

Cancer Trends Progress Report – 2007 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 2007 update to the *Cancer Trends Progress Report* is an important part of that dissemination process. Here you will find a website 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 – 2007 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 of federal and state agency partners, consumer advocates, the American Cancer Society, and others.

As the report details, cancer mortality continues a gradual decline that began in the mid-1990s. Since that time, many preventive and early detection practices have improved. Screening rates for colorectal, breast, and cervical cancers are rising, albeit modestly. The smoking rate among adolescents appears to be heading downward, however there was no decrease in the most recent two year data collection period. Adult cigarette smoking prevalence has been slowly declining since 1991, with some evidence of a steeper decline for females than males. However, overall prevalence has not declined since 2004.

We are beginning to achieve a significant reduction in the rate of recurrence following surgery for common solid tumors, such as breast and colorectal cancers. Clinical trials of post-surgical, adjunctive chemotherapy for men and women with breast or colorectal cancers that involve regional lymph nodes at the time of initial diagnosis and treatment demonstrate major improvements in overall survival for patients receiving multi-agent systemic chemotherapy. Importantly, refinements in treatment programs, thanks to several new, more effective drugs, have led to substantively better survival rates for both of these diseases over the past five years. Based on further recent improvements in the treatment of advanced breast and colorectal cancers with antiangiogenic therapies, monoclonal antibodies, and molecularly targeted drugs, our ability to significantly decrease the risk of relapse for these diseases after primary surgery should only continue to improve.

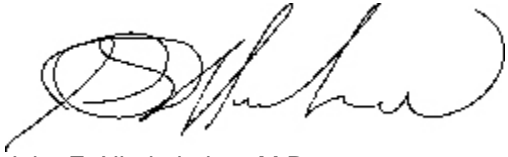
The Human Genome Project has opened up new vistas of cancer research, enabling us to systematically identify all important inherited and acquired genetic alterations that contribute to a person's cancer risk and how, if cancer occurs, it will behave. We are diligently working to understand how these genetic changes affect our ability to prevent and treat this disease. These kinds of studies point to a time when risk will be calculated based on the individual patient. And, new imaging techniques and technologies are peering deep inside the inner workings of the cancer cell, providing insight into tumor biology, along with the capacity to learn—in real time—if a small molecule therapy is reaching, and saturating, its molecular target.

These advances are happening at a pace never before seen. Reports like this one will help to get that message to the patients, policymakers, and health care providers who join researchers on cancer's front lines.

There is, of course, much work left to be done. More intense research and more-effective interventions are needed for several cancers whose death rates are on the rise, including esophageal cancer and non-Hodgkin lymphoma.

There are unacceptable disparities in cancer incidence and outcomes among major racial and ethnic groups. We need more-reliable and more-accurate ways to assess models, and enhance the delivery of quality care to all. The recently launched NCI Community Cancer Centers Program (NCCCP) is researching how best to bring state-of-the-art care and early phase research to all Americans, in the communities where they live.

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.

A handwritten signature in black ink, appearing to read "John E. Niederhuber". The signature is fluid and cursive, with a large initial "J" and "N".

John E. Niederhuber, M.D.
Director, National Cancer Institute

➤ Introduction

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

- The U.S. cancer death rate began to drop for the first time in 1993.
- The incidence rates of all new cancers combined has been relatively stable since the mid 1990s 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.

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

- Overall, declining death rates have slowed.
- Not all cancer death rates are going down. For example, the death rate for lung cancer in females has continued to rise.
- The incidence rates of cancer of the liver, pancreas, kidney, esophagus, and thyroid have continued to rise, as have the rates of new cases of non-Hodgkin lymphoma, leukemia, myeloma, and childhood cancers. The incidence rates of cancer of the brain and bladder, and melanoma of the skin in women and of testicular cancer in men, are rising.
- The burden of some types of cancer weighs more heavily on some groups than 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 will 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 – 2007 Update* is the fourth in a series of reports describing 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 – 2007 Update* 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 toward 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 – 2007 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. This section also covers red meat intake and exposures to 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 progress against cancer by looking at the rates of new cancer cases (incidence) and of cancers diagnosed at late stages. This section describes both.
- **Treatment.** Few treatment measures have been tracked at a national level. 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.** Trends in the proportion of cancer patients alive 5 years after their diagnosis and the costs of cancer care are addressed in this section.
- **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) due to cancer.

Where possible, the *Cancer Trends Progress Report – 2007 Update* shows changes in these data over time (trends). All trends have been evaluated statistically and are significant, unless stable or otherwise specified. When there were sufficient numbers of data points in a series (i.e., 5 or more), the trend graphs were made using a statistical method that illustrates changes in direction, instead of merely connecting one data point to the next. This report also 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 some U.S. racial and ethnic groups are also presented.

Most of the measures for age-adjusted cancer death rates in this report are identical to those 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 on those measures based on scientific evidence and largely from 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 more data on trends are available in that area. 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 simply 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 – 2007 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 from 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 – 2007 Update, National Cancer Institute, NIH, DHHS, Bethesda, MD, December 2007, <http://progressreport.cancer.gov>

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Report Highlights

Major Conclusions

The nation is making progress toward major cancer-related Healthy People 2010 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 1990s.
- Adult cigarette smoking prevalence has been slowly declining since 1991, with some evidence of a steeper decline for females than males. However, overall prevalence has not declined since 2004.
- The long-term trend in smoking rates among adolescents since the late 1990s appears to be heading downward, but this trend must be accelerated, especially since the most recent data point in 2005 suggests a possible flattening of this declining trend.
- Substantial decreases in secondhand smoke exposure have been realized since the beginning of the 1990s across a variety of measures (biological measures as well as work place policies, home rules and, most recently, through state as well as local smoke-free indoor air legislation).

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

- The incidence rates of cancer of the liver, pancreas, kidney, esophagus, and thyroid have continued to rise, as have the rates of new cases of non-Hodgkin lymphoma, leukemia, myeloma, and childhood cancers. The incidence rates of cancer of the brain and bladder and melanoma of the skin in women, and testicular cancer in men, are rising.
- Lung cancer death rates in women continue to rise, but not as rapidly as before. Death rates for cancer of the esophagus and thyroid in men, as well as of the liver, are increasing.
- While progress has been made in all segments of the population, subgroups including children living in smokers' homes and subgroups of nonsmoking workers (for example, blue collar occupations and hospitality industry) have higher rates of exposure to secondhand smoke.
- More people are overweight and obese, and leisure time physical activity is increasing only slightly, if at all.
- Alcohol consumption has been rising slightly since the mid 1990s. Fruit and vegetable intake is not increasing and remains relatively stable. Red meat and fat consumption are stable as well.
- 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 is a trend or just an aberration. 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 gives a snapshot of trends for measures included in this report. 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	Measure	Recent Trend
PREVENTION		DIAGNOSIS (continued)	
Age at smoking initiation	<u>Stable</u>	Incidence (continued)	
Youth smoking	<u>Falling</u>	Cancers that are increasing	
Adult smoking	<u>Falling</u>	Female Lung	<u>Rising</u>
Quitting smoking	<u>Stable</u>	Non-Hodgkin lymphoma	<u>Rising</u>
Health professional advice to quit smoking	<u>Falling</u>	Melanoma of skin (White)	<u>Rising</u>
Secondhand smoke		Stage at diagnosis	
Environmental Tobacco Smoke	<u>NSC</u>	Colon	<u>Falling</u>
Smoke-free work environment	<u>Rising</u>	Female breast	<u>Stable</u>
Smoke-free indoor air laws	<u>Rising</u>	Rectum	<u>Falling</u>
Fruit & vegetable consumption	<u>NSC</u>	Cervix	<u>NSC</u>
Red meat consumption	<u>Stable</u>	Prostate	<u>Falling</u>
Fat consumption	<u>Stable</u>	TREATMENT	
Alcohol consumption	<u>Rising</u>	Breast cancer treatment	
Weight (both sexes)		Mastectomy	<u>Falling</u>
Healthy weight	<u>NSC</u>	No surgery	<u>Rising</u>
Overweight	<u>Stable</u>	BCS with radiation	<u>NSC</u>
Obese	<u>NSC</u>	BCS without radiation	<u>Rising</u>
No leisure time physical activity	<u>NSC</u>	Multiagent chemotherapy	<u>Rising</u>
Sun protection	<u>Falling</u>	Colorectal cancer treatment	<u>Rising</u>
Pesticide levels in the blood	<u>Rising</u>	LIFE AFTER CANCER	
Dioxin levels in the human body	<u>Falling</u>	Survival	
EARLY DETECTION		All cancers	<u>Rising</u>
Breast cancer screening	<u>Falling</u>	Prostate	<u>Rising</u>
Cervical cancer screening	<u>Falling</u>	Female breast	<u>Rising</u>
Colorectal cancer screening		Colorectal	<u>Rising</u>
Fecal Occult Blood Test (FOBT)	<u>Falling</u>	Lung and bronchus	<u>Rising</u>
Endoscopy	<u>Rising</u>	END OF LIFE (Mortality)	
Colorectal test use	<u>Rising</u>	All cancers	<u>Falling</u>
DIAGNOSIS		White	<u>Falling</u>
Incidence		Black	<u>Falling</u>
All cancers	<u>Falling</u>	Hispanic	<u>Falling</u>
White	<u>Falling</u>	American Indian/Alaskan Natives	<u>Stable</u>
Black	<u>Falling</u>	Asian/Pacific Islander	<u>Falling</u>
Hispanics	<u>Falling</u>	Prostate	<u>Falling</u>
American Indian/Alaskan Natives	<u>Stable</u>	Female breast	<u>Falling</u>
		Colorectal	<u>Falling</u>

Asian/Pacific Islanders	<u>Falling</u>
Four most common cancers	
Prostate	<u>Falling</u>
Female breast	<u>Falling</u>
Colorectal	<u>Falling</u>
Lung and bronchus	<u>Falling</u>

Lung and bronchus	<u>Falling</u>
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Summary Tables by Topic

How to Read 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:

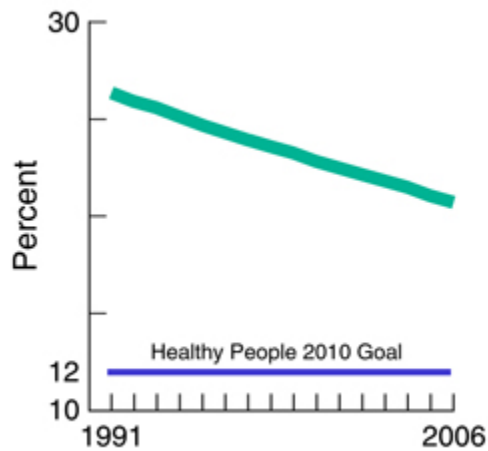
1. **Is the trend moving in the desired direction?**

- A graph shows the trend direction for the measure. The desired trend direction is shown below the graph.
- Each line in the graph is coded by color and line style to indicate whether the trend is:
 - solid green - headed in the right direction
 - ⋯ dotted red - headed in the wrong direction
 - dashed black - stable or non-significant change (NSC)

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 Goal.

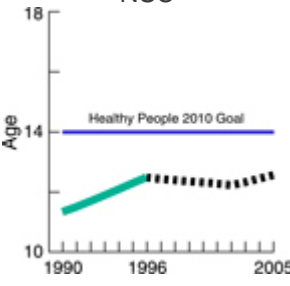
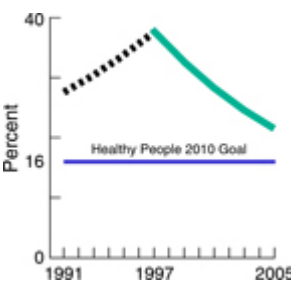
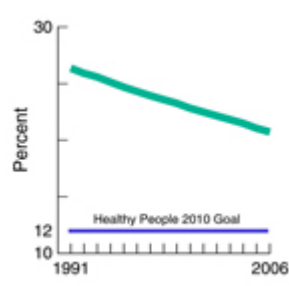
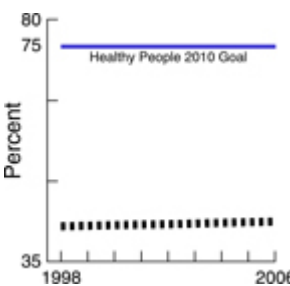
The example below demonstrates the Adult Smoking trend, which is heading in the right direction (solid green line) toward the Healthy People 2010 Goal (solid blue horizontal line).



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.

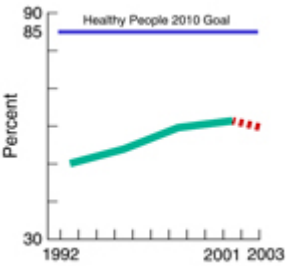
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Age at smoking initiation 1990-2005	Youth smoking 1991-2005	Adult smoking 1991-2006	Quitting smoking 1998-2006
Measure	Average age of first use of cigarettes for respondents aged 12–17 years.	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.	Percentage of smokers aged 18 years and older, who stopped smoking for a day or longer because they were trying to quit.
Trend	Rising, then stable, then NSC 	NSC, then falling 	Falling 	Stable 
Desired direction	Rising ▲	Falling ▼	Falling ▼	Rising ▲
Most recent estimate	In 2005, the average age at first use among people 12 and older was 15.5 years. Among 12- to 17-year-olds, the average age was 12.6. Among those 18–25, the average age was 14.8.	Among high school students in 2005, 23% were current cigarette smokers.	In 2006, 20.8 percent of adults were current cigarette smokers.	In 2006, 43.1 percent of adult smokers aged 18 years and older stopped smoking for one day or longer as they were trying to quit.
Healthy People 2010 target	Increase the average age at first use of cigarettes to 14 years of age for 12- to 17-year-olds.	Decrease the proportion of high school students who currently smoke cigarettes to 16%.	Reduce to 12% the proportion of adult current cigarette smokers.	Increase to 75% the proportion of adult smokers ages 18 and older, who stop smoking for a day or longer because they are trying to quit.
More information	Age at Smoking Initiation	Youth Smoking	Adult Smoking	Quitting Smoking

➤ Summary Table: Prevention – Advice to Quit




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.

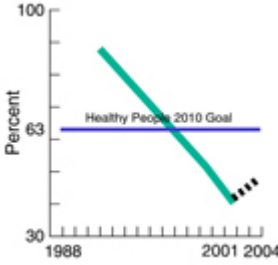
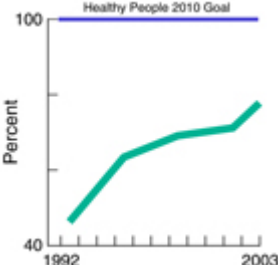
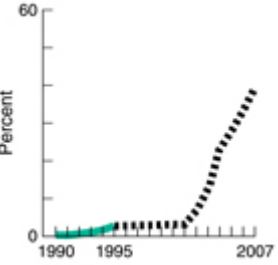
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Health professional advice to quit smoking 1992-2003
Measure	Percentage of current smokers aged 18 years and older who were advised by a health professional in the past year to quit smoking.
Trend	Rising, then falling 
Desired direction	Rising ▲
Most recent estimate	In 2003, 59.8 percent of smokers 18 years of age and older who had seen a health professional during the past 12 months reported being advised by a health professional to quit smoking during the past year.
Healthy People 2010 target	Increase the percentage of physicians and dentists and other health professionals who counsel their at-risk patients about tobacco use cessation to 85 percent.
More information	Health Professional Advice to Quit Smoking

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.

