular, they reported a steep rise in smoke-free workplace policies from 1992 to the mid 1990s. This increase continued, but less steeply, between 1995 and 2002. A steeper rise was noticed again during the period 2001–2003. Finally, during the period 2003–2007, the percentage of workers reporting a smoke-free work environment fell slightly.

The patterns are similar for men and women and among young adults, and those aged 25 years and older.

Smoke-free workplace trends are also similar by race/ethnicity, education, and poverty status.

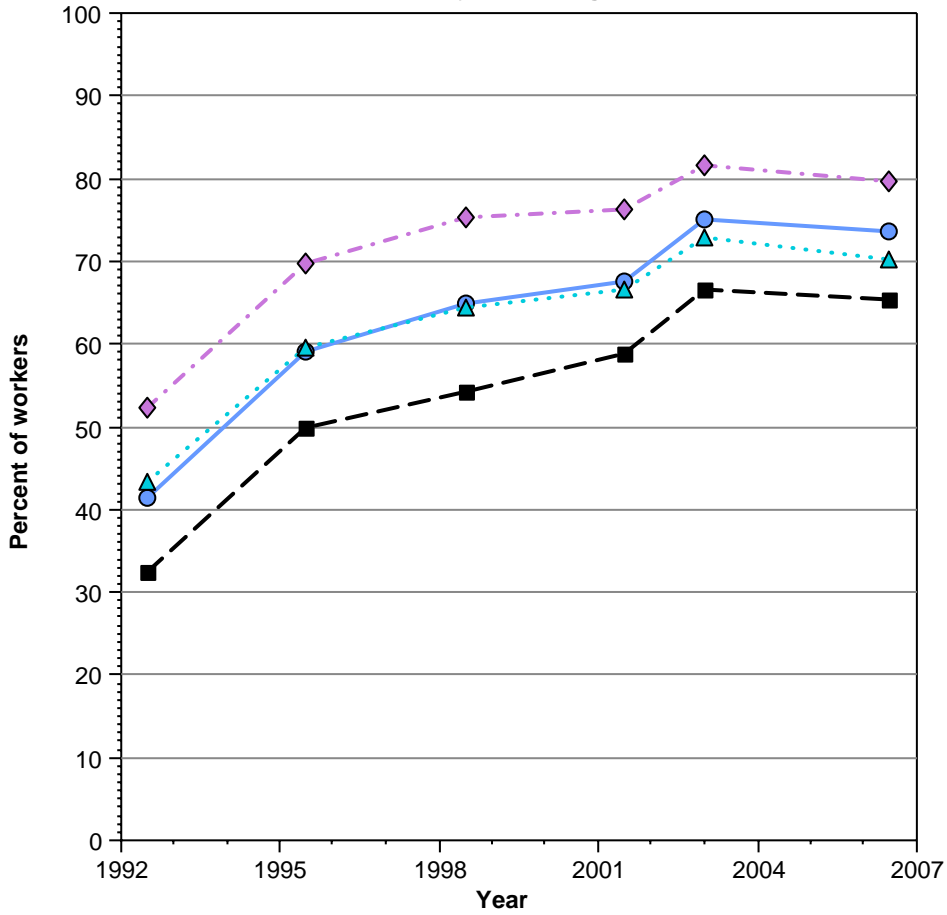
**Figure PSS6: Percentage of workers aged 18 years and older reporting a smoke-free work environment by sex: 1992-2007**



Both Sexes
  Male
  Female

Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute.  
 Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

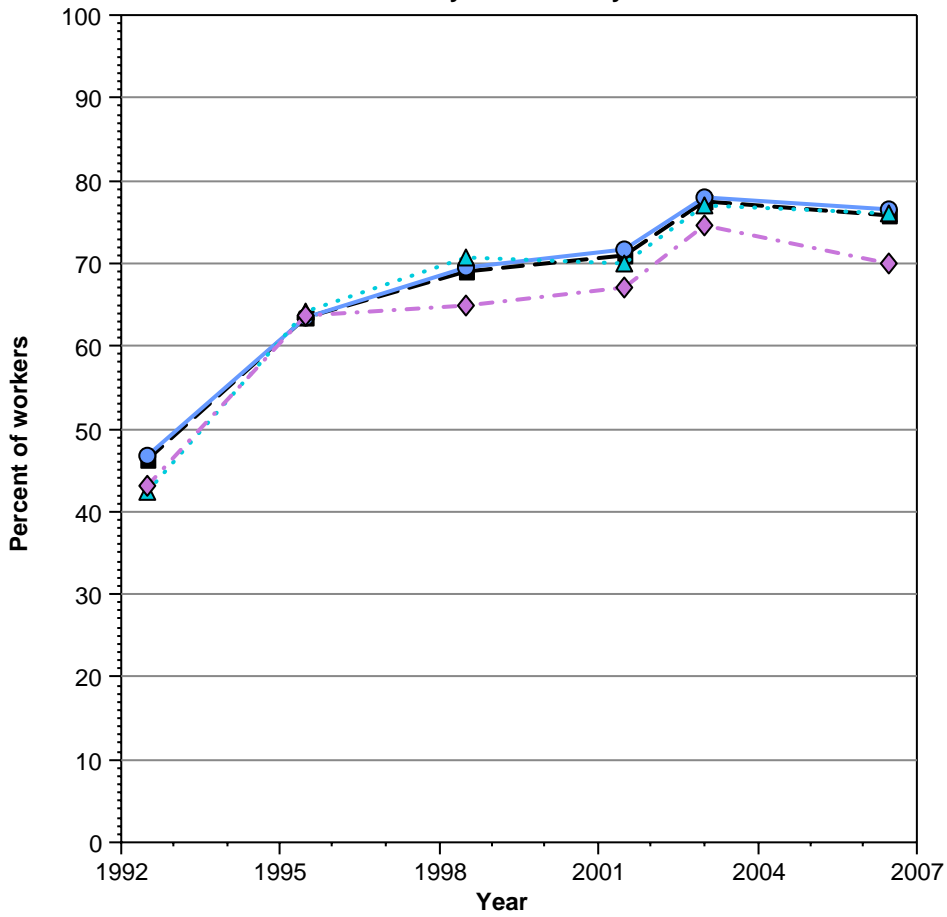
**Figure PSS7: Percentage of workers aged 18 years and older reporting a smoke-free work environment by sex and age: 1992-2007**



Males, ages 18-24
  Males, ages 25+
  Females, ages 18-24
  Females, ages 25+

Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute.  
 Data are age-adjusted to the 2000 standard. Ages 18-24 are age-adjusted using age groups: 18-19, 20-24. Ages 25+ are age-adjusted using age groups: 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure PSS8: Percentage of workers aged 18 years and older reporting a smoke-free work environment by race/ethnicity: 1992-2007**



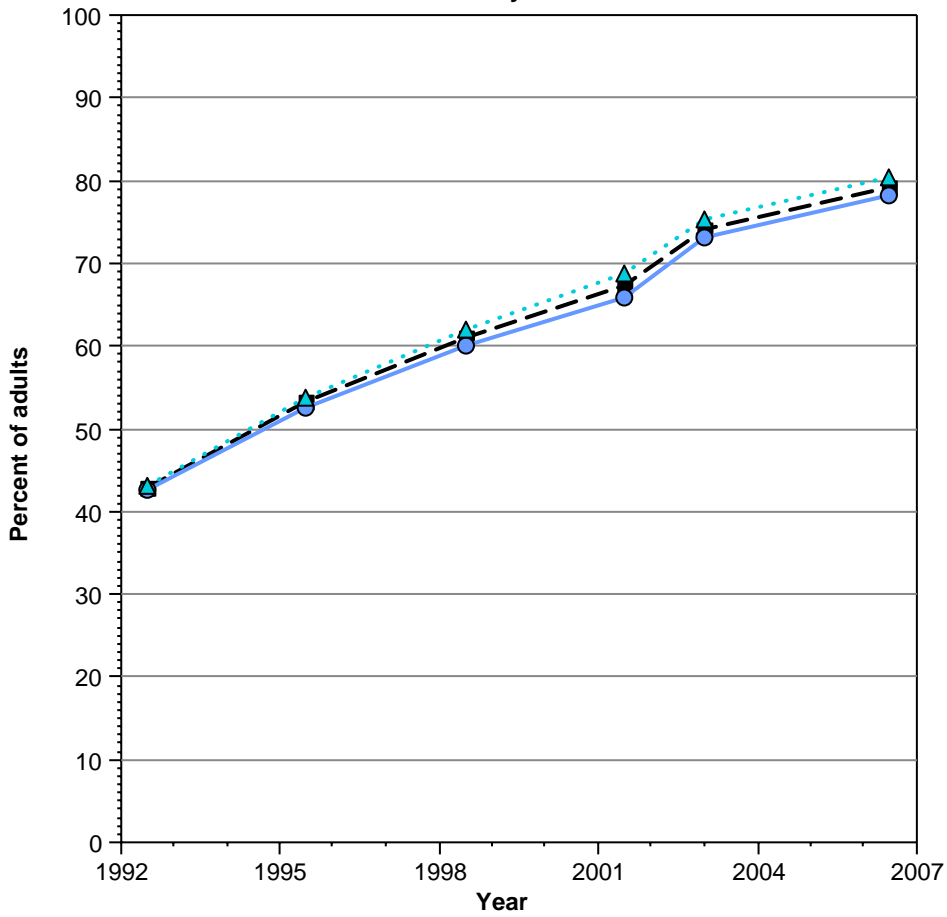
All Races
  Non-Hispanic White  
 Non-Hispanic Black
  Hispanic

Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Smoke-free Home Policy

There has been an overwhelming increase (84 percent) in smoke-free home environments between the periods 1992–1993 (43 percent) and 2006–2007 (79 percent). The rise in smoke-free home policies has been significant during every period over the entire interval. This trend is similar by gender, age, race/ethnicity, education, and poverty level.

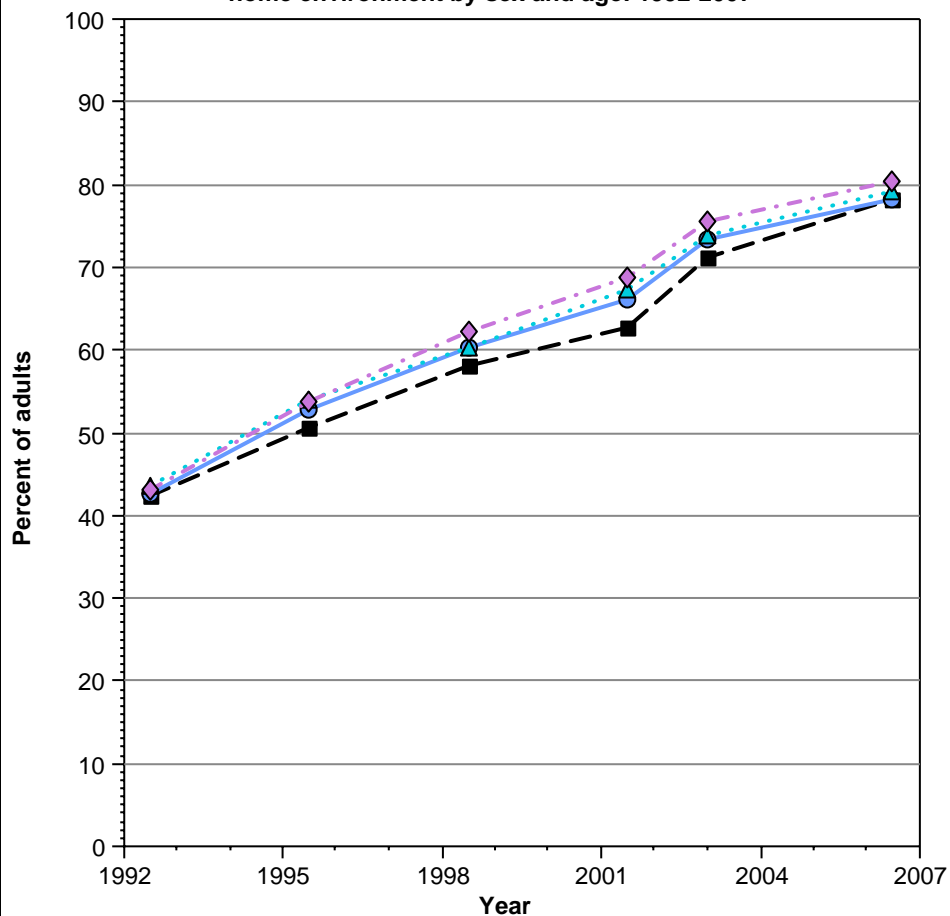
**Figure PSS9: Percentage of adults aged 18 years and older reporting a smoke-free home environment by sex: 1992-2007**



■ Both Sexes      ● Male  
▲ Female

Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute.  
Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure PSS10: Percentage of adults aged 18 years and older reporting a smoke-free home environment by sex and age: 1992-2007**



Males, ages 18-24
  Males, ages 25+
  Females, ages 18-24
  Females, ages 25+

Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute. Data are age-adjusted to the 2000 standard. Ages 18-24 are age-adjusted using age groups: 18-19, 20-24. Ages 25+ are age-adjusted using age groups: 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

## Most Recent Estimates

### *Secondhand Smoke Exposure*

The estimate of U.S. nonsmokers aged 4 years and older currently (during the period 2005–2006) exposed to SHS is 39.4 percent (43.4 percent among males and 36.4 percent among females). Thus, nearly 40 percent of nonsmokers aged 4 years and older are still exposed to SHS.

The most recent cotinine data for the period 2005–2006 for children aged 4–11 years reveal that 51 percent have any detectable level of cotinine in the blood, which is down from 85 percent during the period 1988–1994. Thus, just over half of all children aged 4–11 years are still exposed to SHS. The 2005–2006 data also indicate that 44 percent of children aged 12–17 years, 51 percent of young adults aged 18–24 years, and 35 percent of adults aged 25 years and older are exposed to secondhand smoke.

### *Smoke-free Work Environment*

During the period 2006–2007, 76 percent of indoor workers aged 18 years and older reported that a smoke-free policy was in place at their workplace, with 73 percent of men and 78 percent of women reporting the presence of such a policy. Among workers aged 25 years and older, 74 percent of males and 80 percent of females worked at a smoke-free worksite, as opposed to only 65 percent of male workers and 70 percent of female workers aged 18–24 years.

### *Smoke-free Home Policy*

About 80 percent of men and women reported their homes were smoke-free (78 percent of males and 80 percent of females). This level was seen for both young adults aged 18–24 years as well as those aged 25 years and older.

### *Population Covered by Local and State Smoke-free Indoor Air Laws*

As of November 2009, 22 states, as well as Puerto Rico and the District of Columbia have laws that provide complete or nearly complete protection from SHS, according to [NCI's Smoke-free Meeting Policy](#). Only 11 states have no jurisdictions that meet NCI's standards for smoke-free policies. According to the [American's for Nonsmokers' Rights Foundation](#), as of 2009, 57 percent, 65 percent, and 54 percent of Americans lived in a community where they were covered by a state or local smoke-free law making workplaces, restaurants, and bars, respectively, smoke free. Americans in 19 states, representing 41 percent of the population, lived in a community where all three of these settings were smoke-free by law. Meanwhile Americans in 31 states, representing 71 percent of the population, were covered by a smoke-free law in at least one of these settings.

## **Healthy People 2010 Targets**

Reduce the proportion of children who are regularly exposed to tobacco smoke at home to 6 percent.

Reduce the proportion of nonsmokers exposed to secondhand smoke to 63 percent.

Increase the proportion of persons covered by indoor worksite policies that prohibit smoking to 100 percent.

Increase the number of jurisdictions (States and the District of Columbia) with smoke-free indoor air laws that prohibit smoking in public places and work sites to 51.

## **Groups at High Risk for Exposure to Secondhand Smoke**

Nonsmokers' exposure to SHS has declined broadly in recent years; declines have been observed in both children and nonsmoking adults. However, significant levels of exposure persist. The most recent data suggest that, on average, concentrations of cotinine in children's blood are more than those in nonsmoking adults' blood. Cotinine levels in children's and nonsmokers' blood (aged 4 years and older) have declined in all racial and ethnic groups, but levels have consistently been found to be higher in non-Hispanic Blacks than in both non-Hispanic Whites and Mexican Americans. Male adult exposure estimates are higher than female adult exposure rates. SHS exposure also tends to be higher for persons with lower incomes and lower levels of education.

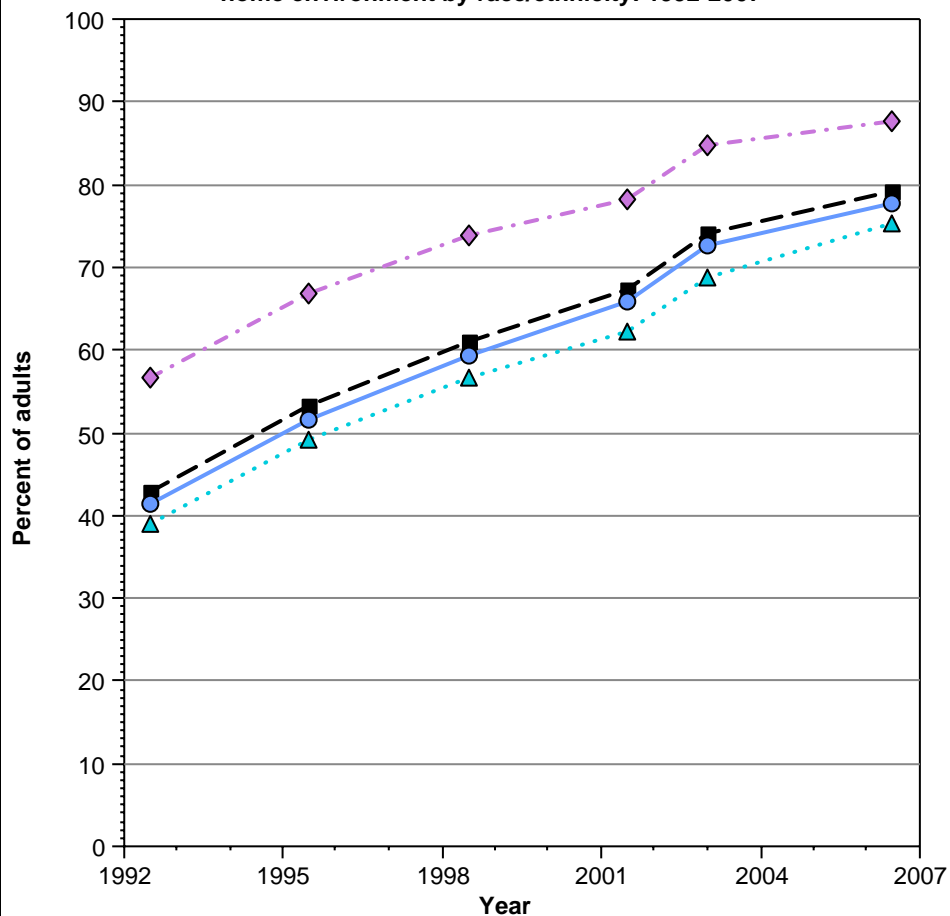
Adult working men are less likely than adult working women to report being protected by smoke-free workplace policies. Similarly, 18–24-year-old working adults are less likely than working adults aged 25 years and older to be covered by such policies. Among those 25 years and older, the percentage reporting a smoke-free workplace decreases with lower levels of education. Additionally, lower-income respondents are less likely to report a smoke-free workplace.

In particular, people who work in casinos, some other hospitality industry worksites, and blue-collar worksites are far less likely to be protected from SHS exposure than other workers, and they are likely to be exposed to especially high levels of SHS on the job.

Non-Hispanic Blacks (75 percent) and non-Hispanic Whites (78 percent) less frequently report having a smoke-free home policy when compared to Hispanics (88 percent). Those with less than a high school diploma and with a high school diploma report a lower percentage of smoke-free home policies when compared to those with more than a high school education. Likewise, smoke-free home policies are less common among lower-income Americans as compared to those with higher incomes. Also, while both smokers' and nonsmokers' reports of smoke-free home policies have increased since 1992, smokers still report lower levels of smoke-free home policies than nonsmokers.



**Figure PSS11: Percentage of adults aged 18 years and older reporting a smoke-free home environment by race/ethnicity: 1992-2007**



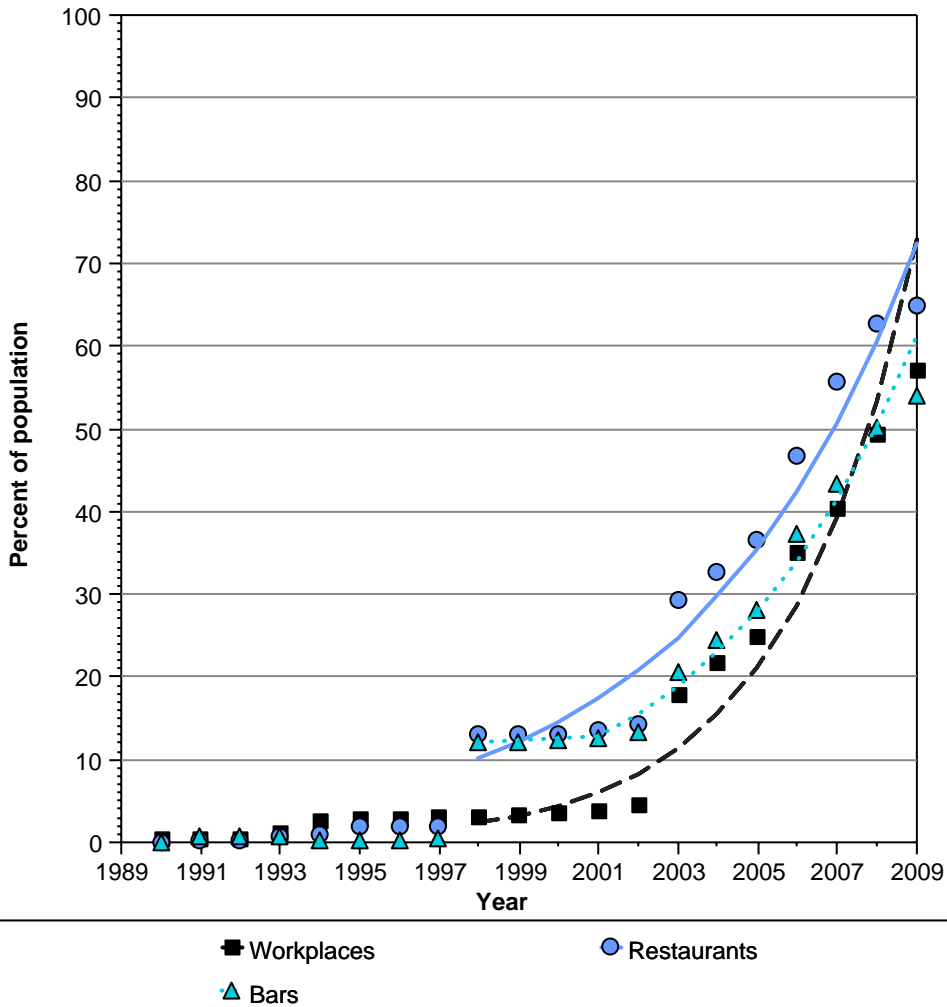
All Races
  Non-Hispanic White  
 Non-Hispanic Black
  Hispanic

Source: Tobacco Use Supplement to the Current Population Survey, sponsored by the National Cancer Institute. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

*Population Covered by Local and State Smoke-free Indoor Air Laws*

The percentage of the U.S. population protected by comprehensive local and state smoke-free laws covering workplaces, restaurants, and bars has risen. The first small increases in this measure during the 1990s were the result of early smoking restrictions in California and Massachusetts and an infusion of funding for evidence-based state tobacco control interventions from National Cancer Institute's/American Cancer Society's American Stop Smoking Intervention Study for Cancer Prevention (ASSIST), and some funding for these types of interventions from the Centers for Disease Control and Prevention (CDC), and The Robert Wood Johnson Foundation's SmokeLess States initiative. The largest absolute gain in enactment of smoke-free laws covering workplaces, restaurants, and bars, has occurred over the past 7-10 years. In recent years, states have joined localities in enacting smoke-free laws.

**Figure PSS12: Percentage of population protected by local and state 100% smoke-free indoor air laws: 1990-2009**



Source: Americans for Nonsmokers' Rights Foundation. All population figures are from the United States Census 2000. The 2009 data are through October 2, 2009. Data are not age-adjusted. Regression lines are calculated for 1998+ estimates because of very low coverage prior to this date.

### Key Issues

Exposure to SHS remains a serious public health concern, and one that is completely preventable. Children's SHS exposure continues to exceed that of adults, and the home is the single most important setting where children are exposed. Special efforts should be targeted to parents and guardians who smoke to convince them to make their homes and cars smoke-free. They should be assisted to quit smoking to protect their own health, to protect their children from SHS exposure, and to reduce the likelihood that their children will become smokers. EPA and HHS are supporting activities and research involving pediatricians counseling parents who smoke about the dangers of SHS for their children in an attempt to accomplish these three goals. Additionally, efforts should focus on helping all parents and guardians, including nonsmokers, ensure that their children are not exposed to SHS, by avoiding public places, such as restaurants, that do not prohibit smoking and making their homes and cars smoke-free. Smoke-free laws effectively protect nonsmokers from SHS exposure and appear to yield health benefits soon after implementation. They help educate the public about the serious health consequences of SHS exposure, help change social norms about smoking, and help smokers quit. Some U.S. states, territories, and localities have enacted laws making it illegal to smoke in a vehicle when a child is present. Like seat belt laws, these laws could potentially be accompanied by public education campaigns.



Momentum toward the passage of smoke-free laws has accelerated in recent years. These laws typically enjoy broad public support, which usually increases after the laws take effect. Recently, in the spring of 2009, North Carolina, a tobacco growing state, passed a strong clean indoor air law protecting its citizens from tobacco smoke in the workplace. Today, hundreds of communities, many states, and several countries (including Ireland, the United Kingdom, Norway, Italy, France, and Uruguay) have such laws in place. Laws are increasingly covering restaurants, bars, casinos, and other worksites that in the past were often exempt. Contrary to concerns voiced by the tobacco industry, peer-reviewed studies using objective measures have consistently found that smoke-free laws have not had a negative economic impact on restaurants and bars.

Despite recent progress, many nonsmoking adults and children remain exposed to SHS. As SHS exposure in enclosed workplaces and public places has decreased due to the implementation of smoke-free policies, the home has become a more important source of exposure, even for adults.

Through a variety of tactics, the tobacco industry has long sought to undermine the credibility of the scientific evidence on the health effects of SHS and to impede the adoption of smoke-free policies in workplaces and public places. These activities have slowed progress toward protecting the public from the hazards of SHS exposure and have harmed the public's health.

### **Additional Information on Secondhand Smoke**

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<http://www.anr.no-smoke.org/pdf/WRBLawsMap.pdf> 
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<http://riskfactor.cancer.gov/studies/tus-cps/>
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<http://www.census.gov/apsd/techdoc/cps/cpsJun01Nov01Feb02.pdf>
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<http://riskfactor.cancer.gov/studies/tus-cps/>
  - Data files (and/or) technical documentation  
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◀ [Back: Sun Protection](#)

[Next: Pesticides](#) ▶

**General studies of people with high exposures to pesticides have found high rates of certain types of cancers.**

**Pesticides and Cancer**

Pesticides are chemicals used to eliminate or control unwanted or harmful insects, plants, fungi, animals, or microorganisms in order to protect food crops and other plants. Some pesticides have been classified as carcinogens. Chlordane and dichlorodiphenyltrichloroethane (DDT) are possible human carcinogens. General studies of people with high exposures to pesticides, such as farmers, pesticide applicators, manufacturers, and crop dusters, have found high rates of blood and lymphatic system cancers; cancers of the lip, stomach, lung, brain, and prostate; as well as melanoma and other skin cancers.

**Measure**

Possible carcinogens, pesticides chlordane and DDT and their metabolites, measured in human blood.

**Period** – 1999–2002

**Trends**

Concentrations of DDT (and its metabolites) have risen. Chlordane was measured in three metabolites. Concentrations of chlordane (and its metabolite, oxychlordane) have risen, and chlordanes (trans-nonachlor and heptachlor epoxide) have declined from 1999–2002. Pesticide levels in human metabolites were measured in a random sample of participants from the National Health and Nutrition Examination Survey (NHANES).

**Table P1. Blood (lipid-adjusted) concentrations of DDT and chlordane, nanogram/gram (ng/g), 1999-2002.**

	1999-2000 (ng/g)	2001-2002 (ng/g)
Chlordane metabolites		
oxychlordane	44.9	49.7
Trans-nonachlor	79.4	78.2
Heptachlor epoxide	23.9	21.6
DDT		
DDE	1780.0	2320.0

Source: National Report on Human Exposure to Environmental Chemicals, Centers for Disease Control and Prevention, 2005

**Most Recent Estimates**

Blood concentrations (nanograms per gram, ng/g):

- Chlordane
  - oxychlordane – 49.7 ng/g
  - trans-nonachlor – 78.2 ng/g
  - heptachlor epoxide – 21.6 ng/g
- DDT(DDE) – 2320 ng/g

**Healthy People 2010 Targets**

Reduce exposure of the population to pesticides, heavy metals, and other toxic chemicals, as measured by blood and urine concentrations of the substances or their metabolites.

- Reduce chlordane (oxychlordane) from 44.9 ng/g to 31.4 ng/g.
- Reduce chlordane (trans-nonachlor) from 79.4 ng/g to 55.6 ng/g.
- Reduce chlordane (heptachlor epoxide) from 23.9 ng/g to 16.7 ng/g.
- Reduce DDT (DDE) from 1780 ng/g to 1250 ng/g.

### Groups at Risk for Pesticide Exposure

Farmers, pesticide applicators, crop dusters, pesticide manufacturers, and home gardeners could be at high risk of exposure to pesticides. The general population may be exposed to low doses of pesticides from fruits and vegetables bought from the supermarket or from contaminated surface or ground water.

### Key Issues

National goals have been set, but not yet reached, to reduce pesticide exposure. To help prevent pesticide exposure, people who apply pesticides should follow application directions and wear appropriate personal protective equipment (gloves, masks, etc.). For the general public, washing fruits and vegetables with water also helps to reduce pesticide exposure.

### Additional Information on Pesticides

- Cancer and the Environment  
<http://www.niehs.nih.gov/health/scied/documents/CancerEnvironment.pdf>
- Eleventh Report on Carcinogens, Revised 2005 (EHIS)  
<http://ehis.niehs.nih.gov/roc/>
- EPA's Annual Pesticide Reports  
<http://www.epa.gov/oppfead1/annual/index.htm>
- Healthy People 2010-Environment  
<http://www.healthypeople.gov/Document/HTML/Volume1/08environmental.htm>
- List of environmental exposures that cause cancer  
<http://monographs.iarc.fr/ENG/Classification/index.php>
- NCI's Cancer Prevention Overview  
[http://www.healthypeople.gov/Document/HTML/Volume1/08environmental.htm#\\_Toc490564699](http://www.healthypeople.gov/Document/HTML/Volume1/08environmental.htm#_Toc490564699)
- Sixth IARC Monographs Advisory Group on Priorities for future evaluation  
<http://monographs.iarc.fr/ENG/Meetings/prioritylist.pdf>
- Fourth National Report on Human Exposure to Environmental Chemicals  
<http://www.cdc.gov/exposurereport/pdf/FourthReport.pdf>

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[Next: Dioxins](#) ▶

**Dioxin levels in the United States environment have been declining for the past 30 years due to increasing regulation and reductions in man-made sources.**

**Dioxins and Cancer**

Dioxins are chemicals produced as by-products of incomplete combustion and through certain chemical processes. Major sources of dioxins in the environment include burning of municipal, toxic, hospital, and domestic wastes; specific industrial processes including metal smelting and refining; and paper and pulp bleaching. Dioxins can also be found as contaminants in some insecticides, herbicides, and wood preservatives, and in cigarette smoke. There are at least 100 different kinds of dioxins, including tetrachlorodibenzo-p-dioxin (TCDD), which is the most toxic and is considered a known human carcinogen. There are also numerous dioxin-like compounds, so-called because they have similar chemical, physical, and toxicological properties to the dioxins. These include the chlorinated dibenzo-p-dioxins (CDDs), chlorinated dibenzofurans (CDFs), and certain coplanar polychlorinated biphenyls (PCBs). Environmental release estimates are often presented in terms of toxic equivalents (TEQs). TEQs are derived from a toxicity weighting system that converts all mixture components to a single value normalized to the toxicity of TCDD.

The most common routes of exposure for dioxins occur through the diet, particularly from ingestion of animal fats including meats, full-fat dairy products, and fatty fish. Exposure can also occur through breathing incineration gases released from medical, municipal, and hazardous waste incinerators and industrial sources such as paper mills, cement kilns, and metal smelters.

**Measure**

Measurement of TCDD in human blood adjusting for lipids (Table P2) and EPA estimates of dioxin releases in the environment (Figure PDI1).

**Period** – 1999–2004 (dioxin measures in humans)

**Trends**

Dioxin levels in the general population of the United States are very low (Table P2). Dioxin levels in the environment have been declining for the last 30 years due to stricter regulations on emissions and reductions in man-made sources. Releases from industrial sources have decreased approximately 80–90% since the 1980s (U.S. EPA, 2006). However, dioxins break down so slowly that past releases will remain in the environment for many years (Figure PDI1).

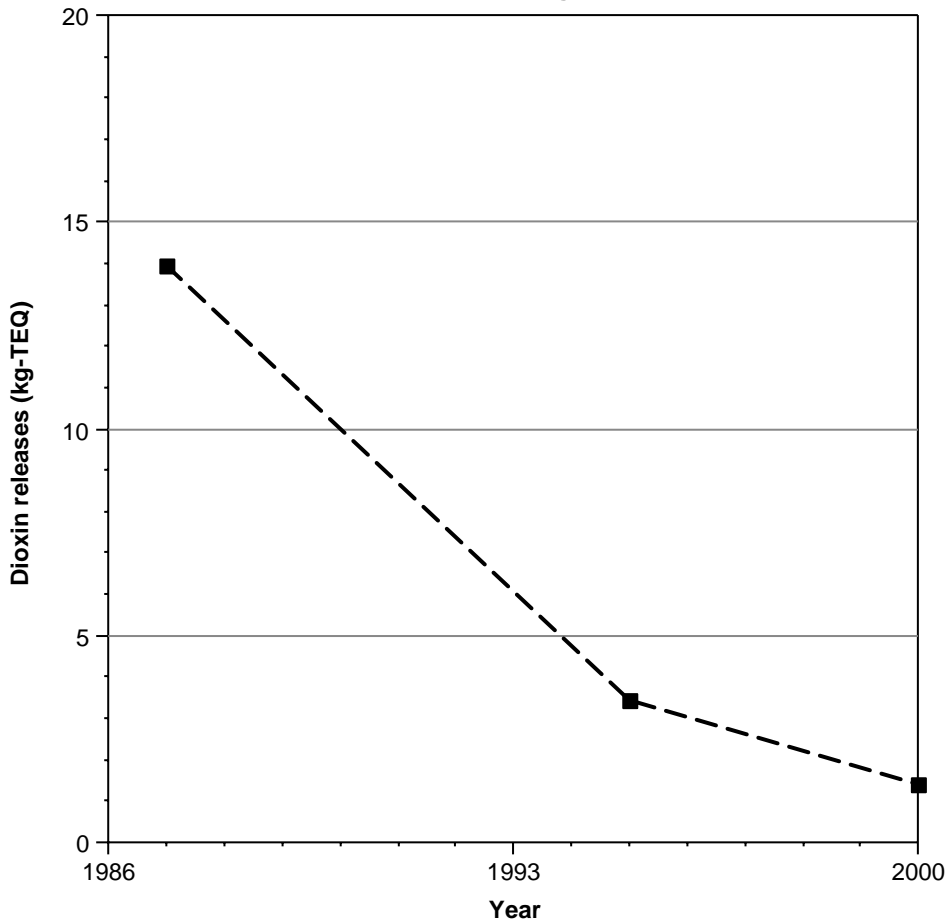
**Table P2. 50th and 95th percentiles for tetrachlorodibenzo-p-dioxin (TCDD) in blood samples from the U.S. population (picograms/gram, lipid adjusted), 1999-2004.**

	1999–2000 (pg/g)	2001–2002 (pg/g)	2003–2004 (pg/g)
TCDD	< LOD*	< LOD*	< LOD*, 5.2

Source: Fourth National Report on Human Exposure to Environmental Chemicals, Centers for Disease Control and Prevention, 2009; available at: <http://www.cdc.gov/exposurereport/pdf/FourthReport.pdf>

\* For certain chemicals like TCDD, each individual sample has its own limit of detection (LOD), which is the level at which a measurement has a 95% probability of being greater than zero. In 1999–2000 and 2001–2002, 12.1 pg/g and 5.8 pg/g, respectively, represented the maximum LOD among the samples analyzed and the geometric mean or average concentration of TCDD in all the samples was less than the maximum LOD so the estimate was reported as < LOD. In 2003-2004 the LOD was 3.8 pg/g.

**Figure PDI1: Total environmental releases of dioxin-like compounds (kg TEQ) from all quantifiable sources during 1987, 1995, and 2000**



Source: U.S. EPA. An Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the U.S. for the Years 1987, 1995, and 2000 (EPA/600/P-03/002f, Final Report, November 2006). U.S. Environmental Protection Agency, Washington, DC, EPA/600/P-03/002F.

### Most Recent Estimates

95th percentile of TCDD concentration in the U.S. population: 5.2 pg/g (see Table P2)  
Estimated dioxin releases to the environment in 2000: 1.42 kg-TEQ (see Figure PDI1)

### Healthy People 2010 Targets

*Reduce air toxic emissions to decrease the risk of adverse health effects caused by airborne toxics.* A specific numerical level for environmental concentration has not yet been set for dioxin.