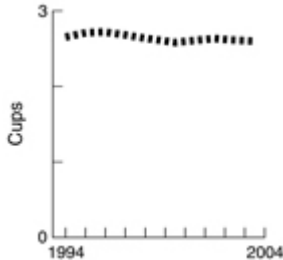
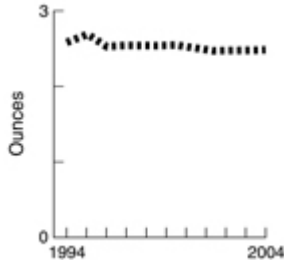
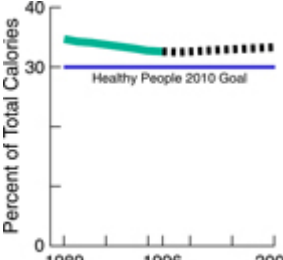
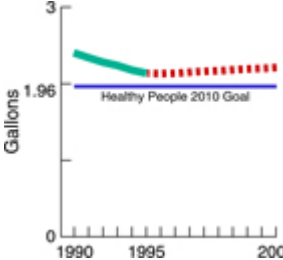
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Environmental tobacco smoke 1988-2004	Smoke-free work environment 1992-2003	Smoke-free indoor air laws 1990-2007
Measure	Percentage of nonsmokers exposed to environmental tobacco smoke.	Percentage of workers aged 18 years and older reporting a smoke-free work environment.	Percentage of the population protected by local and state smoke-free indoor air laws in the workplace.
Trend	Falling, then NSC 	Rising 	Rising, then NSC 
Desired direction	Falling ▼	Rising ▲	Rising ▲
Most recent estimate	The estimate of U.S. nonsmokers aged 4 years and older exposed to secondhand smoke in 2003–2004 was 47 percent.	In 2003, 78 percent of the workforce aged 18 years and older reported that there was a smoke-free policy at their workplace.	As of October 2007, 21 states and the District of Columbia have passed comprehensive clean indoor air laws that require workplaces, including restaurants, to be smoke-free; some jurisdictions' laws also include bars.
Healthy People 2010 target	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 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.
More information	Secondhand Smoke		

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.

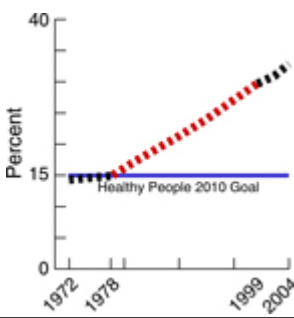
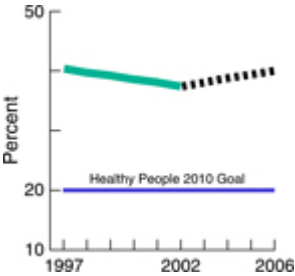
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Fruit and vegetable consumption 1994-2004	Red meat consumption 1994-2004	Fat consumption 1989-2004	Alcohol consumption 1990-2004
Measure	Average daily cups of fruits and vegetables for people ages 2 and older. (Note: This measure includes fruits and vegetables from all sources. One serving is approximately ½ cup.)	Average daily ounces of red meat consumed by individuals aged 2 years and older. (Note: Red meat includes beef, lamb, and pork from all sources and does not include processed poultry.)	Total fat Intakes as a percentage of total calories.	Annual per capita alcohol consumption in gallons by individuals aged 14 years and older.
Trend	NSC, then stable, then NSC 	NSC, then stable, then NSC, then stable 	Falling, then stable 	Falling, then rising 
Desired direction	Rising ▲	Falling ▼	Falling ▼	Falling ▼
Most recent estimate	In 2003-2004, people aged 2 and older had, on average, 1 cup of fruits and 1.6 cups of vegetables, for a total of 2.6 cups of fruits and vegetables.	In 2003-2004, people ages 2 and older had, on average, 2.5 ounces of red meat per day.	Data collected in 2003-2004 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 2002, per capita alcohol consumption was 2.23 gallons for all beverages, including beer, wine, and liquor.
Healthy People 2010 target	There is no target for fruits and vegetables combined. The individual targets are: at least two daily servings of fruits; at least three daily servings of vegetables, with at least one-third being dark-green/orange	There is no Healthy People 2010 target for red meat consumption.	Consume no more than 30 percent of daily calories from fat.	Reduce annual per capita alcohol consumption to 2 gallons.
More information	Fruit and Vegetable Consumption	Red Meat Consumption	Fat Consumption	Alcohol Consumption

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.

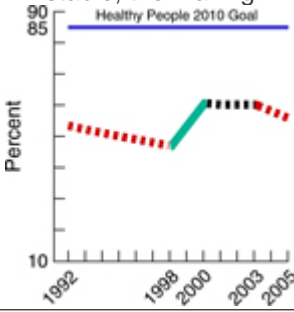
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Weight 1971-2004	Physical activity 1997-2006
Measure	Percentage of adults aged 20 years and older who were at a healthy weight, overweight, or obese (Example: obese).	Percentage of adults aged 18 years and older reporting no physical activity in their leisure time.
Trend	NSC, then rising, then NSC 	Falling, then NSC 
Desired direction	Falling ▼	Falling ▼
Most recent estimate	Among adults in 2003-2004, 32 percent were at a healthy weight, 66 percent were overweight or obese, and 32 percent were obese.	The 2006 National Health Interview Survey (NHIS), an in-person household survey, indicates that 39 percent of adults 18 and older reported no physical activity in their leisure time.
Healthy People 2010 target	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.	Reduce to 20 percent the proportion of adults who engage in no leisure-time physical activity.
More information	Weight	Physical Activity

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.

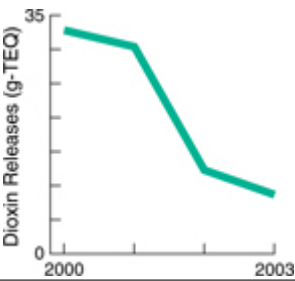
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

Sun Protection 1992-2005	
Measure	Percentage of adults aged 18 years and older who reported that they practice usually or all the time at least one of three sun protection behaviors (use sunscreen, wear protective clothing, or seek shade) when they go outside on a warm sunny day for more than 1 hour.
Trend	Falling, then rising, then stable, then falling 
Desired direction	Rising ▲
Most recent estimate	In 2003, 56 percent of adults said they usually practice at least one of three sun protection behaviors.
Healthy People 2010 target	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.
More information	Sun Protection

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.

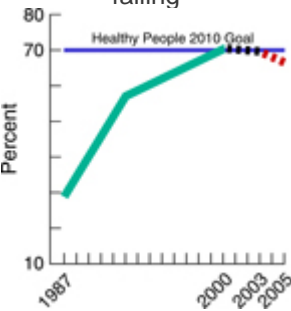
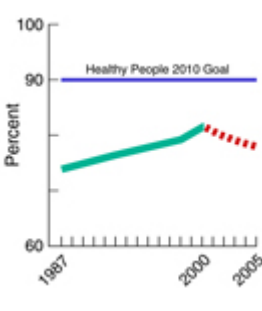
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Pesticides 1999-2002	Dioxins 1999-2003
Measure	Possible carcinogens, pesticides chlordane and DDT and their metabolites, measured in human blood.	Measurement of TCDD in human blood adjusting for lipids, and toxic release inventory of dioxin releases in the environment. (Example: dioxin release).
Trend	Rising (concentrations of DDT and oxychlordane); falling (trans-nonachlor and heptachlor epoxide) (No graph is available for this measure)	Falling for the last 30 years due to reductions in man-made sources. 
Desired direction	Falling ▼	Falling ▼
Most recent estimate	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).	Dioxin releases – 8.59 g-TEQ
Healthy People 2010 target	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 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.
More information	Pesticides	Dioxins

➤ 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.

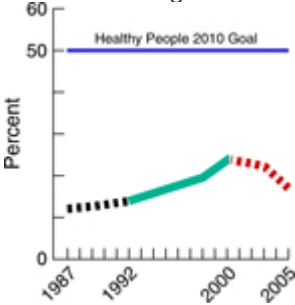
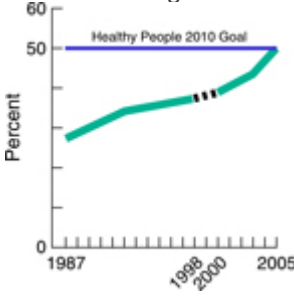
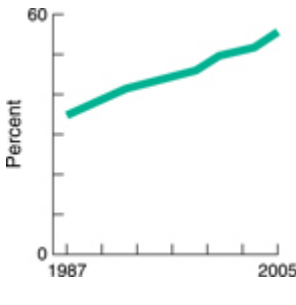
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Breast cancer screening 1987-2005	Cervical cancer screening 1987-2005
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.	Percentage of women aged 18 years and older who reported having had a Pap test within the past 3 years.
Trend	Rising, then stable, then falling 	Rising, then falling 
Desired direction	Rising ▲	Rising ▲
Most recent estimate	In 2003, 67 percent of women aged 40 years and older had a mammogram within the past 2 years, a statistically significant drop from 70% 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.
Healthy People 2010 target	Increase to 70 percent the proportion of women aged 40 years and older who have received 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.
More information	Breast Cancer Screening	Cervical Cancer Screening

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.

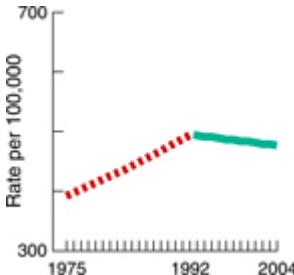
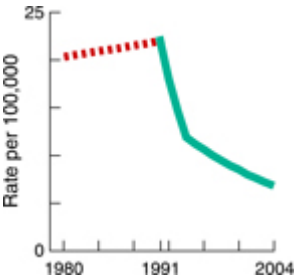
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Fecal Occult Blood Test 1987-2005	Colorectal endoscopy 1987-2005	Colorectal cancer test use 1987-2005
Measure	Percentage of adults aged 50 years and older who reported that they had a fecal occult blood test (FOBT) within the past 2 years, by racial/ethnic group.	Percentage of adults aged 50 years and older who reported that they ever had an endoscopy (proctoscopy, sigmoidoscopy, or colonoscopy).	Percent of adults aged 50 years and older who had a colorectal cancer test.
Trend	NSC, then rising, then falling 	Rising, then NSC, then rising 	Rising 
Desired direction	Rising ▲	Rising ▲	Rising ▲
Most recent estimate	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.
Healthy People 2010 target	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 colonoscopy screenings.
More information	Colorectal Cancer Screening		

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.

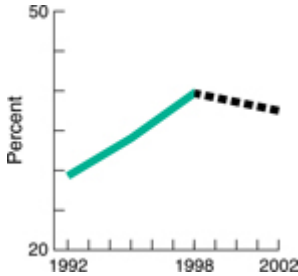
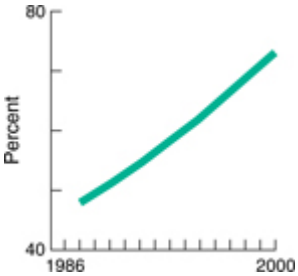
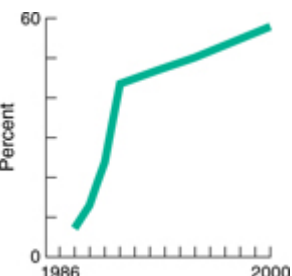
Trend key:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Incidence 1975-2004	Stage at Diagnosis 1980-2004
Measure	The observed number of new cancer cases per 100,000 people per year, 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: prostate cancer).
Trend	Rising, then falling 	Rising, then falling 
Desired direction	Falling ▼	Falling ▼
Most recent estimate	In 2004, the rate of new cases of all cancers combined was 471.6 per 100,000 people per year.	In 2004, 6.5 new cases of prostate cancer per 100,000 men were diagnosed at a late stage.
Healthy People 2010 target	There is no Healthy People 2010 target for cancer incidence.	There is no Healthy People 2010 target for stage at diagnosis.
More information	Incidence	Stage at Diagnosis

Summary Table: Treatment

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:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

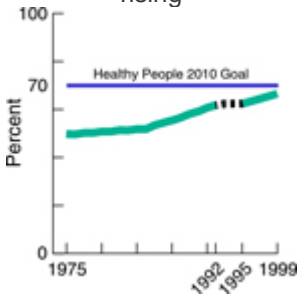
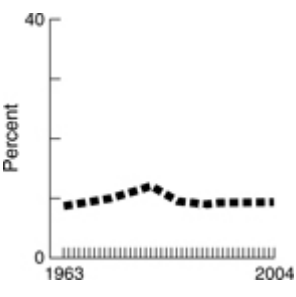
	Breast Cancer Treatment		Colorectal cancer Treatment 1987-2000
	Breast-conserving surgery with radiation 1992-2002	Multi-agent chemotherapy 1987-2002	
Measure	Percent of women aged 20 years and older, diagnosed with early-stage breast cancer (less than stage IIIA), receiving breast-conserving surgery and radiation treatment.	Percent of women aged 20 years and older, diagnosed with node positive, stage I-IIIa breast cancer, receiving multi-agent chemotherapy.	Percent of individuals aged 20 years and older, diagnosed with stage III colon cancer who received 5-FU plus either levamisole or leucovorin or diagnosed with stage II or stage III rectal cancer who received 5-FU with or without radiotherapy.
Trend	Rising, then NSC 	Rising 	Rising 
Desired direction	Rising ▲	Rising ▲	Rising ▲
Most recent estimate	In 2002, 41 percent of women aged 20 years and older diagnosed with early-stage breast cancer (less than stage IIIA) received mastectomy, 37 percent received breast-conserving surgery plus radiation, and 19 percent received breast-conserving surgery only.	In 2000, 69 percent of women aged 20 years and older, diagnosed with node positive breast cancer, received multi-agent chemotherapy.	In 2000, 57 percent of stage III colon, and stage II and III rectal patients aged 20 years and older received adjuvant chemotherapy.
Healthy People 2010 target	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 cancer treatment including colorectal cancer treatment.
More information	Breast Cancer Treatment		Colorectal Cancer Treatment

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:

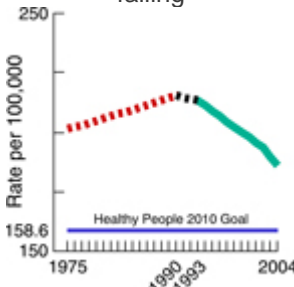
-  solid green - headed in the right direction
-  dotted red - headed in the wrong direction
-  dashed black - stable or non-significant change (NSC)

	Survival 1975-1999 (year diagnosed)	Costs of cancer care 1963-2004
Measure	The proportion of patients surviving cancer 5 years after diagnosis calculated in the absence of other causes of death.	Cancer treatment spending as a percent of total U.S. treatment spending.
Trend	Rising, then stable, then rising 	Stable 
Desired direction	Rising ▲	Falling ▼
Most recent estimate	For adults diagnosed with cancer (all sites) in 1999, 66 percent had survived their cancer for at least 5 years.	2004: 4.7% of total U.S. treatment spending was for cancer treatment.
Healthy People 2010 target	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 costs of cancer care.
More information	Survival	Costs of Cancer Care

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:  solid green - headed in the right direction
 dotted red - headed in the wrong direction
 dashed black - stable or non-significant change (NSC)

	Mortality 1975-2004	Person-years of life lost (PYLL) 2004
Measure	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 due to a cancer and the expected age of death.
Trend	Rising, then stable, then falling 	No trend data are available for person-years of life lost. (No graph can be generated for this one-year measure)
Desired direction	Falling ▼	Falling ▼
Most recent estimate	In 2004, the death rate for all cancers was 185.7 cancer deaths per 100,000 people per year.	In 2004, cancer deaths were responsible for nearly 8.6 million PYLL. Also in 2004, lung cancer accounted for nearly 2.4 million PYLL, the most by far for any cancer. In contrast, prostate cancer, which primarily affects older men, accounted for approximately 268,000 PYLL.
Healthy People 2010 target	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.
More information	Mortality	Person-years of Life Lost

Previous: [Life After Cancer](#)

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 two major groups of risk factors: Behavioral and Environmental.

Behavioral Factors

Scientists estimate that as many as 5075 percent of cancer deaths in the United States are caused by human behaviors such as smoking, physical inactivity, and poor dietary choices. The first part of the Prevention section describes trends in the following behaviors that can help to prevent cancer.

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.

- Not using cigarettes or other tobacco products:
 - [Age at smoking initiation](#)
 - [Youth smoking](#)
 - [Adult smoking](#)
 - [Quitting smoking](#)
 - [Health Professional Advice to Quit Smoking](#)

Diet

Maintaining a healthy weight and eating a moderate-fat diet and enough fruits and vegetables while limiting consumption of red meat and avoiding too much alcohol is also an important step in reducing cancer risk.

- [Eating fruits and vegetables](#)
- [Limiting red meat consumption](#)
- [Eating a moderate-fat diet](#)
- [Not drinking too much alcohol](#)

Physical Activity

Obesity and physical inactivity cause about 2530 percent of several of the major cancers in the U.S., including colon, breast, endometrial, kidney, and esophageal cancers. Obesity is estimated to cause 14 percent of cancer deaths in men and 20 percent of cancer deaths in women.

- [Maintaining or reaching a healthy weight](#)
- [Being physically active](#)

Sun Protection

The number of new cases of melanoma skin cancer has increased between 1975 and 2004, with an estimated number of 60,000 new cases in 2007.

- [Protecting skin from sunlight](#)

Environmental Factors

Certain chemicals, biological agents, toxins, etc. are associated with cancer development. In this section, national trends data associated with environmental exposures and their relationship to cancer are reported.

Secondhand Smoke

- [Secondhand tobacco smoke \(also known as environmental tobacco smoke\)](#)

Chemical Exposures

- [Pesticides](#)
- [Dioxins](#)

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. Because national trends data were unavailable for other environmental exposures that cause cancer, they were excluded from this report.

The average age at which people first begin smoking has been relatively stable since the mid 1990s.

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 and older, 12–17, and 18–25.

Period – 1990–2005

Trends

Age 12 and older: Rising in the early 1990s, then stable

Age 12–17: Rising in the early 1990s, then stable during 1996–2002, with no significant change between 2002–2005

Age 18–25: Rising until 1997, then stable through 2005

Most Recent Estimates

In 2005, the average age at first use among people 12 and older was 15.5 years. Among 12- to 17-year-olds, the average age was 12.6. Among those 18–25, the average age was 14.8.

Healthy People 2010 Targets

Increase the average age at first use of cigarettes to:

- 14 years of age for 12- to 17-year-olds
- 16* years of age for 18- to 25-year-olds (*Target revised from 17 because of baseline revision after Nov 2000 publication—cited in Midcourse Review)

There is no Healthy People 2010 target for age 12 and older as a group.

Groups at High Risk for Beginning Smoking

Most cigarette smokers who first became smokers in 2005 were under age 18 (63.4 percent).

Smoking initiation rates have declined among Blacks, while delayed onset has been consistently indicated. Overall, Blacks have lower smoking initiation rates during adolescence than Whites and Hispanics for both males and females. 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 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 a greater sensitivity to becoming addicted during adolescence with less consumption than smokers initiating smoking as adults. Efforts to help young people delay or better avoid smoking should help to prevent many cancers.

A study examining former high school seniors one year after graduation found that, among never smokers in 12 th grade, 25 percent had begun smoking. Among 12 th grade smokers, 39 percent had increased their cigarette use. Efforts to reduce smoking among adolescents should be extended to young adults—regardless of whether they are enrolled in college—because risk for smoking initiation doesn't end at adolescence.

Additional Information on Age at Smoking Initiation

- Changing Adolescent Smoking Prevalence: Smoking and Tobacco Control Monograph #14 (NCI)
<http://cancercontrol.cancer.gov/tcrb/monographs/14/index.html>
- Fagan P, Moolchan ET, Lawrence D, Fernander A, Ponder PK. Identifying health disparities across the tobacco continuum. *Addiction* 2007;102 (Suppl. 2):5-29.
- Healthy People 2010, Volume 2, Chapter 27 - Tobacco Use and Midcourse Review
<http://www.health.gov/healthypeople/Document/html/volume2/27tobacco.htm>
<http://healthypeople.gov/data/midcourse/html/focusareas/FA27TOC.htm>
- Jamner LD, Whalen CK, Loughlin SE, et al. Tobacco use across the formative years: a road map to developmental vulnerabilities. *Nicotine Tob Res.*2003;5:S71-S87.
- 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.
- Preventing Tobacco Use Among Young People: A Report of the Surgeon General, 1994 (CDC)
http://www.cdc.gov/tobacco/sgr/sgr_1994/index.htm
- Reducing Tobacco Use: A Report of the Surgeon General (Tobacco Information and Prevention Source, CDC)
http://www.cdc.gov/tobacco/sgr/sgr_2000/index.htm
- Rigotti NA, Lee JE, Wechsler H. U.S. college students' use of tobacco products: results of a national survey. *JAMA* 2000;284:699-705.
- Substance Abuse and Mental Health Services Administration (SAMHSA)
<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.

Cigarette smoking by high school students rose early and through the mid 1990s, but has fallen more steeply since the end of the 1990s. The most recent data point in 2005 suggests a flattening of this declining trend but future data are needed to see if there is a significant shift. Smokeless tobacco use appears to be falling.

Youth Tobacco Use and Cancer

For most of the 1990s, about 3,000 youths under 18 became regular cigarette smokers each day. This number has declined recently to just over 2,000 each day. Of these 2,000, nearly 700 will die early due to lung cancer or other tobacco-related diseases.

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 also can 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 – 1991–2005

Trends

Cigarettes: After a non-significant rise from 1991–1997, current cigarette smoking among youth has fallen, showing a very large and statistically significant trend downward since 1997. In fact, the 2005 estimate is lower than the estimate in 1991 at the beginning of the rise in youth smoking, but not significantly different from the previous data point in 2003.

Smokeless tobacco: Current smokeless tobacco use has been falling over the entire 1991–2005 period.

The source of trend data used in this report does not provide data for use of either "any tobacco" or cigars before 1997.

Most Recent Estimates

Among high school students in 2005:

- 23% were current cigarette smokers
- 8% were current users of smokeless tobacco
- 14% were current cigar smokers (including little cigars)
- 28.4% were current users of "any tobacco"

Healthy People 2010 Targets

Decrease the proportion of high school students who currently:

- Smoke cigarettes to 16%
- Use smokeless tobacco to 1%
- Smoke cigars to 8%
- Use any tobacco to 21%

Groups at High Risk for Tobacco Use

In 2005, current cigarette use was higher among White (24.8%) and Hispanic than Black students. Male and female students were equally likely to smoke cigarettes. Overall, cigarette use increases correspondingly with students' grade level, with percentages higher among 12th grade (27.6%) and 11th grade (24.3%) students as compared with 10th grade (21.4%) and 9th grade (19.7%) students. Overall, 9.4% of students had smoked greater than or equal to 20 of the preceding 30 days with more frequent use higher among White than Black and Hispanic students. Among the current smokers, 10.7% of these students smoked more than 10 cigarettes per day on the days that they smoked over the past 30 days, with this rate being higher for male students than female students.

High school males are much more likely than females to use smokeless tobacco (13.6% males, 2.2% females). White students reported higher usage of smokeless tobacco products (10.2%) than Black (1.7%) and Hispanic (5.1%) students.

Current cigar use was higher among male (19.2%) than female (8.7%) students and higher among White (14.9%) and Hispanic (14.6%) students than Black (10.3%) students.

Key Issues

Some research has shown a close link between tobacco promotional activities and adolescent smoking. Over time, the likelihood of smoking initiation is increased when an adolescent acquires a cigarette promotional item. Results suggest that elimination of cigarette promotional campaigns could reduce adolescent smoking. Substantial increases in tobacco industry expenditures on tobacco advertising and promotion in the United States from \$5.7 billion in 1997 to \$15.2 billion in 2003 may have impacted the stalled trend downward in 2005 in adolescent current cigarette smoking.

Previous research has suggested a correlation between smoking in movies and youth smoking. During 2002–2004, a significant overall decline in screen time for tobacco was observed among both middle and high school students who reported seeing fewer actors using tobacco on television or in the movies.

In 2004, 11.7% of middle school students (grades 6 to 8) reported using some form of tobacco in the past month. Cigarettes were the most popular choice (8.1%), followed by cigars (5.2%), then by smokeless tobacco (2.9%), pipes (2.5%), bidis (2.3%), and kreteks (clove cigarettes) (1.5%).

Among high school students reporting current cigarette smoking who were under 18 years of age in 2005, 15.2% reported usually getting their own cigarettes by buying them in a store or gas station. Among those reporting trying to buy cigarettes in a store, nearly 50% said they were not asked to show proof of age.

Overall declining trends in cigarette use are encouraging, but prevention efforts (such as increases in cigarette taxes resulting in increased cigarette prices, anti-tobacco media campaigns, restrictions on public smoking, and community mobilization combined with other interventions to decrease minors' access) must be increased and sustained in order to reach the Healthy People 2010 goal. For every 10% increase in cigarette price, there is a 3.7% decrease in youth prevalence.

Additional Information on Youth Smoking

- Bidi Use Among Urban Youth - Massachusetts, March-April 1999 (MMWR)
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4836a2.htm>
- Healthy People 2010, Volume 2, Chapter 27 - Tobacco Use and Midcourse Review
<http://www.health.gov/healthypeople/Document/html/volume2/27tobacco.htm>
<http://www.healthypeople.gov/data/midcourse/default.htm#pubs>
- Morbidity and Mortality Weekly Report (MMWR) on Youth
<http://www.cdc.gov/mmwr/>
http://www.cdc.gov/tobacco/data_statistics/MMWR/by_topic/youth.htm
- Cigarette Use Among High School Students – United States, 1991–2005
MMWR July 7, 2006 / Vol. 55 / No. 26
- Youth Risk Behavior Surveillance—United States, 2005
MMWR June 9, 2006 / Vol. 55 / No. SS05
- Youth Risk Behavior Surveillance—Selected Steps Communities, 2005
MMWR February 23, 2007 / 56 / No. SS02
- Substance Abuse and Mental Health Services Administration (SAMHSA)
<http://www.samhsa.gov/news/news.html>

- Tobacco Use, Access, and Exposure to Tobacco in Media Among Middle and High School Students – United States, 2004 (MMWR) April 1, 2005 / 54(12);297-301
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5412a1.htm>
- Trends in Cigarette Smoking Among High School Students - United States, 1991-1999 (MMWR)
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4933a3.htm>
- Youth Risk Behavior Surveillance System (YRBSS) (CDC)
<http://www.cdc.gov/nccdphp/dash/yrbs/index.htm>
- U.S. Department of Health and Human Services. Preventing Tobacco Use Among Young People: A Report of the Surgeon General . Atlanta, GA: U.S. Department of Health and Human Services, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Office on Smoking and Health, 1994.
http://www.cdc.gov/tobacco/data_statistics/sgr/sgr_1994/index.htm
- U.S. Department of Health and Human Services. Reducing Tobacco Use: A Report of the Surgeon General . Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2000.
http://www.cdc.gov/tobacco/data_statistics/sgr/sgr_2000/index.htm

Cigarette smoking by adults has slowly fallen since 1991 with a more accelerated rate reduction for women. However, overall prevalence has not declined since 2004. Among 18-24-year-olds, men have shown non-significant changes, while, for young adult women, there are indications of both an early rising trend over the 1990s and a later falling trend.

Smoking and Cancer

Cigarette smoking is the most preventable cause of death in the United States . It causes approximately 30 percent (167,895) of all U.S. cancer deaths each year.

Cigarette smoking also causes cancers of the lung, larynx, mouth, esophagus, pharynx, and bladder. In addition, it plays a role in acute myeloid leukemia and cancers of the pancreas, kidney, cervix, stomach, and liver.

Cigar smoking has been found to cause cancers of the larynx, oral cavity (lip, tongue, mouth, and throat), esophagus, lung, pancreas, stomach, and bladder.

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 – 1991–2006

Trends – Long term trend falling for both men and women aged 18 and older with more recent accelerated reduction for women during 2000-2006 in contrast to men, who had a more gradual trend downward over most of the period. However, there has not been a significant overall change in smoking prevalence since 2004.

Falling for ages 25 and older when both genders are combined, similar to the trends for ages 18 and older, both genders combined. In contrast to this is the nonsignificant increase during 1991–1997 and falling during 1997–2006 for young adults 18–24, both genders combined. Unlike the similar patterns for both men and women 25 and older, men and women 18–24 have different patterns. Men 18–24 show a non-significant rising trend over most of the 1990s and a second non-significant trend downward from 1997–2006, while women of the same age show a significant rising trend until 1999 and a significant falling trend from 1999–2006.

Current cigarette smoking among Hispanics, which tends to be lower than both White (non-Hispanic) and Black (non-Hispanic) rates, appeared to show a steeper falling trend than the White (non-Hispanic) trend. The Black (non-Hispanic) pattern shows a falling trend over 1991–2004 and a non-significant change upward between 2004–2006. It will be important to observe whether the recent Black (non-Hispanic) pattern represents a real turning point or just an anomaly.

Most Recent Estimates

In 2006, 20.8 percent of adults—23.5 percent of men and 18.1 percent of women—were current cigarette smokers. Among 18–24-year-olds, 23.8 percent of young adults—28.5 percent of young men and 19.1 percent of young women—were current cigarette smokers.

In 2005, 2.2 percent of adults—4.2 percent of men and 0.3 percent of women—were current cigar smokers, an increase from earlier in the previous decade (1992). Current cigar smokers have had at least 50 cigars in their lifetimes and, at the time of the interview, continued to smoke every day or some days.

Healthy People 2010 Targets

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

Reduce to 1.2 percent the proportion of adult current cigar smokers.

Groups at High Risk for Smoking

Men are more likely than women to smoke cigarettes. American Indian/Alaska Natives smoke more than White Non-Hispanics and Black Non-Hispanics, who in turn smoke more than Hispanics and Asians.

High-risk groups include American Indian/Alaska Natives and people living below the poverty level who also, typically, are those without health insurance and those with less education than a bachelor's degree.

In 2005, the Substance Abuse and Mental Health Services Administration (SAMHSA) estimated that 6.9 percent of Blacks, 6 percent of Whites, 4.6 percent of Hispanics, 10.9 percent of American Indian/Alaska Natives, and 1.8 percent of Asian American adults were current cigar smokers, based on any use in the past 30 days.

Key Issues

Although the rate of smoking has dropped by nearly 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 recent decade. 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 18 and older, the youngest group 18-24-year-olds has the highest smoking prevalence of any older age group. Another recent phenomenon is the emergence of young adult use of tobacco-filled water pipes, especially at specialty cafes in close proximity to 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 where a "cigar culture" is supported by cigar magazines, shops, and bars or clubs, especially among young and middle-aged White men (aged 18-44) with higher than average incomes and education.

With declining sales of cigarette products as a result of declining cigarette prevalence, the tobacco industry has increased its interest in and marketing of smokeless tobacco products (oral, chewing, snuff, and spit tobacco). This recent marketing includes existing smokeless products as well as test marketing of new smokeless products. While smokeless tobacco products are less lethal than cigarettes, they are not a safe substitute for tobacco smoking. They can cause cancer of the mouth and pancreas and several other health problems. In addition, these products have not been proven to be effective in helping smokers quit, and smokers who delay or defer quitting altogether by supplementing smoking with smokeless products greatly increase their risk of lung cancer.