*Reduce exposure of the population to pesticides, heavy metals, and other toxic chemicals, as measured by blood and urine concentrations of the substances or their metabolites.* A specific numerical level for metabolite concentration has not yet been set for dioxin.

### Groups At Risk for Dioxin Exposure



Workers exposed to dioxin-contaminated air are at high risk of exposure. The general population is at risk of inhaling and ingesting dioxins.

## Key Issues

A national goal has been set to reduce and measure dioxins in the environment and in the human body. People can help prevent exposure to dioxins by following existing Federal Dietary Guidelines, particularly by increasing consumption of fruits, vegetables, and grain products. Certain occupations are at high risk of dioxin exposure.

## Additional Information on Dioxins

- Cancer and the Environment  
<http://www.niehs.nih.gov/health/scied/documents/CancerEnvironment.pdf>
- Eleventh Report on Carcinogens, Revised 2005 (EHIS)  
<http://ehis.niehs.nih.gov/roc/>
- Environmental Protection Agency Information Sheet on Dioxins  
<http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=87843>
- FDA's Q & A about Dioxins  
<http://www.fda.gov/Food/FoodSafety/FoodContaminantsAdulteration/ChemicalContaminants/DioxinsPCBs/ucm077524.htm>
- Healthy People 2010—Environmental Health  
<http://www.healthypeople.gov/Document/HTML/Volume1/08environmental.htm>
- Fourth National Report on Human Exposure to Environmental Chemicals  
<http://www.cdc.gov/exposurereport/pdf/FourthReport.pdf>
- International Agency for Research on Cancer (IARC) Monograph on the Evaluation of Carcinogenic Risks to Humans  
<http://apps.who.int/bookorders/anglais/detart1.jsp?sesslan=1&codlan=1&codcol=72&codcch=69>
- European Commission on Dioxin Exposure and Health  
<http://ec.europa.eu/environment/dioxin/index.htm>
- The Agency for Toxic Substances and Disease Registry (ATSDR): Toxicological Profile for Chlorinated Dibenzo-p-dioxins (CDDs)  
<http://www.atsdr.cdc.gov/toxprofiles/tp104.html>
- Dioxin Source Inventories European Commission Overview Report  
<http://ec.europa.eu/environment/dioxin/download.htm>
- United Nations Environmental Program. Standardized Toolkit for Identification and Quantification of Dioxin and Furan Release.  
[http://www.chem.unep.ch/pops/pcdd\\_activities/default.htm](http://www.chem.unep.ch/pops/pcdd_activities/default.htm)

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[Next: Tobacco Company Marketing Expenditures](#) ▶

**Tobacco advertising and promotion increases Americans' tobacco use.**

### **Reported Annual Cigarette Advertising and Promotional Expenditures**

Tobacco advertising and promotion are causally related to increased tobacco use, and cigarettes are one of the most heavily marketed products in the United States. In 2006, the five major cigarette companies spent \$12.39 billion to advertise and promote cigarettes (adjusted \$). The recently enacted Family Smoking Prevention and Tobacco Control Act, signed into law on June 22, 2009, provides the U.S. Food and Drug Administration (FDA) with broad authority to regulate tobacco product advertising. This legislation removes most federal pre-emption constraints on the ability of states and communities to restrict the time, manner, and place of tobacco advertising and promotions.

#### **Measure**

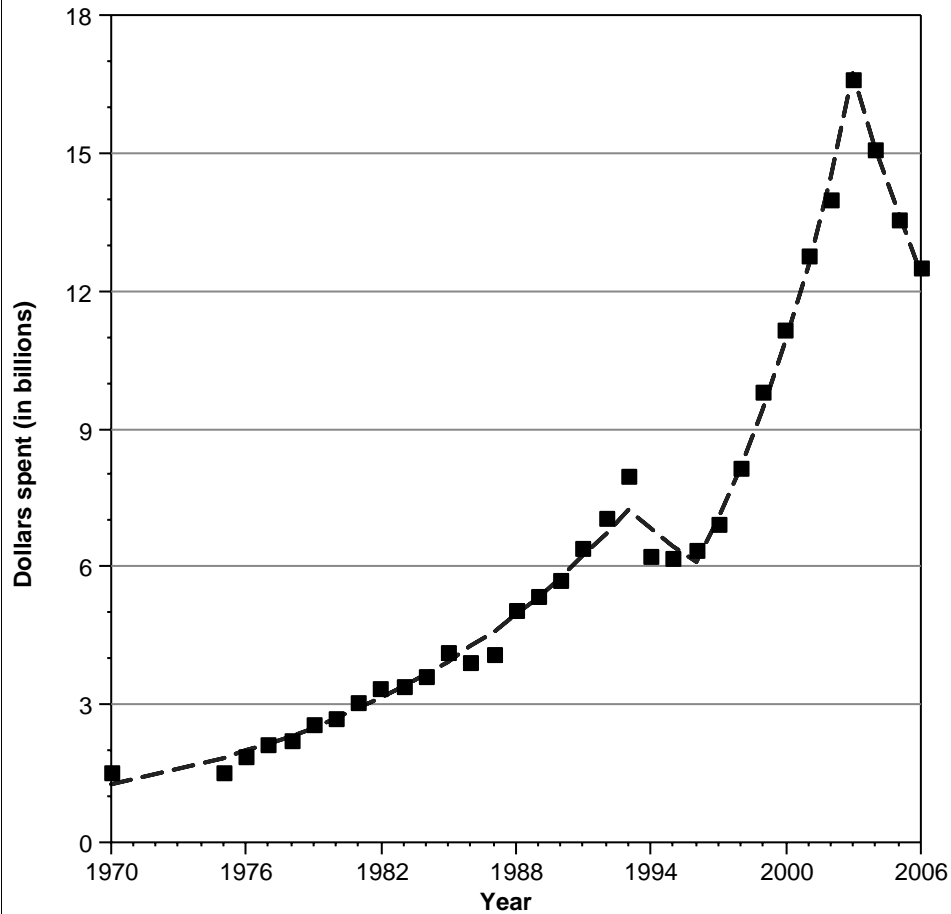
Combined annual advertising and promotional expenditures by the five major U.S. cigarette manufacturers, adjusted to 2006 dollars, as reported by manufacturers to the U.S. Federal Trade Commission (FTC).

**Period** – 1970–2006

#### **Trends**

Reported annual combined expenditures for advertising and promotion for cigarettes (adjusted to 2006 dollars using the gross domestic product implicit price deflator) increased in most years between 1970 and 2003. Since 2003, adjusted combined expenditures have declined.

**Figure PTC1: Annual marketing expenditures by U.S. tobacco companies adjusted to 2006 dollars: 1970-2006**



Source: Federal Trade Commission Cigarette Report For 2006 (<http://www.ftc.gov/os/2009/08/090812cigarettereport.pdf>). Accessed August 18, 2009.  
Estimates are adjusted to 2006 dollars using the Gross Domestic Product: Implicit Price Deflator ([http://www.data360.org/dataset.aspx?Data\\_Set\\_Id=650](http://www.data360.org/dataset.aspx?Data_Set_Id=650)).

### Most Recent Estimates

In 2006, adjusted combined annual expenditures for cigarette advertising and promotion was \$12.39 billion.

### Healthy People 2010 Target

There are no Healthy People 2010 targets for reducing tobacco company marketing expenditures.

### Groups at High Risk for Being Targeted

The tobacco industry has strategically targeted various groups, including youth, young adults, and specific racial and ethnic groups. Much tobacco advertising targets the psychological needs of adolescents, such as popularity, peer acceptance, and positive self-image. Advertising creates the perception that smoking will satisfy these needs. Even brief exposure to tobacco advertising influences adolescents' attitudes and perceptions about smoking and smokers and adolescents' intentions to smoke. Strong and consistent evidence from longitudinal studies indicates that exposure to cigarette advertising influences non-smoking adolescents to initiate smoking and to move toward regular smoking.

In 2006, U.S. District Judge Gladys Kessler found the major U.S. cigarette companies violated the Racketeer Influenced and Corrupt Organization (RICO) statute, noting specifically that the companies "marketed and advertised their products to children under the age of 18 and to young people between the ages of 18–21, in order to ensure an adequate supply of 'replacement smokers,' as older ones fall by the wayside through death, illness, or cessation of smoking."

## **Key Issues**

Currently, most of the cigarette industry's marketing budget is directed toward promotional activities—especially price discounts—which account for about 75 percent of total marketing expenditures. Tobacco advertising has been dominated by three themes: providing satisfaction (taste, freshness, mildness, etc.), allaying anxieties about the dangers of smoking, and creating associations between smoking and desirable outcomes (independence, social success, sexual attraction, thinness, etc.).

As cigarette advertising is curtailed in some traditional media, cigarette companies are exploring the use of new or non-traditional media for distributing pro-tobacco messages and images, including the Internet and cigarette packages. The tobacco industry has become increasingly sophisticated in applying market research to population segments in order to design products, messages, communication channels, and promotions more aligned with the needs and susceptibilities of particular market segments. This research results in more efficiency, greater reach, and increased effectiveness for marketing activities aimed at target populations.

## **Additional Information on Tobacco Company Marketing Expenditures**

- The Role of the Media in Promoting and Reducing Tobacco Use: NCI Monograph 19  
<http://dccps.nci.nih.gov/tcrb/monographs/19/docs/M19MajorConclusionsFactSheet.pdf>
- Kessler G. Final Opinion, U.S. vs. Philip Morris USA, inc. et al. August 17, 2006.  
<http://www.justice.gov/civil/cases/tobacco2/index.htm>

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[Next: Early Detection](#) ▶

## ▶ Early Detection

The use of screening tests to detect cancers early provides better opportunities for patients to obtain more effective treatment with fewer side effects. Patients whose cancers are found early and treated in a timely manner are more likely to survive these cancers than are those whose cancers are not found until symptoms appear. This section describes trends in the use of the following screening tests, each of which has been found to detect cancers accurately for specified age groups; evidence suggests that they decrease the chances of dying from cancer:

- Mammography (for [breast cancer](#))
- Pap test (for [cervical cancer](#))
- Fecal occult blood test (for [colorectal cancer](#))
- Colorectal endoscopy (sigmoidoscopy or [colonoscopy for colorectal cancer](#))

Trends for prostate-specific antigen (PSA) to detect prostate cancer are not included in this edition of the *Cancer Trends Progress Report*. Use of the PSA test has not yet been shown to reduce deaths from prostate cancer. There is also concern about possible harm caused by unnecessary treatments, because the test can find very early cancers that might not cause any harm if left untreated—especially in older men. Other screening methods, such as new imaging techniques to detect breast or lung cancer and ways to detect early cancer in the blood, also require more research on their effectiveness.

◀ [Back: Tobacco Company Marketing Expenditures](#)

[Next: Breast  
Cancer  
Screening](#) ▶

**Mammography use rose steadily in women aged 40 and older until 2000, was stable until 2003, and dropped slightly in 2005. The 2010 target for all women, 70 percent, was met in 2000 but the proportion fell to 67 percent in 2005. Rates fell for non-Hispanic White, non-Hispanic Black, and Hispanic women. Disparities remain for immigrants and those with lower incomes, with less education, without insurance, and lacking a usual health care provider.**

### **Benefits of Screening Mammography**

Regular use of screening mammograms, followed by timely treatment when breast cancer is diagnosed, can help reduce the chances of dying from breast cancer. For women between the ages of 50 and 69, there is strong evidence that screening lowers this risk by 30 percent. For women in their 40s, the risk can be reduced by about 17 percent. For women aged 70 and older, mammography may be helpful, although firm evidence is lacking.

### **Measure**

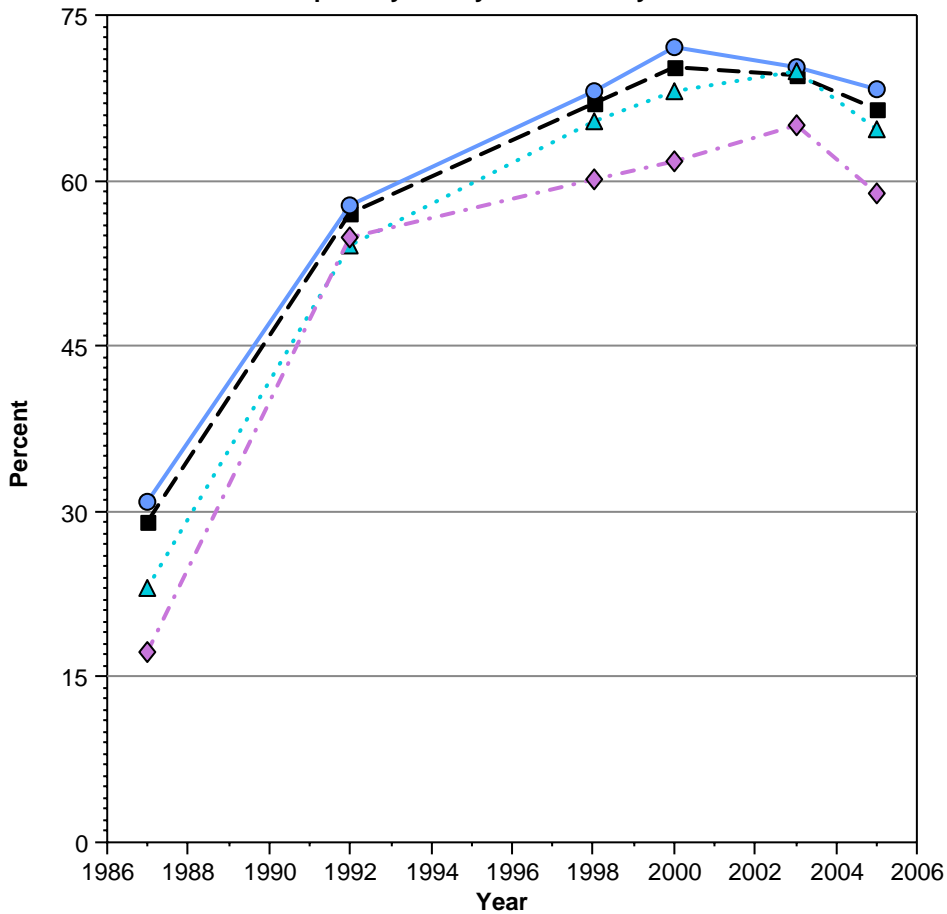
Percentage of women aged 40 and older, by racial/ethnic, geographic, and low-income groups, who reported having had a mammogram within the past 2 years.

**Period** – 1987–2005

Note: The most recent (2008) data are currently being reviewed. This section will be updated once research results have been published.

**Trends** – Rising until 2000, then stable for Whites while continuing to rise for other racial/ethnic groups until 2003. Among White women aged 40 and older, trend fell slightly from 2003 to 2005.

**Figure SBR1: Percent of women aged 40 years and older who had mammography within the past 2 years by race/ethnicity: 1987-2005**



All Races
  Non-Hispanic White  
 Non-Hispanic Black
  Hispanic

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 40-49, 50-64, 65-74, 75+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Most Recent Estimates

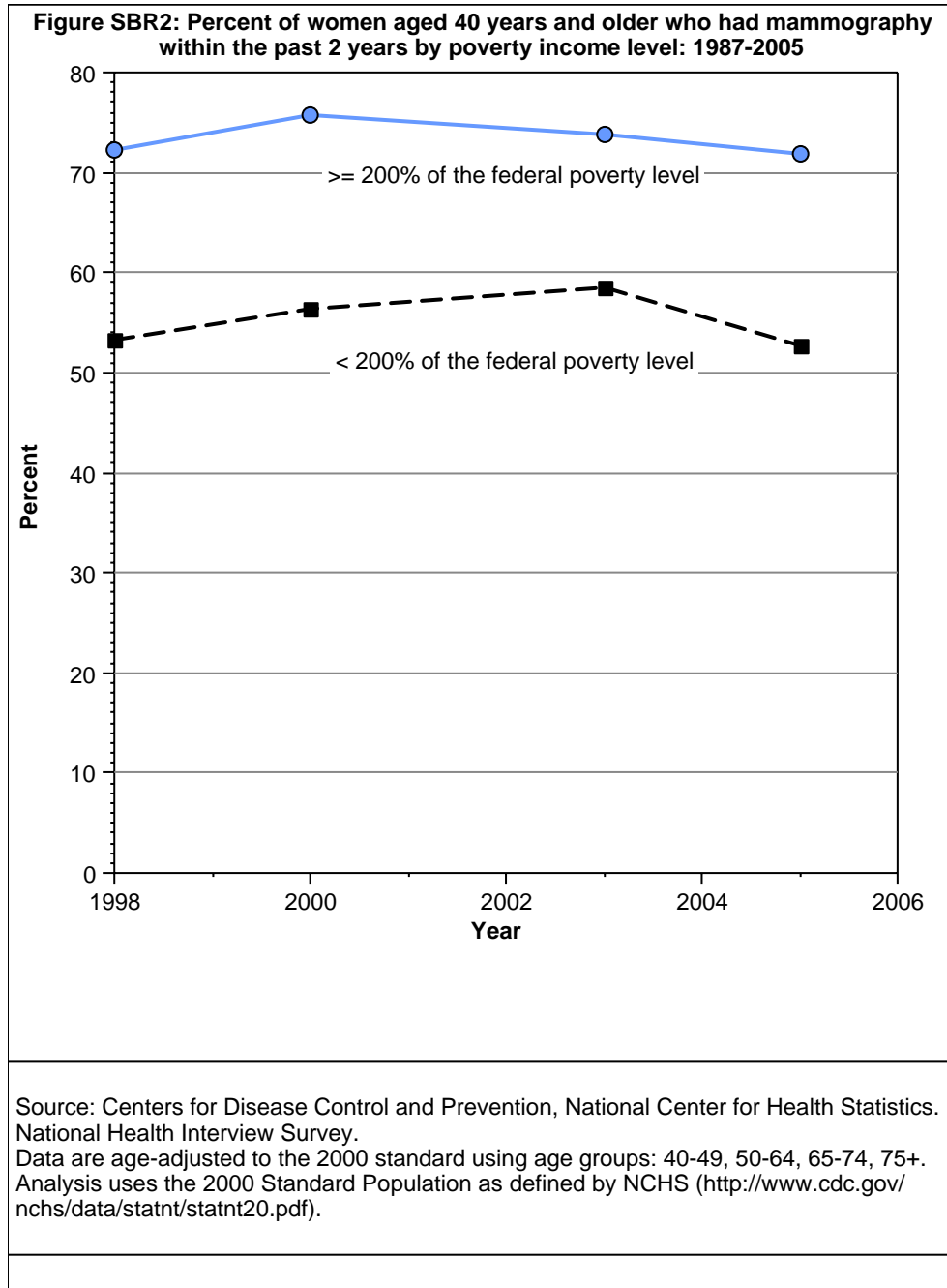
In 2005, 67 percent of women aged 40 and older had a mammogram within the past 2 years, a statistically significant drop from 70 percent in 2003. Among racial/ethnic groups, 59 percent of Hispanics (down from 65 percent in 2003), 65 percent of Blacks (down from 70 percent in 2003), and 68 percent of Whites (down from 71 percent in 2003) had a mammogram within the past 2 years, but these drops were not statistically significant. Among Asian women interviewed in California only, 74 percent had a mammogram in 2005, the same rate as in 2003.

### Healthy People 2010 Targets

Increase to 70 percent the proportion of women aged 40 and older who have had a mammogram within the past 2 years. This target was met in 2003, but the rate dropped to 67 percent, below the target, in 2005.

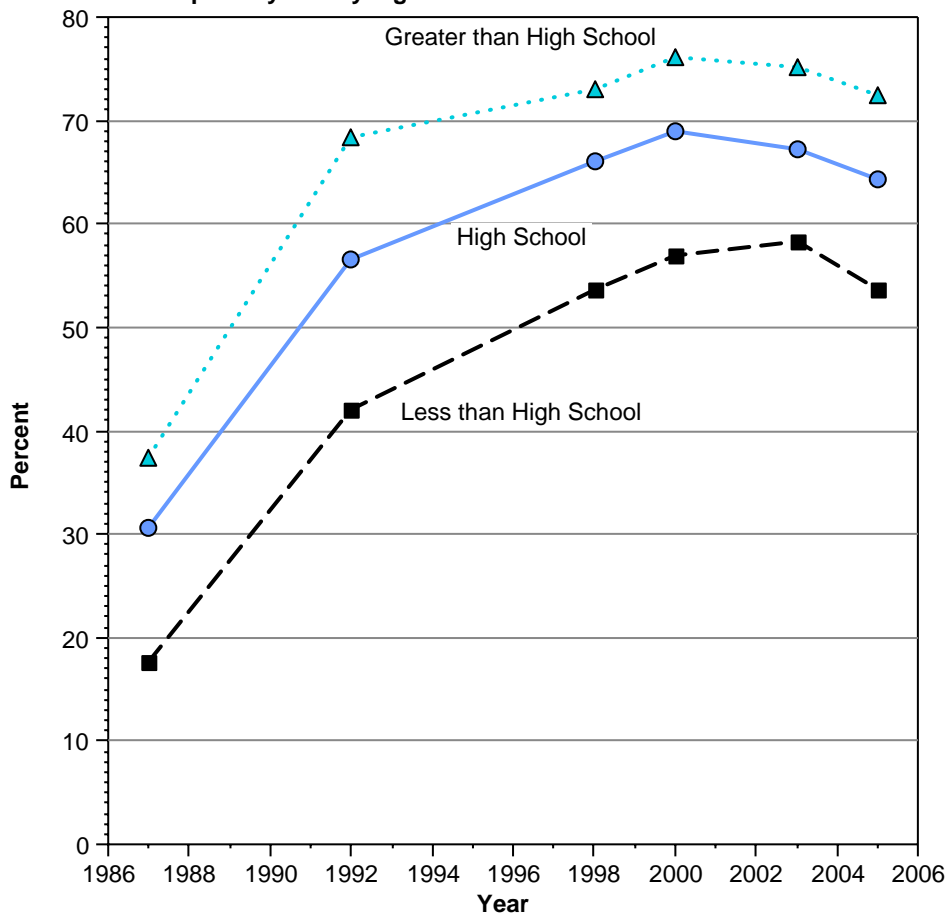
### Groups at High Risk for Not Being Screened

Women who are immigrants and those with lower incomes, with less education, without insurance, and lacking a usual health care provider are less likely to get screening mammograms.





**Figure SBR3: Percent of women aged 40 years and older who had mammography within the past 2 years by highest level of education obtained: 1987-2005**




Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 40-49, 50-64, 65-74, 75+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Key Issues

Cost and knowledge barriers, including lack of insurance and lack of provider recommendations for regular mammograms, need to be removed.

While millions of women have had at least one screening mammogram, many women still have not. Also, even among those women who have had a recent screening mammogram, many do not have them on a regular basis. For women to benefit from mammography, regular screening is needed.

In November 2009, the USPSTF modified their recommendations for mammography screening for specific age groups. For women aged 50 to 74 years, biennial screening mammography was recommended the previous recommendation was for women aged 40 to 69. Evidence for the decision to start regular, biennial screening mammography before the age of 50 years showed more harms and smaller benefits for this age group than for older women and therefore it was recommended that this should be a decision for individual patients and their physicians to make. For women 75 years or older, the USPSTF concluded that the current evidence is insufficient to make a recommendation.

Different organizations have generated different guidelines. To see guidelines issued by the U.S. Preventive Services Task Force and others, go to <http://www.ahrq.gov/clinic/USpstfix.htm>. The Guide to Community Preventive Services, <http://www.thecommunityguide.org/index.html> , is a source of information about evidence-based approaches for enhancing cancer screening.

### **Additional Information on Breast Cancer Screening**

- Breast Cancer (PDQ®): Screening — Health Professionals  
<http://cancer.gov/cancerinfo/pdq/screening/breast/healthprofessional>
- California Health Interview Survey (CHIS) (UCLA)  
<http://www.chis.ucla.edu/> 
- Phillips KA, Kerlikowske K, Baker LC, Chang SW, Brown ML. Factors associated with women's adherence to mammography screening guidelines. *Health Serv Res* 1998 Apr;33(1):29-53.
- Free or Low-Cost Programs Providing Mammography and Clinical Breast Examination in Your Area  
<http://www.cdc.gov/cancer/nbccedp/index.htm>
- Guide to Community Preventive Services  
<http://www.thecommunityguide.org/index.html> 
- Healthy People 2010, Volume 1, Chapter 3—Cancer  
<http://www.health.gov/healthypeople/document/HTML/Volume1/03Cancer.htm>
- Medicaid Coverage for Mammography and Clinical Breast Examination  
<http://www.cms.hhs.gov/medicaid/>
- Medicare Coverage for Mammography and Clinical Breast Examination  
<http://www.medicare.gov/health/mammography.asp>
- National Health Interview Survey (NHIS) (NCHS)  
<http://www.cdc.gov/nchs/nhis.htm>
- State Cancer Profiles, Latest Rates, Percents, and Counts  
<http://statecancerprofiles.cancer.gov/micromaps/>
- US Preventive Services Task Force Recommendations (AHRQ)  
<http://ahrq.gov/clinic/uspstf/uspsbrca.htm>

 [Back: Early Detection](#)

[Next: Cervical Cancer Screening](#) 

**Pap test use is high, though it fell slightly between 2000 and 2005 among women aged 18 and older.**

### **Benefits of Pap Testing**

Regular use of the Pap test followed by appropriate and timely treatment reduces deaths from cervical cancer. Women who have never been screened or who have not been screened in the past 5 years face a greater risk of developing invasive cervical cancer.

### **Measure**

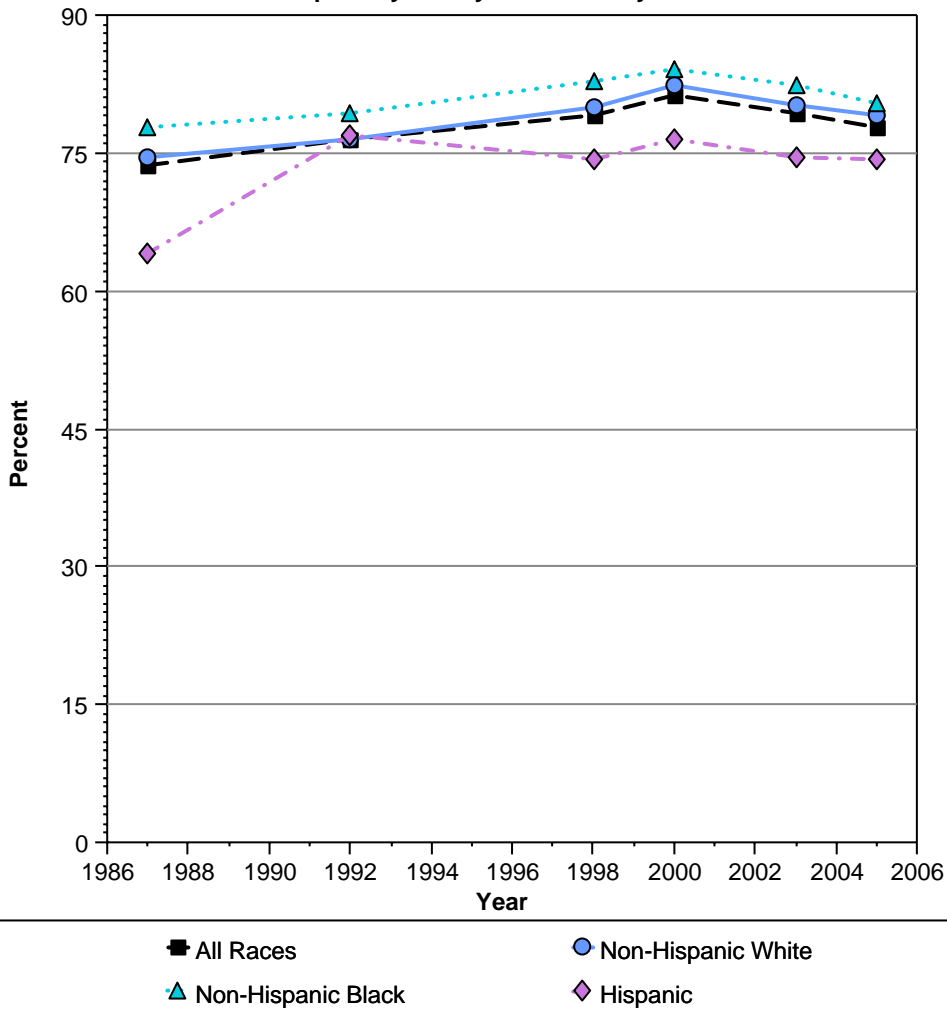
Percentage of women aged 18 years and older who reported they had a Pap test within the past 3 years.

### **Period** – 1987–2005

Note: The most recent (2008) data are currently being reviewed. This section will be updated once research results have been published.

**Trends** – Rising slightly until 2000, then falling slightly for Whites and stabilizing for Hispanics, Blacks, and California Asians (not graphed).

**Figure SCE1: Percent of women aged 18 years and older who had a pap smear test within the past 3 years by race/ethnicity: 1987-2005**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Most Recent Estimates

In 2005, 78 percent of women aged 18 and older had a Pap test within the past 3 years. This includes 74 percent of Hispanics, 80 percent of Blacks, and 79 percent of Whites. These rates were down for all women (from 79 percent in 2003), for Hispanics (from 75 percent in 2003), for Blacks (from 83 percent in 2003), and for Whites (80 percent in 2003). Among Asian women interviewed in California, 73 percent had a Pap test in 2005 (compared with 74 percent in 2003).

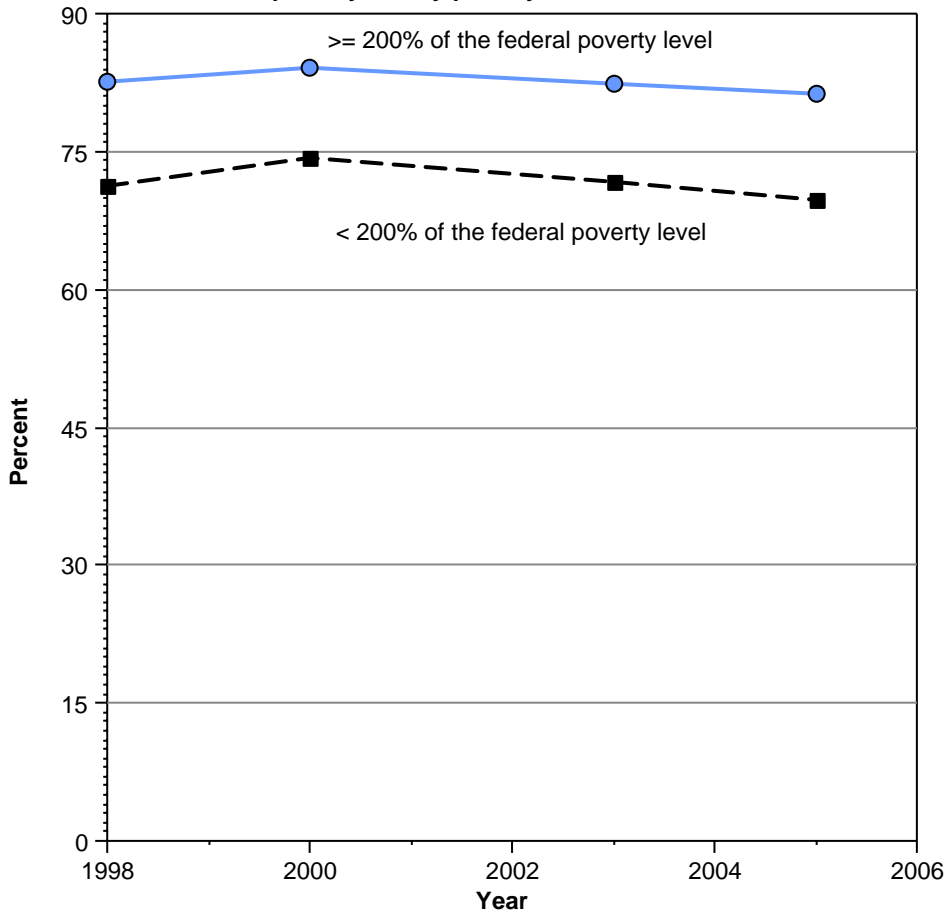
### Healthy People 2010 Targets

Increase to 90 percent the proportion of women aged 18 and older who have received a Pap test within the past 3 years.

### Groups at High Risk for Not Being Screened

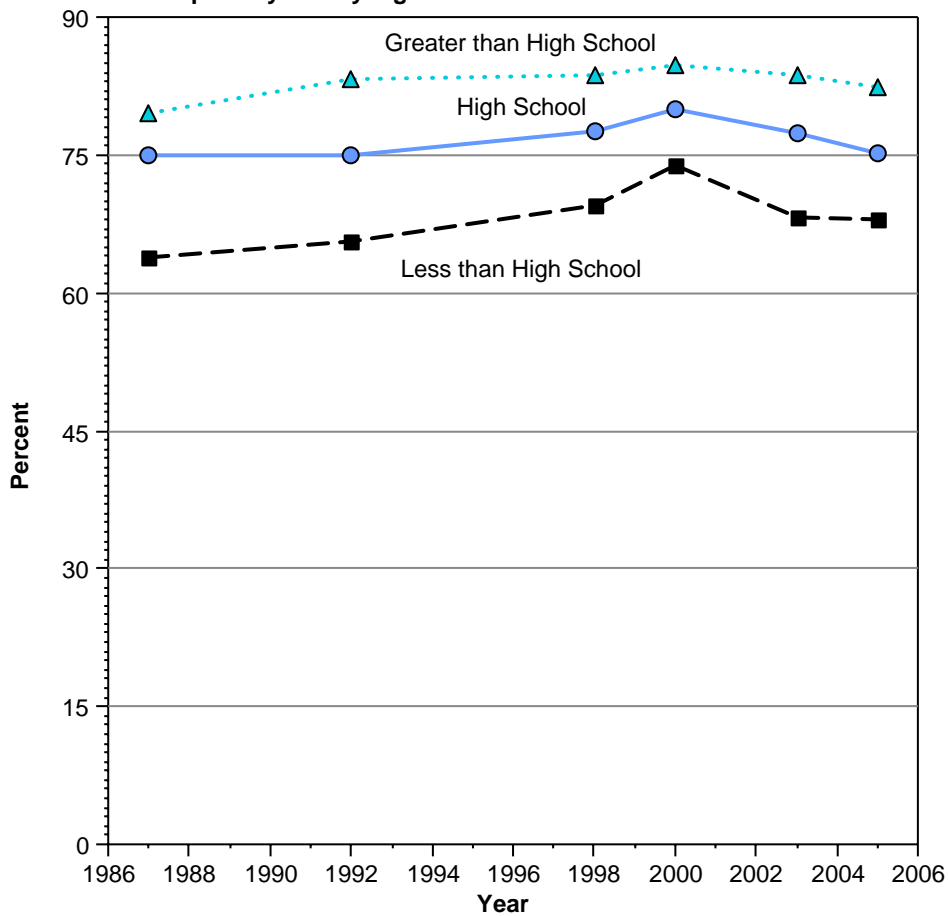
Older, poor, and less educated women are less likely to be screened for cervical cancer. Older women are at greater risk than younger women of developing and dying from cervical cancer. Women who have received the human papillomavirus vaccination (HPV) should still continue to obtain Pap tests.

**Figure SCE2: Percent of women aged 18 years and older who had a pap smear test within the past 3 years by poverty income level: 1987-2005**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure SCE3: Percent of women aged 18 years and older who had a pap smear test within the past 3 years by highest level of education obtained: 1987-2005**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).


## Key Issues

Regular Pap testing needs to be encouraged for all women. Special efforts are needed for older, poor, less educated, and immigrant women. Sexually active women also especially need Pap testing because they are more likely to be exposed to the human papillomavirus (HPV) and the human immunodeficiency virus (HIV), both of which can increase the risk of developing cervical cancer.




HPV testing is a promising new technique that may improve screening efforts because detection of these viruses identifies women at higher risk of cervical cancer, who then may be followed more closely.

A new HPV vaccine for cervical cancer, shown to be effective in girls not exposed to the sexually transmitted virus, was recently released.

In November 2009, the American College of Obstetricians and Gynecologists (ACOG) released new guidelines for cervical cancer screening which say women should delay their first Pap test until age 21, and be screened less often than recommended in the past. The advice is meant to decrease unnecessary testing and potentially harmful treatment, particularly in teenagers and young women. The group's previous guidelines had recommended yearly testing for young women, starting within three years of their first sexual intercourse, but no later than age 21.

Different organizations have generated different guidelines. To see guidelines issued by the U.S. Preventive Services Task Force and others, go to <http://www.ahrq.gov/clinic/USpstfix.htm>. The Guide to Community Preventive Services, <http://www.thecommunityguide.org/index.html> , is a source of information about evidence-based approaches for enhancing cancer screening.