Additional Information on Adult Smoking

- 1964 Surgeon General Report: Reducing the Health Consequences of Smoking (CDC)
http://www.cdc.gov/tobacco/sgr/sgr_1964/sgr64.htm
- 2004 Surgeon General Report: Health Consequence of Smoking
http://www.cdc.gov/tobacco/sgr/sgr_2004/index.htm
- Am J Public Health Theme Issue on Young Adult Tobacco Cessation -- August 2007 vol. 97, No. 8
- Cigar Smoking and Cancer (ACS)
http://www.cancer.org/docroot/PED/content/PED_10_2X_Cigar_Smoking.asp?sitearea=PED
- Centers for Disease Control and Prevention. Cigarette Smoking Among Adults United States, 2006. MMWR 2007;56:1157-61.
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5644a2.htm>
- Fagan P, Moolchan ET, Lawrence D, Fernander A and Ponder PK. Identifying health disparities across the tobacco continuum. Addiction 2007; 102 (Suppl. 2):5-29.

- Healthy People 2010, Volume 2, Chapter 27 Tobacco Use
<http://www.health.gov/healthypeople/Document/html/volume2/27tobacco.htm>
- Healthy People 2010, Volume 2, Chapter 27 Tobacco Use and Midcourse Review
<http://www.health.gov/healthypeople/Document/html/volume2/27tobacco.htm>
<http://www.healthypeople.gov/data/midcourse/default.htm#pubs>
- International Agency on Research and Cancer (IARC)
<http://www-cie.iarc.fr/htdocs/monographs/vol83/01-smoking.html>
- MMWR Cigarette Smoking Among Adults United States 2003
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5420a3.htm>
- 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>
- Smoking and Tobacco Control Monograph 9 Cigar Health Effects and Trends: Chapter 1: Cigar Smoking Overview and Current State of the Science (NCI)
http://cancercontrol.cancer.gov/tcrb/monographs/9/m9_1.PDF
- Smokeless Tobacco and How to Quit (ACS)
http://www.cancer.org/docroot/PED/content/PED_10_13X_Quitting_Smokeless_Tobacco.asp?sitearea=PED
- State Cancer Profiles, Latest Rates, Percents, and Counts
<http://statecancerprofiles.cancer.gov/micromaps/>
- USDA ERS April 2005 Tobacco Outlook
<http://www.ers.usda.gov/publications/tbs/nov04/tbs25702/tbs25702.pdf>
- USDA ERS October 2007 Tobacco Outlook
<http://usda.mannlib.cornell.edu/usda/current/TBS/TBS-10-24-2007.pdf>
- U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. National Center for Health Statistics. Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2006. Vital and Health Statistics Series 10: Data from the National Health Interview Survey No. 235 Hyattsville, Maryland December 2007 DHHS Publication No. (PHS) 2007-1563 Provisional Report 8/2007pgs 38-40.
http://www.cdc.gov/nchs/data/series/sr_10/sr10_236.pdf

Adult attempt-to-quit rates are stable, similar for men and women, and show no-significant change for young adults while beginning to show a small significant rise for those 25 years of age and older. However, successful quitting for those 25 and older appears to be falling overall for men while showing no-significant change for women. Hispanics showed a rise in attempts to quit while White non-Hispanics and Black non-Hispanics were stable and showed no significant change, respectively.

The Effects of Quitting Smoking on Cancer

Ten years after quitting smoking, a person's risk of getting lung cancer is about one-third to one-half that of people who continue to smoke. The longer the time off cigarettes, the lower the risk. Quitting also reduces the risk of getting cancers of the larynx, esophagus, pancreas, bladder, and cervix.

The sooner one quits smoking, the better. Long-term smokers who stop smoking at around 50 or 60 years of age are less likely to get lung cancer than are people who continue to smoke. Quitting at around age 30 lowers this risk even more.

The quickest non-cancer health benefit of quitting is a lower risk of coronary heart disease. This risk is cut in half within 1 year after quitting. After 15 years, the chance of getting the disease is similar to that of people who never smoked.

Measures

Those persons (aged 18 and older) who attempted to quit smoking for one day or more during the past 12 months among current cigarette smokers.

Those persons (aged 25 and older) who successfully quit smoking cigarettes 3 months or longer but less than 12 months ago, among current cigarette smokers who attempted to quit during the past 12 months and former smokers who completely quit less than 12 months ago.

Previous versions of the Cancer Trends Progress Report have concentrated on those adults 25 years of age and older because quitting in that age group overlaps less with initiation of smoking. However, the Healthy People 2010 (HP 2010) goal is stated more generally to apply to all current smokers 18 years of age and older. Previous versions of the report used the Tobacco Use Supplement to the Current Population Survey (TUS-CPS) to track progress in quitting smoking. The current NHIS data now provides enough data points to make it appropriate to switch to it for consistency with HP 2010. It also allows a more refined look at trends over the most recent period of time using the joinpoint method. This transition is nearly seamless in that the two data sources show consistent trends for attempts to quit and successful quitting for the period of time they both cover.

Period – 1998–2006

Trends

Adult attempt-to-quit rates are stable, similar for men and women, and show no-significant change for young adults while beginning to show a small significant rise for those 25 years of age and older.

Among Hispanics 18 and older, those attempting to quit smoking for one day or more rose, while the trend for non-Hispanic Whites was stable and a no-significant change was observed for non-Hispanic Blacks.

However, successful quitting for those 25 and older appears to be falling for both genders combined and for men, while showing no significant change for women.

Most Recent Estimates

In 2006, 43.1 percent (40.8 for men and 43.4 for women) of adult smokers (aged 18 and older) stopped smoking for one day or longer as they were trying to quit. Among the 18–24-year-olds, 51.1 percent attempted quitting, while only 41.9 percent of those 25 years of age and older attempted quitting. For those 18 and older, among Hispanics and black non-Hispanics, the corresponding percentages were 45 and 45.1, respectively, while it was 42.4 for White non-Hispanics.

In 2006, 8.6 percent (8.5 for men and 8.6 for women) successfully quit for 3 months or more among current smokers 25 years of age and older who tried to quit smoking during the past 12 months and former smokers who quit less than 1 year ago.

Healthy People 2010 Target

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

There are no Healthy People 2010 targets for the other quit measure in this report.

Groups at High Risk for Not Quitting

Older smokers (aged 65 years and older) are much less likely to try to quit. However, once they do quit, this group is more likely to be successful for 3 months or longer.

Blacks have higher rates of trying to quit than Whites—as seen here—but generally lower rates of successfully quitting for 3 months or longer.

Smokers with lower levels of education and lack of access to valid treatment due to lack of health insurance are less likely to be successful quitters.

Blue-collar and service workers are not as successful in quitting smoking as white-collar workers even though they have the same rate of quit attempts.

Key Issues

Studies show that most smokers want to quit.

Efforts to reduce smoking are most effective when multiple techniques are used, including educational, clinical, regulatory (such as clean indoor air laws, which don't allow smoking in work areas and public places), and economic interventions (for example, increasing excise taxes), along with media campaigns and other social strategies. Factors related to smoking in the social environment play the largest role for predicting long-term quitting versus relapse.

Several methods utilizing combinations of nicotine replacement products and/or prescription anti-depressants and other new prescription medications with behavior therapy have been shown to be effective in reducing smoking, but research shows that only a small percentage of smokers utilize these products and methods to help them quit. In addition, many who do use these nicotine products and other medications do not use them as directed for maximum success. Most of these products have been shown in clinical studies to be about twice as effective as not using them for smokers wanting to quit smoking. However, the general success rate is typically not higher than 10–20 percent. Therefore, to provide a comprehensive approach to helping smokers quit, it is important for new products to be developed and for more people to use these products as directed for maximal success, coupled with the environmental efforts as mentioned above (e.g., increase clean indoor air laws, increase cigarette taxes, media campaigns, and social strategies).

Lack of health insurance is a barrier to cessation. In 1998, only 50 percent of Medicaid recipients were covered for one or more tobacco dependence treatments and few studies have examined the effectiveness of cessation treatments for the poor.

The HHS recently launched a national initiative to provide quitline support. Callers are automatically routed to a state-run quitline if one exists in their area. If there is no state-run quitline, callers are routed to the National Cancer Institute (NCI) quitline.

CDC has recommended minimum levels of tobacco control funding for states. Only three states met or exceeded this minimal funding level for 2005, while 10 states fund at least half this level and the other states fund below half. Most states have actually had recent funding cuts for tobacco control, likely contributing in part to the recent decline in smoking cessation.

Recently, the tobacco industry has been increasing their marketing and promotion of smokeless tobacco products, generating controversy over whether smokeless products can help smokers transition to quitting. Smokeless tobacco products have not been shown to prevent smokers from quitting tobacco use, thus their use should not be encouraged, nor should they be thought of as a safer substitute for those who can't quit smoking. Smokers who delay or defer quitting altogether by supplementing smoking with smokeless products greatly increase their risk of lung cancer.

Additional Information on Quitting Smoking

- ACS: Guide to Quitting Smoking
http://www.cancer.org/docroot/PED/content/PED_10_13X_Guide_for_Quitting_Smoking.asp
- Addiction vol 102 Supplement 2 October 2007 Methodological Issues for Research on Tobacco-Related Health Disparities.
- Am J. Public Health August 2007, vol 97, No. 8 – theme on Young Adult Tobacco Cessation.
- Campaign for Tobacco-Free Kids. State Tobacco Settlement: Special Reports. Washington, D.C. National Center for Tobacco-Free Kids
<http://www.tobaccofreekids.org/reports/settlements/>
- Healthy People 2010, Volume 2, Chapter 27 - Tobacco Use
<http://www.health.gov/healthypeople/Document/html/volume2/27tobacco.htm>
- National Network of Tobacco Cessation Quitlines
<http://www.smokefree.gov>
- North American Quitline Consortium resource guide - Quitline Operations: A Practical Guide to Promising Approaches
<http://naquitline.org/index.asp?dbid=3&dbsection=operations>
- National Cancer Institute Fact Sheet on Quitting Smoking: Why to Quit and How to Get Help
<http://www.cancer.gov/cancertopics/factsheet/Tobacco/cessation/>
- Population-Based Smoking Cessation: Smoking and Tobacco Control Monograph #12 (NCI)
<http://cancercontrol.cancer.gov/tcrb/monographs/12/index.html>
- Reducing Tobacco Use: A Report of the Surgeon General (Tobacco Information and Prevention Source, CDC)
http://www.cdc.gov/tobacco/sgr/sgr_2000/index.htm
- Tobacco Cessation Guideline (The Surgeon General)
<http://surgeongeneral.gov/tobacco/>

Health Professional advice to current smokers to quit smoking was rising; however, in the most recent period it may be falling.

The Effects of Clinical Advice on Quitting Smoking

Clinicians' advice to quit smoking can by itself contribute 5 to 10 percent quit percentages 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 suggest that the clinician should follow the "5 A's" (Ask, Advise, Assess, Assist, and Arrange). For unmotivated patients, the clinician should instead provide a motivational intervention. The Public Health Service-sponsored "Clinical Practice Guideline: Treating Tobacco Use and Dependence" expert panel's analysis suggests that a wide variety of clinicians, which would include dentists as well as physicians, can successfully implement brief strategies effectively.

Measures

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

NOTE: Previous updates of the Cancer Trends Progress Report (CTPR) have shown this data separating medical doctor advice from dentist advice to stop smoking. Because the 2003 Tobacco Use Supplement to the Current Population Survey was a Special Cessation Supplement, we asked several detailed questions about health professional advice to quit smoking instead of the fewer questions asking basic information about medical doctor and dentist advice separately. We will have the separate advice again for 2006–2007 and will report that in the next update in 2009. Thus we have combined the medical doctor and dentist advice from past years to indicate any advice from either type of doctor so that we can report trends for health professionals in general in this report. This is likely to slightly underestimate the 2003 value because cognitive research studies tend to indicate more affirmative responses are given when items are asked about separately (in 1992–2002 "medical doctor" and "dentist" asked about separately) than when they are combined (in 2003 asked about "medical doctor," "dentist," "nurse," and "other health professional" combined).

Period – 1992–2003

Trends

The percentage of smokers advised to quit shows a rise between 1993–1999 and then rises more gradually between 1999–2002, and is falling slightly between 2001–2002 and 2003. The rise until 2002 is seen for both male and female smokers, with a non-significant change for males and falling for females between 2001–2002 and 2003. In 2003, there was a slight fall to 59 percent from 61 percent of smokers receiving advice to quit from health professional.

Among 18–24-year-olds, both genders saw a rise for a shorter period (1992–1999) before showing a non-significant change and stability than for those 25 years of age and older for whom a rise was seen from 1992–2002 and then falling between 2001–2002 and 2003.

As mentioned above, the stable or slightly falling trends over the one or two most recent year estimates available may be due to a question wording change. The 2006–2007 data in the 2009 update will provide further clarification about the most recent period.

While the general trends are similar, most striking is the advice disparity between 18–24-year-old males and other gender/age categories (18–24-year-old females and those who are 25 and older of either gender). Young adult males, while showing a rise in receipt of advice to quit smoking from health professionals, are not anywhere near the level of the three other gender/age categories.

Most Recent Estimates

In 2003, 59.8 percent of smokers 18 years of age and older (57.7 percent of males, 61.7 percent of females) who had seen a health professional during the past 12 months reported being advised by a health professional to quit smoking during the past year. In contrast to the value of about 60 percent for females 18–24 years of age (61.6 percent), and females and males 25 and older (61.7 and 59.9 percent, respectively), among 18–24-year-old males only 43.3 percent reported receiving this advice. Thus the 18–24-year-old males are advised to quit smoking at about two-thirds the rate of the other three gender/age groups.

In 2001–2002, 62 percent of smokers (60 percent of males, 63 percent of females) reported being advised by a physician to quit smoking during the past year (see 2005 CTPR update – <http://progressreport.cancer.gov/2005>). In contrast to physicians, the corresponding figure reporting dentists' advice was only 32 percent (33 percent of males, 30 percent of females).

Healthy People 2010 Target

Increase the percentage of physicians and 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

The percentage of smokers advised by a medical doctor to quit increases with the age of the smoker. Consistent with the data presented in the update is a finding from a 2005 NHIS Cancer Control Supplement examination by Curry et al. (August 2007) that shows 58 percent of young adults (aged 18–24) reported being advised by a health professional to stop smoking compared with 67 percent among adults 25 years of age and older. We have seen here that this disparity is especially concerning for young adult men who are advised at a much lower rate than other gender/age categories (18–24 vs. 25 and older).

By contrast, there doesn't appear to be much change in terms of smokers' age with regard to reports of dentists' advice to quit, except for the oldest age group (65 and older), which appears to receive that advice less frequently than do younger age groups.

White non-Hispanics report the highest percentage of physician advice, followed by Black non-Hispanics and Hispanics. The relationship doesn't seem to be a corresponding relationship by race/ethnicity with regard to smokers' reports of dentists' advice to quit smoking.

More women had health professional advice to quit smoking (61.7 percent) as compared with men (57.7 percent).

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 with media campaigns and other social strategies.

While the long-term increase in both medical doctors' and dentists' advice to quit smoking is encouraging, it is clear that more progress can be made, especially for dentists. Given medical doctors', dentists' and other health professionals' combined access to 70–80 percent of smokers each year, clinicians can play a major role in smoking cessation by advising all of their smoking patients to quit.

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

Links to Additional Information on Health Professionals' Advice to Quit Smoking

- Curry SJ, Sporer AK, Pugatch O, Campbell RT, Emery S. Use of tobacco cessation treatments among young adult smokers: 2005 National Health Interview Survey. *Am J Public Health* 2007;97:1464-1469.

- Curry SJ, Byers T, Hewitt M. eds. Fulfilling the Potential of Cancer Prevention and Early Detection. Washington D.C.: The National Academies Press 2003.
- Fiore MC, Bailey WC, Cohen SJ, et al. Treating Tobacco Use and Dependence. Clinical Practice Guideline. Rockville, Md.: U.S. Department of Health and Human Services. Public Health Service. June 2000.
<http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat2.chapter.7644>
- Healthy People 2010, Volume 1, Chapter 3
<http://www.health.gov/healthypeople/Document/HTML/Volume1/03Cancer.htm>
- Healthy People 2010, Volume 2, Chapter 27 Tobacco Use and Midcourse Review
<http://www.health.gov/healthypeople/Document/html/volume2/27tobacco.htm>
<http://www.healthypeople.gov/data/midcourse/default.htm#pubs>
- Population-Based Smoking Cessation: Smoking and Tobacco Control Monograph #12 (NCI)
<http://cancercontrol.cancer.gov/tcrb/monographs/12/index.html>
- Reducing Tobacco Use: A Report of the Surgeon General (Tobacco Information and Prevention Source, CDC)
http://www.cdc.gov/tobacco/sgr/sgr_2000/index.htm
- Tobacco Cessation Guideline (The Surgeon General); Treating Tobacco Use and Dependence
<http://surgeongeneral.gov/tobacco/>
- U.S. Department of Commerce, Census Bureau (1995–2001). National Cancer Institute Sponsored Tobacco Use Supplement to the Current Population Survey (1992–1999)
<http://riskfactor.cancer.gov/studies/tus-cps/>
 - Data files and/or technical documentation
<http://riskfactor.cancer.gov/studies/tus-cps/info.html>
<http://www.census.gov/apspd/techdoc/cps/cps-main.html>
- 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)
<http://riskfactor.cancer.gov/studies/tus-cps/>
 - Data files and/or technical documentation
<http://www.census.gov/apspd/techdoc/cps/cpsJun01Nov01Feb02.pdf>
- U.S. Department of Commerce, Census Bureau (2006). National Cancer Institute and Centers for Disease Control and Prevention Co-sponsored Tobacco Use Supplement to the Current Population Survey (2003)
<http://riskfactor.cancer.gov/studies/tus-cps/>

Much progress has been made in reducing secondhand smoke exposure over the last 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 that is exhaled by the smoker. Like mainstream smoke, it 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.

Measure

Presented here are three measures of progress in this area:

1. Percentage of nonsmokers exposed to SHS. (The percentage of nonsmokers aged four 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 the population protected by local and state smoke-free indoor air laws covering workplaces, restaurants, and bars.

The third measure, smoke-free laws, draws on data collected and analyzed by the Americans for Nonsmokers Rights Foundation. The change has been made to allow the inclusion of both local and state laws, and to ensure consistency with the NCI Smoke-free Meeting Policy. For more information see: <http://dccps.nci.nih.gov/tcrb/smokefreemeetingpolicy.html>.

Period –

1. Secondhand smoke: 1988–2004
2. Smoke-free work environment: 1992–2003
3. Smoke-free indoor air laws: 1990–2007

Trends

Over the last 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 1988–2002, with a non-significant increase between the last two two-year periods (2001–02 to 2003–2004). Both the long-term and the more recent trends are observed in both males and females. The proportion of nonsmokers (four years of age and older) with detectable levels of cotinine, a marker for SHS, in their blood has been approximately halved over the period 1988–1994 to 2003–2004, from 88 to 47 percent. For nonsmoking adults aged 20 years and older, a decline of more than 77 percent has been seen between 1988–1991 and 2001–2002 (Surgeon General Report, 2006).

Indoor workers reported a steep rise in smoke-free workplace policies from 1992–1993 to the mid 1990s. This increase continued, but less steeply, between 1995–1996 and 2001–2002. The most recent period, 2001–2002 to 2003, shows a steeper rise—again coincident with the increases in the percentage of the population protected by local and state smoke-free workplace laws. The patterns are similar for men and women and for young adult workers and adult workers aged 25 years and older. Patterns also appear similar for different racial and ethnic groups.

The percentage of the U.S. population protected by comprehensive local and state smoke-free laws covering workplaces, restaurants, and bars has been rising, although no significant change in this area was observed during some periods in the mid-to-late 1990s. The earliest rise in these measures occurred in the early-to-mid 1990s, with early smoking restrictions in California and Massachusetts and an infusion of funding for evidence-based state tobacco control interventions from National Cancer Institutes/American Cancer Societys American Stop Smoking Intervention Study (ASSIST), and some funding for these types of interventions from the Centers for Disease Control and Prevention (CDC), and The Robert Wood Johnson Foundations SmokeLess States initiative. In contrast, the largest absolute gain in enactment of smoke-free laws covering workplaces, restaurants, and bars, has occurred over the past 10 years, with the greatest increases, especially in state smoke-free laws, seen over the recent five-year period of 2002–2007.

Note: The data source has been changed to one that provides information on both state and local legislative activity.

Most Recent Estimates

The estimate of U.S. nonsmokers aged 4 years and older currently (2003–04) exposed to SHS is 47 percent. Thus, nearly 50 percent of nonsmokers 4 years and older are still exposed to SHS (most current value from the 2003–2004 National Health and Nutrition Examination Survey [NHANES]).

The most recent NHANES 2001–04 data reveals that children aged 4–17 years having any detectable level of cotinine in the blood is 57 percent, down from 87 percent during the period 1988–1994. Thus, nearly 60 percent of children aged 4–17 years are still exposed to SHS.

In 2003, 78 percent of indoor workers aged 18 years and older reported that a smoke-free policy was in place at their workplace, with 74.8 percent of men and 81 percent of women reporting the presence of such a policy. Among workers 25 years of age and older, 79 percent worked at a smoke-free worksite, as opposed to only 70 percent of workers aged 18–24 years. Also during that time, 74 percent of all adults aged 18 years and older reported that smoking is not allowed anywhere in their home. These figures represent significant increases since 1992–1993.

As of August 2007, 21 states plus the District of Columbia are nearly or entirely smoke-free according to [NCI's Smoke-free Meeting Policy](#) or will be by the beginning of 2008. There are only 11 states that contain no smoke-free jurisdictions. According to the [American Nonsmokers Rights Foundation](#) as of October 1, 2007 40 percent, 56 percent, and 44 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. One in four Americans lived in a community where all three of these settings were smoke-free by law, while 59% of Americans 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, for adults aged 18–24 years and 25 years and older, in both men and women, and in all racial and ethnic groups. However, significant levels of exposure persist. In particular, people who work in restaurants, bars, casinos, and some other hospitality industry worksites are far less likely to be protected from SHS exposure than other workers, and are likely to be exposed to especially high levels of SHS on the job.

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.

The most recent data suggest that, on average, concentrations of cotinine in childrens blood are more than twice those in nonsmoking adults' blood.

Cotinine levels in nonsmokers blood have declined in all racial and ethnic groups, but levels have consistently been found to be higher in African Americans than in Whites and Mexican Americans. SHS exposure also tends to be higher for persons with lower incomes.

Key Issues

Exposure to SHS remains a serious public health concern, and one that is completely preventable. Childrens SHS exposure continues to exceed that of adults, and the home is the single most important setting where children are exposed. Data from the 2003 Tobacco Use Supplement to the Current Population Survey suggest that homes with at least one adult smoker and at least one child under the age of 18 are potentially exposing children in 55 percent of these homes to SHS by virtue of not having a smoke-free home rule. 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.

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 and child care facilities—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. Three states, the Territory of Puerto Rico, and at least four local jurisdictions in the United States 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. Today, hundreds of communities, many states, and several countries (including Ireland, the entire 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 publics health.

Additional Information on Secondhand Smoke

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<http://www.cancer.org/downloads/STT/CPED2007PWSecuredCPED.pdf>
- American Nonsmokers' Rights Foundation
<http://www.no-smoke.org>
- America's Children in Brief: Key National Indicators of Well-Being, 2006. Blood cotinine levels. Table POP9.B.
<http://www.childstats.gov/>
- Centers for Disease Control and Prevention, National Center for Health Statistics. National Health and Nutrition Examination Survey, 1988–1994, 1999–2000, and 2001–2002
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http://www.cdc.gov/tobacco/data_statistics/Factsheets/SecondhandTrends.htm
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<http://www.surgeongeneral.gov/library/secondhandsmoke/>
- Healthy People 2010, Volume 2, Chapter 27 – Tobacco Use and Midcourse Review
<http://www.health.gov/healthypeople/Document/html/volume2/27tobacco.htm>
<http://www.healthypeople.gov/data/midcourse/default.htm#pubs>
- Muggli ME, Forster JL, Hurt RD, Repace JL. The smoke you dont see: Uncovering tobacco industry scientific strategies aimed against Environmental Tobacco Smoke policies. Am J Public Health. 2001; 91: 1419-1423.
- National Toxicology Program of National Institute of Environmental Health Science/NIH/HHS
<http://ntp.niehs.nih.gov/index.cfm?objectid=72016262-BDB7-CEBA-FA60E922B18C2540>
- Third National Report on Human Exposure to Environmental Chemicals: Tobacco Smoke (National Center for Environmental Health, CDC), July 21, 2005.
<http://www.cdc.gov/exposurereport/3rd/>
- U.S. Department of Commerce, Census Bureau (1995–2001). National Cancer Institute-Sponsored Tobacco Use Supplement to the Current Population Survey (1992–1999).
<http://riskfactor.cancer.gov/studies/tus-cps/>
 - Data files (and/or) technical documentation
<http://riskfactor.cancer.gov/studies/tus-cps/info.html>
<http://www.census.gov/apsd/techdoc/cps/cps-main.html>
- 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://www.census.gov/apsd/techdoc/cps/cpsJun01Nov01Feb02.pdf>
- U.S. Department of Commerce, Census Bureau (2006). National Cancer Institute and Centers for Disease Control and Prevention Co-sponsored Tobacco Use Supplement to the Current Population Survey (2003)
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<http://www.census.gov/apsd/techdoc/cps/cpsFeb03Jun03Nov03.pdf>
- World Health Organization, International Agency for Research on Cancer Monographs. Vol. 83: Tobacco Smoke and Involuntary Smoking. July 24, 2002.
<http://monographs.iarc.fr/ENG/Monographs/vol83/volume83.pdf>

Fruit and vegetable intake has remained relatively stable since 1994.

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 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 ages 2 and older. This measure includes fruits and vegetables from all sources. One serving is approximately ½ cup.

Period – 1989–2004

Trends

Total fruits and vegetables: Relatively stable

Fruits: Relatively stable

Vegetables: Relatively stable

Most Recent Estimates

In 2003-2004, people aged 2 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

- Choose a Variety of Fruits and Vegetables Daily: Understanding the Complexities
<http://jn.nutrition.org/cgi/content/abstract/131/2/487S>

Red meat consumption has been relatively stable.

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 their 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 ages 2 and older. Red meat includes beef, lamb, and pork from all sources and does not include processed poultry.

Period – 1994–2004

Trends – Stable

Most Recent Estimates

In 2003-2004, people ages 2 and older had, on average, 2.5 ounces of red meat per day.

Among racial and ethnic groups, Non-Hispanic Blacks had 1.3 ounces of red meat per day, while Mexican-Americans had 1.7 and Non-Hispanic Whites had 2.5.

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.

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The percent of total calories from fat has remained relatively stable since 1989.

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—all as a percentage of total calories.

Period – 1989–2004

Trends – Relatively stable overall

Total fat: Falling slightly, then stable

Saturated fat: Falling slightly, then stable

Monounsaturated fat: Falling slightly

Polyunsaturated fat: Stable

Most Recent Estimates

Data collected in 2003-2004 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. Polyunsaturated fat intakes tend to increase as education levels increase.

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, etc; animal products; margarine; fried potatoes; chips; and shortenings. Some manufacturers have recently discontinued the use of trans fatty acids.

Additional Information on Fat Consumption

- 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/abstract/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.health.gov/healthypeople/Document/html/volume2/19Nutrition.htm>
- Food, Nutrition, Physical Activity, and the Prevention of Cancer: A Global Perspective, World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR)
<http://www.dietandcancerreport.org/>

Per capita alcohol consumption has been relatively stable over the past decade.

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 that 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 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 – 1990–2004

Trends – Falling from 1990–1995, then rising from 1995–2004

Most Recent Estimate

In 2004, per capita alcohol consumption was 2.23 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 (13- to 14-year-olds). Among 12- to 17-year-olds, Whites and Hispanics are more likely than Blacks to use alcohol. Among alcohol drinkers, those aged 18–25 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

- 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
- Apparent per capita ethanol consumption for the United States, 1850-2003 (NIAAA)
<http://www.niaaa.nih.gov/Resources/DatabaseResources/QuickFacts/AlcoholSales/consum01.htm>
- Food, Nutrition and the Prevention of Cancer: A Global Perspective, (AICR)
http://www.aicr.org/site/PageServer?pagename=res_report_home
- Healthy People 2010, Volume 2, Chapter 28 - Substance Abuse
<http://www.health.gov/healthypeople/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>

More adults are becoming obese.**Overweight, Obesity, and Cancer**

Compelling evidence exists that prevention of obesity reduces the risk for many of the most common cancers, 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 – 1971–2006

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: Non-significant change

Obese: Rising

Note: These trends do not indicate that individuals are moving from healthy weight to obese. Rather, the observed trends are likely due to a similar number of persons moving from healthy weight to overweight and from overweight to obese.

Most Recent Estimates

Among adults aged 20 and older in 2005-2006:

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

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.

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 be one of the major reasons for 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

- Body Mass Index Table (National Heart, Lung, and Blood Institute)
http://www.nhlbi.nih.gov/guidelines/obesity/bmi_tbl.htm
- 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>
- Physical Activity and Health: A Report of the Surgeon General – Chapter 4: The Effects of Physical Activity on Health and Disease (CDC)
<http://www.cdc.gov/nccdphp/sgr/chap4.htm>
- 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/>

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 with a lower risk of breast cancer and possibly lung and endometrial cancer. Studies continue to look at 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 one hour of physical activity every day for children and adolescents, and 2.5 hours of moderate intensity aerobic activity or one hour 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 had no leisure-time physical activity during the past month.

Period – 1997–2006

Trends – Falling, then non-significant change.

This means that in 2003 slightly more adults had any physical activity in their leisure time, and this improvement may be eroding.

Most Recent Estimates

The 2006 National Health Interview Survey (NHIS), an in-person household survey, indicates that 39 percent of adults 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 also is more common among those with less education.

For youth, physical activity is lower among females, especially Blacks. Also, physical activity decreases as children get older.

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 to 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 – U.S. Department of Health and Human Services
<http://www.health.gov/PAGuidelines/>
- Physical Activity Trends – United States, 1998–2004 (2006 Health United States, Table 72)
<http://www.cdc.gov/nchs/hus.htm>
- State Cancer Profiles, Latest Rates, Percents, and Counts
<http://statecancerprofiles.cancer.gov/micromaps/>

Only 56 percent of adults say they protect themselves from the sun.

Sun Protection and Cancer

The number of new cases of melanoma skin cancer has increased between 1975 and 2004, with an estimated number of 60,000 new cases in 2007. 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 forty to fifty percent of Americans who live to age 65 will have these two types of skin cancer at least once, most of these cancers and melanoma skin cancers can be prevented.. Studies suggest that reducing unprotected exposure to the sun and to 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 practice usually or all the time at least one of three sun protection behaviors (use sunscreen, wear protective clothing, or seek shade) when they go outside on a warm sunny day for more than 1 hour.

We supplemented and modified our question on hat use (as part of protective clothing) to more accurately distinguish from baseball caps (that do not fully protect the face, neck, and ears) from other types of fully protective hats. We accomplished this by using graphic illustrations of different hats and by asking a separate question about baseball cap and sun visor use.

Period – 1992–2005

Trends – Falling from 1992–1998, rising between 1998–2000, recently stable between 2000–2003, and falling slightly between 2003–2005. Trends are similar for both men and women except that womens' practices were stable during the last period 2003–2005, while mens' practices of these behaviors fell between 2003 and 2005.

Protective clothing: The percentage of people who usually or always use at least one sun protective article of clothing (fully sun protective hat or long-sleeve shirt) is falling.