## Additional Information on Cervical Cancer Screening

- American Cancer Society Guideline for the Early Detection of Cervical Neoplasia and Cancer  
<http://caonline.amcancersoc.org/cgi/content/full/52/6/342> 
- California Health Interview Survey (CHIS) (UCLA)  
<http://www.chis.ucla.edu/> 
- Cervical Cancer (PDQ®): Screening — Health Professionals  
<http://www.cancer.gov/cancerinfo/pdq/screening/cervical/HealthProfessional>
- Free or Low-Cost Pap Test Programs in Your Area  
<http://www.cdc.gov/cancer/nbccedp/index.htm>
- Guide to Community Preventive Services  
<http://www.thecommunityguide.org/index.html> 
- Healthy People 2010, Volume 1, Chapter 3—Cancer  
<http://www.health.gov/healthypeople/document/HTML/Volume1/03Cancer.htm>
- Medicaid Coverage for Pap Testing and Pelvic Exams  
<http://www.cms.hhs.gov/medicaid/>
- Medicare Coverage for Pap Testing and Pelvic Exams  
<http://www.medicare.gov/health/cervical.asp>
- National Health Interview Survey (NHIS) (NCHS)  
<http://www.cdc.gov/nchs/nhis.htm>  
<http://www.appliedresearch.cancer.gov/surveys/nhis/>
- Schiffman M, Castle PE, Jeronimo J, Rodriguez AC, and Wacholder S. Lancet. Human papillomavirus and cervical cancer. 2007 Sep 8;370(9590):890–907.  
[http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list\\_uids=17826171&dopt=AbstractPlus](http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list_uids=17826171&dopt=AbstractPlus)  
(Abstract)
- State Cancer Profiles, Latest Rates, Percents, and Counts  
<http://statecancerprofiles.cancer.gov/micromaps/>
- U.S. Preventive Services Task Force Guidelines (AHRQ)  
<http://ahrq.gov/clinic/uspstf/uspscerv.htm>

[◀ Back: Breast Cancer Screening](#)

[Next: Colorectal Cancer Screening ▶](#)

**Colorectal cancer screening rates continue to rise but remain low among people aged 50 and older.**

### Benefits of Screening Tests for Colorectal Cancer

Research supports the use of several screening tests for colorectal cancer. Usage is monitored by total test use and the following two specific tests:

- **Fecal occult blood test (FOBT).** When done every 1 to 2 years using home test kits in people aged 50 to 80, the FOBT can decrease the number of deaths due to colorectal cancer.
- **Colorectal endoscopy (sigmoidoscopy or colonoscopy).** Regular sigmoidoscopy can reduce colorectal cancer deaths. More research is needed to learn the best timing between exams and to determine the effectiveness of screening by colonoscopy. Colonoscopy also is the diagnostic procedure used to follow up positive FOBT and sigmoidoscopy screening tests.

(Note: The 1987 and 1992 versions of the National Health Interview Survey asked only about proctoscopy use. Due to improvements in colorectal cancer screening technology and because sigmoidoscopy and colonoscopy are now recommended for colorectal cancer screening by major expert groups and covered by Medicare, respondents to the 2000 National Health Interview Survey were asked whether they had had a proctoscopy, sigmoidoscopy, or colonoscopy. The procedures are referred to collectively in this report as colorectal endoscopy.)

### Measure

**FOBT:** Percentage of adults aged 50 and older who reported that they had a fecal occult blood test (FOBT) within the past 2 years, by racial/ethnic group. In the 2000 National Health Interview Survey (NHIS), questions were asked on both home and office FOBT, and in 2003 questions were asked only on home FOBT. Responses from the 2000–2005 NHIS for home FOBT are directly calculated.

(Note: Responses from the 1987–1998 NHIS may under represent use of home FOBT because, starting in 2000, respondents were asked when—but not where—their most recent home blood stool test was. Before 2000, respondents were asked when their most recent blood stool test was and whether it was a home or office test. If a home and office test were both received within the past 2 years and the office test was the more recent, the response would be counted in the 2000 and later surveys and not in the pre-2000 surveys.)

**Colorectal endoscopy:** Percentage of adults aged 50 and older who reported that they ever had an endoscopy (proctoscopy, sigmoidoscopy, or colonoscopy).

**Colorectal cancer test use:** Percentage of adults aged 50 and older who had a colorectal cancer test (home-based FOBT in the last 2 years and/or ever had a colorectal endoscopy).

**Period** – 1987–2005

Note: The most recent (2008) data are currently being reviewed. This section will be updated once research results have been published.

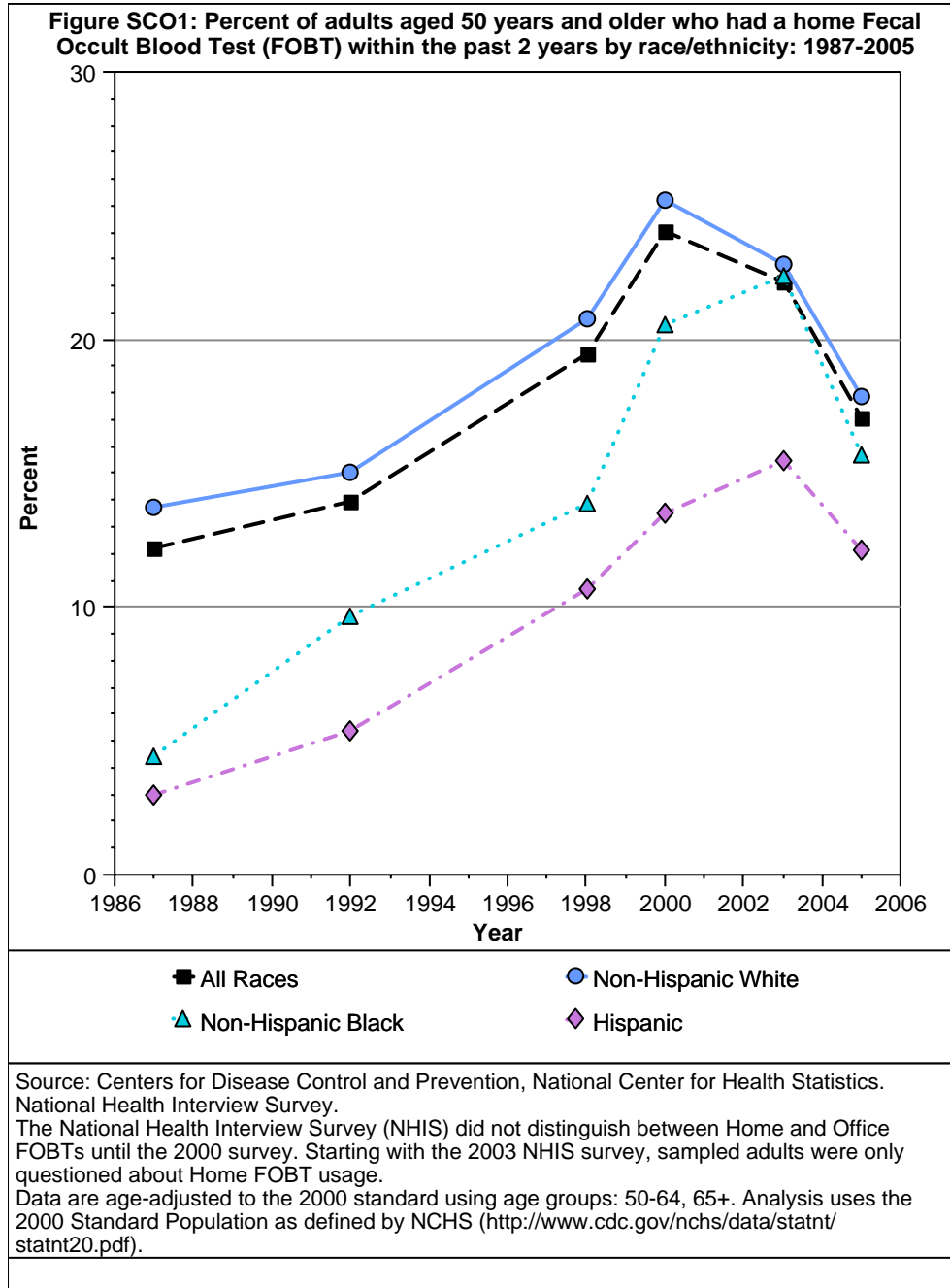
### Trends

**Home FOBT:** Decline. Home FOBT had been rising until 2000, then began falling in Whites, continued to rise in Blacks and Hispanics until 2003, then falling in these groups in 2005.

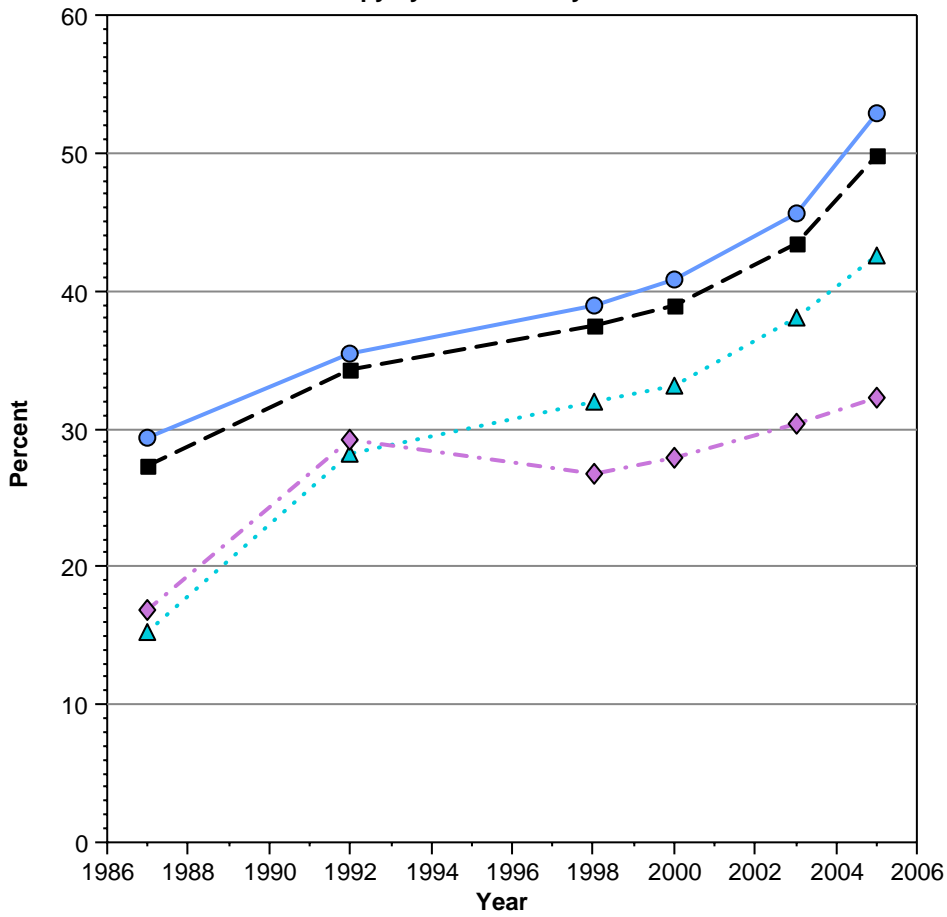


**Colorectal endoscopy:** Rising overall. Colorectal endoscopy had been rising from 1987–1998, stabilized until 2000, then began to rise again after 2000 and rose especially rapidly (Annual Percent Change = 7 percent) from 2003–2005. These same trends characterize both Whites and Blacks. Among Hispanics, rates were slightly higher in 2005 than in 1992.

**Colorectal cancer test use:** Rising overall. Rising, especially from 1987–1992, 1998–2000, and 2003–2005. Since 1987, colorectal cancer test use has been rising among Whites. Overall, rise among Blacks was attributable to large significant increases from 1987–1992 and 1998–2000. After a large rise among Hispanics from 1987–1992, the trend has been stable. Among Asians interviewed in California only, rates were stable from 2001–2003 (not graphed).



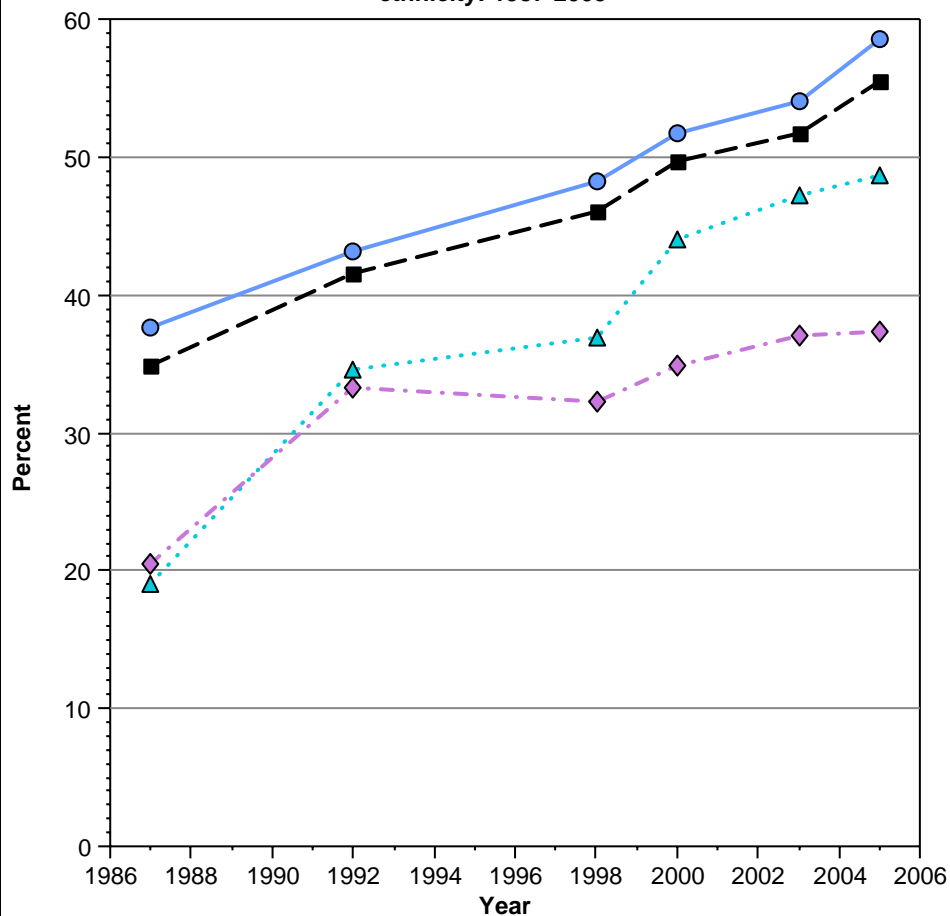
**Figure SCO2: Percent of adults aged 50 years and older who ever had a colorectal endoscopy by race/ethnicity: 1987-2005**



All Races
  Non-Hispanic White  
 Non-Hispanic Black
  Hispanic

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 50-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure SCO3: Colorectal test use rates^ for adults aged 50 years and older by race/ethnicity: 1987-2005**



All Races
  Non-Hispanic White  
 Non-Hispanic Black
  Hispanic

^ Colorectal Test Use Rates are defined as the combined percentage of people who have received a home FOBT in the last 2 years or have ever had a colorectal endoscopy. Each surveyed individual can only contribute once to the numerator of the calculation.  
 Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 50-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Most Recent Estimates

In 2005, 25 percent of people aged 50 and older had a **home FOBT** within the past 2 years. This includes 18 percent of Hispanics, 24 percent of Blacks, and 26 percent of Whites. Among Asian women interviewed in California, 22 percent had a home FOBT within the past 2 years. In 2005, 50 percent of people 50 and older had ever had a **colorectal endoscopy**. This includes 32 percent of Hispanics, 43 percent of Blacks, and 53 percent of Whites. Among Asian women interviewed in California, 53 percent had ever had a colorectal endoscopy. In 2005, 59 percent of people 50 and older had used a **colorectal cancer test**. This includes 40 percent of Hispanics, 52 percent of Blacks, and 61 percent of Whites. Among Asian women interviewed in California, 60 percent had used a colorectal cancer test.

### Healthy People 2010 Targets

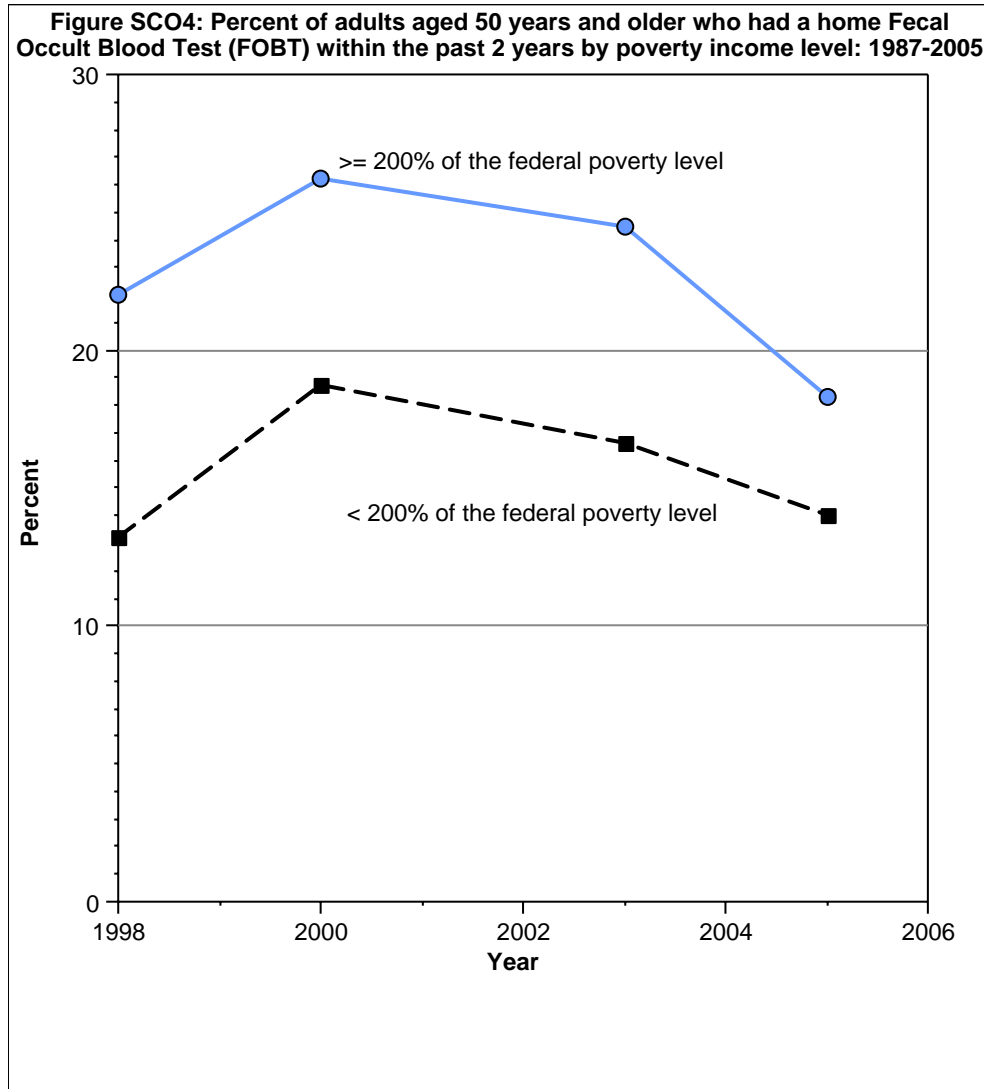
Increase to 50 percent the proportion of adults aged 50 and older who have had an FOBT within the past 2 years.

Increase to 50 percent the proportion of adults aged 50 and older who have ever had a sigmoidoscopy. Since colonoscopy use has eclipsed sigmoidoscopy use over the decade, we examined colonoscopy and sigmoidoscopy jointly. The target of 50% was met (for endoscopy including colonoscopy and sigmoidoscopy) in 2005.

No Healthy People 2010 target has been set for the proportion of adults who should receive colonoscopy screenings.

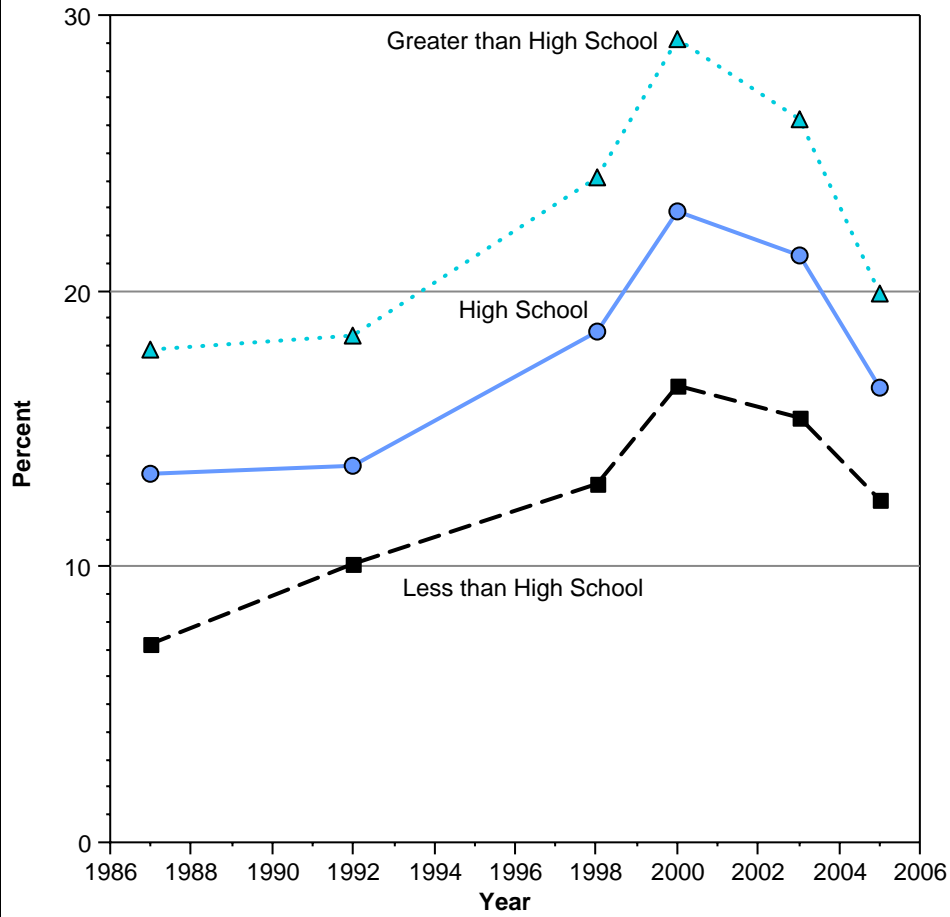
### Groups at High Risk for Not Being Screened

Immigrants and those with lower incomes, with less education, without insurance, and lacking a usual health care provider are less likely to be screened for colorectal cancer.



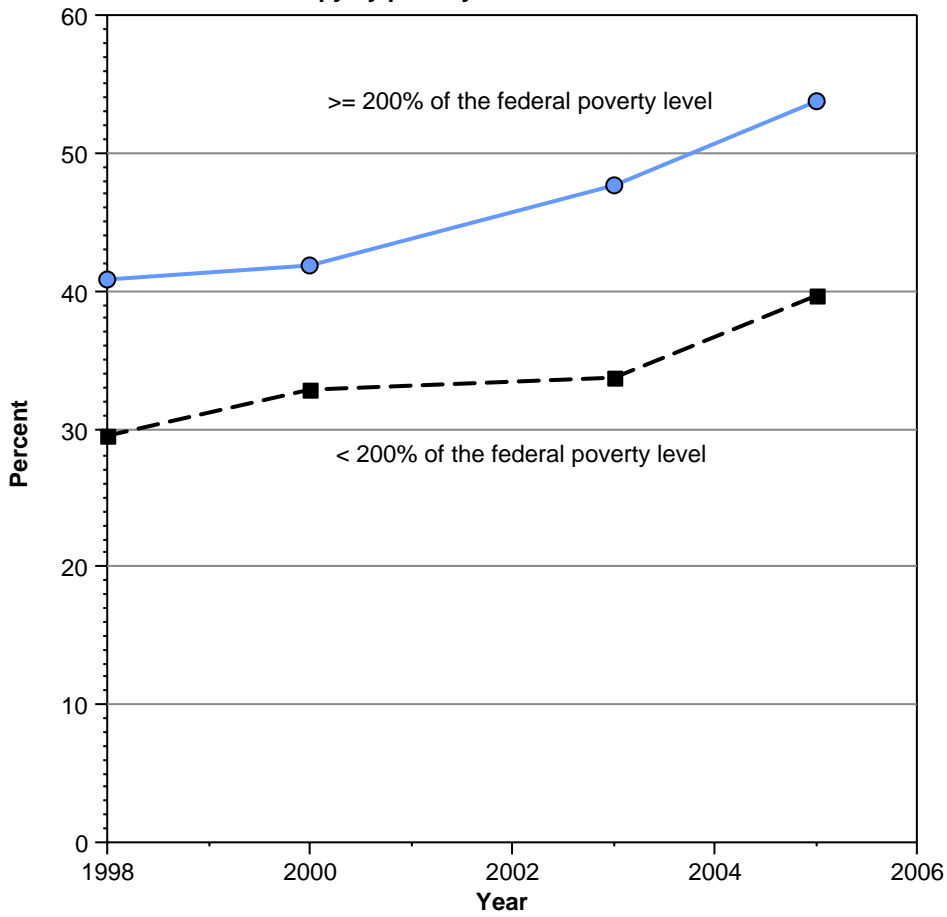
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. The National Health Interview Survey (NHIS) did not distinguish between Home and Office FOBTs until the 2000 survey. Starting with the 2003 NHIS survey, sampled adults were only questioned about Home FOBT usage. Data are age-adjusted to the 2000 standard using age groups: 50-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure SC05: Percent of adults aged 50 years and older who had a home Fecal Occult Blood Test (FOBT) within the past 2 years by highest level of education obtained: 1987-2005**



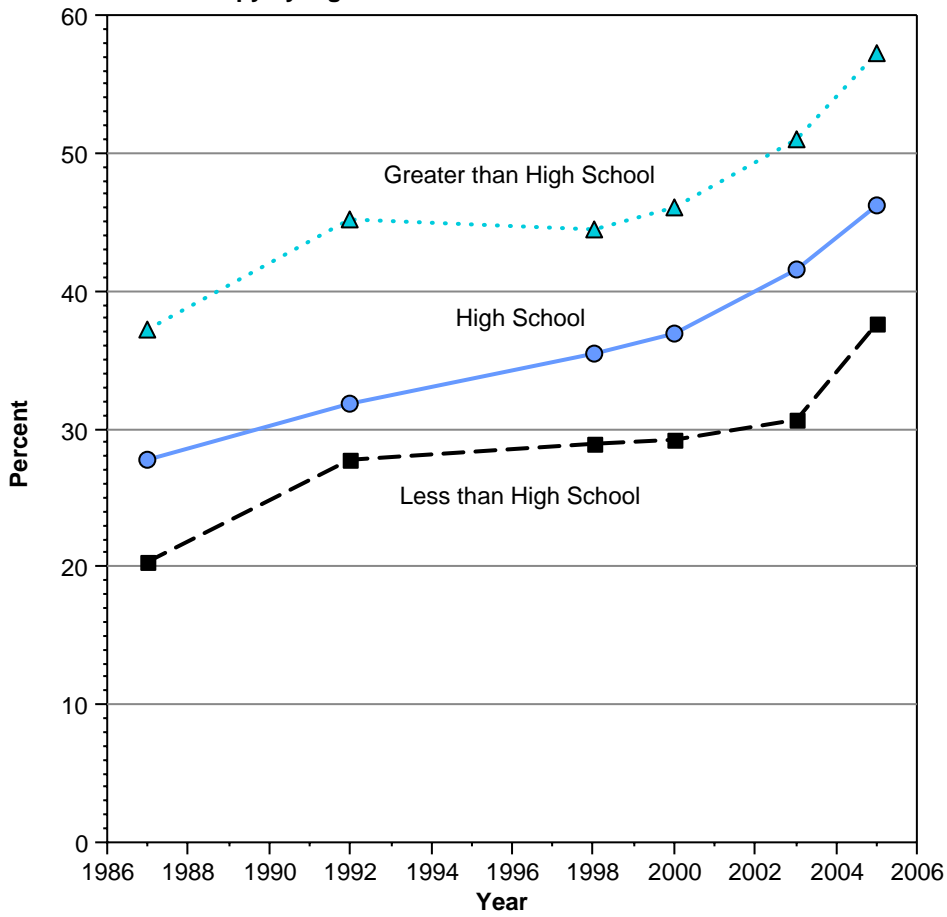
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 The National Health Interview Survey (NHIS) did not distinguish between Home and Office FOBTs until the 2000 survey. Starting with the 2003 NHIS survey, sampled adults were only questioned about Home FOBT usage.  
 Data are age-adjusted to the 2000 standard using age groups: 50-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

**Figure SCO6: Percent of adults aged 50 years and older who ever had a colorectal endoscopy by poverty income level: 1987-2005**



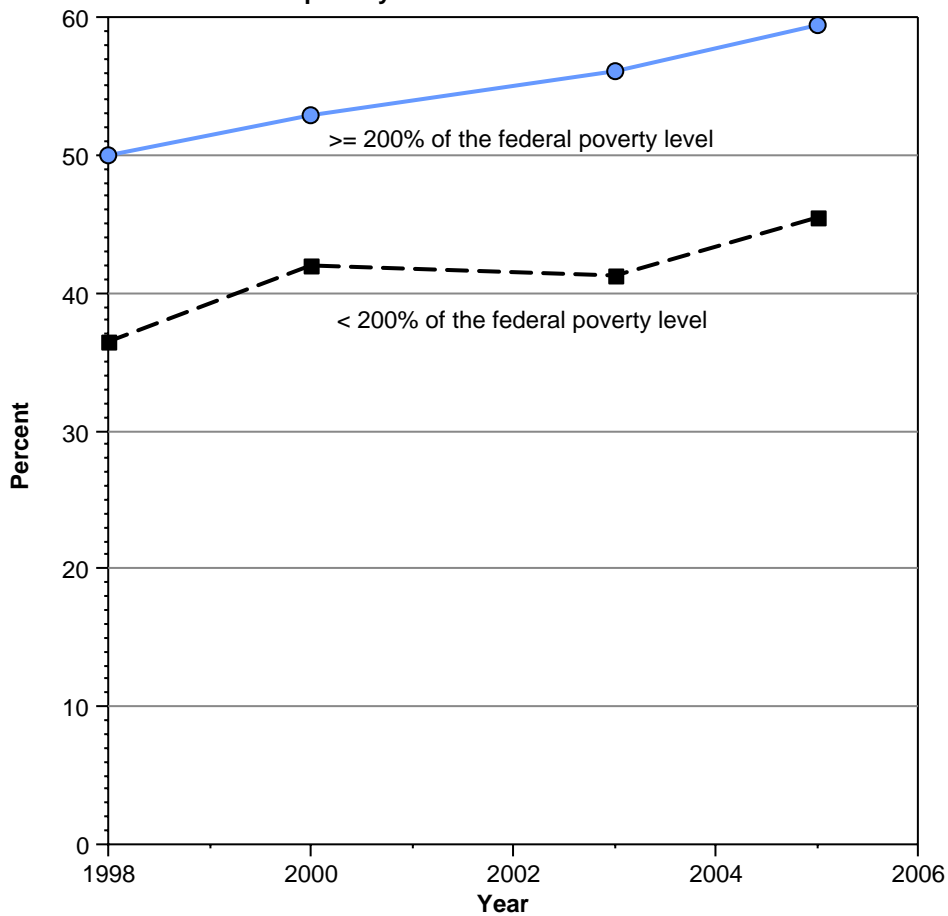
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
Data are age-adjusted to the 2000 standard using age groups: 50-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

Figure SC07: Percent of adults aged 50 years and older who ever had a colorectal endoscopy by highest level of education obtained: 1987-2005



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 50-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

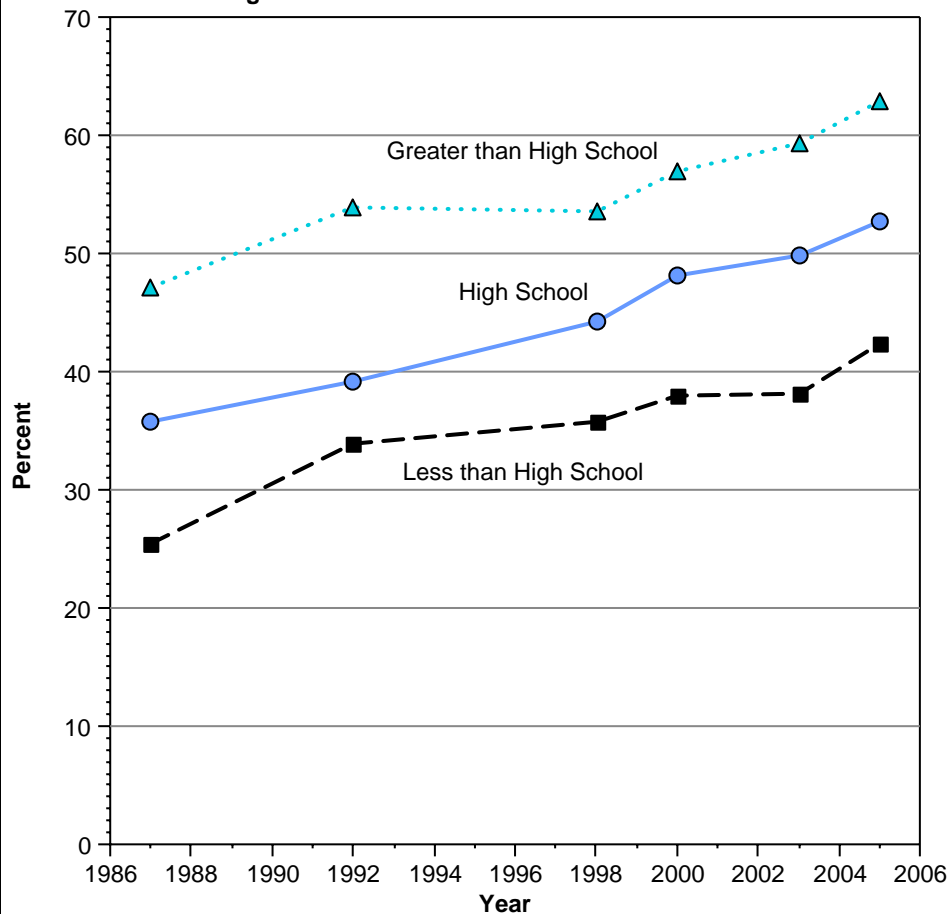
**Figure SCO8: Colorectal test use rates<sup>^</sup> for adults aged 50 years and older by poverty income level: 1987-2005**



<sup>^</sup> Colorectal Test Use Rates are defined as the combined percentage of people who have received a home FOBT in the last 2 years or have ever had a colorectal endoscopy. Each surveyed individual can only contribute once to the numerator of the calculation.  
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
Data are age-adjusted to the 2000 standard using age groups: 50-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).



**Figure SCO9: Colorectal test use rates<sup>^</sup> for adults aged 50 years and older by highest level of education obtained: 1987-2005**




<sup>^</sup> Colorectal Test Use Rates are defined as the combined percentage of people who have received a home FOBT in the last 2 years or have ever had a colorectal endoscopy. Each surveyed individual can only contribute once to the numerator of the calculation. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. Data are age-adjusted to the 2000 standard using age groups: 50-64, 65+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

## Key Issues

Despite some improvements over time, colorectal cancer screening rates remain low. Understanding and overcoming doctor and patient barriers to these life-saving tests is critical.

Newer screening methods, such as virtual colonoscopy and fecal DNA testing, are promising and need further evaluation.

A substantial proportion of reported FOBT and colorectal endoscopy procedures may be used for diagnostic rather than screening purposes.

Different organizations have generated different guidelines. To see guidelines issued by the U.S. Preventive Services Task Force and others, go to <http://www.ahrq.gov/clinic/USpstfix.htm>. The Guide to Community Preventive Services, <http://www.thecommunityguide.org/index.html> , is a source of information about evidence-based approaches for enhancing cancer screening.

## Additional Information on Colorectal Cancer Screening

- Agency for Healthcare Research and Quality, Staying Healthy  
<http://www.ahrq.gov/consumer/healthy.html>
- The Annual Report to the Nation on the Status of Cancer, 1973-1997, with a Special Section on Colorectal Cancer (ACS)  
<http://www3.interscience.wiley.com/cgi-bin/fulltext/75504286/HTMLSTART> 
- Cancer Intervention Surveillance Network (CISNET), Colorectal Cancer Mortality Projections  
<http://cisnet.cancer.gov/projections/colorectal>
- Colorectal Cancer (PDQ®): Screening — Health Professionals  
<http://www.cancer.gov/cancerinfo/pdq/screening/colorectal/healthprofessional>
- Colorectal Cancer Testing in the Medicare Population: 1998–2004
- <http://www2.thecarolinascenter.org/crc/crc.aspx?tabid=229> 
- Guide to Community Preventive Services  
<http://www.thecommunityguide.org/index.html> 
- Healthy People 2010, Volume 1, Chapter 3—Cancer  
<http://www.health.gov/healthypeople/document/HTML/Volume1/03Cancer.htm>
- National Cancer Institute, Colorectal Cancer Screening: Questions and Answers  
<http://www.cancer.gov/cancertopics/factsheet/Detection/colorectal-screening>
- National Health Interview Survey (NHIS) (NCHS)  
<http://www.cdc.gov/nchs/nhis.htm>
- State Cancer Profiles, Latest Rates, Percents, and Counts  
<http://statecancerprofiles.cancer.gov/micromaps/>
- U.S. Preventive Services Task Force Recommendations (ARHQ)  
<http://www.ahrq.gov/clinic/uspstf/uspscolo.htm>

◀ [Back: Cervical Cancer Screening](#)

[Next: Diagnosis](#) ▶

## ➤ Diagnosis

The rate of newly diagnosed cancer cases ([incidence](#)) is one way to measure progress against cancer. A lower rate of new cases suggests greater progress is being made.

Another important measure is the proportion of cancers diagnosed at a later stage of development. The stage of a cancer shows how far the disease has progressed and spread within the body. The earlier the [stage at diagnosis](#), the better the chances are for a cure. Downward trends in the proportion of late cancer diagnoses are a sign that screening is working for cancers for which early detection methods are available.