Shade: The percentage of people who usually seek shade fell between 1992–1998, then rose between 1998–2000, fell again between 2000–2003, and appears to be rising in the most recent period 2003–2005.

Sunscreen: The percentage of people who usually use sunscreen rose slightly after 1992, was stable from 1998–2000, and rose between 2000–2003. Most recently between 2003–2005, sunscreen use is falling more steeply than any of the earlier rises. In 2000, we began to track the level of sun protective factor (SPF), which is more in line with the intent of the Healthy People 2010 goal for sunscreen use. There also was a rise between 2000–2003 for those using sunscreen with an SPF of 15 or higher, but that trend is falling during the most recent period.

Most Recent Estimates

In 2005, 56 percent of adults said they usually practice at least one of three sun protection behaviors:

- 30 percent reported usually applying sunscreen, and 27 percent usually applied sunscreen with an SPF of 15 or higher
- 18 percent reported usually wearing some type of fully sun protective clothing; if baseball caps are added to the fully sun protective hats, then usual use of at least partial sun protective clothing is about 38 percent
- 33 percent usually sought shade

Only 43 percent of young adults aged 18–24 used one or more sun protective methods, whereas 58 percent of those 25 years of age and older reported using one or more methods. Among men 18 and older, only 47 percent reported usually using one or more methods of sun protection, in contrast to 65 percent of women 18 and older.

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 are less likely to use some form of sun protection (use sunscreen, wear protective clothing, seek shade). Adults with lower incomes and less education are less likely to use sunscreens.

Key Issues

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 for helping to prevent certain other forms of cancer has been raised. Vitamin D is most efficiently made from exposure to sunlight but also can 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 June 16, 2007 Position Statement released 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 remarked, "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."

Most recently, there have been two National Institutes of Health-sponsored conferences in May and September of 2007 and a recent NCI study published in November 2007 pertaining to the effects of vitamin D on health and cancer. The NCI study found a protective effect of vitamin D status on colorectal cancer mortality but no effect on total cancer mortality. An accompanying editorial by co-sponsors of the May NIH conference on vitamin D and cancer cautioned that while 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 nor should they consume high amounts of vitamin D. More definitive data on both benefits and potential adverse effects of high doses are required before making major recommendations. Finally in October 2007, the American Institute for Cancer Research (AICR) and World Cancer Research Fund (WCRF) in the second edition of their expert panel report concluded that their review of cohort studies provided limited evidence suggesting that foods containing vitamin D or vitamin D status are protective for colorectal cancer.

Some research suggests that people apply less than an adequate amount of sunscreen and fail to reapply it appropriately. This, coupled with research showing that those who use sunscreen tend to increase 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, conducted by Adele Green and colleagues 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. While an additional eight years of follow-up did not yield a statistically significant difference for basal cell carcinoma 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.

Pending FDA regulations of sunscreens are important because present labeling information misleads the public about the protection they are getting. 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.

According to industry estimates, 28 million Americans are using some form of indoor tanning annually and there are about 25,000 tanning salons in the United States. In most states, indoor tanning facilities are unregulated with no lower age restriction for usage. Adolescence and childhood are particularly vulnerable periods for future development of skin cancer. National Health Interview Survey (NHIS) Cancer Control Supplement data in 2005 for the first time started tracking indoor tanning use by both adults and adolescents. Nearly 9 percent of 14- to 17-year-olds used tanning devices during the past 12 months; girls are seven times more likely than boys to use such devices. WHO recommends that access to tanning beds be restricted for those under the age of 18. As of March 31, 2007, only 18 states had enacted laws related to minors' access to tanning facilities (State Cancer Legislative Database, July 2007 Fact Sheet on Skin Cancers). Adults could also benefit from other future FDA regulations proposed for indoor tanning equipment/facilities. The NHIS 2005 Cancer Supplement, shows that 14 percent of adults 18 years of age and older (11 percent of males and 17 percent of females) have used indoor tanning devices in the past 12 months. Those using indoor tanning devices are primarily non-Hispanic whites (17 percent total; 12 percent males and 21 percent females).

Additional Information on Sun Protection

- Davis CD, Hartmuller V, Freedman M, Hartge P, Picciano MF, Swanson CA, Milner JA. Introduction - Vitamin D and Cancer: Current Dilemmas and Future Needs. *Nutrition Reviews* August 2007(II);65(8):S71-S74.
- Davis CD, Dwyer JT. The "Sunshine Vitamin": Benefits Beyond Bone? *Editorial JNCI* 2007;99(21):1563-1565.
- Freedman DM, Looker AC, Chang S-C, Graubard BI. Prospective Study of Serum of Vitamin D and Cancer Mortality in the UNted States. *JNCI* 2007;99(21):1594-1602.
- Healthy People 2010, Volume 1, Chapter 3 - Cancer
<http://www.health.gov/healthypeople/Document/HTML/Volume1/03Cancer.htm>
- Intersun: The Global UV Project (World Health Organization)
<http://www.who.int/uv/publications/en/Intersunguide.pdf>
<http://www.who.int/docstore/peh-uv/pub/who-ehg-95-16.htm>
- National Health Interview Survey (NHIS) (NCHS)
<http://www.cdc.gov/nchs/nhis.htm>
- North American Conference on UV, Vitamin D and Health May 25, 2006 Statement
http://www.cancer.ca/ccs/internet/standard/0,3182,3172_486352054_langId-en,00.html
- Preventing Skin Cancer: Findings of the Task Force on Community Preventive Services on Reducing Exposure to Ultraviolet Light
<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5215a1.htm>
- SEER Cancer Statistics Review, 1975-2004 (NCI)
http://seer.cancer.gov/csr/1975_2004/
- Skin and Allergy News (Elsevier publication) vol.38, No. 7, July 2007, p. 1
<http://www.skinandallergynews.com>
- State Cancer Legislative Database Fact Sheet July 2007: States with laws Addressing Minors' Access to Tanning Facilities. National Cancer institute: State Cancer Legislative Database Program, Bethesda, MD, 2007 <http://www.sclid-nci.net>
- van der Pols JC, Williams, GM, Pandeya N, Logan V, Green, AC. Prolonged Prevention of Squamous Cell Carcinoma of the Skin by Regular Sunscreen Use. *Cancer Epidemiol Biomarkers Prev* 2006;15(12):2546-2548.

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
- Sixth IARC Monographs Advisory Group on Priorities for future evaluation
<http://monographs.iarc.fr/ENG/Meetings/prioritylist.pdf>
- Third National Report on Human Exposure to Environmental Chemicals
http://www.cdc.gov/exposurereport/pdf/factsheet_general.pdf

Dioxin levels in the United States environment have been declining for the last 30 years due to reductions in man-made sources.

Dioxins and Cancer

Dioxins are chemicals produced through paper and pulp bleaching; burning of municipal, toxic, and hospital wastes; certain electrical fires; and smelters. Dioxins can also be found in some insecticides, herbicides, wood preservatives, and cigarette smoke. There are at least 100 different kinds of dioxins, including Tetrachlorodibenzo-p-dioxin (TCDD). The most common routes of exposure for dioxins occur through the diet, particularly from animal fats.

Not all dioxins can cause cancer. TCDD is a particular dioxin that is likely to cause cancer in humans. The general population is exposed to low levels of TCDD primarily from eating dairy products, fish, and meat.

Measure

Measurement of TCDD in human blood adjusting for lipids (Table P2) and toxic release inventory of dioxin releases in the environment (Figure P16).

Period – 1999–2003 (dioxin releases)

Trends

Dioxin levels in the human body appear to be declining (Table P2). Dioxin levels in the United States environment have been declining for the last 30 years due to reductions in man-made sources. However, dioxins break down so slowly that past releases will remain in the environment for many years. The refore, dioxin levels in the environment will never go to zero (Figure P16).

Table P2. Blood (lipid-adjusted) concentrations of Tetrachlorodibenzo-p-dioxin (TCDD) (picograms per gram), 1999-2002.

	1999-2000 (pg/g)	2001-2002 (pg/g)
TCDD	<LOD, 12.1*	<LOD, 5.8*

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

* 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 2001-2001, 12.1 pg/g and 5.8 pg/g, respectively, represent the maximum LOD among the samples analyzed. Because the geometric mean or average concentration of all the samples for TCDD is less than the maximum LOD, the estimate can be reported as <LOD.

Most Recent Estimates

TCDD – 5.80 pg/g
 Dioxin releases – 8.59 g-TEQ

Healthy People 2010 Targets

Reduce air toxic emissions to decrease the risk of adverse health effects caused by airborne toxins . 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/oc/factsheets/cancer-environment.pdf>
- Eleventh Report on Carcinogens, Revised 2005 (EHIS)
<http://ehis.niehs.nih.gov/roc/>
- FDA's Q & A about Dioxins
<http://www.cfsan.fda.gov/~lrd/dioxinqa.html#g1>
- Healthy People 2010-Environment
<http://www.healthypeople.gov/Document/HTML/Volume1/08environmental.htm>
- Third National Report on Human Exposure to Environmental Chemicals
<http://www.cdc.gov/exposurereport/3rd/pdf/thirdreport.pdf>

➤ 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 and to decrease the chances of dying from cancer (except colonoscopy, where evidence remains insufficient):

- 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.

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 White Non-Hispanic, Black Non-Hispanic, 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

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 between 2003–2005.

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% 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.

Key Issues

Cost and knowledge barriers, including lack of insurance and providers that discourage women from getting 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.

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/>
- Factors Associated with Women's Adherence to Mammography Screening Guidelines (Health Services Research)
<http://www.hospitalconnect.com/hsr/database/viewarticle.jsp?articleId=123>
- Free or low-cost programs providing mammography and clinical breast examination in your area
<http://www.cdc.gov/cancer/nbccedp/index.htm>
- 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/cervical.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>

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

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

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.

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.

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>
- 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>
- Healthy People 2010, Volume 1, Chapter 3 - Cancer
<http://www.health.gov/healthypeople/document/HTML/Volume1/03Cancer.htm>
- Human Papillomavirus and Cervical Cancer (Article)
Mark Schiffman, Philip E. Castle, Jose Jeronimo, Ana C. Rodriguez, and Sholom Wacholder. Lancet. 2007 Sep 8;370(9590):890-907.
http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list_uids=17826171&dopt=AbstractPlus (Abstract)
- 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/>
- California Health Interview Survey (CHIS) (UCLA)
<http://www.chis.ucla.edu/>
- 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/uspsscerv.htm>

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.

(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 two 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

Trends

Home FOBT: Decline. Home FOBT had been rising until 2000, then began falling slightly in Whites, rose in Blacks and Hispanics until 2003, then fell in Blacks in 2005 and stabilized in Hispanics.

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%) between 2003–2005. These same trends characterize both Whites and Blacks. Among Hispanics, there has been no significant change in rates since 1992.

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

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. This target 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.

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.

Additional Information on Colorectal Cancer Screening

- The Annual Report to the Nation on the Status of Cancer, 1973-1997, with a special section on colorectal cancer (Cancer)
<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://www.thecarolinascenter.org/crcreport2/>
- 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://ahrq.gov/clinic/uspstf/uspstfbrca.htm>

➤ Diagnosis

The rates of newly diagnosed cancer cases ([incidence](#)) are one way to measure progress against cancer. The lower the rates, the better.

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 for cure. Downward trends in the proportion of late cancer diagnoses are a sign that screening is working for the cancers for which early detection methods are available.

This section of the *Cancer Trends Progress Report – 2007 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: female breast, colon, rectum, cervix, and prostate.

After several decades of significant increase, rates have stabilized since 1995 when adjusted for delays in cancer case reporting.

Measuring New Cancer Cases

In 2008, more than half of all new cancers were cancers of the prostate, breast, lung, and colon/rectum. According to American Cancer Society projections there were 1,437,180 new cases of cancer in 2008, including 186,320 prostate cancers; 184,450 female breast cancers; 215,020 lung cancers; and 148,810 cancers of the colon/rectum.

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 are adjusted for cancer case reporting delays, based on data from approximately 10 percent of the U.S. population.

Period – 1975-2005

Trends

All sites combined: Incidence was on the rise until 1992, when it began to decline.

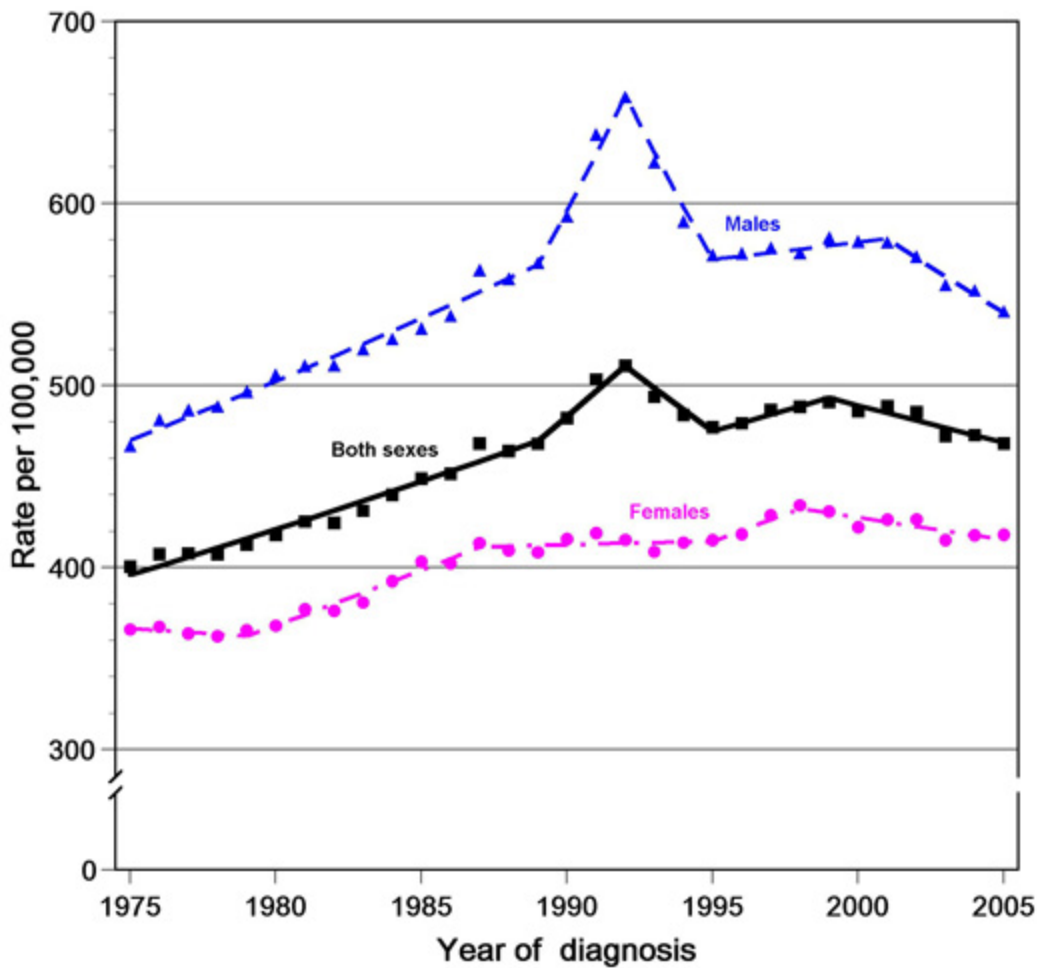
Prostate cancer: Incidence rose beginning around 1988, peaked in 1992, then fell until around 1995, after which it was stable.

Female breast cancer: Incidence rose between 1980 and 2001, then began to fall through 2005.

Colorectal cancer: Incidence rose until 1985. It has fallen steadily since then, except for a slight non-significant rise during the period 1995-1998.

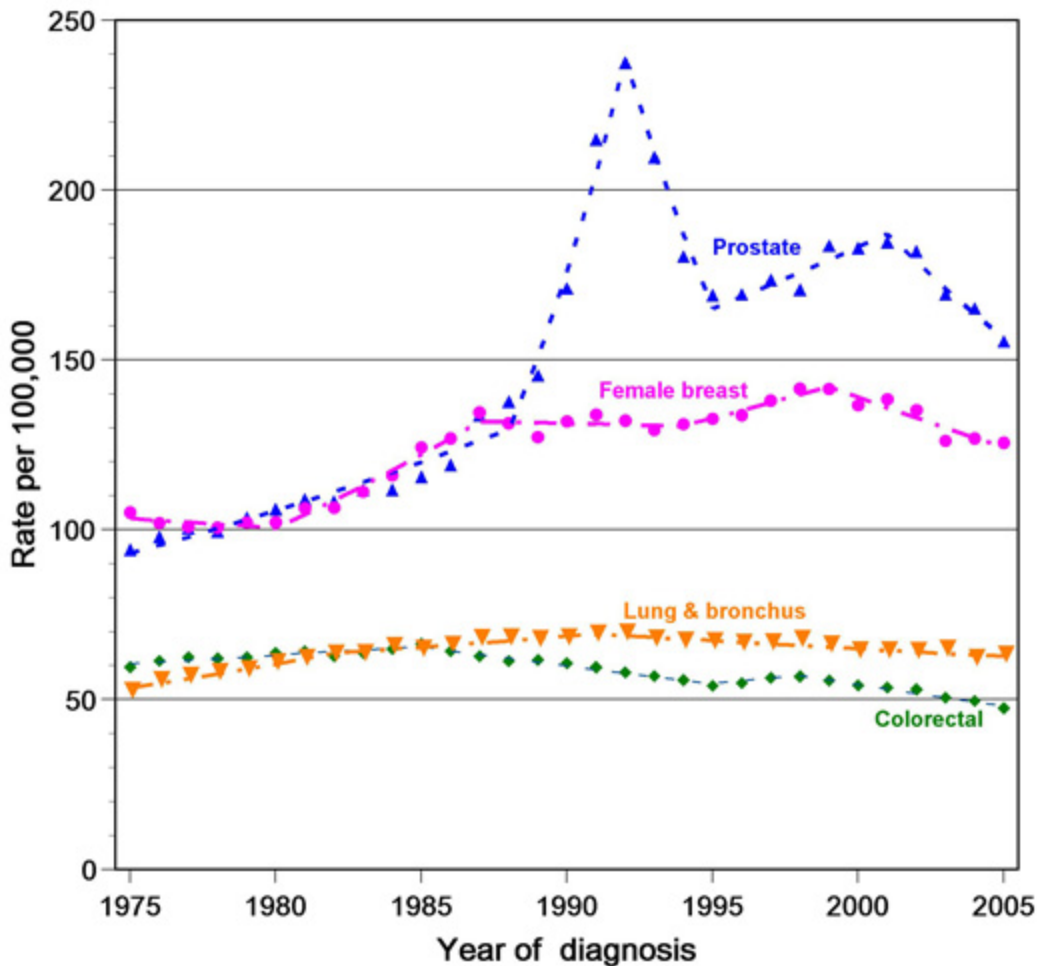
Lung cancer: Incidence of lung cancer increased until 1991, after which it fell.

Figure D1. Rates of new cases of all cancers, delay-adjusted cancer incidence: 1975-2005



1. Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas <http://seer.cancer.gov registries/terms.html>.
2. 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 D2. Rates of new cases of the four most common cancers, delay-adjusted cancer incidence: 1975-2005



1. Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas <http://seer.cancer.gov/registries/terms.html>.
 2. 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 2005, new cases of cancer occurred at the following rates:

All sites combined: 468.1 per 100,000 people per year

Prostate: 155.4 per 100,000 men per year

Female breast: 125.5 per 100,000 women per year

Colorectal: 47.4 per 100,000 people per year

Lung: 62.9 per 100,000 people per year

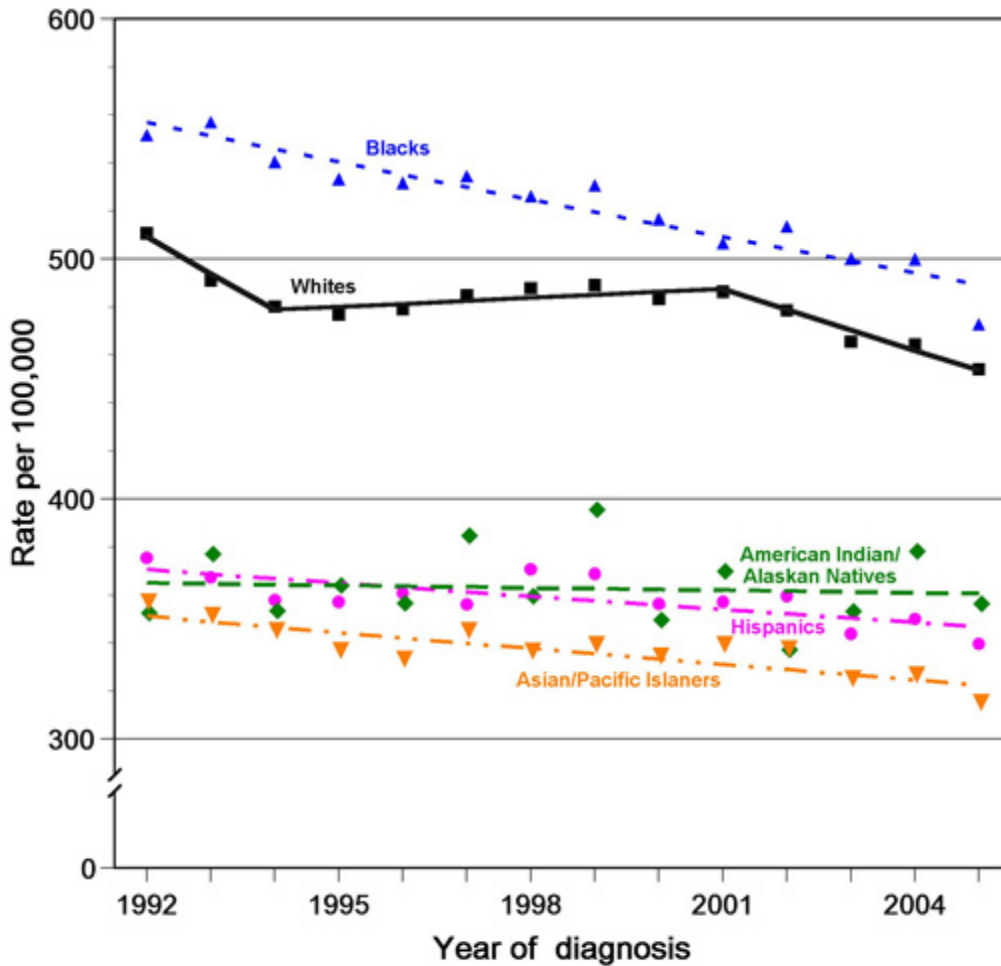
Healthy People 2010 Targets

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. Rates are relatively low among American Indians/Alaska Natives with regionally higher rates of some cancers. These disparities are not likely due to genetic differences. Rather, they are more likely due to social, cultural, behavioral, and environmental factors.

Figure D3. Rates of new cases of all cancers, by race / ethnicity: 1992-2005



1. Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas <http://seer.cancer.gov/registries/terms.html>.

2. 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/>.

Key Issues

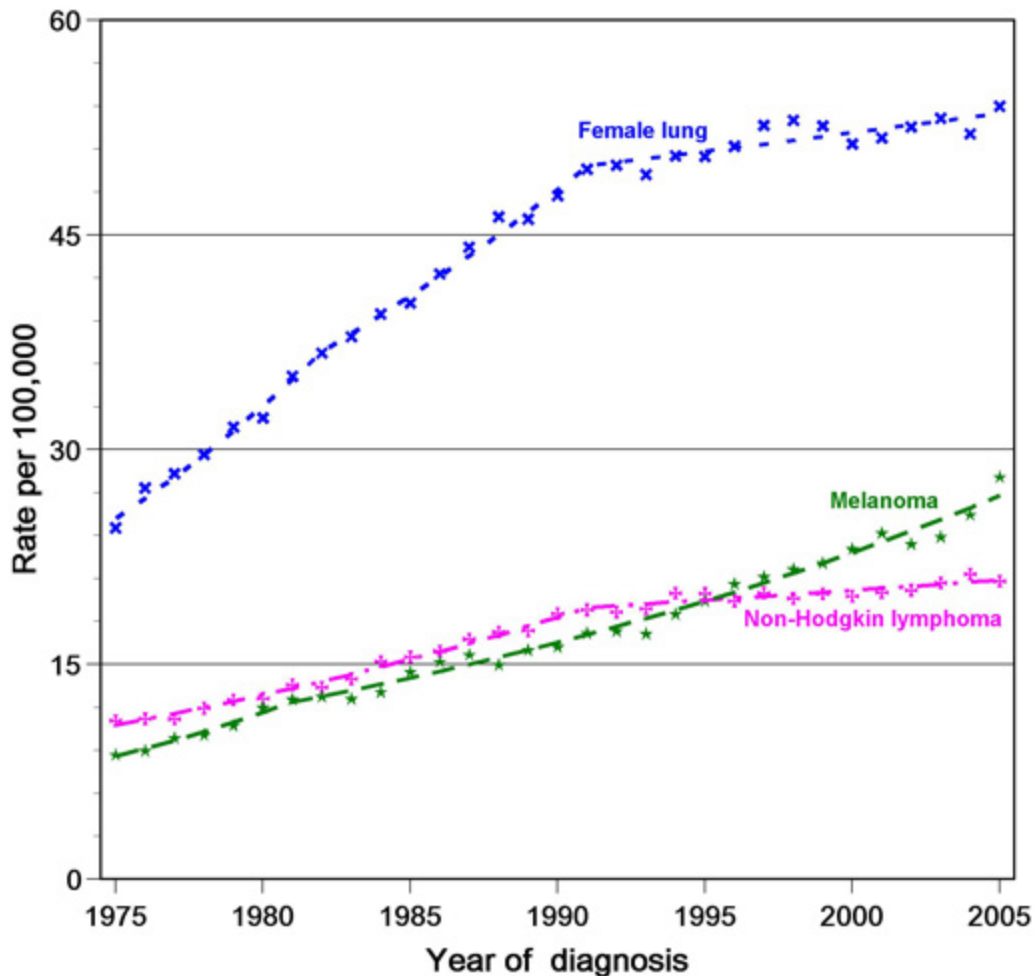
Although lung cancer incidence rates in women have recently stabilized, lung cancer remains the leading cause of cancer death in women. This highlights the need to reduce smoking prevalence and environmental tobacco smoke (ETS) exposure among all women, focusing especially on those populations whose 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 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, including:

- Non-Hodgkin lymphoma
- Leukemia
- Pancreatic cancer
- Kidney cancer
- Thyroid cancer
- Liver and intrahepatic bile duct cancer among men
- Cancer of the esophagus among men
- Testicular cancer in men
- Melanoma in women
- Cancer of the brain in women
- Cancer of the urinary bladder in women
- Childhood cancer

The incidence of some relatively rare cancers, including those of the liver, pancreas, and esophagus which are highly fatal is rising.

Figure D4. Rates of some common cancers that are increasing, delay-adjusted cancer incidence: 1975-2005



1. Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas

<http://seer.cancer.gov registries/terms.html>.

2. 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/>.

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, 1975–2004 (NCI) http://seer.cancer.gov/csr/1975_2004/
- State Cancer Profiles <http://statecancerprofiles.cancer.gov>
- Statistics for 2008 (ACS) <http://www.cancer.org/downloads/STT/2008CAFFfinalsecured.pdf>
- Women and Smoking: A Report of the Surgeon General - 2001 (Tobacco Information and Prevention Source, CDC) http://www.cdc.gov/tobacco/sgr/sgr_forwomen/index.htm

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 (I, II, III, or IV, for example) 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 and being cured.

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, breast, and cervix uteri.

Period – 1980–2005 (Late stage prostate data is presented for the years from 1995 to 2005)

Trends

Prostate: Late-stage prostate cancer has fallen from 1995 to 2005, following the introduction of the prostate-specific antigen (PSA) test.

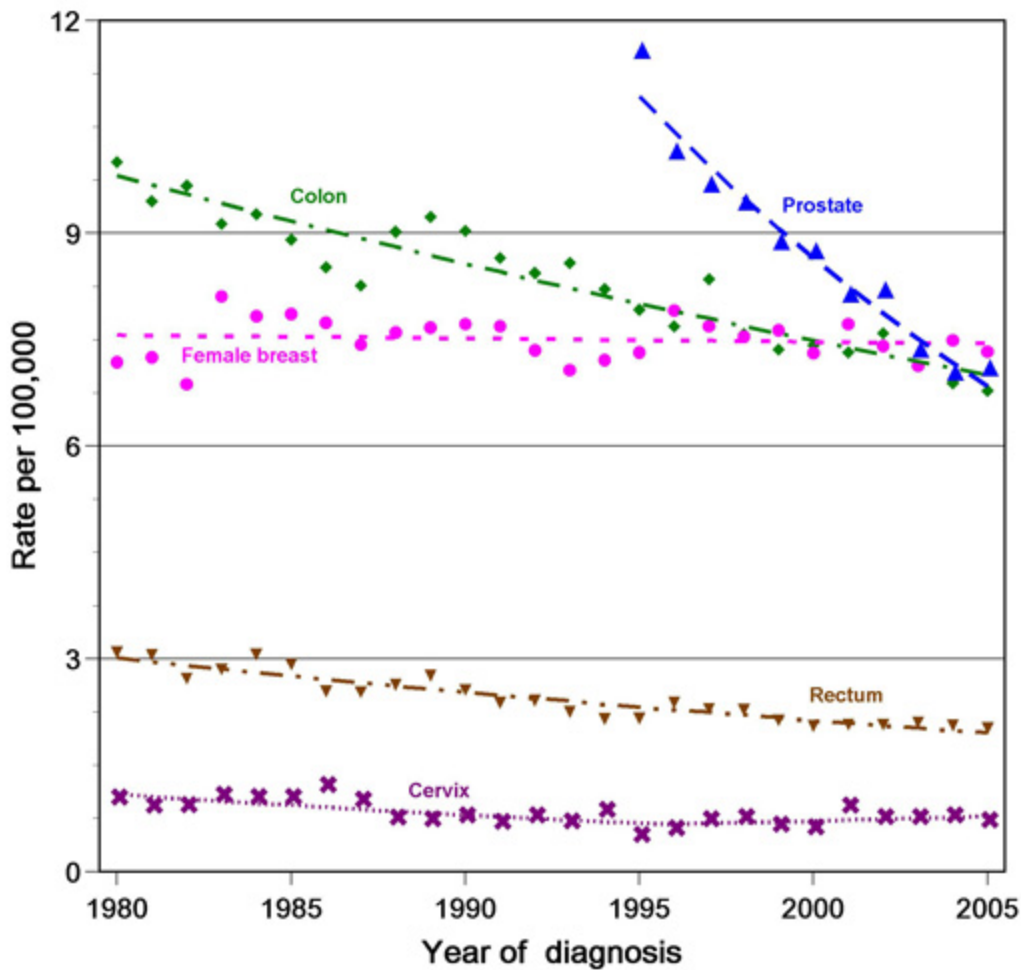
Colon: Falling

Female breast: Stable

Rectum (including Rectosigmoid Junction): Falling

Cervix: Falling from 1980-1996 and non-significant change from 1996-2005

Figure D5. Rates of new cases of late-stage disease: 1980-2005



1. Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas <http://seer.cancer.gov registries/terms.html>.