This section of the *Cancer Trends Progress Report – 2009/2010 Update* provides data on the rates of new cancers, based on the NCI Surveillance, Epidemiology, and End Results (SEER) Program, by cancer site and by racial and ethnic group. Also included are data on the proportion of cancers diagnosed at a late stage for five of the major cancer sites where cancer screening has been shown to make a difference in outcomes and is recommended—or is being widely used—as in the case of prostate cancer screening. Cancer sites include the female breast, colon, rectum, cervix, and prostate.

◀ [Back: Colorectal Cancer Screening](#)

[Next: Incidence](#) ▶

## Incidence

## Diagnosis

(2007 data now available. For 2008 data, please go to [NCIs Cancer Statistics Review.](#))

**After several decades of significant increase, delay adjusted rates have stabilized since 1999.**

### Measuring New Cancer Cases

In 2010, more than half of all new cancers were cancers of the prostate, female breast, lung, and colon/rectum. According to American Cancer Society projections, there were 1,529,560 new cases of cancer in 2010, including 217,730 cases of prostate cancer; 209,060 cases of female breast cancer; 222,520 cases of lung cancer; and 142,570, cases of colon/rectum cancer.

Cancer incidence is usually measured as the number of new cases each year for every 100,000 people (for gender-specific cancers, people of the same gender serve as the denominator) and age-adjusted (to a standard population) to allow comparisons over time.

### Measure

**Incidence rate:** The observed number of new cancer cases per 100,000 people per year is adjusted for cancer case reporting delays, based on data from approximately 10 percent of the U.S. population.

**Period** – 1975–2007

### Trends

**All sites combined:** Overall incidence was on the rise from 1975 to 1989, with non-significant changes in rates from 1989 to 1999. From 1999 to 2007, incidence has significantly declined. Among men, incidence rates rose from 1975 to 1992. From 1992 to 1995, cancer incidence among men significantly declined, with no significant change between 1995 and 2000. From 2000 to 2007, incidence trends among men resumed a decline. Among women, from 1975 to 1979 incidence rates were stable before rising between 1979 and 1987 and then stabilizing through 1998. From 1998 to 2007, cancer incidence among women significantly declined.

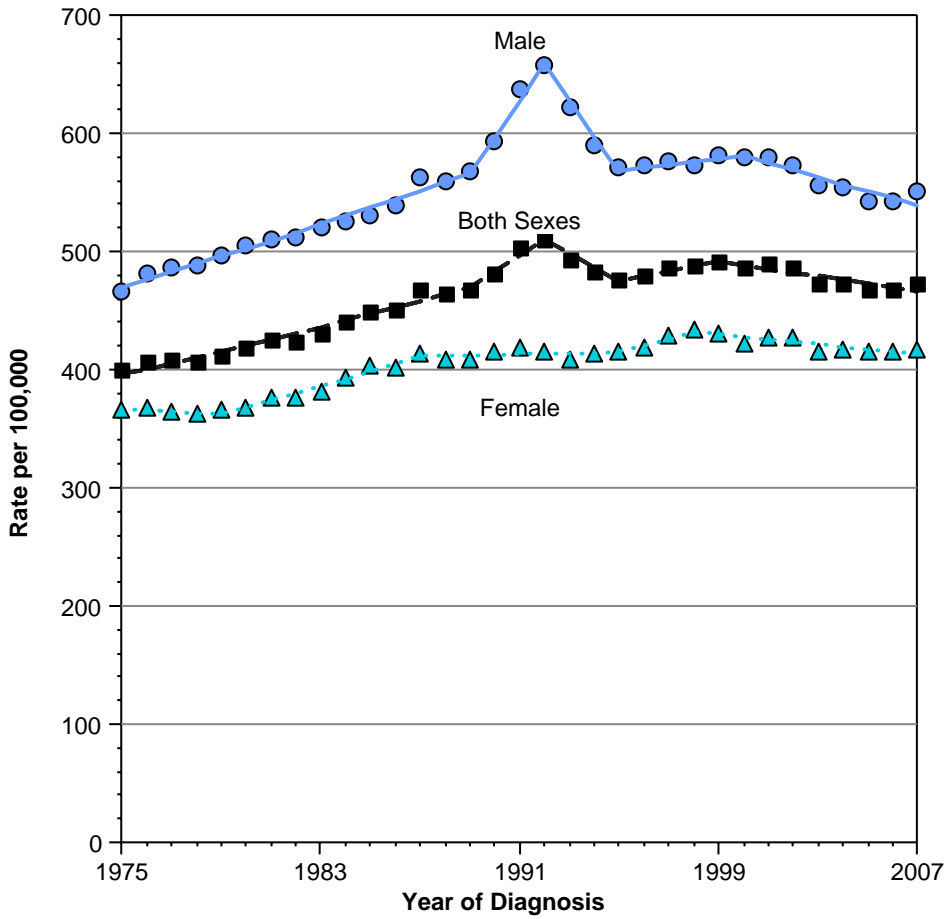
**Prostate cancer:** Incidence rose between 1975 and 1992 and then fell until around 1995. After a period of non-significant change from 1995 to 2000, rates declined again from 2000 to 2007.

**Female breast cancer:** After an initial period of no significant change, incidence rates rose between 1980 and 1987, before stabilizing from 1987 to 1998. Incidence rates fell from 1998 to 2007.

**Colorectal cancer:** Among males, incidence rose between 1975 and 1985; incidence rates were stable among women during these years. Among both men and women, incidence rates have fallen steadily since 1985, except for a period of non-significant change in rates among both men and women from 1995 to 1998.

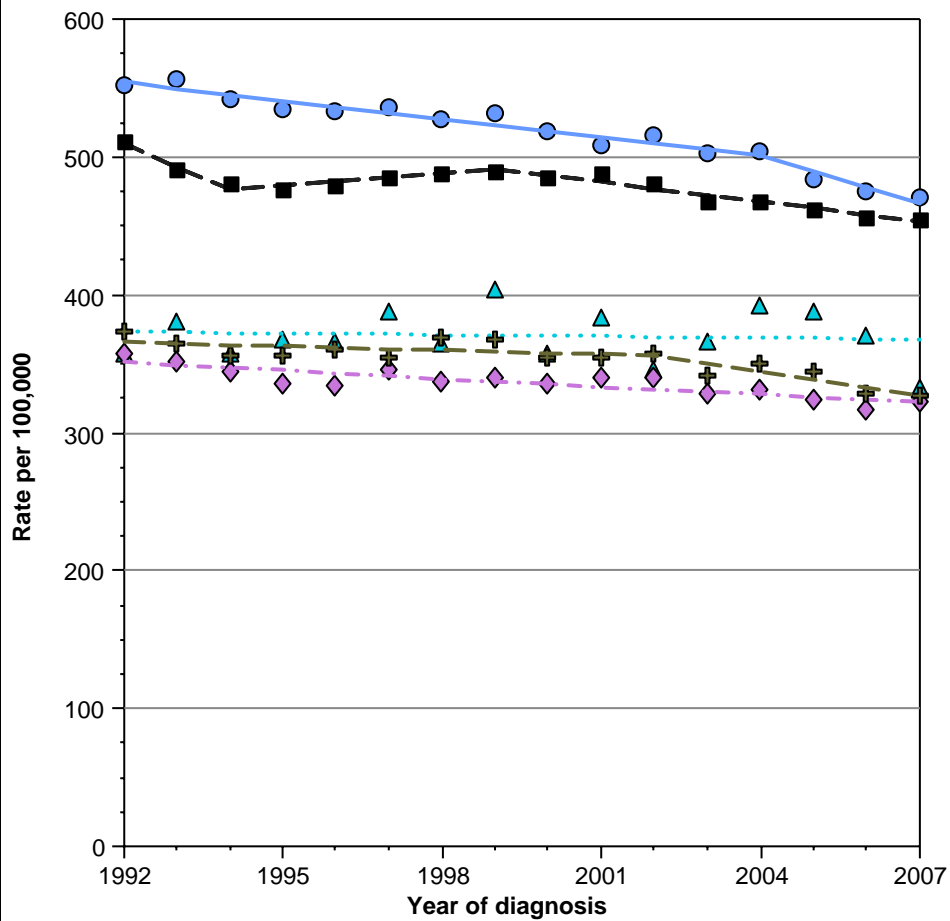
**Lung cancer:** Incidence of lung cancer was consistently higher among males than females between 1975 and 2006. Incidence rates increased among men from 1975 until 1982, were stable from 1982 to 1991, and declined from 1991 to 2007. Lung cancer incidence rates steadily increased among women from 1975 to 2007.

Figure DIN1: Rates of new cases of all cancer, delay-adjusted cancer incidence by sex: 1975-2007



Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas (<http://seer.cancer.gov/registries/terms.html>). Data are age-adjusted to the 2000 standard using age groups: <1, 1-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+. Analysis uses the 2000 Standard Population (Census P25-1130) as defined by NCI (<http://seer.cancer.gov/stdpopulations/>).

**Figure DIN2: Rates of new cases of all cancer by race/ethnicity: 1992-2007**



White
  Black  
 American Indian/Alaska Native
  Asian/Pacific Islander  
 Hispanic

Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas (<http://seer.cancer.gov/registries/terms.html>). Data are age-adjusted to the 2000 standard using age groups: <1, 1-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+. Analysis uses the 2000 Standard Population (Census P25-1130) as defined by NCI (<http://seer.cancer.gov/stdpopulations/>).

**Most Recent Estimates (Delay-adjusted)**

In 2007, new cases of cancer occurred at the following rates:

**All sites combined:** 472.68 cases per 100,000 people per year

**Prostate:** 170.88 per 100,000 men per year

**Female breast:** 124.68 per 100,000 women per year

**Colorectal:** 51.60 per 100,000 men per year and 41.15 per 100,000 women per year

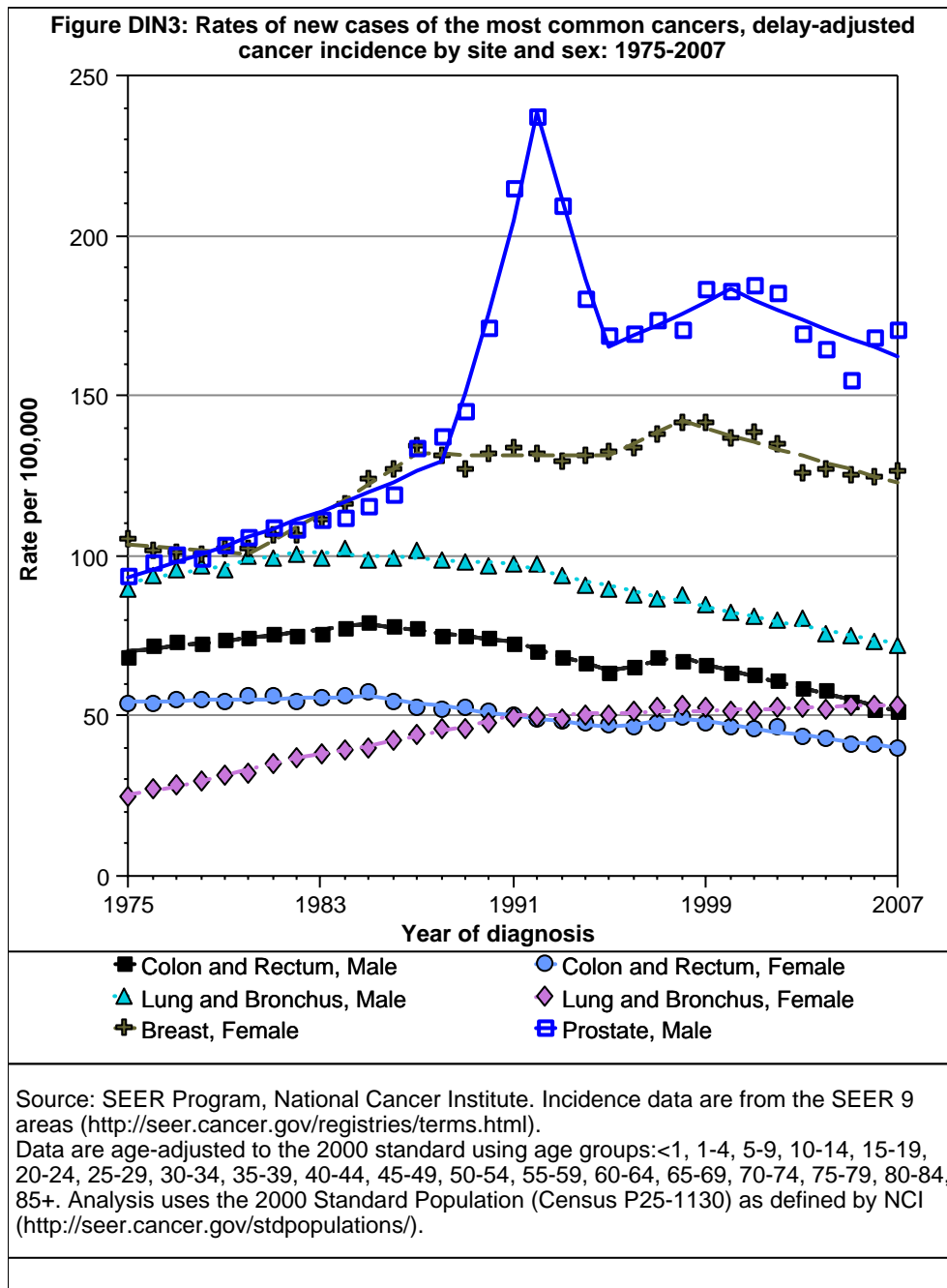
**Lung:** 71.82 per 100,000 men per year and 53.02 per 100,000 women per year

## Healthy People 2010 Targets

There is no Healthy People 2010 target for cancer incidence.

## Groups at High Risk for Getting New Cancers

Among major racial/ethnic groups, blacks have the highest rate of new cancers, followed by whites. Comparatively, rates are lower among American Indians/Alaska Natives, Hispanics, and Asians and Pacific Islanders.

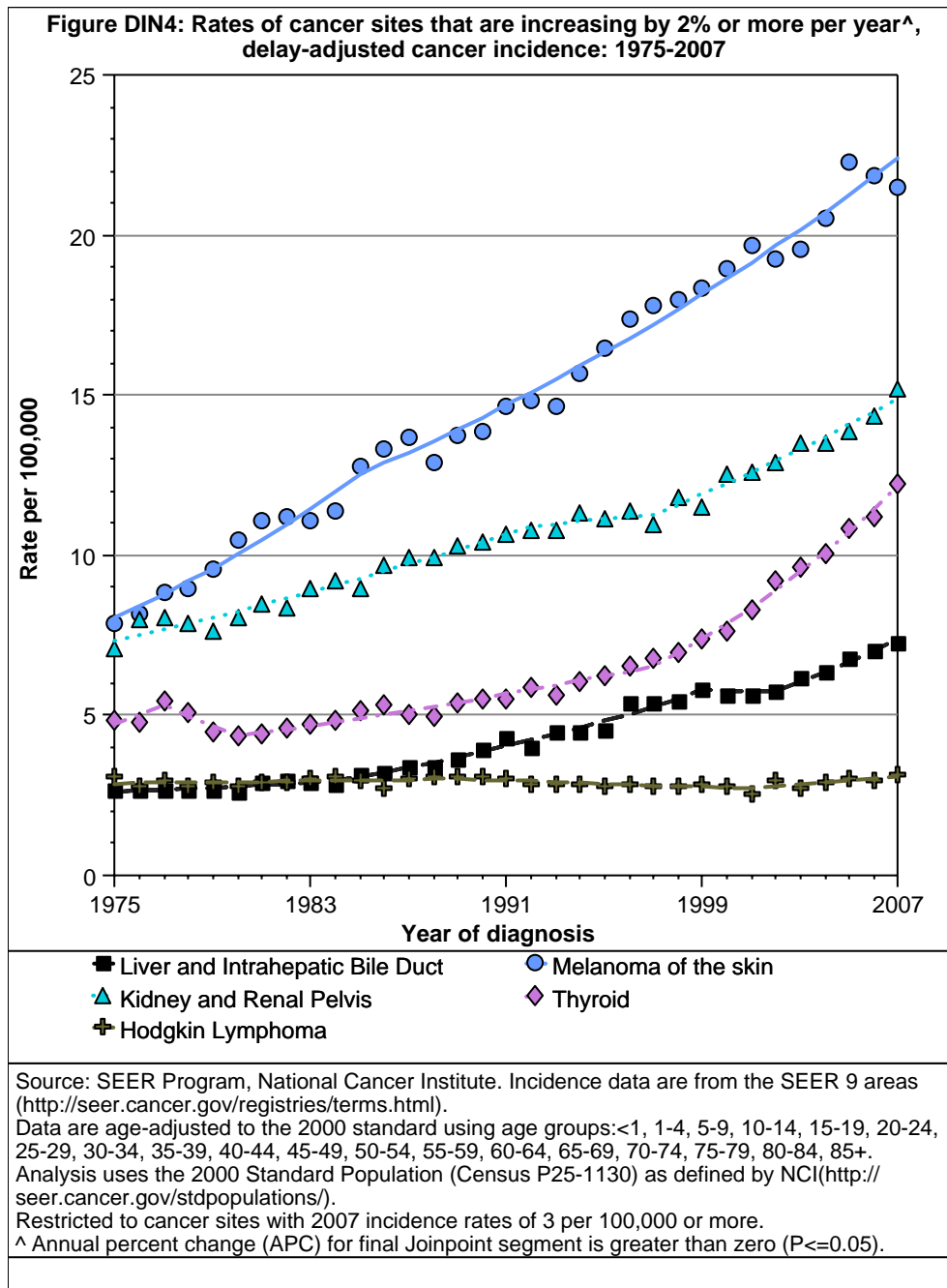


## Cancer Sites with Increasing Incidence Trends

The small subset of cancer sites with the fastest increasing incidence rates (annual percent changes of 2 percent or more per year) include melanoma of the skin; cancer of the kidney and renal pelvis; thyroid; Hodgkin lymphoma, and liver and intrahepatic bile duct cancers. The incidence rates of other cancer sites are also rising; however, they are rising at rates of less than 2 percent per year. These cancers include non-Hodgkin lymphoma, childhood cancer, pancreas cancer, leukemia, testis, and esophageal cancer. Rising cancer incidence trends must be interpreted with caution, because they can reflect a “real” increase in cases, a temporary increase in cases associated with early detection, or a permanent increase in cases associated with finding cases that are histologically malignant but biologically indolent.

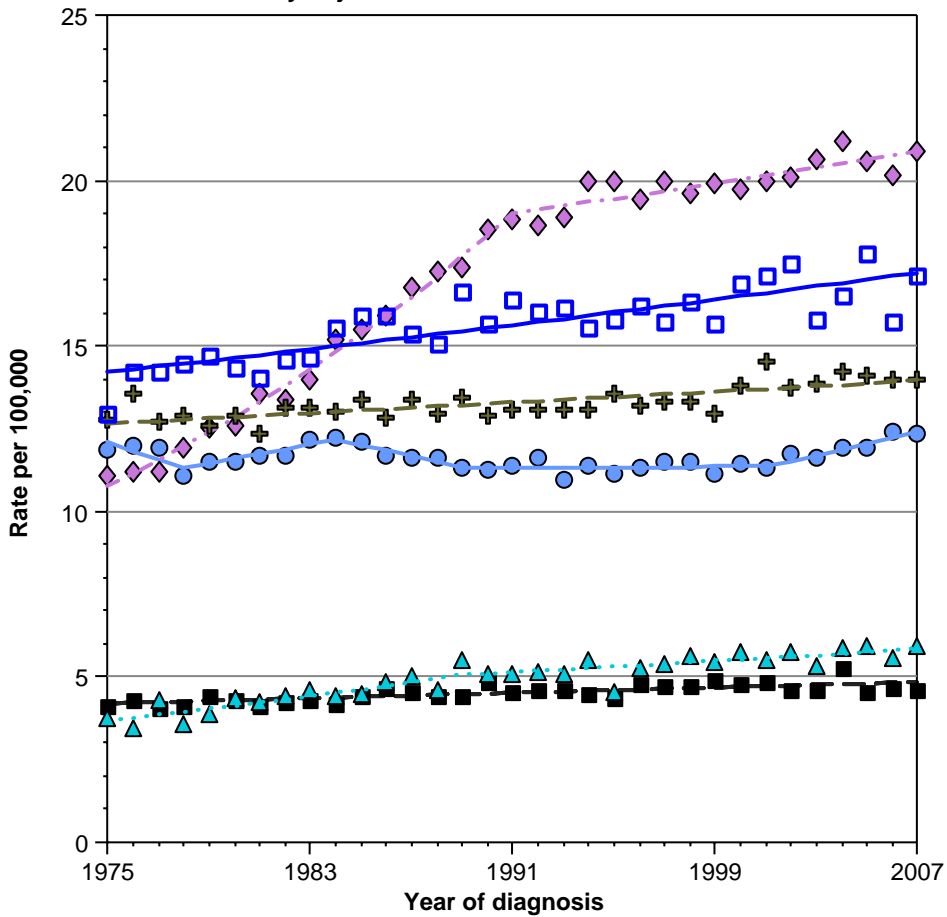
### Cancer Sites with Decreasing Incidence Trends

Incidence rates are decreasing for all cancer sites combined and for the four leading cancers (prostate, breast, lung, and colorectal cancer); incidence rates of several other cancer sites are also decreasing. Among cancer sites with annual incidence rates of at least 5 cases per 100,000 cancers with decreasing incidence are corpus and uterus (not otherwise specified); ovary; oral cavity and pharynx; stomach; cervix uteri; and urinary bladder cancers.





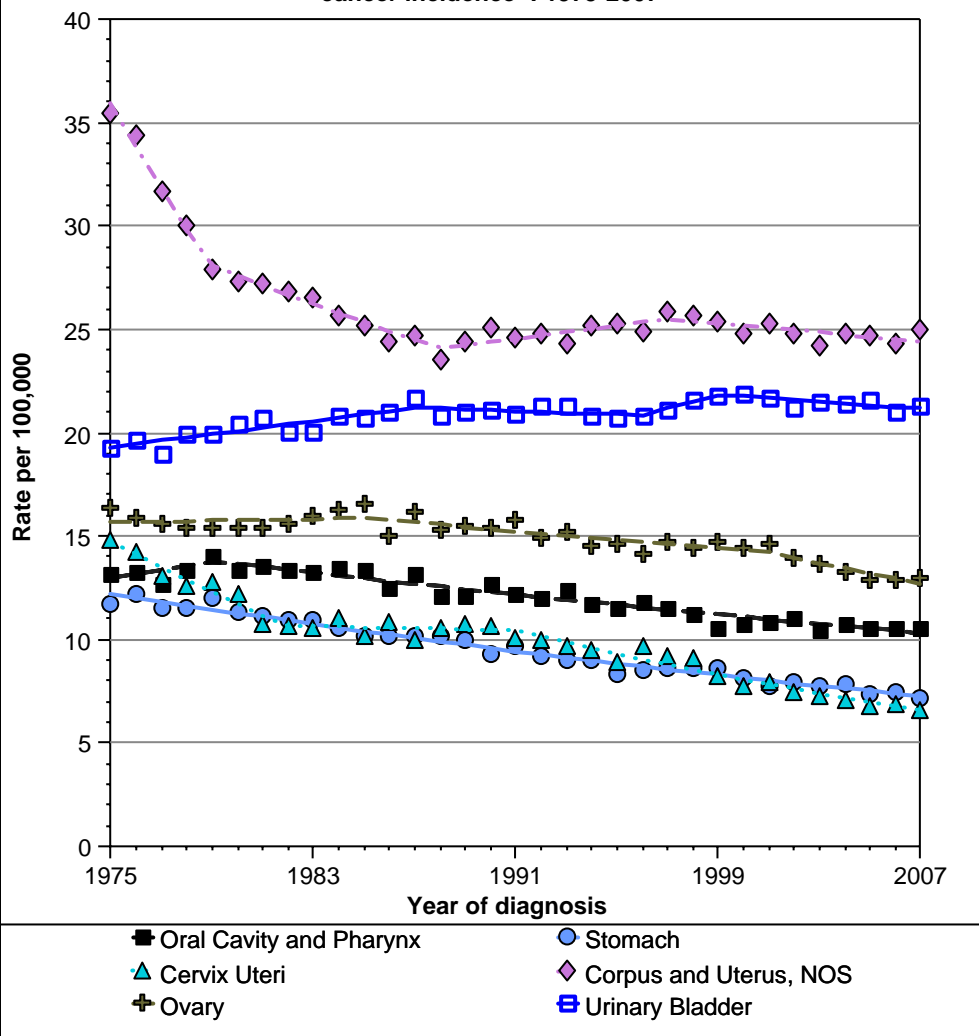
**Figure DIN5: Rates of cancer sites that are increasing by less than 2% per year<sup>^</sup>, delay-adjusted cancer incidence: 1975-2007**



- Esophagus
- ▲ Testis
- ⊕ Leukemia
- Pancreas
- ◆ Non-Hodgkin Lymphoma
- Childhood (Ages <20)

Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas (<http://seer.cancer.gov/registries/terms.html>).  
 Data are age-adjusted to the 2000 standard using age groups:<1, 1-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+.  
 Analysis uses the 2000 Standard Population (Census P25-1130) as defined by NCI(<http://seer.cancer.gov/stdpopulations/>).  
 Restricted to cancer sites with 2007 incidence rates of 3 per 100,000 or more.  
<sup>^</sup> Annual percent change (APC) for final Joinpoint segment is greater than zero (P<=0.05).

**Figure DIN6: Rates of cancer sites with intermediate and decreasing delay-adjusted cancer incidence<sup>^</sup>: 1975-2007**



Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas (<http://seer.cancer.gov/registries/terms.html>). Data are age-adjusted to the 2000 standard using age groups:<1, 1-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+. Analysis uses the 2000 Standard Population (Census P25-1130) as defined by NCI(<http://seer.cancer.gov/stdpopulations/>). Restricted to cancer sites with 2007 incidence rates greater than 5 per 100,000. <sup>^</sup> Cancer sites with annual mortality rates between 5 and 40 per 100,000 population after rounding. Annual percent change (APC) for final Joinpoint segment is less than zero (P<=0.05).

**Key Issues**

Although the rate of increase in lung cancer incidence among women has slowed recently, the increasing trend remains statistically significant, and lung cancer is by far the leading cause of cancer deaths among women. This highlights the need to reduce smoking prevalence and environmental tobacco smoke (ETS) exposure among all women, focusing especially on those populations whose tobacco use and ETS exposure remains high, such as women with lower levels of education.


The recent decline in new breast cancer incidence is thought to be related to the decline in hormone replacement therapy (HRT) use and the small decline in screening using mammography. Although most major cancers are occurring less frequently, cancers of some sites are on the rise and require greater efforts at control.

For instance, incidence rates of some cancers, including melanoma of the skin, cancer of the kidney, and renal pelvis, thyroid, and liver and intrahepatic bile duct cancers, are rising with annual percent changes of greater than 2 percent. Incidence rates of some other cancers are also rising; however, they are rising at a rate of less than 2 percent per year. These cancer sites include non-Hodgkin lymphoma, childhood cancer, pancreatic cancer, leukemia, testicular cancer, and esophageal cancer.

Rising incidence rates must be interpreted with caution, because trends can reflect real increases in cases, temporary increase in cases with earlier detection, or additional finding of cases that are histologically malignant but biologically indolent.

Incidence rates of most leading cancers are decreasing, including female breast, prostate, colorectal and lung cancers. Incidence rates are also decreasing for other sites, including corpus and uterus; not otherwise specified; ovary; oral cavity and pharynx; stomach; brain and other nervous system; and urinary bladder.

### **Additional Information on Incidence**

- The Health Consequences of Smoking: A Report of the Surgeon General (May 27, 2004)  
<http://www.surgeongeneral.gov/library/smokingconsequences/>
- SEER Cancer Statistics Review, 1975–2007 (NCI)  
[http://seer.cancer.gov/csr/1975\\_2007/](http://seer.cancer.gov/csr/1975_2007/)
- State Cancer Profiles  
<http://statecancerprofiles.cancer.gov>
- Statistics for 2010 (ACS)  
[http://www.cancer.org/docroot/stt/stt\\_0.asp](http://www.cancer.org/docroot/stt/stt_0.asp) 
- Women and Smoking: A Report of the Surgeon General — 2001 (Tobacco Information and Prevention Source, CDC)  
<http://www.surgeongeneral.gov/library/womenandtobacco>

[◀ Back: Diagnosis](#)

[Next: Stage at Diagnosis ▶](#)

## ▶ Stage at Diagnosis

(2007 data now available)

## Diagnosis

**There are fewer late-stage diagnoses for five major cancers where early detection is either recommended and/or widely used.**

### Late-Stage Diagnosis of Cancer

Cancers can be diagnosed at different stages in their development. Stage of cancer diagnosis may be expressed as numbers (for example, I, II, III, or IV) or by terms such as "localized," "regional," and "distant." The lower the number or the more localized the cancer, the better a person's chances of benefiting from treatment.

Tracking the rates of late-stage (distant) cancers is a good way to monitor the impact of cancer screening. When more cancers are detected in early stages, fewer should be detected in late stages.

### Measure

Late-stage diagnosis rate: The number of new cancer cases diagnosed at a late (distant) stage, per 100,000 people per year. This report shows the rates for cancers of the prostate, colon, female breast, and cervix uteri.

**Period** – 1980–2007 (Late-stage prostate data is presented for the years 1995 to 2007)

### Trends

**Prostate:** Late-stage prostate cancer fell from 1995 to 2007, following the introduction of the prostate-specific antigen (PSA) test.

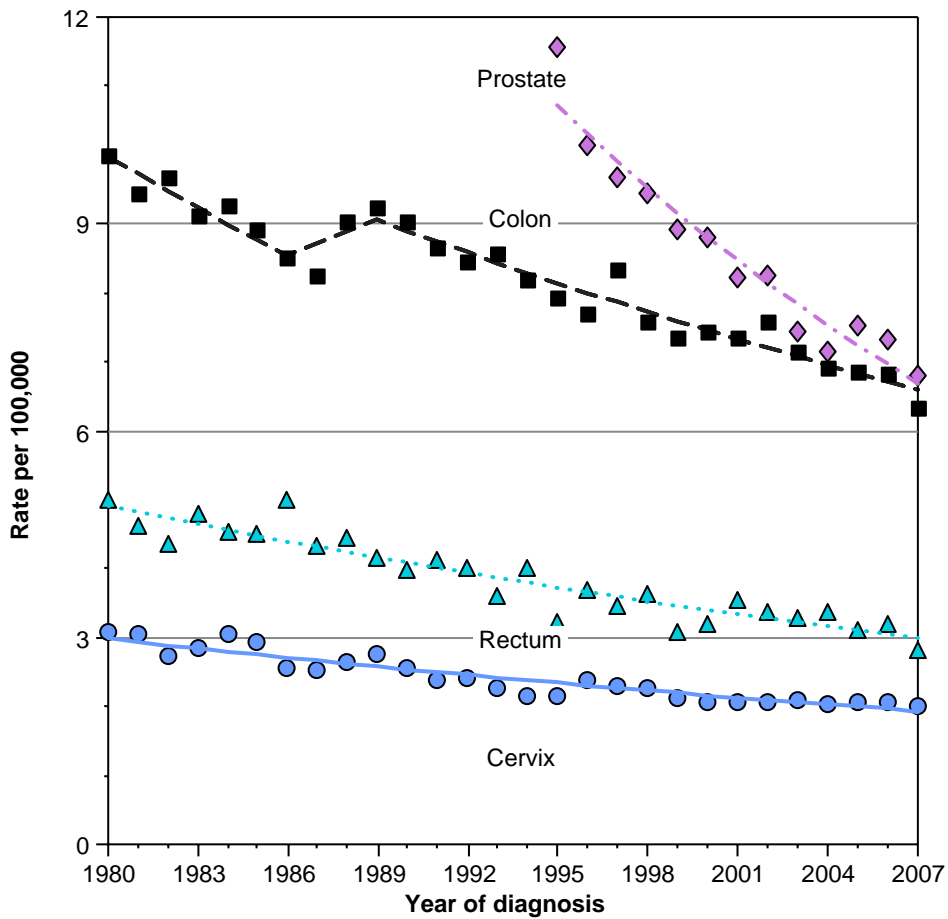
**Colon:** Late-stage colon cancer incidence fell for most of the period of between 1980 and 2007.

**Female breast:** Incidence rates of late-stage cancer have been stable throughout the period between 1980 and 2007.

**Rectum (including Rectosigmoid Junction):** Incidence rates fell throughout the period between 1980 and 2007.

**Cervix:** Incidence rates fell from 1980–2007.

**Figure DST1: Rates of new cancers of distant stage diseases by cancer site: 1980-2007**



Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas (<http://seer.cancer.gov/registries/terms.html>). Data are age-adjusted to the 2000 standard using age groups: <1, 1-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+. Analysis uses the 2000 Standard Population (Census P25-1130) as defined by NCI (<http://seer.cancer.gov/stdpopulations/>).

### Most Recent Estimates

In 2007, five major cancers were diagnosed at a late stage at the following rates:

**Prostate:** 6.69 new cases per 100,000 men per year

**Colon:** 6.32 new cases per 100,000 people per year

**Female breast:** 7.46 new cases per 100,000 women per year

**Rectum:** 1.93 new cases per 100,000 people per year

**Cervix:** 0.53 new cases per 100,000 women per year

## Healthy People 2010 Targets

There is no Healthy People 2010 target for this measure.

## Groups at High Risk for Late-Stage Diagnosis


People who do not have access to health care or do not receive regular, recommended cancer screening tests or experience a delay in following up on an abnormal screening test finding are at highest risk of being diagnosed with late-stage cancer.

## Key Issues

A lower rate of diagnosis at late stages is an early sign of the effectiveness of cancer screening efforts. These lower rates can be expected to occur before decreases in death rates are seen. For example, the drop in new cases of late-stage prostate cancer probably was an early indicator of lower death rates observed for this disease.

Important differences among racial and ethnic groups in the percentage of cases diagnosed at a late stage contribute to disparities in cancer mortality.

## Additional Information on Stage at Diagnosis

- SEER Cancer Statistics Review, 1975–2007 (NCI)  
[http://seer.cancer.gov/csr/1975\\_2007](http://seer.cancer.gov/csr/1975_2007)
- Staging (ACS)  
[http://www.cancer.org/docroot/eto/content/eto\\_1\\_2x\\_staging.asp](http://www.cancer.org/docroot/eto/content/eto_1_2x_staging.asp) 

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## ➤ Treatment

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- [Breast Cancer Treatment](#)
- [Colorectal Cancer Treatment](#)
- [Kidney Cancer Treatment](#)
- [Lung Cancer Treatment](#)
- [Ovarian Cancer Treatment](#)
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Cancer treatment is improving—saving lives and extending survival for people with cancers at many sites, including breast, colon, bladder, lung, prostate, ovary, and kidney, and for people with leukemias, lymphomas, and pediatric cancers.

Clinical trials are the major avenue for evaluating the benefits of new therapies. However, a relatively small percentage of all adult cancer patients (aged 20 years and older) participate in clinical trials. The exact percentage is unknown because NCI-sponsored trials and industry-sponsored trials are tracked separately. However, it is estimated to be less than 5 percent for most types of cancer. It is important to increase physician and patient awareness of, and participation in, clinical trials if we are to examine new treatments, find more effective treatments more rapidly, and broaden the options available to patients.

For treatments already in use, trends in patterns of care have been examined for major cancers, including breast, colorectal, prostate, lung, bladder, and ovarian cancers. Patterns of care at specific points in time, generally in relationship to the release of new guidance on care, have been documented for additional cancers, including cervical, endometrial, head and neck, non-Hodgkin lymphoma, and melanoma. These studies have been supported through the NCI Patterns of Care/Quality of Care and Surveillance, Epidemiology, and End-Results (SEER)-Medicare projects.

Research results on breast cancer treatment have shown that the use of breast-conserving surgery increased markedly from 1992 to 2002. From 1998 to 2002 the proportion of women receiving breast-conserving surgery who also received radiation treatment declined modestly. The use of recommended adjuvant chemotherapy increased substantially from 1987 to 1995. However, the increase has slowed between 1995 and 2005. Similarly, the receipt of adjuvant chemotherapy for stage III colon cancer increased markedly following the publication in 1989 of clinical recommendations for this treatment with a moderate increase from 1990 to 2005. Paclitaxel was unavailable in 1991, but following its introduction and approval by the Food and Drug Administration (FDA), its use among patients with stage III or IV ovarian cancer rose steadily until peaking in 1996 at 67 percent. The use of paclitaxel and chemotherapy of any type decreased in 2002.

The studies also show that older individuals and members of racial/ethnic minority groups are less likely to receive these treatments. More investigation is required to determine if these differences in treatments received constitute disparities in quality of care that need to be addressed through policy or organizational interventions. Women with node-positive breast cancer are less often given chemotherapy if they are aged 65 years or older. However, past clinical trials have included few older women, and there are no clear guidelines for women aged 70 years or older. Although chemotherapy has been reported to improve survival and palliation of lung change patients with stage IIIB or IV, patients aged 80 years or older receive chemotherapy less than half as often as patients under the age of 70. Some of these differences have decreased over time; for example, the treatment gap between White and Black patients with stage III colon cancer closed between 1995 and 2000.

NCI is working with many Federal and private partners to improve methods and data systems for tracking the quality of cancer care. For prostate cancer, a major study on quality-of-life outcomes among 3,500 men following diagnosis has provided important new information that will help men and their families and physicians to make more informed decisions about treatment. An ongoing NCI study, the Cancer Care Outcomes Research and Surveillance Consortium, will provide more detailed information on how to link quality-of-care measures to outcomes important to colorectal and lung cancer patients. Other similar initiatives are being supported by major professional organizations, as well as by NCI.

These and other ongoing studies will provide much new information on treatment. Future editions of the *Cancer Trends Progress Report* will include treatment trends for cancer sites for which there are definitive treatment guidelines based on rigorous evidence of benefit to patients.

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**There has been a significant increase in the use of intravesical therapy for patients diagnosed with non-muscle invasive Ta G1-2 bladder cancer. However, this therapy is given to only 27 percent of patients with non-muscle invasive disease.**

### Benefits of Treatment

The use of intravesical therapy has been associated with improved survival.

### Measure

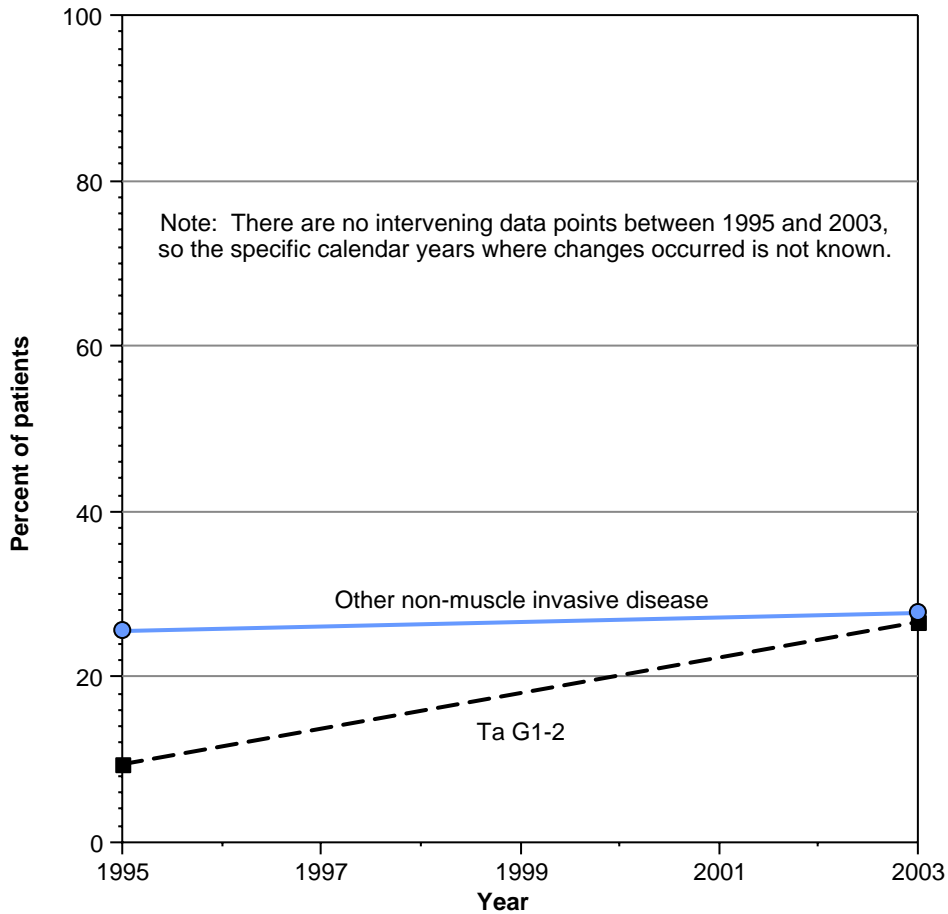
Percentage of individuals receiving intravesical therapy in non-muscle invasive bladder cancer.

**Period** – 1995–2003

**Trends** – Rising in Ta G1-2; stable in other non-muscle invasive disease.



**Figure TBL1: Percent of patients receiving intravesical therapy for non-muscle invasive disease Ta G1-2 and all other non-muscle invasive disease: 1995-2003**



Source: SEER based Patterns of Care Studies, Applied Research Program, National Cancer Institute.  
 Data are age-adjusted based on the age distribution of urinary bladder cancer patients from 2002-2004 in the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>) using age groups: 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+.

### Most Recent Estimates

In 2003, 27 percent of patients with non-muscle invasive disease received intravesical therapy.

### Healthy People 2010 Targets

There are no Healthy People 2010 targets for bladder cancer treatment.


### Groups at High Risk for Not Receiving Appropriate Treatment

The use of intravesical therapy varies by geographic area, with individuals in the mid-West more likely to receive intravesical therapy compared to those living in Los Angeles. Patients of other races, primarily Asians, were more likely to receive intravesical therapy than White patients. There were no differences between White, Black, and Hispanic patients in the use of intravesical therapy.

## Key Issues

The barriers to the use of intravesical therapy should be identified.

## Additional Information on Bladder Cancer Treatment

- Bladder Cancer Treatment (PDQ®)  
<http://www.cancer.gov/cancertopics/pdq/treatment/bladder/Patient>
- All About Bladder Cancer (ACS)  
[http://www.cancer.org/docroot/CRI/CRI\\_2x.asp?sitearea=LRN&dt=44](http://www.cancer.org/docroot/CRI/CRI_2x.asp?sitearea=LRN&dt=44) 
- Huang GJ, Hamilton AS, Lo M, Stein JP, Penson DF. Predictors of intravesical therapy for nonmuscle invasive bladder cancer: results from the Surveillance, Epidemiology and End Results Program 2003 Patterns of Care Project. J Urol 2008;180:520–4.

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**The proportion of women with node positive disease receiving appropriate treatment is high. Older women are less likely to receive chemotherapy than younger women, but there are no major differences in treatment among major racial and ethnic groups.**

### **Breast-Conserving Surgery and Radiation Treatment Benefits of Treatment**

Clinical trials have demonstrated that women with early-stage breast cancer who receive breast-conserving surgery with radiation have survival similar to women who receive a mastectomy. A 1990 NIH Consensus Development Panel concluded that "breast conservation treatment (BCS followed by radiation therapy) is an appropriate method of primary therapy for the majority of women with stage I and II breast cancer and is preferable because it provides survival equivalent to total mastectomy and axillary dissection while preserving the breast."

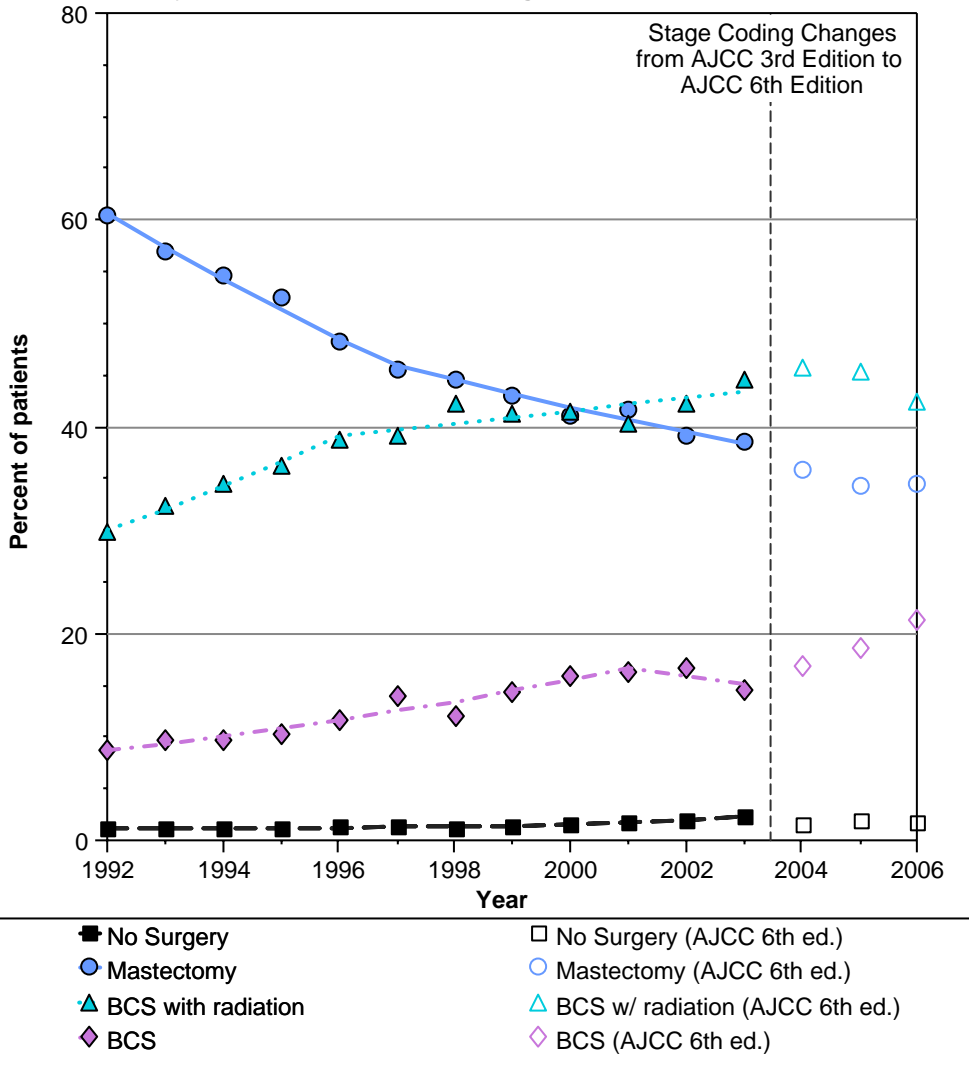
### **Measure**

Percent of women ages 20 and older, diagnosed with early-stage breast cancer (less than stage IIIA), receiving breast-conserving surgery and radiation treatment.

**Period** – 1992–2006

**Trends** – Rising between 1992 and 1998, falling slightly between 1998 and 2006.

**Figure TBR1: Treatment distribution for invasive female breast cancer patients aged 20 years and older with AJCC stage less than IIIA: 1992-2006**



Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 13 areas (<http://seer.cancer.gov/registries/terms.html>). Data are age-adjusted based on the age distribution of lung cancer patients from 2004-2006 in the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>) using age groups: 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+.

**Most Recent Estimates**

In 2006, 35 percent of women ages 20 and older diagnosed with early-stage breast cancer (less than stage IIIA) received a mastectomy, 42 percent received breast-conserving surgery plus radiation, and 21 percent received breast-conserving surgery only.

**Healthy People 2010 Targets**

There are no Healthy People 2010 targets for breast cancer treatment.

**Multi-Agent Chemotherapy  
Benefits of Treatment**

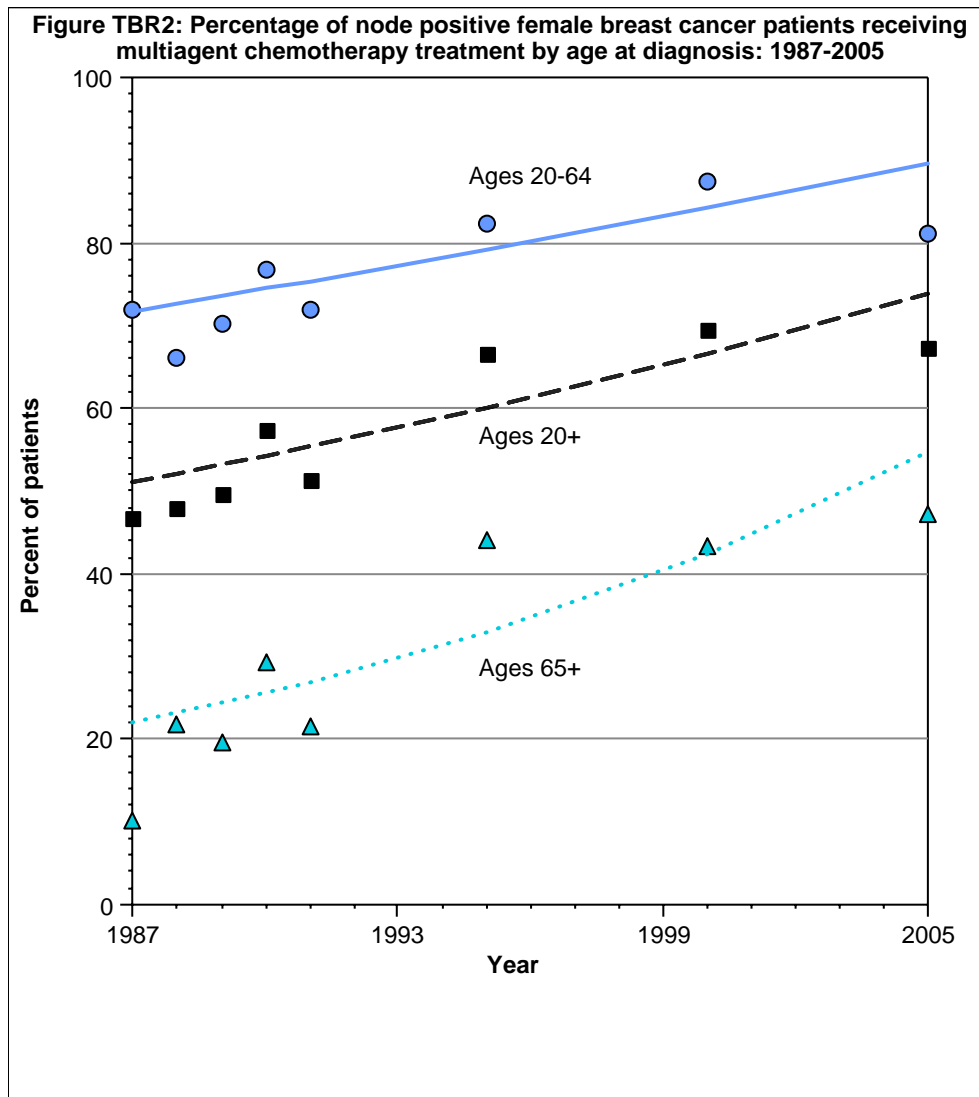
For women with positive lymph nodes, multi-agent chemotherapy has been recommended by NIH since 1985. However, the NIH Consensus Conference on Breast Cancer in 2000 stated insufficient numbers of women age 70 or older were included in clinical trials to make a recommendation about chemotherapy. Based on the results of numerous randomized, controlled treatment trials, tamoxifen has been recommended for women with estrogen-receptor positive breast cancer.

**Measure**

Percent of women ages 20 and older, diagnosed with node positive, stage I–IIIa breast cancer, receiving multi-agent chemotherapy.

**Period** – 1987–2005

**Trends** – Rising use through 1995, but stable after that time.



Source: SEER based Patterns of Care Studies, Applied Research Program, National Cancer Institute.  
 Data are age-adjusted based on the age distribution of female breast cancer patients from 2004-2006 in the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>) using age groups: 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+.

**Most Recent Estimates**

In 2005, 67 percent of women ages 20 and older, diagnosed with node positive breast cancer, received multi-agent chemotherapy.

## Healthy People 2010 Targets

There are no Healthy People 2010 targets for breast cancer treatment, including multi-agent chemotherapy.

## Groups at High Risk for Not Receiving Appropriate Treatment

Studies have found that older women are less likely to receive radiation treatment following breast-conserving surgery. Even elderly patients with no or very few co-morbid conditions—such as diabetes, kidney, or heart disease—were less likely to receive treatment. Although there are no clear guidelines for the use of chemotherapy in women age 70 or older the use of chemotherapy is lower among older women.

## Key Issues

Emerging treatments for breast cancer include the anti-HER2/neu antibody, trastuzumab for patients with HER2 over expressing cancers, and aromatase inhibitors either in conjunction with or instead of tamoxifen. The inclusion of women age 70 or older in clinical trials is necessary to determine the benefit of more aggressive therapies.

## Additional Information on Breast Cancer Treatment

- Breast Cancer (PDQ®): Treatment — Health Professionals  
<http://www.cancer.gov/cancertopics/pdq/treatment/breast/healthprofessional/>
- NCI Patterns of Care/Quality of Care Studies  
<http://healthservices.cancer.gov/surveys/poc/>
- SEER-Medicare Studies  
<http://healthservices.cancer.gov/seermedicare/>

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**The proportion of patients receiving appropriate adjuvant therapy has increased steadily since 1987. Potential disparities remain for some groups of patients.**

### **Benefits of Treatment**

On the basis of accumulated evidence from clinical trials, a 1990 NIH Consensus Development Conference recommended that patients with stage III colon cancer be given adjuvant chemotherapy. The 1990 NIH Consensus Conference also recommended combined adjuvant chemotherapy and high-dose external-beam radiotherapy for stage II and III rectal cancer. Radiation does not appear to affect disease-specific or overall survival for rectal cancer, although it does decrease local recurrence.

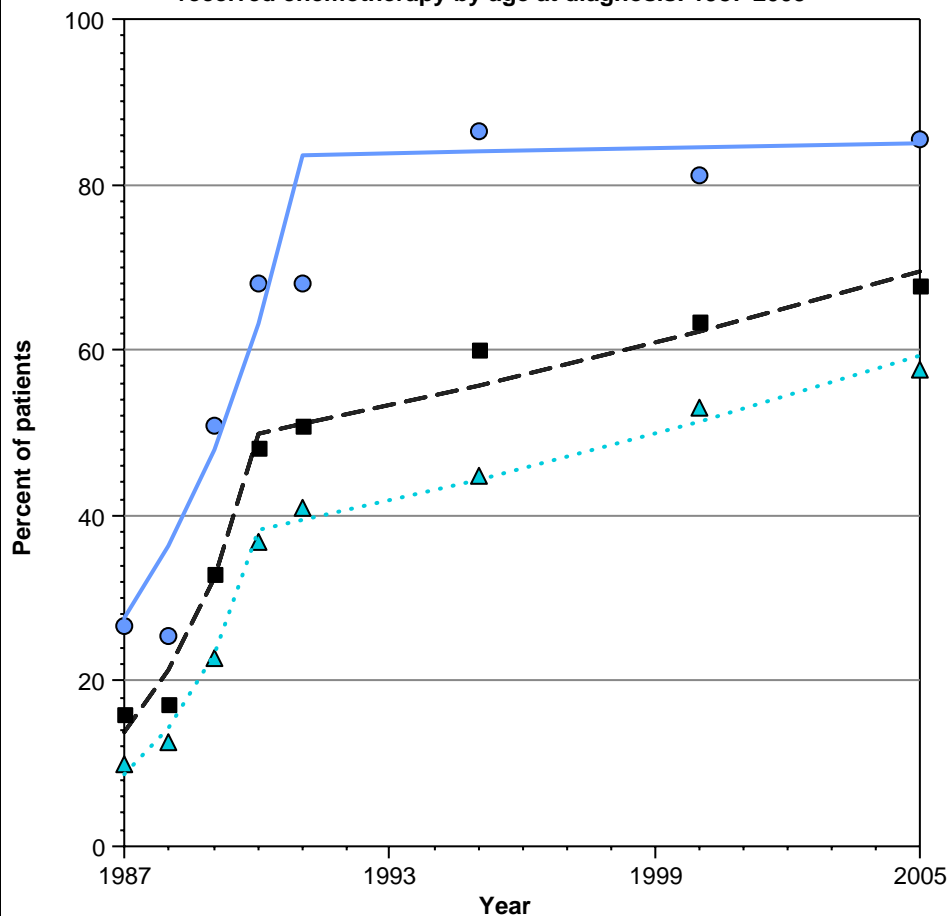
### **Measure**

Percent of individuals, aged 20 years and older, diagnosed with stage III colon cancer who received chemotherapy or diagnosed with stage II or stage III rectal cancer who received chemotherapy with or without radiotherapy.

**Period** – 1987–2005

**Trends** – Rising rapidly from 1987 to 1990, rising moderately from 1990 to 2005.

**Figure TCO1: Percent of colon stage III and rectal stages II & III cancer patients who received chemotherapy by age at diagnosis: 1987-2005**



Ages 20+
  Ages 20-64  
 Ages 65+

Source: SEER based Patterns of Care Studies, Applied Research Program, National Cancer Institute.  
 Data are age-adjusted based on the age distribution of colorectal cancer patients from 2004-2006 in the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>) using age groups: 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+.

### Most Recent Estimates

In 2005, 60 percent of stage III colon and stage II and III rectal patients aged 65 years and older received adjuvant chemotherapy, while more than 85 percent of patients aged 20 to 64 received chemotherapy.

### Healthy People 2010 Targets

There are no Healthy People 2010 targets for cancer treatment, including colorectal cancer treatment.

### Groups at High Risk for Not Receiving Appropriate Treatment



Studies have found that older colorectal patients are less likely to receive adjuvant chemotherapy treatment, even after adjustment for the higher rate of pre-existing co-morbid conditions among older patients. Even elderly patients with no or very few co-morbid conditions, such as diabetes, kidney disease, or heart disease, were less likely to receive treatment. Earlier studies indicated that Black patients were less likely to receive treatment than White patients; however, this disparity was not found in the 2000 NCI Patterns of Care/Quality of Care study. However, older patients continue to receive adjuvant chemotherapy less often than younger patients.

## Key Issues

Chemotherapy for colorectal cancer is a rapidly evolving field. Emerging treatments include chemotherapy regimens that incorporate irinotecan and/or oxaliplatin agents that interfere with DNA synthesis during cancer cell division and, more recently, anti-angiogenesis agents. These newer drugs result in better outcomes for many colorectal cancer patients, but they also are much more expensive than earlier treatments.

## Additional Information on Colorectal Cancer Treatment

- Cancer Intervention Surveillance Network (CISNET), Colorectal Cancer Mortality Projections  
<http://cisnet.cancer.gov/projections/colorectal>
- NCI Patterns of Care/Quality of Care Studies  
<http://healthservices.cancer.gov/surveys/poc/>
- Colon Cancer Treatment (PDQ®) — Health Professional  
<http://www.cancer.gov/cancertopics/pdq/treatment/colon/HealthProfessional/>
- Rectal Cancer Treatment (PDQ®)  
<http://www.cancer.gov/cancertopics/pdq/treatment/rectal/healthprofessional/>
- SEER-Medicare Studies  
<http://healthservices.cancer.gov/seermedicare/>

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[Next: Kidney Cancer Treatment ▶](#)

Since 2000, the use of complete nephrectomy in patients with localized and regional kidney cancer has decreased while the rate of partial nephrectomy has increased.

### Benefits of Treatment

Partial nephrectomy rather than complete removal of the kidney may prevent serious side effects, including chronic kidney disease, while producing similar outcomes.

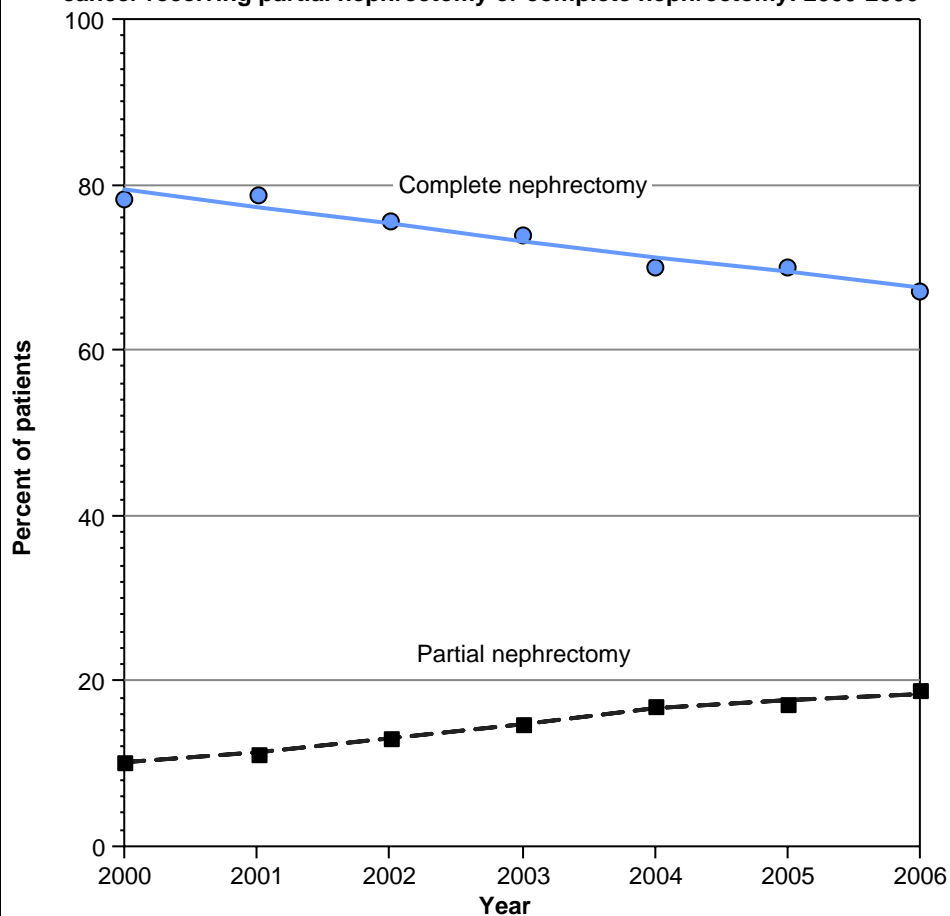
### Measure

Partial nephrectomy (removal of part of the kidney) or complete nephrectomy in patients with local-regional disease.

**Period** – 2000–2006

**Trends** – Partial nephrectomy increased from 2000 to 2004 and was stable from 2004 to 2006.

**Figure TK11: Percent of patients (ages 20+) diagnosed with localized/regional kidney cancer receiving partial nephrectomy or complete nephrectomy: 2000-2006**



Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>). Data are age-adjusted based on the age distribution of kidney cancer patients from 2004-2006 in the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>) using age groups: 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+. Complete nephrectomy includes complete, total, simple and radical nephrectomies.

### Most Recent Estimates

The rate of partial nephrectomy is 19 percent. The rate of complete nephrectomy is 68 percent.


### Healthy People 2010 Targets

There are no Healthy People 2010 targets for kidney cancer treatment.

### Key Issues

The use of partial nephrectomy should be encouraged when appropriate.

### Additional Information on Kidney Cancer Treatment

- Kidney Cancer (NCI)  
<http://www.cancer.gov/cancertopics/types/kidney>
- Kidney Cancer Association  
<http://www.kidneycancer.org> 

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**Between 1996 and 2005 there was a substantial increase in the use of chemotherapy for patients with non-small cell lung cancer stages IIIB or IV. Older patients were less likely to receive chemotherapy than younger patients.**

### **Benefits of Treatment**

Improved survival and palliation of disease related symptoms have been reported with the use of chemotherapy and radiation.

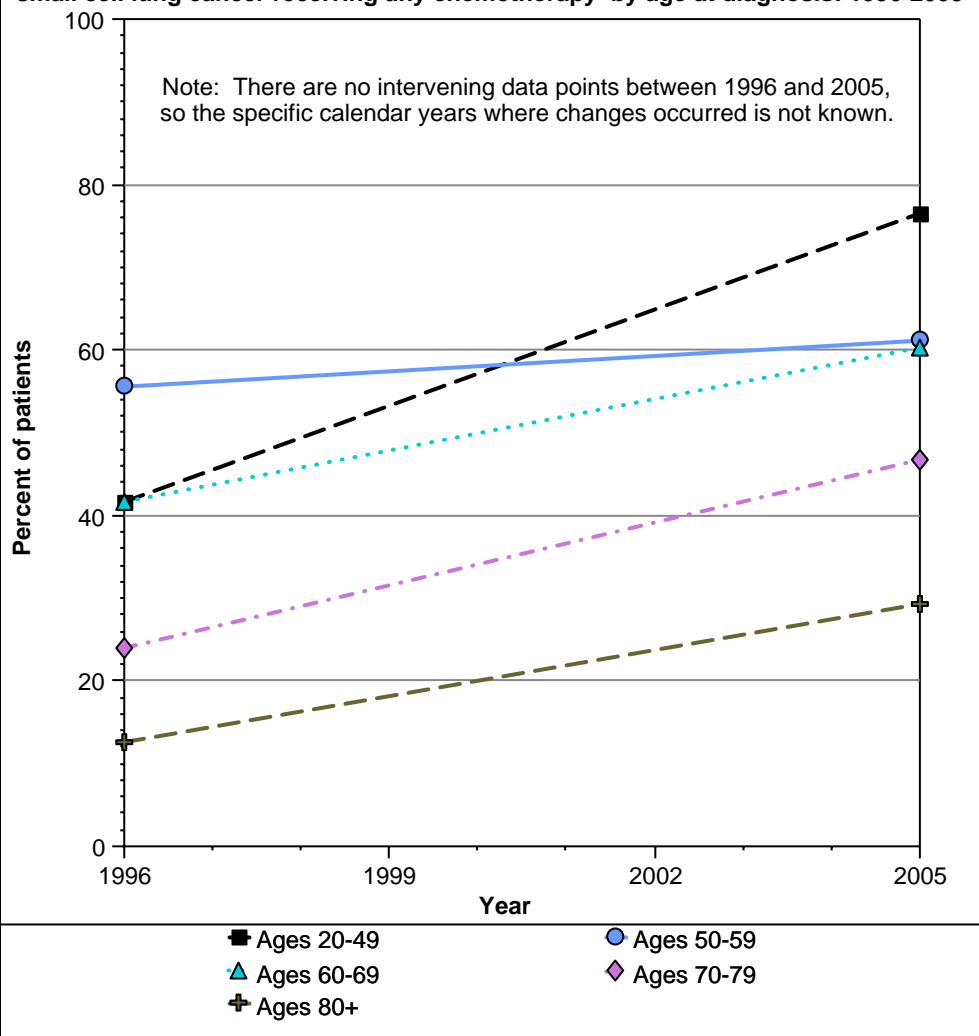
### **Measure**

Chemotherapy following the diagnosis of stage IIIB or IV non-small cell lung cancer.

**Period** – 1996 and 2005

**Trends** – Rising in patients ages 20–49, 60–69, and 70–79.

**Figure TLU1: Distribution of patients (ages 20+) diagnosed with stage IIIB or IV non-small cell lung cancer receiving any chemotherapy by age at diagnosis: 1996-2005**



Source: SEER based Patterns of Care Studies, Applied Research Program, National Cancer Institute.  
 Data are age-adjusted based on the age distribution of lung cancer patients from 2004-2006 in the SEER 17 areas (<http://seer.cancer.gov registries/terms.html>) using age groups: 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+.

**Most Recent Estimates**

Percent of patients diagnosed with stage IIIB or IV non-small cell lung cancer receiving chemotherapy in 2005:

- Age 20–49, 77 percent
- Age 50–59, 61 percent
- Age 60–69, 60 percent
- Age 70–79, 47 percent
- Age 80 or older, 29 percent

**Healthy People 2010 Targets**

There are no Healthy People 2010 targets for the treatment of lung cancer.

## Groups at High Risk for Not Receiving Appropriate Treatment

Overall, the use of chemotherapy decreases as the age of the patient increases. Less than 50 percent of patients age 70 or older receive chemotherapy.

### Key Issues

There have been significant increases in the use of chemotherapy for the treatment of advanced lung cancer in most age groups. Although patients age 50–59 did not have a significant increase in their use of chemotherapy in 2005, these patients had a much higher use of chemotherapy than other age groups in 1996. While there have been no significant increases in patients age 80 or older, co-morbid conditions and performance status may influence their treatment decisions.

### Additional Information on Lung Cancer Treatment

- Non-Small Cell Lung Cancer Treatment (PDQ®)  
<http://www.cancer.gov/cancertopics/pdq/treatment/non-small-cell-lung/Patient>

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The use of paclitaxel rose following its approval by the Food and Drug Administration (FDA), but use has decreased in the most recent year for patients with late-stage disease.

### Benefits of Treatment

In early stage ovarian cancer, an analysis of two pooled studies showed an increase in overall survival with the administration of chemotherapy. Guidelines suggest intraperitoneal (IP) chemotherapy for later stage ovarian cancer.

### Measure

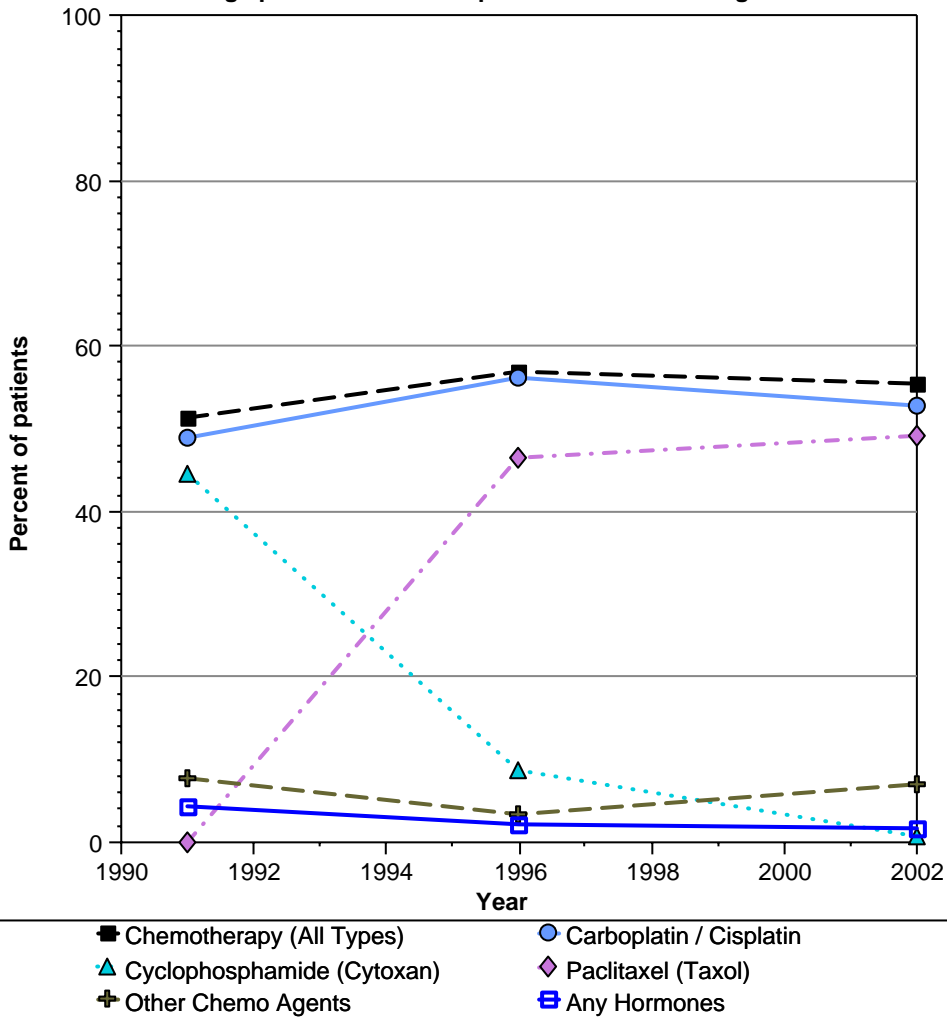
Percent of individuals diagnosed with ovarian cancer who received chemotherapy by stage of diagnosis.

**Period** – 1991, 1996, 2002

**Trends** – From 1996 to 2002, for women with stage I or II, the use of chemotherapy was stable. Women with stage III and IV have had a decrease in the use of chemotherapy over the same time period.

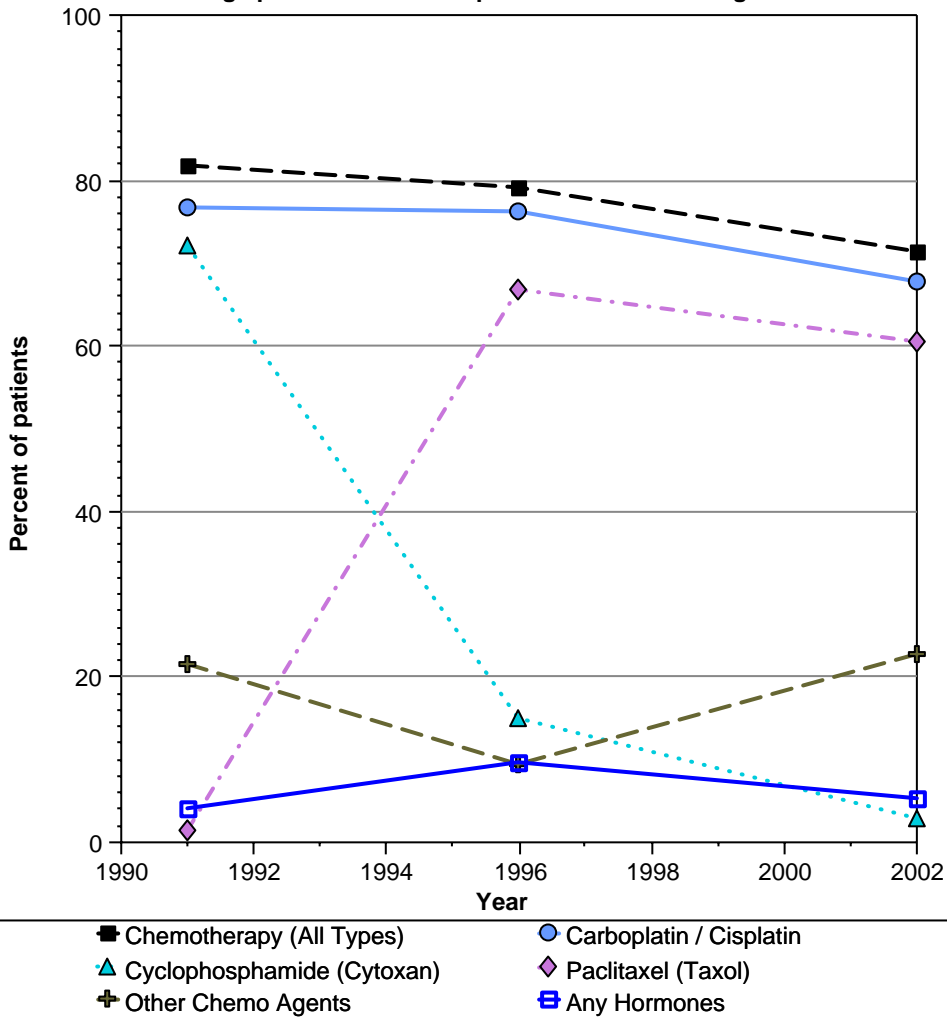


**Figure TOV1: Percent of patients (ages 20+) diagnosed with stage I or II ovarian cancer receiving specific chemotherapeutic and hormonal agents: 1991-2002**



Source: SEER based Patterns of Care Studies, Applied Research Program, National Cancer Institute.  
 Data are age-adjusted based on the age distribution of ovarian cancer patients from 2001-2003 in the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>) using age groups: 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+.

**Figure TOV2: Percent of patients (ages 20+) diagnosed with stage III or IV ovarian cancer receiving specific chemotherapeutic and hormonal agents: 1991-2002**



Source: SEER based Patterns of Care Studies, Applied Research Program, National Cancer Institute.  
 Data are age-adjusted based on the age distribution of ovarian cancer patients from 2001-2003 in the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>) using age groups: 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+.

**Most Recent Estimates**

In 2002, 56 percent of women with stage I or II ovarian cancer received chemotherapy compared to 72 percent of women with stage III or IV disease.

**Healthy People 2010 Targets**

There are no Healthy People 2010 targets for cancer treatment, including for ovarian cancer treatment.

**Groups at High Risk for Not Receiving Appropriate Treatment**

Paclitaxel is recommended for the treatment of ovarian cancer. There has been a non-significant decrease in its use for women with stage III or IV disease between 1996 and 2002.

## Key Issues

Taxol was approved for the treatment of ovarian cancer in December 1992. Between 1991 and 1996 the dissemination of taxol into community practice can be seen. There was a substitution of taxol for cyclophosphamide in those years.

The use of IP chemotherapy is recommended for late-stage ovarian cancer. Research is needed to examine the current use of IP therapy.

## Additional Information on Ovarian Cancer Treatment

- Detailed Guide: Ovarian Cancer—How is Ovarian Cancer Treated (ACS)  
[http://www.cancer.org/docroot/CRI/content/CRI\\_2\\_4\\_4X\\_How\\_is\\_ovarian\\_cancer\\_treated\\_33.asp](http://www.cancer.org/docroot/CRI/content/CRI_2_4_4X_How_is_ovarian_cancer_treated_33.asp)
- Ovarian Cancer Health Center (WebMD)  
<http://www.webmd.com/ovarian-cancer/default.htm>
- Ovarian Cancer: Treatment (NCI)  
<http://www.cancer.gov/cancertopics/treatment/ovarian>

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The use of hormonal therapy for localized/regional disease increased with the age of the patient.

### Benefits of Treatment

A meta-analysis comparing early hormonal therapy with hormonal therapy given later to men with locally advanced prostate cancer found a decrease in overall mortality for those who received early hormonal therapy, whether or not the patient had other treatment. Hormonal therapy is currently recommended for men at high risk of recurrence.

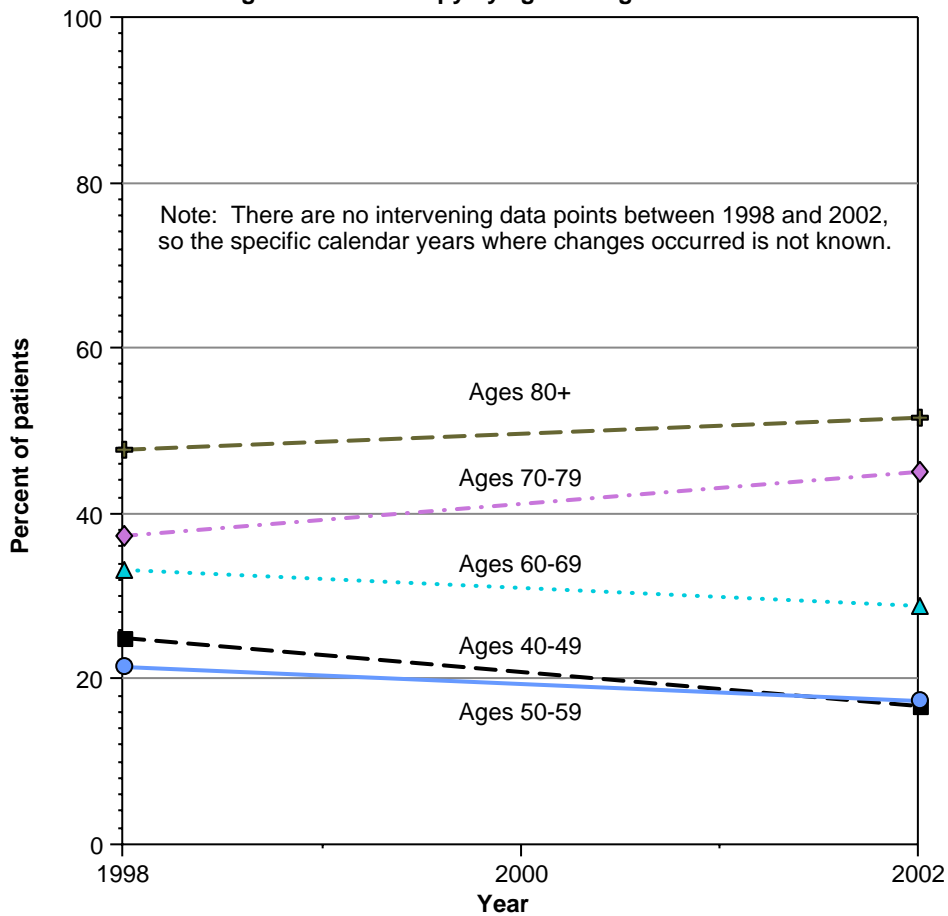
### Measure

Hormonal therapy following the diagnosis of prostate cancer.

**Period** – 1998 and 2002

**Trends** –Between 1998 and 2002 there were no significant changes in the use of hormonal therapy.

**Figure TPR1: Percent of men (ages 40+) with localized/regional prostate cancer and receiving hormonal therapy by age at diagnosis: 1998-2002**



Source: SEER based Patterns of Care Studies, Applied Research Program, National Cancer Institute.  
 Data are age-adjusted based on the age distribution of prostate cancer patients from 2004-2006 in the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>) using age groups: 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+.

### Most Recent Estimates

The percentage of men with localized/regional prostate cancer given hormonal therapy was highest for those aged 80 years or older (52 percent) and lowest for men aged 40–49 years and 50–59 years (17 percent).



### Healthy People 2010 Targets

There are no Healthy People 2010 targets for prostate cancer treatment.

### Key Issues

Currently hormone therapy is recommended only for patients at high risk of recurrence. Zeliadt found that in 1999 African-American men aged 65 years or older were less often given androgen deprivation therapy than were White men.

## Additional Information on Prostate Cancer Treatment

- Prostate Cancer Treatment (PDQ®)  
<http://www.cancer.gov/cancertopics/pdq/treatment/prostate/Patient>
- Learn About Cancer (ACS)  
[http://www.cancer.org/docroot/lrn/lrn\\_0.asp](http://www.cancer.org/docroot/lrn/lrn_0.asp) 
- Us TOO Prostate Cancer Education and Support  
<http://www.ustoo.org/> 
- Zeliadt SB, Potosky AL, Etzioni R, Ramsey SD, Penson DF. Racial disparity in primary and adjuvant treatment for nonmetastatic prostate cancer: SEER-Medicare trends 1991 to 1999. Urology 2004 Dec;64(6):1171–6.

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[Next: Life After  
Cancer ▶](#)

## ▶ Life After Cancer

More and more people are benefiting from the early detection of cancer and its successful treatment. These medical advances are improving both quality of life and length of survival, permitting many survivors to continue full and productive lives at home and at work.

Nevertheless, national data regarding life after cancer are limited. They include:

- The economic impact of cancer ([Cost of cancer care](#))
- Survival rates for cancer by each stage at diagnosis ([Survival](#))
- Cancer survivors' smoking status ([Cancer survivors and smoking](#))

Few national measures are available that reflect health-related quality of life for cancer survivors, such as:

- The ability of cancer survivors to perform daily tasks
- The impact of cancer on employment and insurability
- The effects of cancer on family and loved ones

These and other measures related to life after cancer are subjects of intense research interest as well as matters of great concern to cancer survivors themselves. Future editions of the *Cancer Trends Progress Report* will include additional measures in this area.

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[Next: Costs of  
Cancer Care](#) ▶

**National cancer care expenditures were an estimated \$104.1 billion in 2006.**

The financial costs of cancer care are a burden to people diagnosed with cancer, their families, and society as a whole. National cancer care expenditures have been steadily increasing in the United States. Cancer care accounted for an estimated \$104.1 billion in medical care expenditures in the United States in 2006. In the near future, cancer costs may increase at a faster rate than overall medical expenditures. As the population ages, the absolute number of people treated for cancer will increase faster than the overall population, and cancer prevalence will increase relative to other disease categories—even if cancer incidence rates remain constant or decrease somewhat. Costs also are likely to increase as new, more advanced, and more expensive treatments are adopted as standards of care.

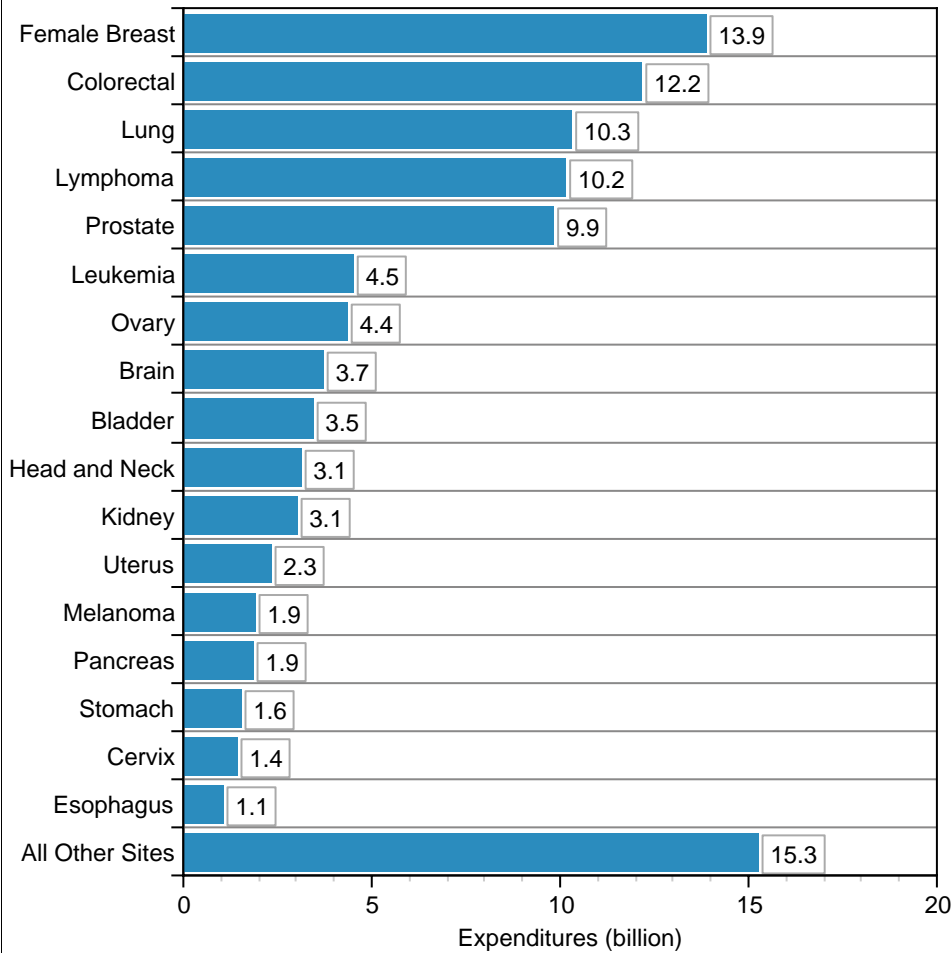
The national economic burden of cancer care in 2006 is shown below for bladder, brain, female breast, cervical, colorectal, esophageal, head and neck, kidney, lung, ovarian, pancreatic, prostate, stomach, and uterine cancers, as well as lymphoma, leukemia, and melanoma. All other cancers are combined as a single category.

Starting in 2006, cancer care expenditures are estimated using new methods with the most recent cancer incidence, survival and cost of care data. As a result, these estimates of cancer care expenditures may not be directly comparable to those reported elsewhere. Additional updates and trends in cancer care expenditures will be available in the future.

National expenditures were largest for lymphoma and female breast, colorectal, lung, and prostate cancers, reflecting prevalence of disease, treatment patterns, and costs for different types of care.



Figure LCO1: Estimates of national expenditures for cancer care in 2006 (in billions of dollars) by cancer site



Source: Based on methods for estimating and projecting cancer prevalence by phase of care described in Mariotto AB, Yabroff KR, Feuer EJ, De Angelis R, Brown M. Projecting the number of patients with colorectal carcinoma in initial, monitoring and last year of life phase of care in the US: 2000 – 2020. *Cancer Cause Control*, 2006; 17:1215–1226. Methods for estimating costs by phase of care are described in Yabroff KR, Lamont EB, Mariotto A, Warren JL, Meekins A, Topor M, Brown ML. Cost of care for elderly cancer patients in the United States. *J Natl Cancer Inst* 2008;100:630–641. Cost estimates expressed in 2006 dollars using CMS cost adjusters and adjusted for out-of-pocket expenditures, including co-payments and deductibles. Estimates for the population younger than 65 were developed using ratios of cost in the younger than 65 and older 65 populations from studies conducted in managed care populations.

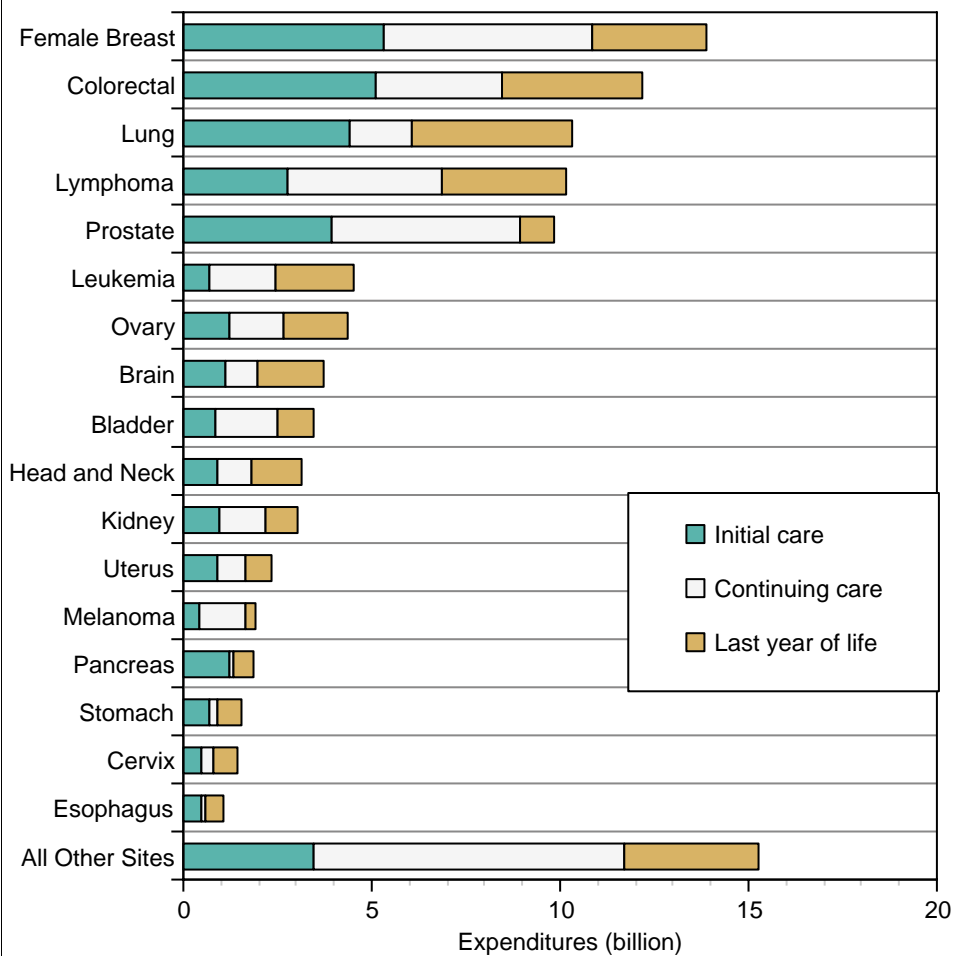
Expenditures associated with cancer are commonly reported by phase of care, which divides care into clinically relevant periods: (1) the initial phase, which is the period after diagnosis, (2) the last year of life, and (3) the continuing phase or the monitoring phase, which is the period between the initial phase and last year of life phase. Expenditures for cancer patients with short survival are typically grouped with the last year of life phase because their care is most similar to care received at the end of life. For all cancers, annualized costs associated with cancer are highest in the initial and last year of life phases, and lowest in the continuing phase of care, following a “u-shaped” curve.

National expenditures in 2006 are calculated by combining 2006 cancer prevalence by cancer site and phase of care with annualized expenditures associated with cancer care in 2006 dollars.

The following figures display expenditures by phase of care and the proportion of expenditures by phase of care for the 17 cancer sites and all cancer sites combined. Estimates do not include expenditures related to screening, which are likely to be substantial in 2006.

Cancers with the largest expenditures in the initial phase of care in 2006 are female breast, colorectal, lung, and prostate. In the last year of life phase of care, cancers with the largest expenditures are lung, colorectal, lymphoma, and female breast. In the continuing phase of care, female breast, prostate, lymphoma, and colorectal cancers have the largest expenditures.

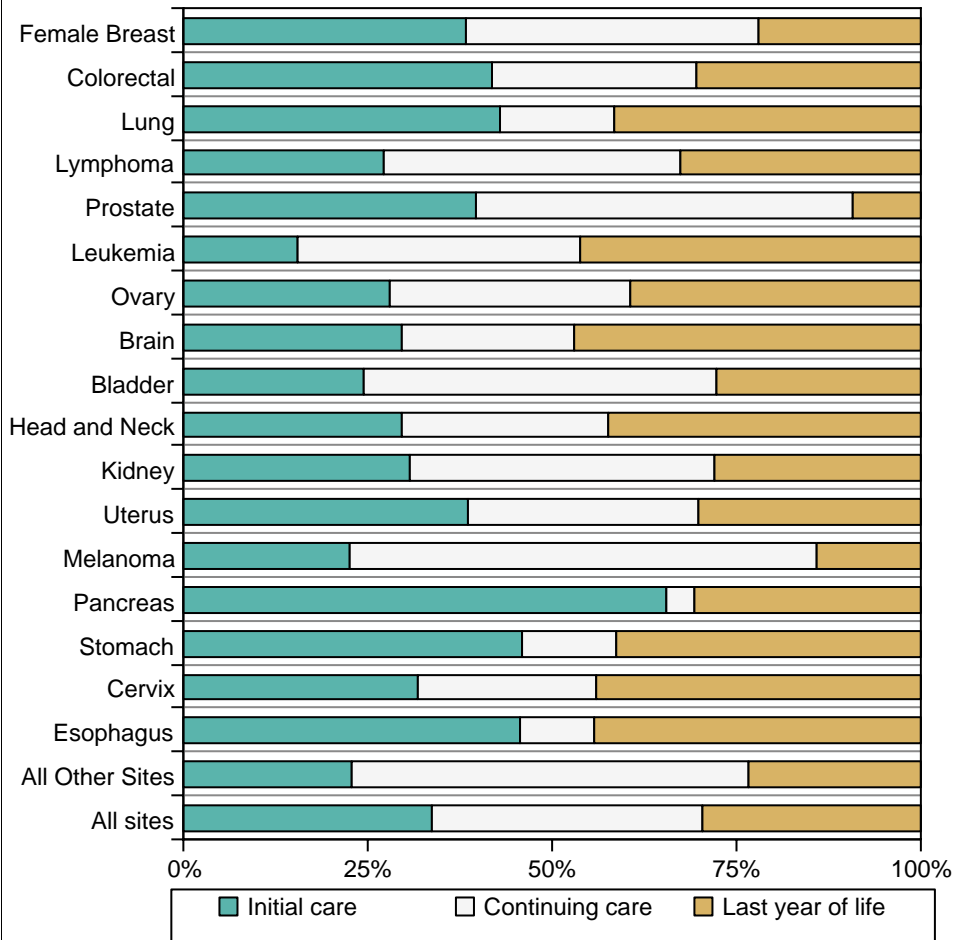
Figure LCO2: Estimates of national expenditures for cancer care in 2006 (in billions of dollars) by cancer site and phase of care



Source: Based on methods for estimating and projecting cancer prevalence by phase of care described in Mariotto AB, Yabroff KR, Feuer EJ, De Angelis R, Brown M. Projecting the number of patients with colorectal carcinoma in initial, monitoring and last year of life phase of care in the US: 2000 – 2020. *Cancer Cause Control*, 2006; 17:1215–1226. Methods for estimating costs by phase of care are described in Yabroff KR, Lamont EB, Mariotto A, Warren JL, Meekins A, Topor M, Brown ML. Cost of care for elderly cancer patients in the United States. *J Natl Cancer Inst* 2008;100:630–641. Cost estimates expressed in 2006 dollars using CMS cost adjusters and adjusted for out-of-pocket expenditures, including co-payments and deductibles. Estimates for the population younger than 65 were developed using ratios of cost in the younger than 65 and older 65 populations from studies conducted in managed care populations.

In this cross-sectional snapshot of national expenditures for cancer care in 2006, the proportion of expenditures in each phase of care varies by cancer type. For cancer types with short survival following diagnosis, such as pancreas, stomach, and lung, the majority of expenditures in 2006 are for patients in the initial and last year of life phases, with only a small percentage for patients in the continuing phase. Other cancer types with longer survival, such as female breast, melanoma, and prostate, have a higher percentage of expenditures for patients in the continuing phase of care. Overall, approximately 33.6% of expenditures are in the initial phase, 36.8% in the continuing phase, and 29.6% in the last year of life phase of care.

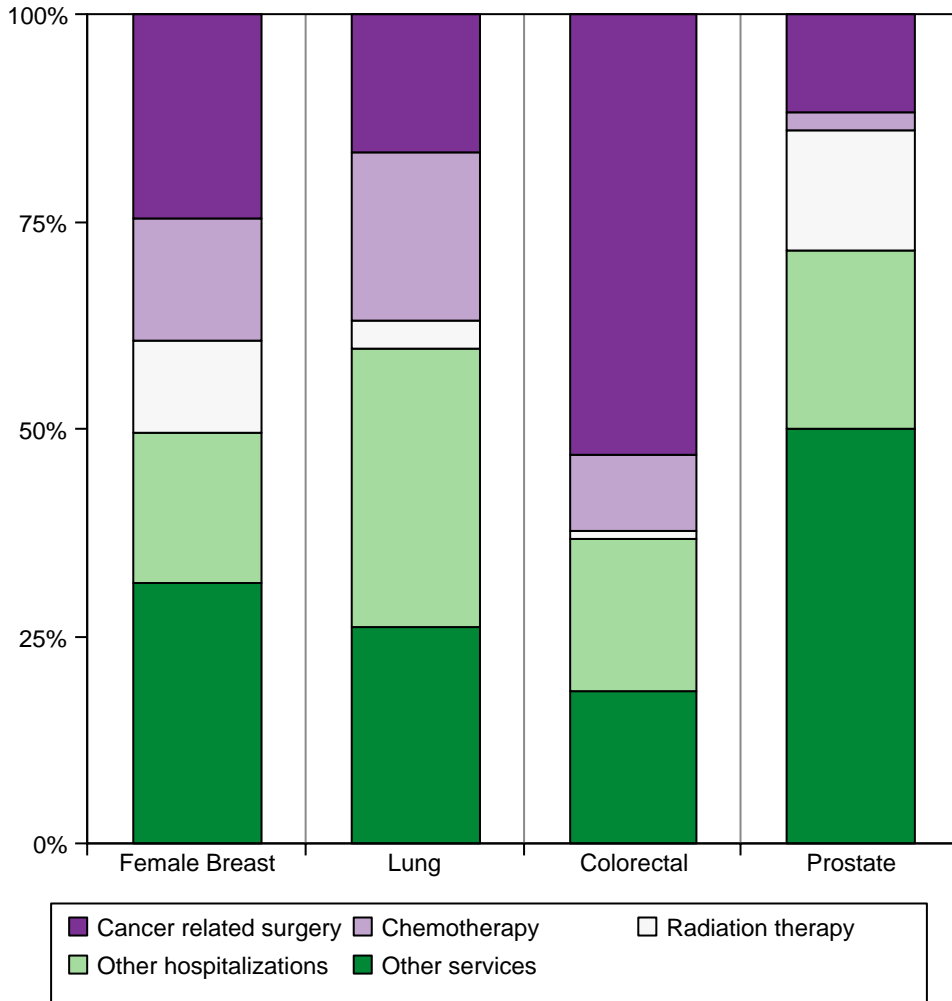
Figure LCO3: Estimates of the proportion of national expenditures for cancer care in 2006 by cancer site and phase of care



Source: Based on methods for estimating and projecting cancer prevalence by phase of care described in Mariotto AB, Yabroff KR, Feuer EJ, De Angelis R, Brown M. Projecting the number of patients with colorectal carcinoma in initial, monitoring and last year of life phase of care in the US: 2000 – 2020. *Cancer Cause Control*, 2006; 17:1215–1226. Methods for estimating costs by phase of care are described in Yabroff KR, Lamont EB, Mariotto A, Warren JL, Meekins A, Topor M, Brown ML. Cost of care for elderly cancer patients in the United States. *J Natl Cancer Inst* 2008;100:630–641. Cost estimates expressed in 2006 dollars using CMS cost adjusters and adjusted for out-of-pocket expenditures, including co-payments and deductibles. Estimates for the population younger than 65 were developed using ratios of cost in the younger than 65 and older 65 populations from studies conducted in managed care populations.

The types of cancer care and associated costs vary by cancer site. The percentage of Medicare payments in the first year following diagnosis in 2002 due to cancer-related surgery, chemotherapy, radiation therapy, other hospitalizations, and other services among the four most common cancers is listed in Figure 4. The percentage of all care represented by hospital care, either associated with cancer-directed surgery or other hospitalizations, varied for female breast (43%), colorectal (72%), lung (50%), and prostate cancers (33%). The percentage of first-year costs attributable to chemotherapy and radiation therapy also varied by cancer site.

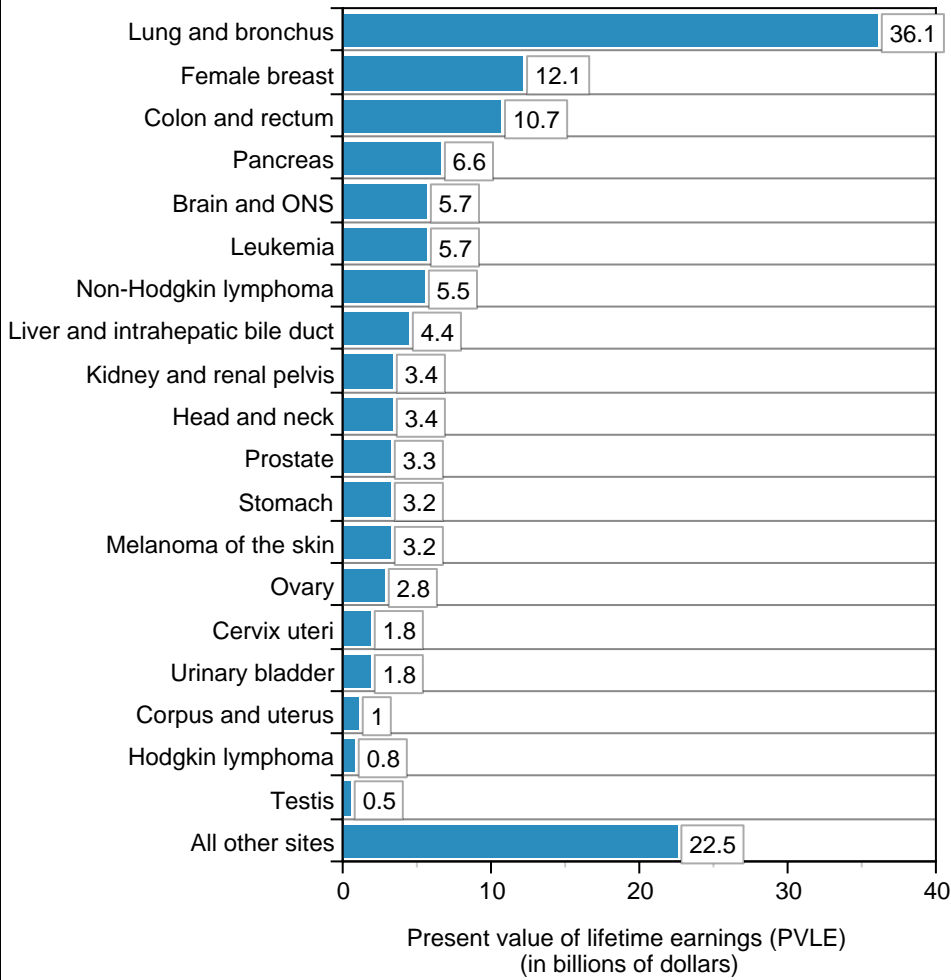
Figure LCO4: Percentage of Medicare Payments in the First Year Following Diagnosis for Cancer Care by Type of Service in 2002



Source: Warren JL, Yabroff KR, Meekins A, Topor M, Lamont E, Brown ML. Evaluation of trends in the cost of initial cancer treatment. J Natl Cancer Inst 2008;100:888-897.

Direct medical expenditures are only one component of the total economic burden of cancer. The indirect costs include losses in time and economic productivity resulting from cancer-related illness and death. Using earnings to value lost productivity due to premature cancer deaths in the United States, mortality costs associated with an approximately 600,000 cancer deaths in 2005 are estimated to be \$134.8 billion. Lost productivity due to cancer deaths is greatest for lung, colorectal, and female breast cancers. Based on projected growth and aging of the U.S. population, productivity costs will increase if cancer mortality rates are constant in the future.

Figure LCO5: Lost productivity due to cancer deaths in the United States among adults aged 20 years and older, 2005



Source: Bradley CJ, Yabroff KR, Dahman B, Feuer EJ, Mariotto A, Brown ML. Productivity costs of cancer mortality in the United States: 2000-2020. J Natl Cancer Inst 2008;100: 1763-70.

(Five year follow-up for cases diagnosed in 2002 now available)

**Five-year survival rates have improved for all sites combined.**

## Cancer Survival

Advances in the ways that cancer is diagnosed and treated have increased the number of people who live disease-free for long periods of time. This report looks at trends in 5-year survival rates for cancer, the time period traditionally associated with good prognosis. However, some people will experience a recurrence of their cancer after 5 years.

In 2007, more than 11.7 million Americans were alive after having been diagnosed with invasive cancer. Among survivors, nearly 2.6 million were living with a previous diagnosis of female breast cancer, more than 2.2 million had been diagnosed with prostate cancer, and more than 1.1 million had been diagnosed with colorectal cancer. More than 1.7 million of 11.7 million Americans diagnosed with invasive cancer were longer-term survivors (14.7 percent) diagnosed at least 20 years earlier.

## Measure

Five-year **relative cancer survival rate**: The proportion of patients surviving cancer 5 years after diagnosis calculated in the absence of other causes of death. This rate is a ratio (expressed as a percentage) of the proportion of observed survivors in a cohort of cancer patients to the proportion of expected survivors. This report shows survival rates for cancers of the prostate, female breast, colon/rectum, and lung. It also shows survival rates for all cancers combined.

**Period** – 1975–2002 (year diagnosed)

**Trends** – Mostly rising.

**All cancer sites combined**: Generally rising since 1975, except for a stable period during 1992–1995

**Prostate**: Generally rising since 1975, except for stable periods during 1992–1995 and 1999–2002

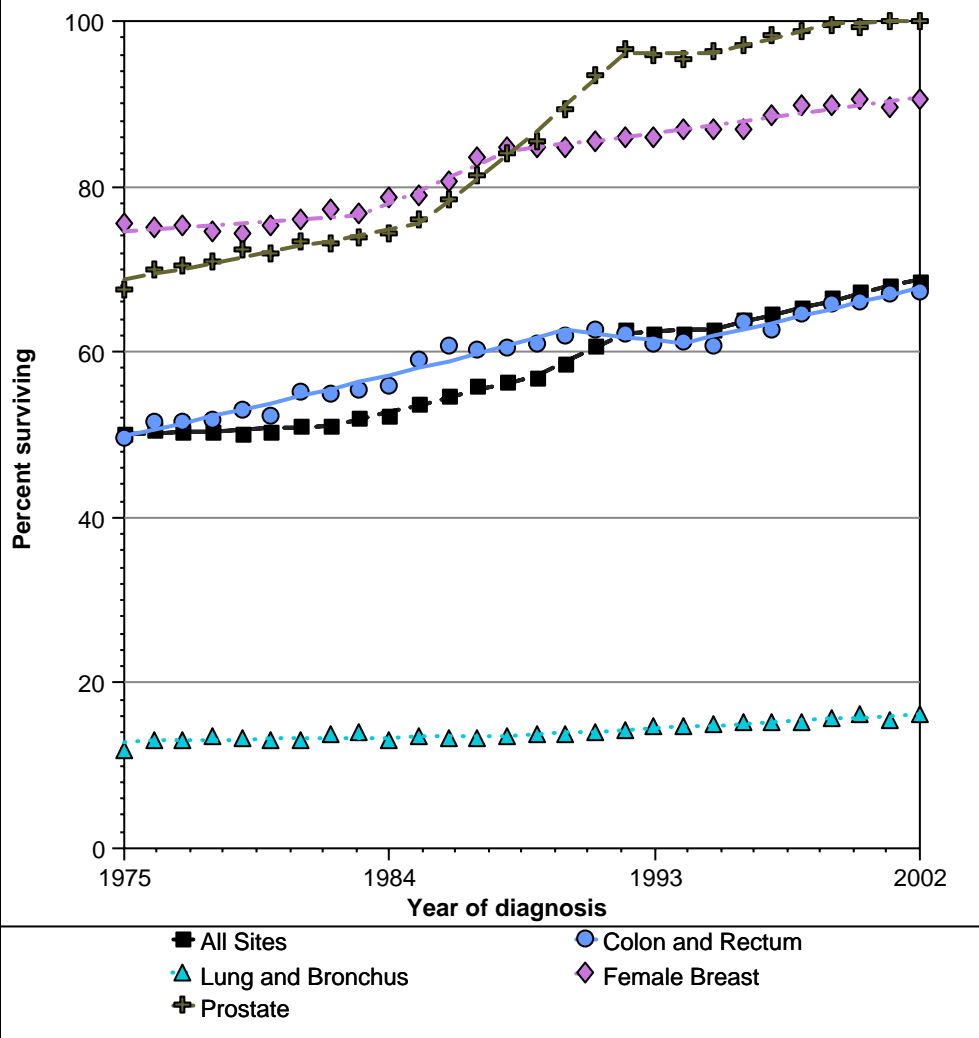
**Female breast**: Rising since 1983

**Colorectal**: Generally rising since 1975, except for non-significant change during 1990–1994

**Lung and bronchus**: Small but significant rise since 1988. Five-year survival remains less than 20 percent

Among the four cancer sites listed above, 5-year survival rates are highest for prostate and female breast cancers, intermediate for colorectal cancer, and lowest for lung cancer.

Figure LSU1: 5-year relative survival rates by site: 1975-2002



Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas (<http://seer.cancer.gov/registries/terms.html>). Data are not age-adjusted.

### Most Recent Estimates

Of the patients diagnosed with cancer (all sites) in 2002, 68.5 percent survived cancer for at least 5 years. Among those who were children (aged 19 years and younger) at the time of their diagnosis in 2002, 80.9 percent survived cancer for at least 5 years.

### Healthy People 2010 Targets

Increase to 70 percent the proportion of cancer survivors who are living 5 years or longer after diagnosis.

### Groups at High Risk for Limited Survival


Late stage at diagnosis is associated with limited survival. Causes of disparity in late stage cancer diagnosis vary by site, but may include factors related to low socio-economic status (e.g., health insurance, income, or education) or related demographic attributes (e.g., age, gender, or race and ethnicity minority). This association supports the need for continued development of early detection and stage-appropriate treatment strategies, as well as expanded efforts to ensure that all Americans have equal access to these life-saving interventions.

## Key Issues

Improved survival rates result from a combination of early detection, better treatments, and improved supportive care. It is difficult to separate out the contribution of each factor. Caution is also warranted against over-interpretation of improved survival as a result of early detection via screening (lead-time bias).

Despite the positive trends in 5-year survival for three of the most common cancers, lung cancer survival rates remain low. Prevention efforts to reduce the incidence of lung cancer would therefore contribute to improvement in overall cancer survival rates for all cancers combined.

## Additional Information on Cancer Survival

- Healthy People 2010, Volume 1, Chapter 3 - Cancer  
<http://www.health.gov/healthypeople/document/HTML/Volume1/03Cancer.htm>
- SEER Cancer Statistics Review, 1975-2007 (NCI)  
[http://seer.cancer.gov/csr/1975\\_2007/](http://seer.cancer.gov/csr/1975_2007/)  
<http://seer.cancer.gov/faststats/>
- Statistics for 2010 (American Cancer Society)  
[http://www.cancer.org/docroot/stt/stt\\_0.asp](http://www.cancer.org/docroot/stt/stt_0.asp) 

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and Smoking](#) ▶



**Despite their increased risk for chronic health conditions and premature death, a significant number of cancer survivors continue to smoke after their diagnosis. Young survivors, those under the age of 40, may be at particular risk for smoking. To enhance the length and health-related quality of their lives, efforts are needed to identify these individuals and provide them with evidence-based interventions to help them quit smoking and remain tobacco free.**

### **Cancer Survivors and Smoking**

As the population of cancer survivors increases and their expected time of survival lengthens, attention to the health behaviors of these individuals is becoming an important focus of attention. Adoption or maintenance of healthy lifestyles after cancer has the potential to reduce both cancer and non-cancer related morbidity. In some cases, lifestyle choices such as smoking may also affect survival. Tracking these behaviors permits evaluation of how well cancer control efforts are working to reduce unnecessary disability and death among those with a history of cancer. Examination of survivors' smoking status is new to the Cancer Trends Progress Report this year.

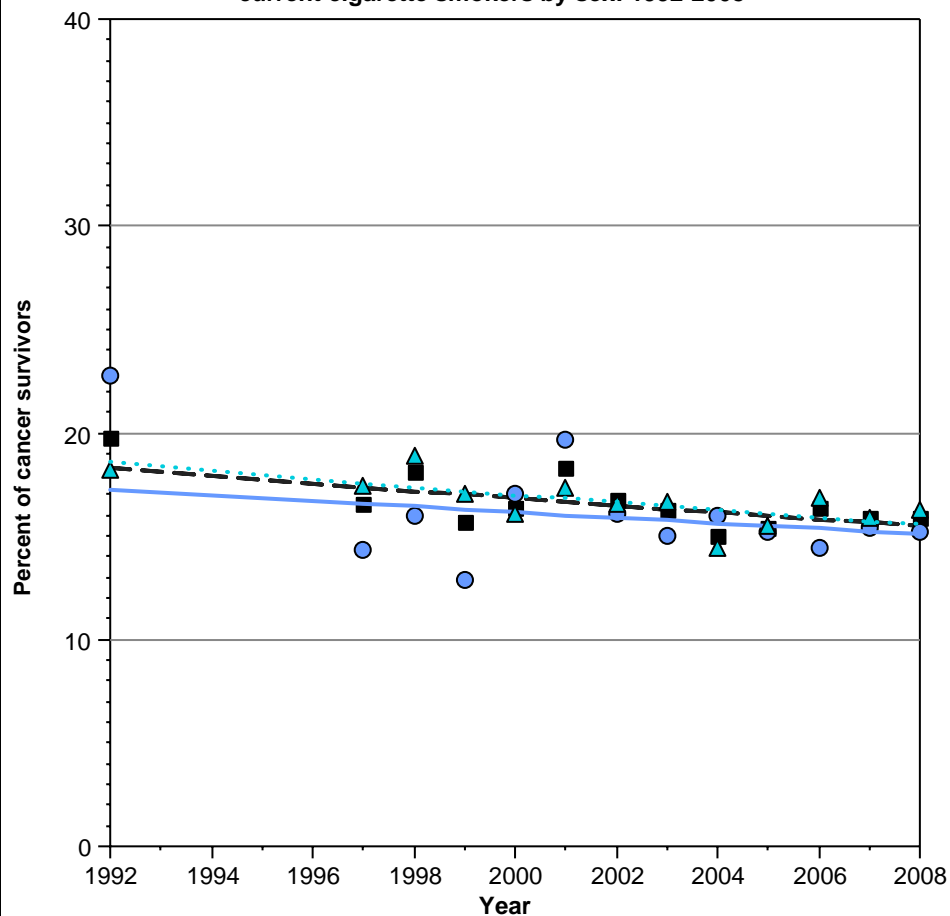
#### **Measure**

Rates of smoking among cancer survivors are based on the self-reporting of individuals with a cancer history who are interviewed as part of the annual population-based National Health Interview Survey (NHIS). Participants were asked whether or not they were a current smoker.

**Period** – 1992–2008

**Trends** – Declining slowly.

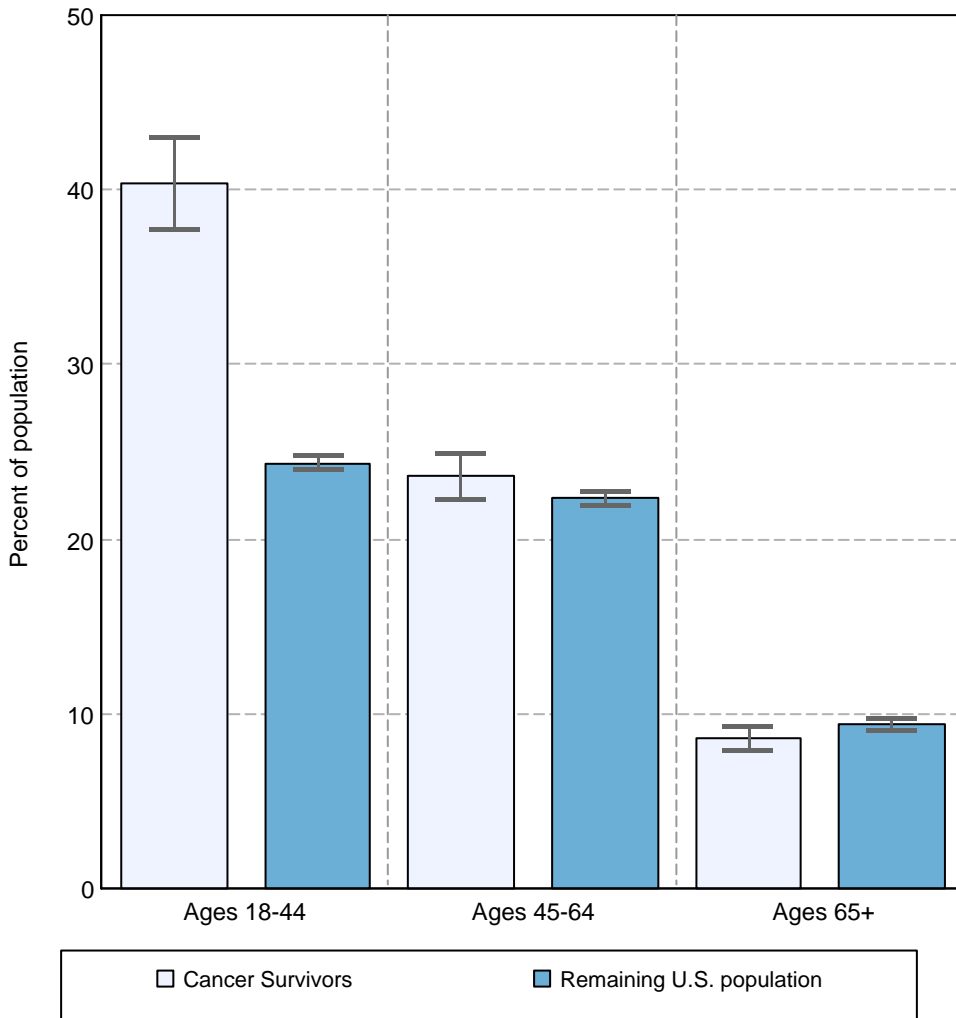
**Figure LCS1: Percentage of cancer survivors aged 18 years and older who were current cigarette smokers by sex: 1992-2008**



Both Sexes
  Male
  Female

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted based on the age distribution of cancer patients diagnosed in 2000 in the SEER 17 areas (<http://seer.cancer.gov/registries/terms.html>) using age groups: 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+.

Figure LCS1: Percentage of current smokers among cancer survivors and remaining U.S. population by age : 2000-2008



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey.  
 Data are age-adjusted to the 2000 standard using age groups: 18-24, 25-34, 35-44, 45-64, 65+.  
 Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Most Recent Estimates

Based on estimates adjusted for the age distribution of cancer patients diagnosed in the SEER program (figure LCS1), the percent of adult cancer survivors who currently smoke is decreasing over time, and the rate of decline is similar for both men and women. However, Figure LCS2 presents estimates of smoking prevalence, age-adjusted to the 2000 U.S. standard population to permit comparison with the U.S. population at large. These graphs show that cancer survivors aged 18-44 report smoking at rates higher than those reported for the rest of the population. Cancer survivors over age 44 report smoking rates similar to those of the rest of the population.

### Healthy People 2010 Targets

There is no Healthy People 2010 target for smoking rates among cancer survivors. However, it is reasonable to set this at the goal determined for the general population, which is to decrease to 12 percent the proportion of people who smoke.

### Groups at High Risk for Continuing to Smoke After Surviving Cancer

Analysis of NHIS data (2000–2008) by age suggests that younger survivors (those below age 40) are at greater risk for being current smokers than either older cancer survivors or those in the general population. Survivors of lung, head and neck, and cervical cancers—cancers for which there is a known association between smoking and cancer risk—are at higher risk of being current smokers than survivors of other cancer sites.

## Key Issues

Despite the known association between smoking and cancer incidence and mortality, a significant number of survivors continue to smoke after diagnosis. Further, because these figures are based on self-report, they may underestimate the actual proportion of survivors who smoke.

Efforts are needed to ensure all individuals diagnosed with cancer are asked about their smoking status and provided evidence-based smoking cessation programs, including counseling and medications as appropriate. Screening of smoking status among family members and caregivers of cancer survivors is also important as their behaviors can adversely affect survivors' health.

## Additional Information on Cancer Survivors and Smoking

- Bellizzi KM, Rowland JH, Jeffery DD, McNeel T. Health behaviors of cancer survivors: examining opportunities for cancer control intervention. *J Clin Oncol* 2005;23(34):8884–93.
- Demark-Wahnefried W, Pinto BM, Gritz ER. Promoting health and physical function among cancer survivors: potential for prevention and questions that remain. *J Clin Oncol* 2006;24(32):5125–31.
- Gritz ER, Demark-Wahnefried W. Health behaviors influence cancer survival. *J Clin Oncol* 2009;27(12):1930–2.
- Gritz ER, Fingeret MC, Vidrine DJ, Lazev AB, Mehta NV, Reece GP. Successes and failures of the teachable moment: smoking cessation in cancer patients. *Cancer* 2006;106(1):17–27.
- Online smoking information and cessation resources:
  - <http://www.smokefree.gov/>
  - <http://www.cancer.gov/cancertopics/smoking>

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## ▸ End of Life

- [Mortality](#)
- [Person-Years of Life Lost](#)

The ultimate measure of our nation's success against cancer is how quickly and how far we can lower the death rate from this group of diseases. This final section of the *Cancer Trends Progress Report – 2009/2010 Update* provides national data not only on cancer mortality by major sites, but also in terms of years of life lost to cancer—a measure that emphasizes the tragedy of common cancers that strike people at a relatively young age.

As highlighted at the beginning of this report, the news is good. For the first time since the government began collecting mortality data early in the last century, cancer death rates began to decline in 1993. It is our job as a nation to maintain and accelerate this trend. Future editions of this report will continue to document our progress in the ongoing battle against deaths from cancer.

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## Mortality

(2007 data now available)

End of Life

**After several decades of steady increases, the U.S. cancer death rate stabilized from 1990 to 1992 and has significantly declined from 1992 to 2007.**

### Measuring Cancer Deaths

In 2007, cancers of the female breast, prostate, lung, and colon/rectum accounted for more than half of all cancer deaths in the United States. Lung cancer alone claimed one-fourth of the lives lost to cancer. According to American Cancer Society projections, in 2010 there were 569,490 cancer deaths overall, including 157,300 deaths from lung cancer; 51,370 from cancers of the colon/rectum; 39,840 from female breast cancer; 36,800 deaths from cancer of the pancreas and 32,050 from prostate cancer. Cancer mortality is usually measured as the annual number of deaths from cancer for every 100,000 people, adjusted to a standard population.

### Measure

The number of cancer deaths per 100,000 people per year, age-adjusted to a U.S. 2000 standard population.

**Period** – 1975–2007

### Trends

**All sites combined:** Death rates among both sexes combined increased through 1992 and then fell from 1992 through 2007. Among men, death rates increased through 1990, were stable from 1990 to 1993, and fell thereafter. Among women, death rates were stable from 1975 to 1979, increased from 1979 to 1987, were stable from 1987 to 1998 and fell from 1998 to 2007.

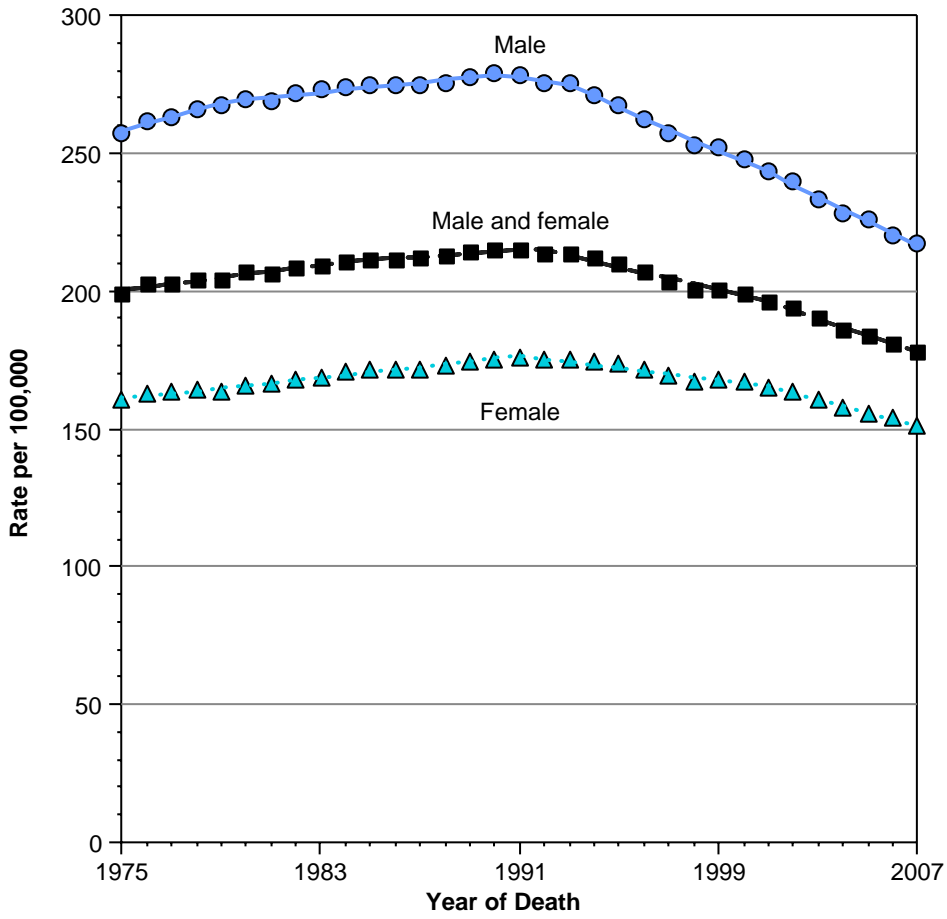
**Colorectal cancer:** Death rates among women fell from 1975 to 2007. Among men, rates fell from 1984 to 2007.

**Female breast cancer:** After rising from 1975 to 1990, death rates have steadily fallen.

**Lung cancer:** Death rates among men rose from 1975 to 1991 and fell from 1991 to 2007. Death rates among women rose from 1975 to 2002 and fell from 2002 to 2007.

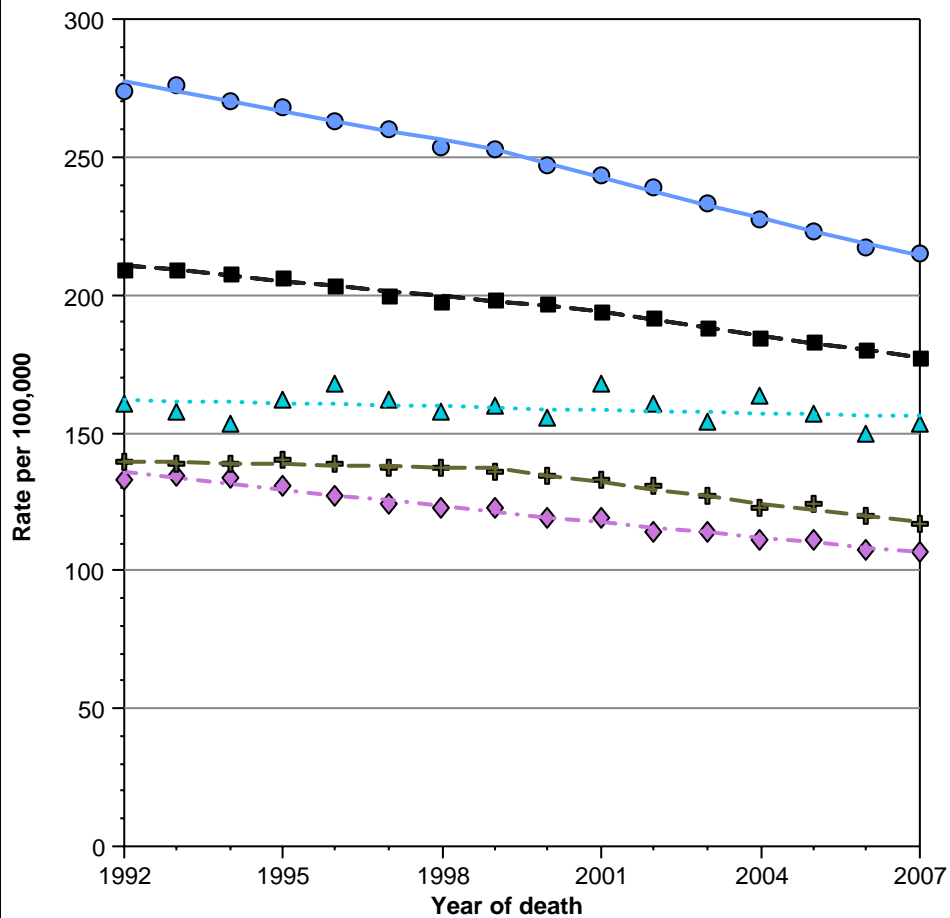
**Prostate cancer:** After increasing from 1975 to 1991, prostate cancer death rates fell from 1994 to 2007.

Figure EMO1: Death rates for all cancers by sex: 1975-2007



Source: National Center for Health Statistics data as analyzed by NCI. Data are age-adjusted to the 2000 standard using age groups: <1, 1-4, 5-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+. Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

Figure EMO2: Death rates for all cancers by race/ethnicity: 1992-2007



White
  Black  
 American Indian/Alaska Native
  Asian or Pacific Islander  
 Hispanic

Source: National Center for Health Statistics data as analyzed by NCI. Data are age-adjusted to the 2000 standard using age groups: <1, 1-4, 5-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+. Analysis uses the 2000 Standard Population as defined by NCHS (<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>).

### Most Recent Estimates

In 2007, the death rate for all cancers was 178.15 cancer deaths per 100,000 people per year.

### Healthy People 2010 Target

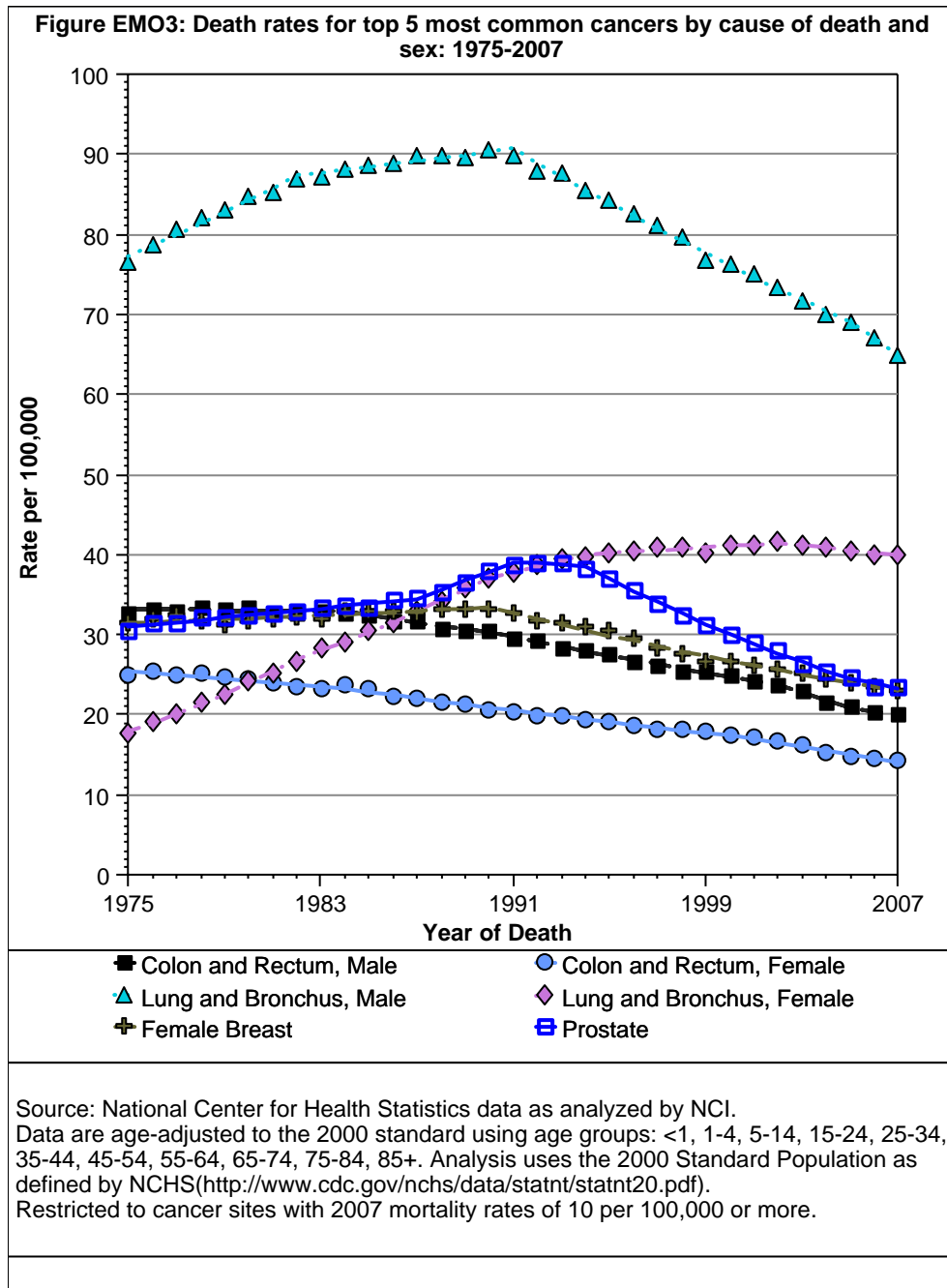
Reduce the overall cancer death rate to 158.6 cancer deaths per 100,000 people per year by 2010.

### Groups at High Risk for Cancer Deaths

Blacks experience the highest cancer death rates, followed by whites, who also have cancer death rates that exceed the Healthy People 2010 objective of 158.6 deaths or less per 100,000 people per year. In 2007, cancer death rates among Asian and Pacific Islanders, American Indians and Alaska Natives, and persons of Hispanic ethnicity were lower than the Healthy People 2010 objective.



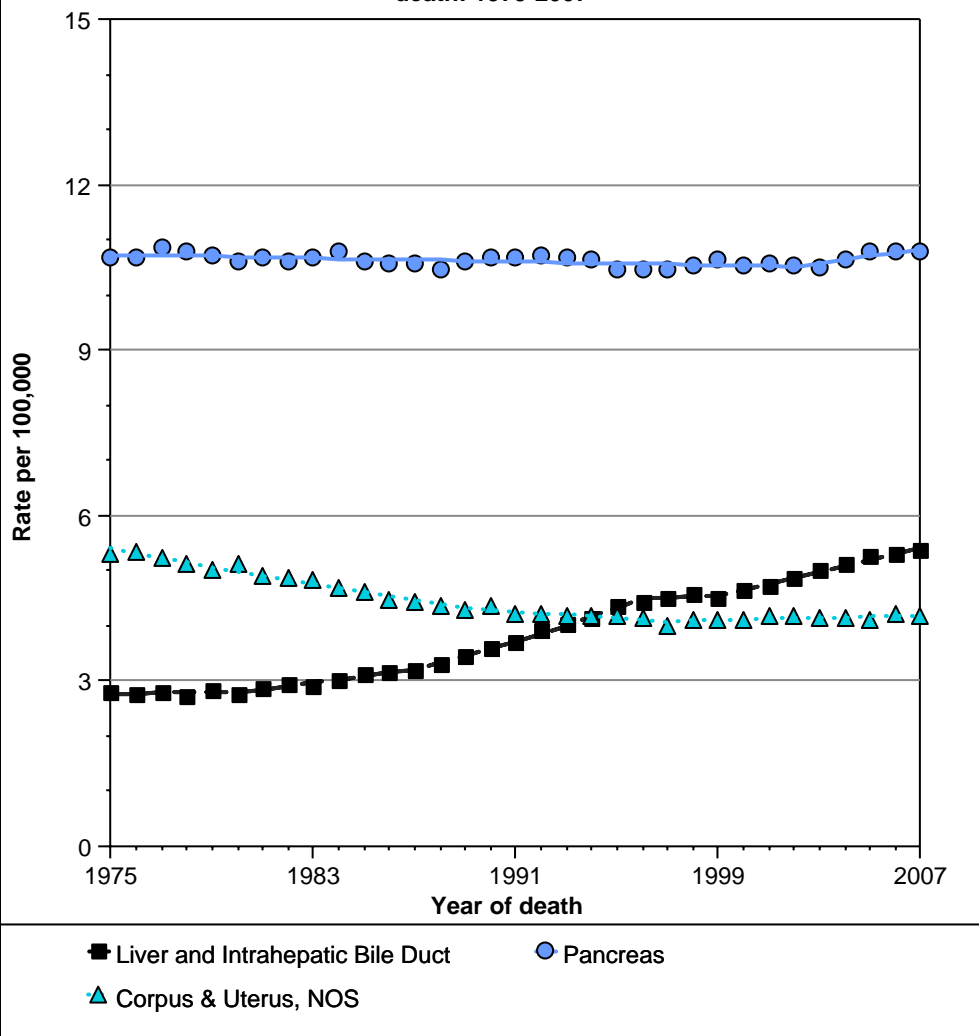
Studies have shown that persons self-reported as American Indian, Asian, or Hispanic on census and survey records may sometimes be reported as white or non-Hispanic on the death certificate, resulting in an underestimation of deaths and death rates for these groups. [http://www.cdc.gov/nchs/data/series/sr\\_02/sr02\\_148.pdf](http://www.cdc.gov/nchs/data/series/sr_02/sr02_148.pdf).



### Cancer Sites with Increasing Mortality Trends

Mortality rates are currently increasing for only a few cancer sites. These sites include liver and intrahepatic bile duct, pancreas and recently corpus and unspecified uterus.

**Figure EMO4: Death rates for sites with current increasing trends<sup>^</sup> by cause of death: 1975-2007**

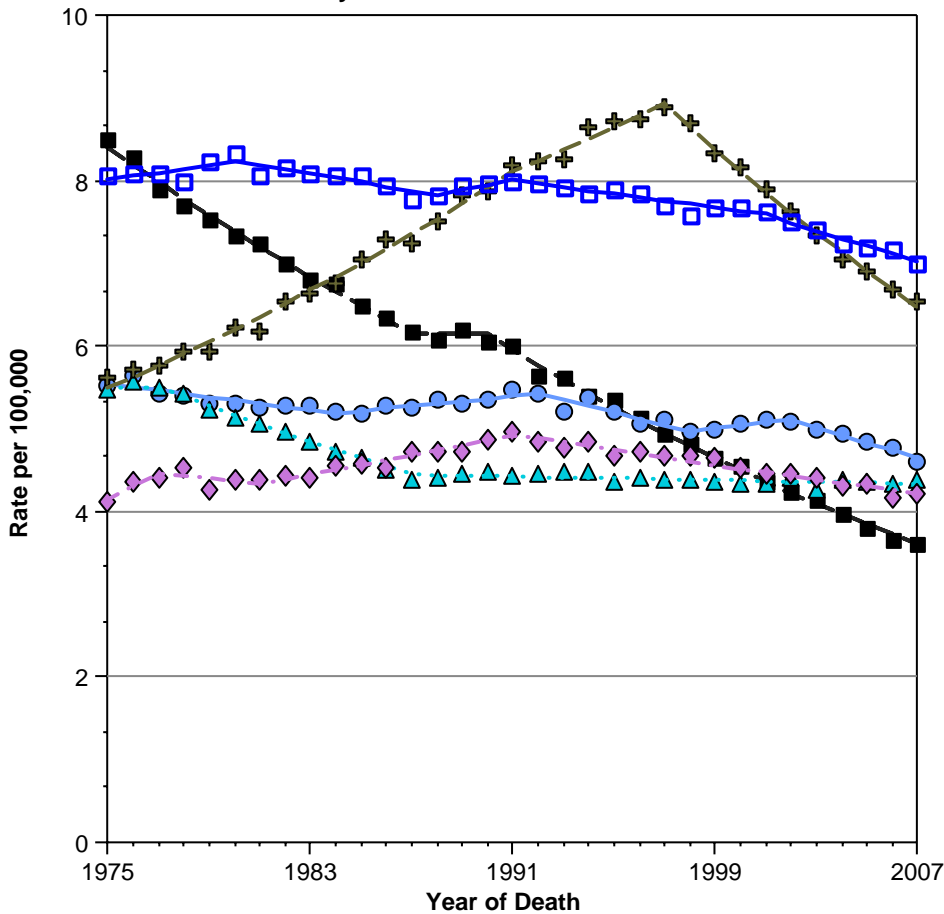


Source: National Center for Health Statistics data as analyzed by NCI. Data are age-adjusted to the 2000 standard using age groups: <1, 1-4, 5-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+. Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>). Restricted to cancer sites with 2007 mortality rates between 3 and 10 per 100,000. <sup>^</sup> Annual percent change (APC) for final Joinpoint segment is greater than zero ( $P \leq 0.05$ ).

**Cancer Sites with Decreasing Mortality Trends**

The mortality rates for some cancer sites that historically have had mortality rates of less than 10 per 100,000 people are decreasing. These decreases coincide with decreases in the more common causes of cancer death (Figure EMO2) (mortality rates for all sites combined, as well as mortality rates for the five top sites: colorectal cancer, female breast cancer, male lung cancer, female lung cancer, and prostate cancer, are all decreasing). Figure EMO5 shows other cancers with lower incidence rates (2–10 per 100,000), including leukemia; non-Hodgkin lymphoma; stomach cancer; ovarian cancer; urinary bladder cancer; and brain and other nervous system cancers that also have decreasing incidence trends.

Figure EMO5: Death rates for sites with intermediate rates and decreasing trends<sup>^</sup> by cause of death: 1975-2007



Stomach
  Ovary  
 Urinary Bladder
  Brain and Other Nervous System  
 Non-Hodgkin Lymphoma
  Leukemia

Source: National Center for Health Statistics data as analyzed by NCI. Data are age-adjusted to the 2000 standard using age groups: <1, 1-4, 5-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+. Analysis uses the 2000 Standard Population as defined by NCHS(<http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>). Restricted to cancer sites with 2007 mortality rates between 3 and 10 per 100,000. <sup>^</sup> Annual percent change (APC) for final Joinpoint segment is less than zero (P<=0.05).

## Key Issues

Although overall death rates are on the decline, cancer deaths for some sites are increasing, such as liver and intrahepatic bile duct, pancreas, and corpus and unspecified uterus.

An ongoing challenge for the United States is to find new and better ways to reduce and eliminate disparities in cancer death rates among different populations of Americans.

## Additional Information on Mortality

- American Cancer Society - Statistics for 2010  
[http://www.cancer.org/docroot/stt/stt\\_0.asp](http://www.cancer.org/docroot/stt/stt_0.asp)
- Cancer Intervention Surveillance Network (CISNET), Colorectal Cancer Mortality Projection  
<http://cisnet.cancer.gov/projections/colorectal>

- Healthy People 2010, Volume 1, Chapter 3 - Cancer  
<http://www.health.gov/healthypeople/document/HTML/Volume1/03Cancer.htm>
- National Vital Statistics System  
<http://www.cdc.gov/nchs/deaths.htm>
- State Cancer Profiles  
<http://statecancerprofiles.cancer.gov>

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## Person-Years of Life Lost

(2007 data now available)

End of Life

**Cancer is responsible for more person years of life lost than all other causes of death combined.**

### Person-Years of Life Lost (PYLL)

Death rates alone do not provide a complete picture of the burden that deaths impose on the population. Another useful measure that may add a different dimension is person-years of life lost (PYLL)—the years of life lost because of early death from a particular cause or disease. PYLL caused by cancer helps to describe the extent to which life is cut short by cancer. On average, each person who died from cancer in 2007 lost an estimated 15.4 years of life.

### Measure

PYLL due to a particular disease or cause is measured as the difference between the actual age stemming from the disease/cause and the expected age of death. Specifically, this measure is estimated by linking life table data to each death of a person of a given age and sex. The life table permits a determination of the number of additional years an average person of that age, race, and sex would have been expected to live.

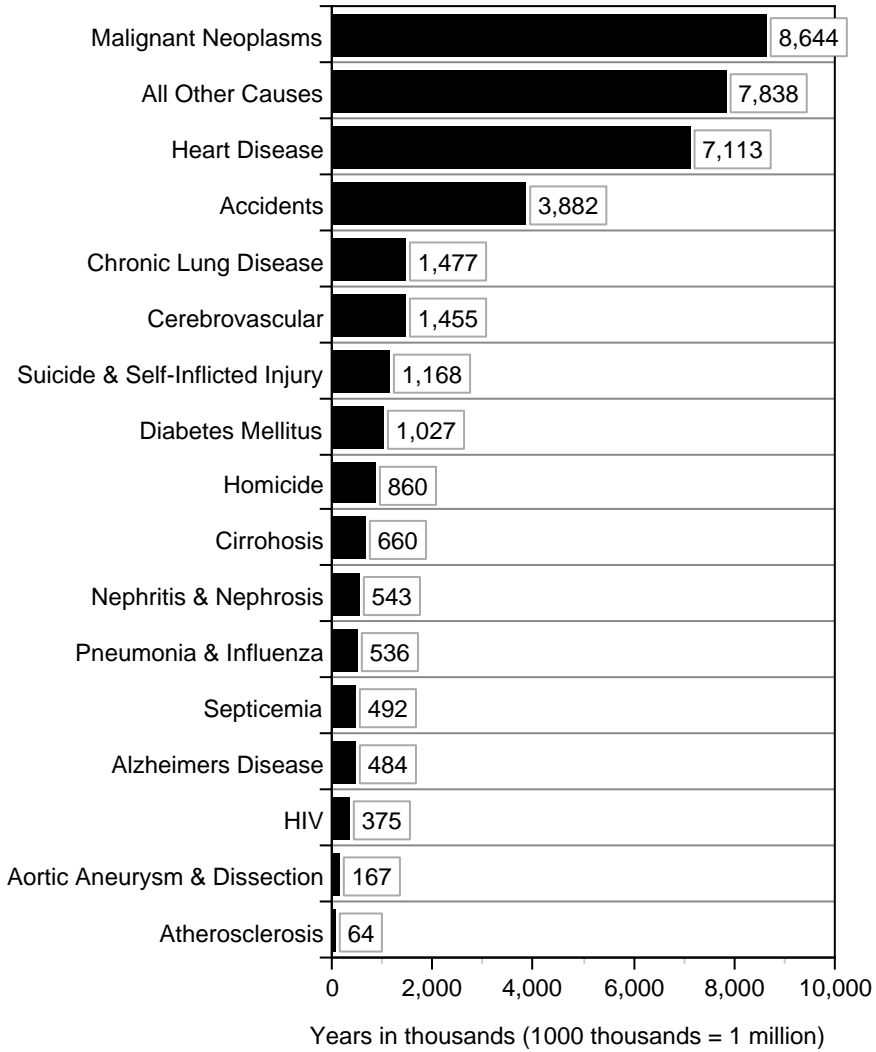
**Period** – 2007

**Trends** – No trend data are available.

### Most Recent Estimates

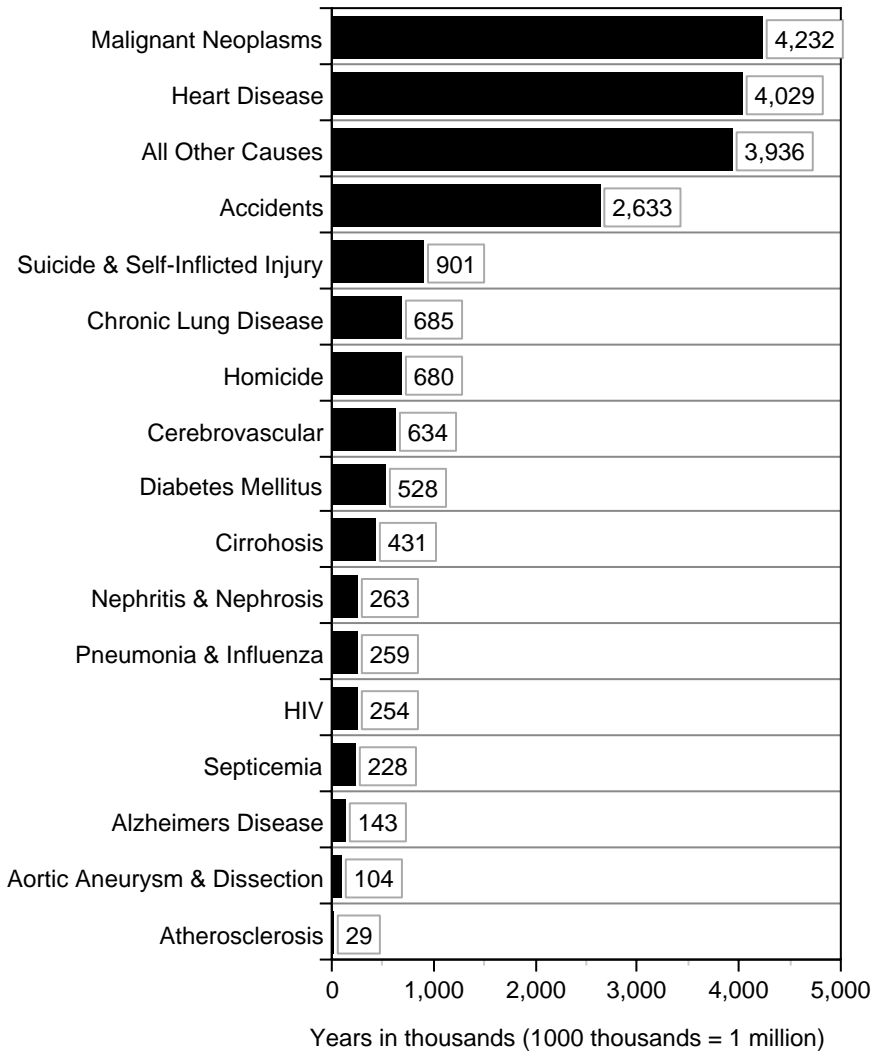
In 2007, cancer deaths were responsible for more than 8.6 million PYLL, which is more than heart disease and all other causes of death, combined. About 51 percent of the PYLL caused by cancer death occurred among women. The number of PYLL from causes other than cancer varied by gender, with more accidental deaths and suicides among men and more cerebrovascular and chronic lung disease-related deaths among women.

Figure EPY1: Person-years of life lost in the U.S. due to major causes of death, All Races, Both Sexes: 2007



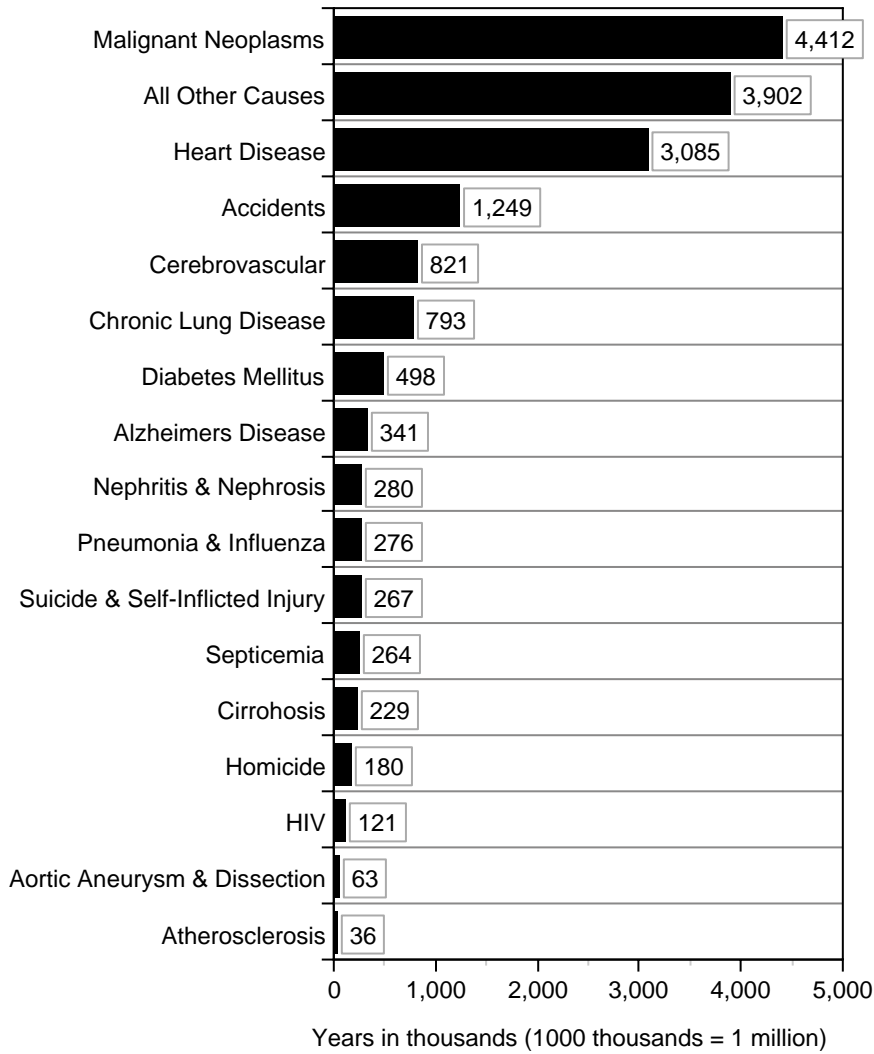
Source: National Center for Health Statistics data as analyzed by NCI and National Center for Health Statistics life-tables.  
Data are not age-adjusted.  
Estimates produced using 2006 life-tables.

Figure EPY2: Person-years of life lost in the U.S. due to major causes of death, All Races, Males: 2007



Source: National Center for Health Statistics data as analyzed by NCI and National Center for Health Statistics life-tables.  
 Data are not age-adjusted.  
 Estimates produced using 2006 life-tables.

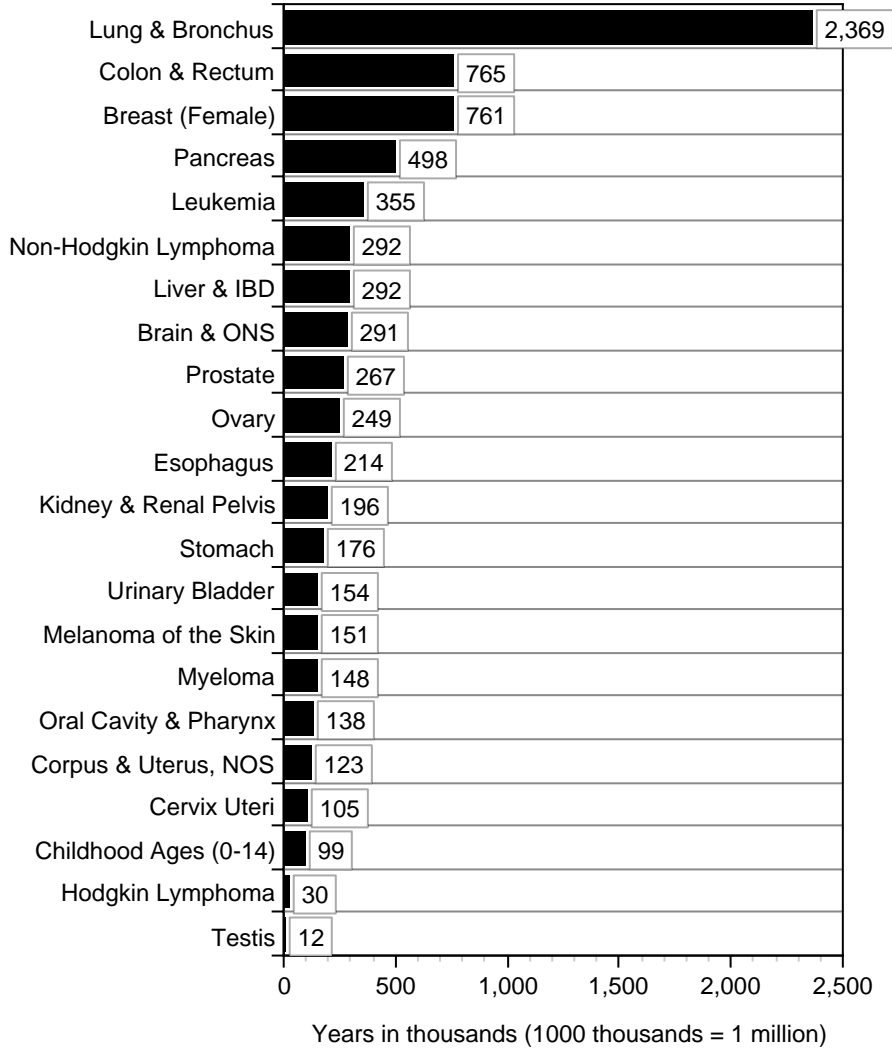
Figure EPY3: Person-years of life lost in the U.S. due to major causes of death, All Races, Females: 2007



Source: National Center for Health Statistics data as analyzed by NCI and National Center for Health Statistics life-tables.  
 Data are not age-adjusted.  
 Estimates produced using 2006 life-tables.



Figure EPY4: Person-years of life lost in the U.S. due to cancer, All Races, Both Sexes: 2007



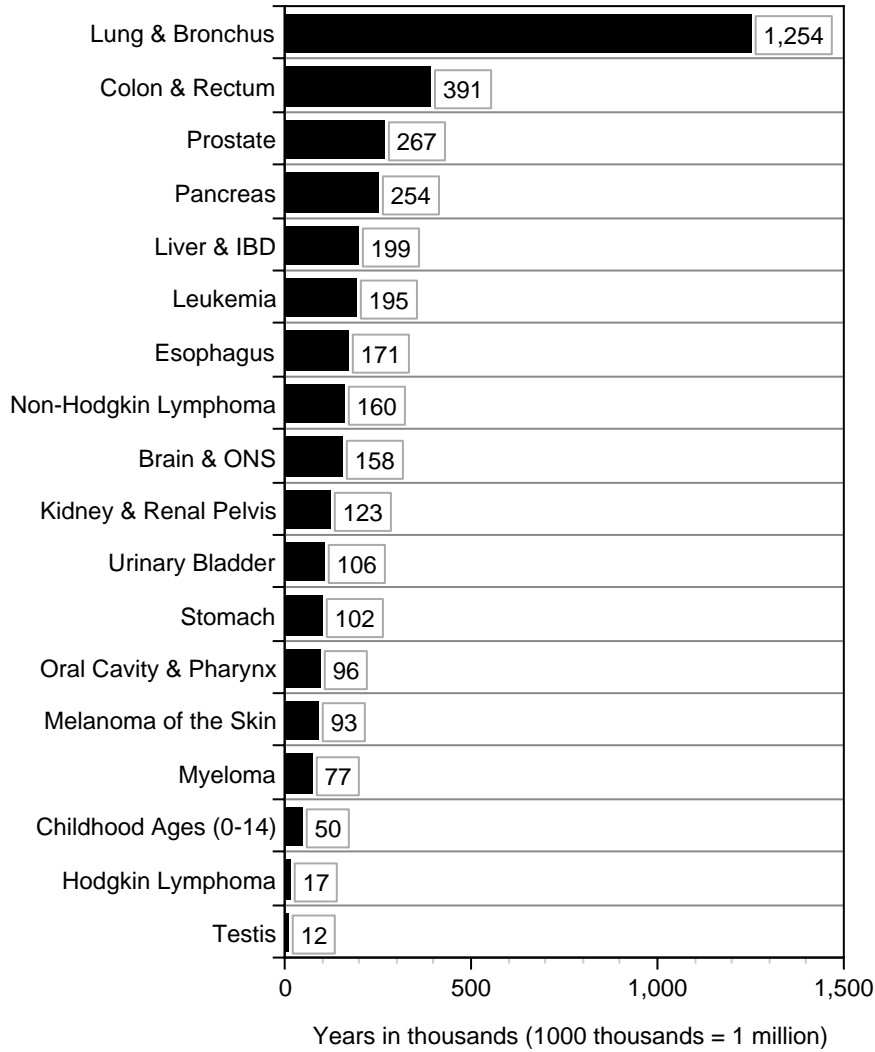
Source: National Center for Health Statistics data as analyzed by NCI and National Center for Health Statistics life-tables.  
 Data are not age-adjusted.  
 Estimates produced using 2006 life-tables.

Lung cancer accounted for nearly 2.4 million PYLL, the most by far for any cancer, partially because of the relatively low percent of survival and the relatively early age of onset. In contrast, another leading cancer, prostate cancer, which primarily affects older men, accounted for many fewer PYLL—approximately 267,000.

In 2007, for each of the leading cancer sites affecting both men and women, men had more PYLL than women. For both sexes combined, these sites include lung and bronchus; colon and rectum; pancreas; leukemia; non-Hodgkin lymphoma; liver and intrahepatic bile duct; brain and other nervous system; esophagus; kidney and renal pelvis; stomach; urinary bladder; melanoma of the skin; myeloma; oral cavity and pharynx; childhood cancers; and Hodgkin lymphoma.

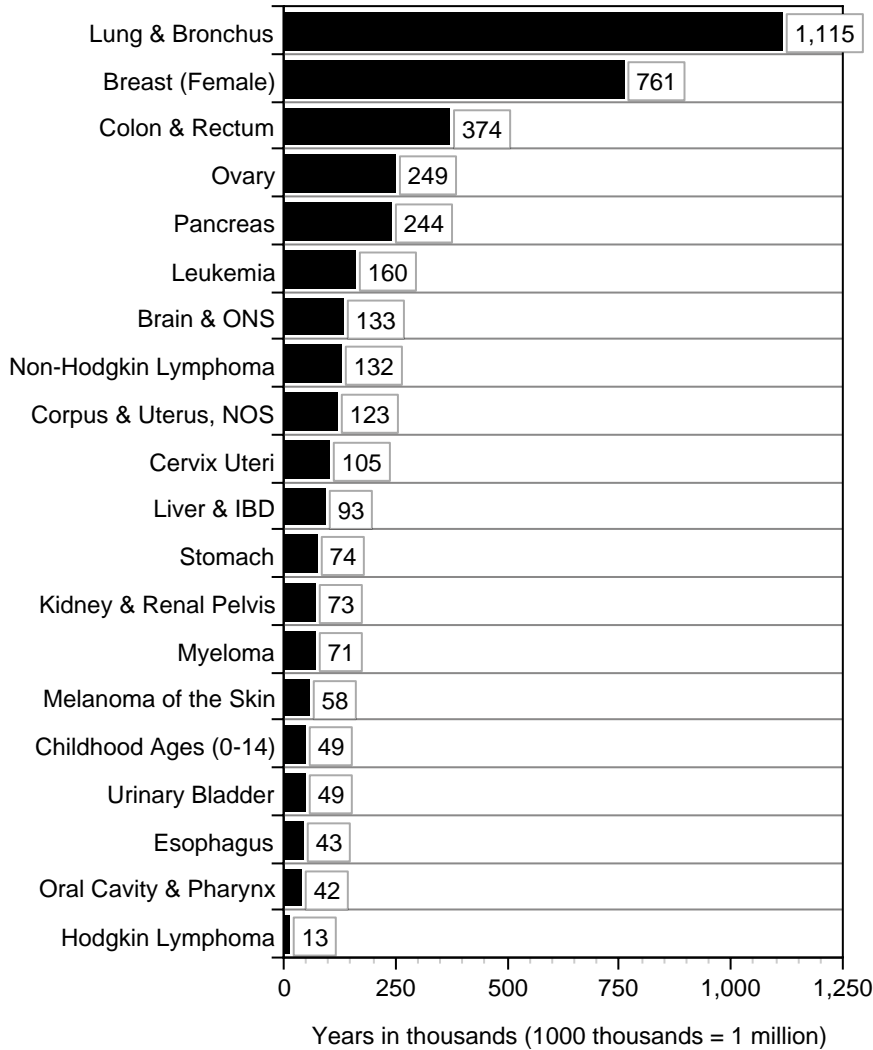
However, the number of person years of life lost stemming from collective cancer deaths among women, was slightly greater than that among men because the number of person years of life lost due to cancers affecting only women (i.e., female breast; ovary; corpus and uterus; NOS; and cervix uteri) exceeded the number of person years of life lost stemming from cancers affecting only men (i.e., prostate and testis).

Figure EPY5: Person-years of life lost in the U.S. due to cancer,  
All Races, Males: 2007



Source: National Center for Health Statistics data as analyzed by NCI and National Center for Health Statistics life-tables.  
Data are not age-adjusted.  
Estimates produced using 2006 life-tables.

Figure EPY6: Person-years of life lost in the U.S. due to cancer, All Races, Females: 2007



Source: National Center for Health Statistics data as analyzed by NCI and National Center for Health Statistics life-tables.  
 Data are not age-adjusted.  
 Estimates produced using 2006 life-tables.

### Healthy People 2010 Targets

There is no Healthy People 2010 target for this measure.

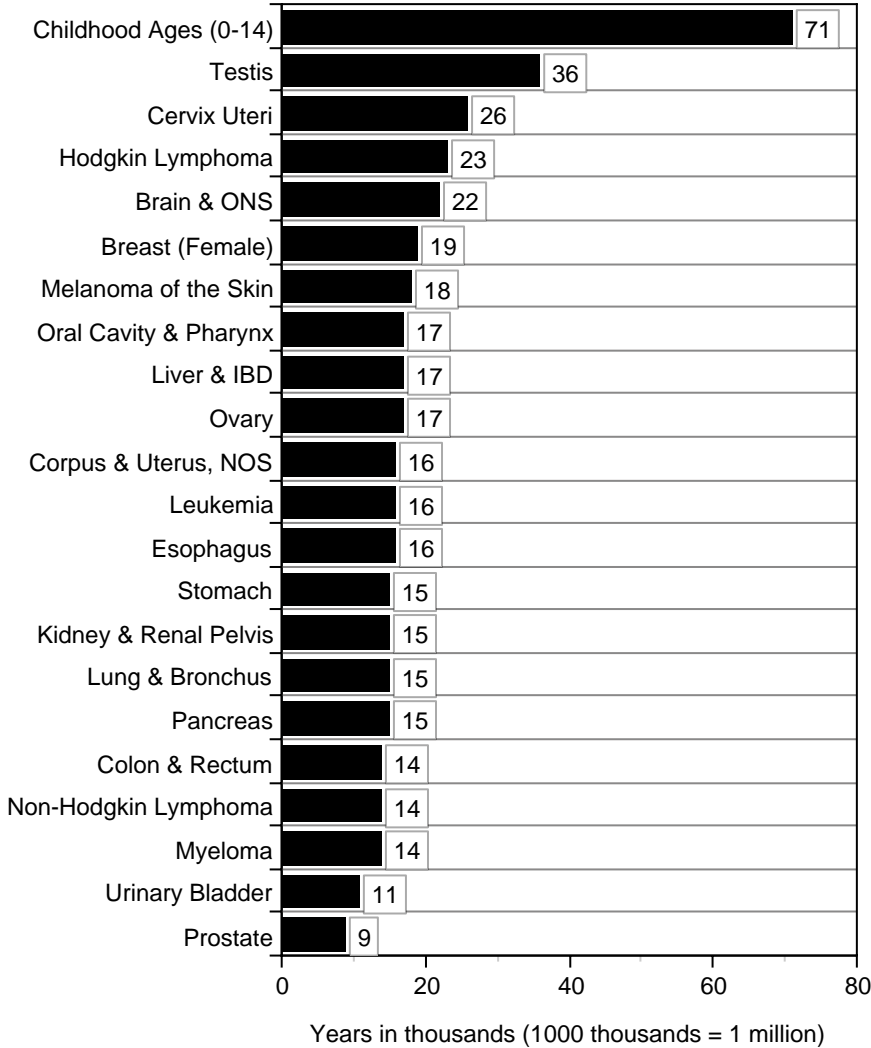
### Groups at High Risk for the Most PYLL

Cancers that are both common and associated with poor survival are responsible for the most PYLL. These factors are accentuated when median age of death occurs many years before the expected lifespan. Lung cancer is an example of a common cancer that has a 5-year survival rate of less than 20 percent.

### Total Versus Average PYLL

Deaths from childhood cancers, which are uncommon, lead to the most years of life lost for the individual but contribute only a small percentage to total PYLL.

Figure EPY7: Average-years of life lost in the U.S. due to cancer, All Races, Both Sexes: 2007



Source: National Center for Health Statistics data as analyzed by NCI and National Center for Health Statistics life-tables.  
Data are not age-adjusted.  
Estimates produced using 2006 life-tables.

## Key Issues

The greatest impact on reducing the number of years lost to cancer will come from progress against common cancers such as lung, female breast, and colorectal cancers—as well as new scientific breakthroughs for cancers where the prognosis is poor (e.g., pancreatic cancer).

## Additional Information on Person-Years of Life Lost

- SEER Cancer Statistics Review, 1975–2007 (NCI)  
[http://seer.cancer.gov/csr/1975\\_2007/index.html](http://seer.cancer.gov/csr/1975_2007/index.html)

◀ [Back: Mortality](#)

## Appendices

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[Figure Numbering Key](#)

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[Methodology for Characterizing Trends](#)

[Survival Estimation Methods](#)

*NCI wishes to acknowledge the following Federal agencies as sources for the data used in this report:*

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Figures in the *Cancer Trends Progress Report – 2009/2010 Update* have been renumbered for easier association with the specific chapter and section in which they appear. The first letter of the 3-letter code indicates the chapter, while the second and third letters represent the section. Below is the key for figure numbering:

### **PREVENTION (P)**

PSI – Age at Smoking Initiation  
PYS – Youth Smoking  
PAS – Adult Smoking  
PQS – Quitting Smoking  
PCA – Clinicians' Advice to Quit Smoking  
PMC – Medical Coverage of Tobacco Dependence Treatment  
PFV – Fruit and Vegetable Consumption  
PRM – Red Meat Consumption  
PFC – Fat Consumption  
PAC – Alcohol Consumption  
PPA – Physical Activity  
PWT – Weight  
PSP – Sun Protection  
PSS – Secondhand Smoke  
PPE – Pesticides  
PDI – Dioxins  
PTC – Tobacco Company Marketing Expenditures

### **EARLY DETECTION (S)**

SBR – Breast Cancer Screening  
SCE – Cervical Cancer Screening  
SCO – Colorectal Cancer Screening

### **DIAGNOSIS (D)**

DIN – Incidence  
DST – Stage at Diagnosis

### **TREATMENT (T)**

TBL – Bladder Cancer Treatment  
TBR – Breast Cancer Treatment  
TCO – Colorectal Cancer Treatment  
TKI – Kidney Cancer Treatment  
TLU – Lung Cancer Treatment  
TOV – Ovarian Cancer Treatment  
TPR – Prostate Cancer Treatment

### **LIFE AFTER CANCER (L)**

LCO – Costs of Cancer Care  
LSU – Survival  
LCS – Cancer Survivors and Smoking

### **END OF LIFE (E)**

EMO – Mortality  
EPY – Person-years of Life Lost

## ► Cancer Incidence and Mortality Rates - United States, 2007

The following tables depict the incidence and mortality rates for the cancers included in the *Cancer Trends Progress Report – 2009/2010 Update*. Rates are per 100,000 and are age-adjusted to the 2000 U.S. Standard Population. Click on the cancer name to view more detailed data for that particular cancer. For cancers not included in the tables, please visit the Cancer Statistics Review, 1975–2007 ([http://seer.cancer.gov/csr/1975\\_2007/sections.html](http://seer.cancer.gov/csr/1975_2007/sections.html)).

### Delay-adjusted incidence rates

Cancer	All races			Whites			Blacks		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
<a href="#">All sites</a>	472.7	550.3	417.3	485.4	559.8	432.8	503.0	636.6	410.9
<a href="#">Brain and other nervous system</a>	6.6	7.8	5.6	7.3	8.7	6.0	4.7	4.9	4.6
<a href="#">Female breast</a>	126.3	X	126.3	129.8	X	129.8	122.1	X	122.1
<a href="#">Colon and rectum</a>	45.3	51.6	40.1	44.6	50.9	39.5	55.8	62.5	51.0
<a href="#">Corpus uteri</a>	25.0	X	25.0	25.8	X	25.8	22.3	X	22.3
<a href="#">Esophagus</a>	4.6	8.0	1.9	4.8	8.3	1.9	5.0	8.0	2.9
<a href="#">Hodgkin</a>	3.1	3.6	2.7	3.4	3.9	3.0	3.1	3.5	2.6
<a href="#">Kidney and renal pelvis</a>	15.2	20.6	10.7	15.4	20.7	10.9	18.0	24.6	13.0
<a href="#">Leukemia</a>	14.0	18.3	10.8	14.8	19.4	11.4	9.8	13.2	7.6
<a href="#">Liver and bile duct</a>	7.2	11.2	3.8	5.8	8.9	3.0	9.7	16.4	4.7
<a href="#">Lung and</a>	61.0	71.8	53.0	62.2	71.3	55.8	71.8	96.6	55.1
<a href="#">Melanoma of the skin</a>	21.5	26.9	17.8	26.5	32.6	22.5	0.0	0.0	0.0
<a href="#">Non-Hodgkin lymphoma</a>	20.9	25.5	17.2	22.3	27.1	18.3	15.2	17.8	13.1
<a href="#">Oral cavity and pharynx</a>	10.6	15.6	6.2	10.9	16.0	6.3	9.7	15.3	5.4
<a href="#">Ovary</a>	13.0	X	13.0	13.6	X	13.6	11.7	X	11.7
<a href="#">Pancreas</a>	12.4	14.1	10.9	12.3	14.2	10.7	15.5	16.3	14.7
<a href="#">Prostate</a>	170.9	170.9	X	168.2	168.2	X	259.3	259.3	X
<a href="#">Stomach</a>	7.1	10.2	4.8	6.1	9.0	3.8	11.3	16.6	7.8
<a href="#">Testis</a>	5.9	5.9	X	7.1	7.1	X	1.4	1.4	X
<a href="#">Thyroid</a>	12.2	5.9	18.5	13.1	6.3	20.0	7.3	3.0	10.7
<a href="#">Urinary bladder</a>	21.3	37.8	8.9	23.6	41.8	9.7	13.0	20.6	7.8

Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas (<http://seer.cancer.gov/registries/terms.html>). Data are age-adjusted to the 2000 standard using age groups:<1, 1-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+. Analysis uses the 2000 Standard Population (Census P25-1130) as defined by NCI (<http://seer.cancer.gov/stdpopulations/>).

X - Statistic not shown. Rate based on fewer than 25 cases for the year 2007.

### Age-adjusted mortality rates

Cancer	All races			Whites			Blacks		
	Total	Males	Females	Total	Males	Females	Total	Males	Females

<u>All sites</u>	178.2	217.8	150.9	177.1	215.2	150.6	216.3	284.2	175.2
<u>Brain and other nervous system</u>	4.2	5.1	3.5	4.6	5.5	3.8	2.4	2.8	2.1
<u>Breast</u>	12.8	0.3	22.8	12.4	0.3	22.2	18.6	0.4	31.4
<u>Colon and rectum</u>	16.7	20.1	14.2	16.2	19.5	13.7	23.4	29.1	19.7
<u>Corpus uteri</u>	4.2	X	4.2	3.9	X	3.9	7.5	X	7.5
<u>Esophagus</u>	4.3	7.7	1.6	4.3	7.8	1.5	4.7	8.4	2.2
<u>Hodgkin lymphoma</u>	0.4	0.5	0.3	0.4	0.5	0.3	0.4	0.5	0.3
<u>Kidney and renal pelvis</u>	4.0	5.8	2.6	4.1	5.9	2.7	4.1	6.0	2.8
<u>Leukemia</u>	7.0	9.4	5.3	7.2	9.8	5.4	6.2	8.0	5.0
<u>Liver and bile duct</u>	5.4	7.9	3.2	5.0	7.2	3.1	7.1	11.5	3.8
<u>Lung and bronchus</u>	50.7	65.2	40.0	51.2	64.8	41.1	55.9	82.8	38.3
<u>Melanoma of the skin</u>	2.7	4.0	1.7	3.0	4.5	1.9	0.5	0.5	0.5
<u>Non-Hodgkin lymphoma</u>	6.5	8.3	5.2	6.8	8.6	5.4	4.5	5.8	3.6
<u>Oral cavity and pharynx</u>	2.5	3.9	1.4	2.4	3.7	1.4	3.3	5.7	1.6
<u>Ovary</u>	8.2	X	8.2	8.6	X	8.6	6.6	X	6.6
<u>Pancreas</u>	10.8	12.5	9.4	10.6	12.4	9.1	14.0	15.7	12.7
<u>Prostate</u>	23.5	23.5	X	21.6	21.6	X	52.0	52.0	X
<u>Stomach</u>	3.6	5.0	2.6	3.1	4.4	2.2	6.9	10.4	4.6
<u>Testis</u>	0.2	0.2	X	0.2	0.2	X	0.1	0.1	X
<u>Thyroid</u>	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.6
<u>Urinary bladder</u>	4.4	7.6	2.2	4.5	8.0	2.2	3.8	5.4	2.8

US Mortality Files, National Center for Health Statistics, Centers for Disease Control and Prevention. Rates are per 100,000 and are age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130).

X - Statistic not shown. Rate based on fewer than 25 cases for the year 2007.

In order to obtain a consistent characterization of population trends in factors related to the prevention, early detection, or treatment of cancer, the joinpoint statistical methodology was used in this report (<http://srab.cancer.gov/joinpoint/>). This methodology characterizes a trend using joined linear segments on a logarithmic scale; the point where two segments meet is called a "joinpoint." The methodology has previously proven useful in characterizing trends in cancer incidence and mortality rates (e.g., in the Annual Report to the Nation on the Status of Cancer, 1975–2004, Featuring Cancer in American Indians and Alaska Natives).

The joinpoint software (Joinpoint Version 3.4.2) uses statistical criteria to determine:

- The fewest number of segments necessary to characterize a trend
- Where the segments begin and end
- The annual percent change (APC) for each segment. (A linear trend on a log scale implies a constant annual percent change.)

In addition, a 95-percent confidence interval around the APC was used to determine if the APC for each segment differed significantly from zero. Whenever possible, weighted regression lines (utilizing standard errors) were calculated using the joinpoint software. Using a log response variable, the weight (motivated by the delta method) equals the square of the response variable divided by the square of the standard error. If the standard errors were unavailable, an unweighted regression was used.

Using the results of these analyses, we characterize trends in this report with respect to both their public health importance and statistical significance. If a trend was:

- Changing less than or equal to 0.5% per year ( $-0.5 \leq \text{APC} \leq 0.5$ ), and the APC was not statistically significant, we characterized it as **STABLE**
- Changing more than 0.5% per year ( $\text{APC} < -0.5$  or  $\text{APC} > 0.5$ ), and the APC was not statistically significant, we characterized it as **NON-SIGNIFICANT CHANGE**
- Changing with a statistically significant  $\text{APC} > 0$ , we characterized it as **RISING**
- Changing with a statistically significant  $\text{APC} < 0$ , we characterized it as **FALLING**

While these categorizations are somewhat arbitrary, they do provide a consistent method to characterize the trends across disparate measures. However, statistical significance in addition to the absolute value of change for incidence and mortality trends were used to ensure consistency with all major publications on national cancer trends.

To avoid statistical anomalies, segments had to contain at least three observed data points, and no segment could begin or end closer than three data points from the beginning or end of the data series. Because we constrained the joinpoint models to those in which no segment could begin or end closer than three data points from the beginning or end of the data series, if there were four data points or fewer, only one segment could be fit; from five to seven data points, up to two segments could be fit; and from eight to 10 data points, up to three segments could be fit. To avoid some of these limitations, for two to six data points we connected the data points to determine the APC for each time period, and then employed a two-sample test using the standard errors derived from the survey to determine the statistical significance of the change across periods. For 7-13 data points we allowed a maximum of 1 joinpoint, 14-20 data points, we allowed a maximum of 2 joinpoints, for 21-27 data points, we allowed a maximum of 3 joinpoints, and for 28 or more data points, we allowed a maximum of 4 joinpoints.

A new addition to the methodology in the 2009/2010 update of the Cancer Trends Progress Report is the Average Annual Percent Change (AAPC), a measure which uses the underlying joinpoint model to compute a summary measure of the trend over a fixed pre-specified interval. The AAPC is useful for comparing the most recent trend across different groups (e.g., racial groups or gender) when the final joinpoint segments are not directly comparable because they are of different lengths.

Regardless of where the joinpoints occur for the different series, the AAPC can be computed over the same fixed interval for all the series (e.g., 2002–2006 to characterize the most recent trend). The AAPC is computed as a weighted average of the APC's from the joinpoint model, with the weights equal to the length of the APC intervals included. For more information on the AAPC, see <http://srab.cancer.gov/joinpoint/aapc.html>. When there are seven or fewer data points, the AAPC was computed based on the connected data points, rather than an underlying joinpoint model. The derivation of the AAPC and its standard error based on a series of connected points is presented in a technical report (<http://srab.cancer.gov/reports/tech2009.02.pdf>).

Age adjustment (to a standard population) for measures was done using the direct method of standardization. Whenever possible, age adjustment for measures was done using the age adjustment groups specified for Healthy People 2010 age-adjusted measures (<http://wonder.cdc.gov/data2010/aagroups.htm>). The year 2000 standard population for specific age groups is available in Klein and Schoenborn (2001). For cancer incidence, 19 age groups were used with the 2000 standard population as specified in <http://seer.cancer.gov/stdpopulations>.

#### References:

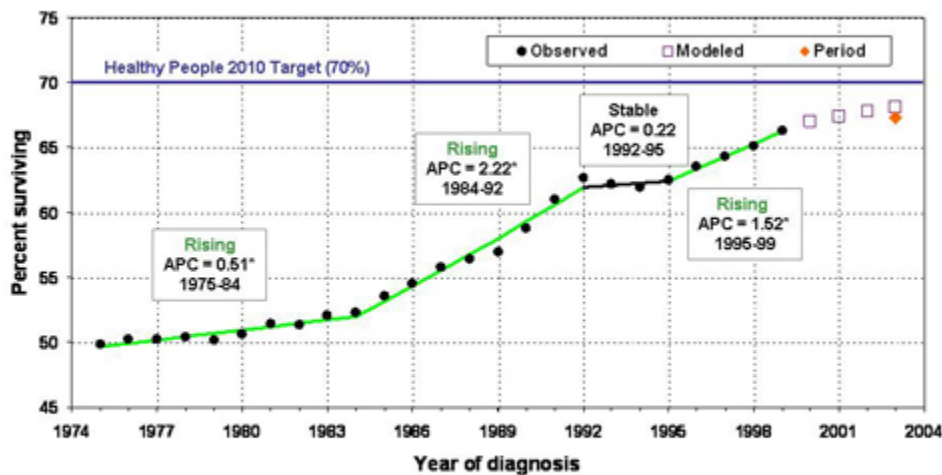
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In Figure L1 of this report, the most recent 5-year estimates of survival are for patients diagnosed in 2001. The estimates are slightly dated due to the lag time in cancer registry reporting of new cases and the time it takes to observe 5-year survival. Because complete follow-up is available only through 2005, the most recent estimates are based on data as follows:

Survival Time	Diagnosis Year
1 year	2005
2 years	2004
3 years	2003
4 years	2002
5 years	2001

Researchers at the National Cancer Institute (NCI) and elsewhere have been considering methods for extrapolating to obtain long-term survival estimates for cases diagnosed. Two such methods are the **period method** and the **modeled method**.

Figure L1a. 5-year relative survival rates  
All cancer sites combined: 1975–1999



HP 2010 Goal 3-15: 70%  
Source: SEER Program, National Cancer Institute. Rates are from the SEER 9 areas (<http://seer.cancer.gov/registries/terms.html>).  
Data are not age-adjusted.  
Weighted regression lines (utilizing standard errors) are calculated using the Joinpoint (JP) Regression Program, Version 3.0. April 2005, National Cancer Institute.  
\* The Annual Percent Change (APC) is statistically significant.

The **period method**, introduced by Brenner et al. (1) and slightly modified for use with Surveillance, Epidemiology, and End Results (SEER) data (2), considers only the patients' survival experience within the most recent calendar period (i.e., 2003–2005). For example, to estimate the 5-year survival in 2005, we use 0- to 1-year survival experience for cases diagnosed in (2003–2005), 1- to 2-year survival experience for cases diagnosed in (2002–2004), who survived at least 1 year, and so on up to 4- to 5- year survival experience for cases diagnosed in (1999–2001), who survived at least 4 years. The period 5-year survival is then calculated by multiplying these interval survival probabilities. The period method was not developed to provide survival trend but to give the most up-to-date estimate of survival experience observed in the data. The period method estimate is plotted as a filled diamond in the figure above.

The **modeled method** (3–4) consists of fitting a trend line across diagnosis years to each of the five observed interval survival probabilities (e.g., the 0- to 1-year survival for cases diagnosed in 2001 to 2005, 1- to 2-year survival for cases diagnosed in 2001 to 2004, etc.). These trend lines are then projected to the year of interest. The final estimate for a particular diagnosis year is obtained by multiplying the known and projected interval survival probabilities together.

For example, to estimate the 5-year survival rate for those diagnosed in 2005 using available data, *known* 0- to 1-year survival rates are combined with 1- to 2-, 2- to 3-, 3- to 4-, and 4- to 5-year *projections* from the model. The advantage of this method is that if survival is improving over time, the 4- to 5-year estimate of survival used for the 2005 computation will more accurately reflect the improved trend compared to the 2001 estimate used in the period method. The 5-year modeled survival estimates are plotted as open squares in the figure above. Because these projections combine known survival probabilities with projections, they are not a simple extrapolation of the last segment estimated using joinpoint regression.

These methods have the potential to provide clinicians, patients, cancer control analysts, and policy makers improved estimates of the long-term prognoses of recently diagnosed patients. As researchers continue to refine survival estimation methods and examine their assumptions and predictive ability, we ask for your input. Please [click here to provide feedback](#).

## References

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