2. 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 2005, five major cancers were diagnosed at a late stage at the following rates:

Prostate: 7.1 new cases per 100,000 men per year

Colon: 6.8 new cases per 100,000 people per year

Female breast: 7.4 new cases per 100,000 women per year

Rectum: 2.0 new cases per 100,000 people per year

Cervix: 0.7 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 regular, recommended cancer screening tests and/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, 1975-2005 (NCI)
http://seer.cancer.gov/csr/1975_2005
- Staging (ACS)
http://www.cancer.org/docroot/eto/content/eto_1_2x_staging.asp

▸ Treatment

- [Breast Cancer Treatment](#)
- [Colorectal Cancer Treatment](#)

Note: Trends in the use of adjuvant therapy for melanoma, ovarian, prostate and head and neck cancer will be available in late 2008.

Cancer treatment is improving—saving lives and extending survival for people with cancers at many sites, including breast and colon, and for people with leukemias, lymphomas, and pediatric cancers.

Clinical trials are the major avenue for discovering, developing, and evaluating new therapies. However, a relatively small percentage of all adult cancer patients (20 years and older) participate in clinical trials; the exact percentage is unknown because NCI-sponsored trials and industry-sponsored trials are tracked separately. It is important to increase physician and patient awareness of, and participation in, clinical trials if we are to test new treatments more rapidly, find more effective treatments, 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, 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 bladder, 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 over the period 1992 - 2002. However, between 1998 and 2002 the proportion of women receiving breast-conserving surgery who also received radiation treatment declined modestly. The use of recommended adjuvant chemo- and hormonal therapy increased substantially between 1987 and 1995. Similarly, the receipt of adjuvant chemotherapy for stage III colon cancer increased markedly following the publication in 1989 of clinical recommendations for this treatment.

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. In addition, 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.

The proportion of women with node positive disease receiving appropriate treatment is high. Older women receive less treatment than younger women but there are not major differences in treatment among major racial and ethnic groups.

Note: Additional information on the trends in adjuvant chemotherapy and hormonal therapy will be available for early stage breast cancer in early 2009.

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 – 1992–2002

Trends – Rising between 1992 and 1998, falling slightly between 1998 and 2002

Most Recent Estimates

In 2002, 41 percent of women ages 20 and older diagnosed with early-stage breast cancer (less than stage IIIA) received mastectomy, 37 percent received breast-conserving surgery plus radiation, and 19 percent received breast-conserving surgery only.

Healthy People 2010 Targets

There are no Healthy People 2010 targets for cancer treatment including breast conserving surgery and radiation treatment.

Multi-Agent Chemotherapy Benefits of Treatment

For women with positive lymph nodes, multi-agent chemotherapy has been recommended by NIH since 1985, along with tamoxifen for those women with estrogen-receptor positive tumors, based on the results of numerous randomized controlled treatment trials.

Measure

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

Period – 1987–2000

Trends – Rising

Most Recent Estimates

In 2000, 69 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 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 in addition to breast-conserving surgery, 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, or heart disease, were less likely to receive treatment. Similar decreases in the use of chemotherapy among older women also have been observed.

Key Issues

Treatment options for breast cancer are complex, depending on nodal status, hormone receptor status, and age. Substantial toxicity and other risks are associated with radiation treatment and chemotherapy. As is the case for most cancers, women over the age of 70 have not been well represented in randomized controlled treatment trials. For all of these reasons, appropriate treatment should be the outcome of a fully informed, patient decision-making process that takes complex clinical factors and patient preferences into account. 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.

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/>

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

Note: Updated adjuvant therapy information for stage II and III colorectal cancer will be available in early 2009.

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, ages 20 and over, diagnosed with stage III colon cancer who received 5-FU plus either levamisole or leucovorin or diagnosed with stage II or stage III rectal cancer who received 5-FU with or without radiotherapy.

Period – 1987–2000

Trends – Rising, rapidly between 1987 and 1990, rising moderately between 1990 and 2000.

Most Recent Estimates

In 2000, 57 percent of stage III colon, and stage II and III rectal patients ages 20 and older received adjuvant chemotherapy.

Healthy People 2010 Targets

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

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/>

- PDQ Information on Colon Cancer
<http://www.cancer.gov/cancertopics/pdq/treatment/colon/HealthProfessional/>
- PDQ Information on Rectal Cancer
<http://www.cancer.gov/cancertopics/pdq/treatment/rectal/healthprofessional/>
- SEER-Medicare Studies
<http://healthservices.cancer.gov/seermedicare/>

▶ 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:

- Survival rates for cancer by each stage at diagnosis ([Survival](#))
- The estimated total number of survivors
- The economic impact of cancer ([Cost of cancer care](#))

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.

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

Cancer Survival

Advances in the ways 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 have a recurrence of their cancer after 5 years.

In 2005 nearly 11.1 million Americans who had been diagnosed with cancer were alive. Of these, nearly 2.5 million were diagnosed with female breast cancer, 2.1 million were diagnosed with prostate cancer, and 1.1 million were diagnosed with colorectal cancer. Approximately 592,709 (5 percent of the 10.7 million) Americans diagnosed with cancer were longer-term survivors diagnosed at least 29 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. It is a ratio expressed as a percent, 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, lung, and for all cancers combined.

Period – 1975–2000 (year diagnosed)

Trends – Mostly rising

All cancer sites combined: Generally rising since 1975 except stable during 1992–1995

Prostate: Generally rising since 1975 except stable during 1992–1995

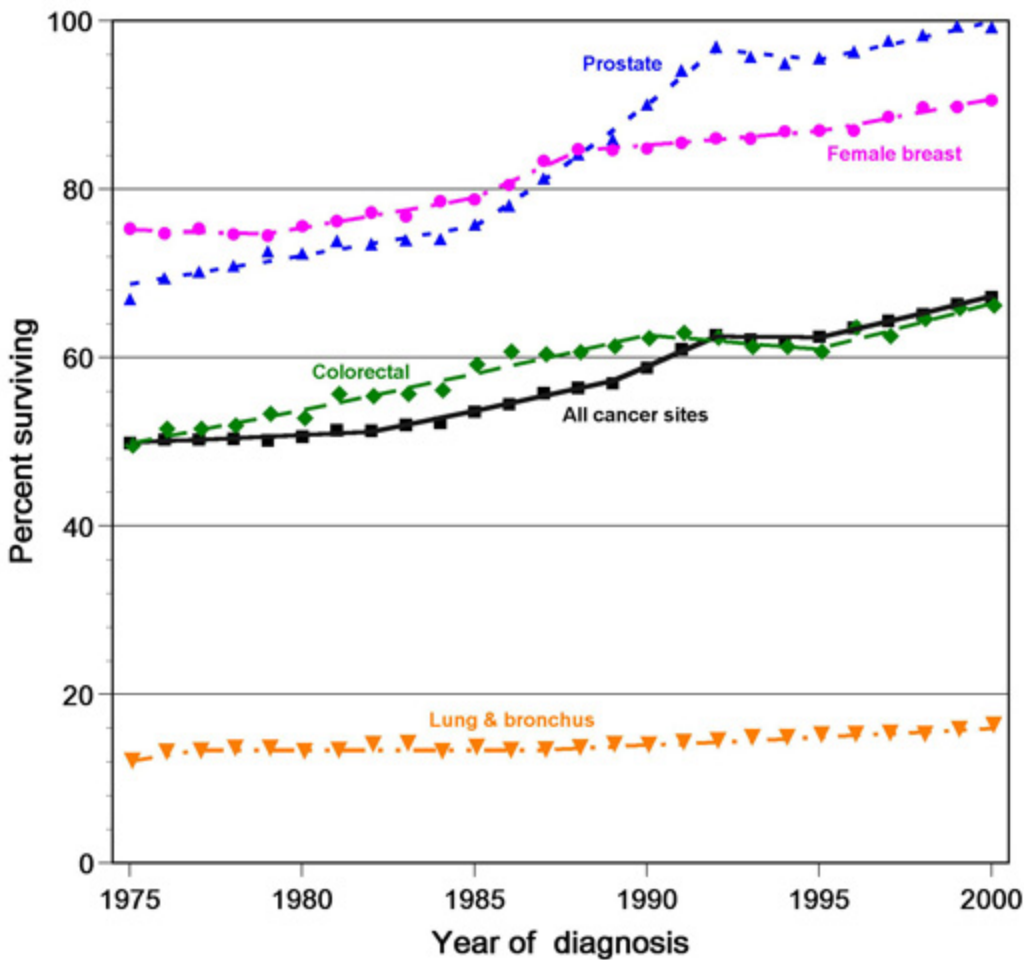
Female breast: Rising since 1975

Colorectal: Generally rising since 1975 except for non-significant change during 1990–1995

Lung and bronchus: Significant slight rise since 1987

Among these four cancers, five-year survival rates are highest for prostate and female breast cancers and lowest for lung cancer.

Figure L1. 5-year relative survival rates: 1975-2000



1. Source: SEER Program, National Cancer Institute. Incidence data are from the SEER 9 areas <http://seer.cancer.gov/registries/terms.html>.

Most Recent Estimates

For patients diagnosed with cancer (all sites) in 2000, 67.2 percent had survived their 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. 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 both early detection and better treatments. It is difficult to separate out the contribution of each factor.

Despite the positive trends in 5-year survival for three of the most common cancers, lung cancer survival rates remain low.

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, 1975-2005 (NCI)
http://seer.cancer.gov/csr/1975_2005
<http://seer.cancer.gov/faststats/>
- Statistics for 2008 (ACS)
http://www.cancer.org/docroot/stt/stt_0.asp

Page last reviewed: May 13, 2009

Cancer treatment spending has risen but remains stable in proportion to total U.S. treatment spending.

The financial costs of cancer treatment are a burden to people diagnosed with cancer, their families, and society as a whole. Cancer treatment accounted for an estimated \$72.1 billion in 2004—just under 5 percent of U.S. spending for all medical treatment. Between 1995 and 2004, the overall costs of treating cancer increased by 75 percent. In the near future it is expected that 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 cases will increase relative to other disease categories—even if cancer incidence rates remain constant or decrease somewhat. Costs also are likely to increase at the individual level as new, more advanced, and more expensive treatments are adopted as standards of care.

Updated estimates are currently being calculated for cancer treatment costs by phase of care and the national economic burden of cancer treatment for all cancers combined, as well as for cancer of the lung, breast, colorectal, prostate, head/neck, bladder, ovary, kidney, endometrial, cervix, pancreas, and esophagus; and lymphoma, leukemia, and melanoma. These cost estimates will be available in 2009.

NCI will continue to monitor cancer costs and track the percentage of total medical costs accounted for by cancer care. Over the last three decades, this percentage has remained remarkably constant.

As total spending for medical treatment rose between 1963 and 2004, so did spending for cancer treatment.

Table L1: National Cancer Treatment Expenditures in Billions of Dollars (1963-2004)

Year	Cancer treatment spending (billions)	Total personal health care spending (billions)	Percentage of cancer treatment spending to total
1963	\$1.3	\$29.4	4.4%
1972	\$3.9	\$78.0	5.0%
1980	\$13.1	\$217.0	6.0%
1985	\$18.1	\$376.4	4.8%
1990	\$27.5	\$609.4	4.5%
1995	\$41.2	\$879.3	4.7%
2004	\$72.1	\$1540.7	4.7%

Source: 1963-1995: Brown ML, Lipscomb J, Snyder C. The burden of illness of cancer: economic cost and quality of life. Annual Review of Public Health 2001;22:91-113. 2004: NIH Cost of Illness Report to the U.S. Congress, 2005; National Health Care Expenditures Projections: 2003-2013, <http://www.cms.hhs.gov/statistics/nhe/projections-2003/proj2003.pdf>

Spending for each year is expressed in current dollars for that year. While cancer treatment costs increased dramatically between 1963 and 2004, the proportion of these costs to all health care expenditures remained stable. Cancer spending in this chart does not include screening, which cost an additional \$10 to \$15 billion in 2004.

Total treatment expenditures for each of the four most common cancers are remarkably similar. However, individual costs for other cancers based on Medicare data show wide variation by type of cancer.

Table L2: Estimates of National Expenditures for Medical Treatment for the 15 Most Common Cancers (based on Cancer Prevalence in 1998 and Cancer-Specific Costs for 1997–1999, projected to 2004 using the medical care component of the Consumer Price Index)

	Percentage of all new cancers (1998)	Expenditures (billions; in 2004 dollars)	Percentage of all cancer treatment expenditures	Average Medicare payments* per individual in first year following diagnosis (in 2004 dollars)
Lung	12.7%	\$9.6	13.3%	\$24,700
Breast	15.9%	\$8.1	11.2%	\$11,000

	Percentage of all new cancers (1998)	Expenditures (billions; in 2004 dollars)	Percentage of all cancer treatment expenditures	Average Medicare payments* per individual in first year following diagnosis (in 2004 dollars)
Colorectal	10.7%	\$8.4	11.7%	\$24,200
Prostate	16.8%	\$8.0	11.1%	\$11,000
Lymphoma	4.6%	\$4.6	6.3%	\$21,500
Head/Neck	2.8%	\$3.2	4.4%	\$18,000
Bladder	4.4%	\$2.9	4.0%	\$12,300
Leukemia	2.4%	\$2.6	3.7%	\$18,000
Ovary	1.9%	\$2.2	3.1%	\$36,800
Kidney	2.6%	\$1.9	2.7%	\$25,300
Endometrial	2.9%	\$1.8	2.5%	\$16,200
Cervix	0.8%	\$1.7	2.4%	\$20,100
Pancreas	2.3%	\$1.5	2.1%	\$26,600
Melanoma	4.0%	\$1.5	2.0%	\$4,800
Esophagus	1.0%	\$0.8	1.1%	\$30,500
All Other	14.0%	\$13.4	18.5%	\$20,400
Total	100.0%	\$72.1	100%	

Source: Based on methods described in: Brown ML, Riley GF, Schussler N, Etzioni RD. Estimating health care costs related to cancer treatment from SEER-Medicare data. Medical Care 2002 Aug;40(8 Suppl):IV-104-17. Phase-specific prevalence and cost estimates are for SEER-Medicare cases diagnosed between 1996 and 1999, with costs expressed in 2001 dollars using CMS cost adjusters. Estimates are updated to 2004 using the medical care services component of the Consumer Price Index: U.S. Department of Labor, Bureau of Labor Statistics: CPI Detailed Report and Producer Price Indexes . Washington . U.S. Government Printing Office. Monthly reports for January 1999March 2004.

*Medicare payments include copayments and deductibles paid by patient.

Among the four most common cancers, the first-year costs for lung and colorectal cancer are higher because screening is not as commonly used in the detection of these cancers. While there is no lung cancer screening recommendation, if screening for colorectal cancer were performed as recommended, the proportion of cases presenting at advanced stages—when treatment is more extensive and costly—would be reduced.

Medicare does not cover certain cancer care expenses, such as oral medicines commonly used to treat cancers of the breast and prostate. These out-of-pocket costs may add as much as 10 percent to the estimates shown above.

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. The total economic burden of cancer in 2004 is estimated to have been \$190 billion.

▸ 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 – 2007 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.

After several decades of steady increases, the U.S. cancer death rate stabilized from 1990 to 1993 and has significantly declined from 1993 to 2005.

Measuring Cancer Deaths

In 2005, cancers of the breast, prostate, lung, and colon/rectum accounted for more than half of all cancer deaths in the United States. Lung cancer alone claimed more than one-fourth of the lives lost to cancer. According to American Cancer Society projections, in 2008 there were 565,650 cancer deaths overall, including 161,840 deaths from lung cancer; 49,960 from cancers of the colon/rectum; 40,930 from female breast cancer; 34,290 deaths from cancer of the pancreas (replacing prostate cancer as the fourth leading cause) and 28,660 from prostate cancer. Cancer mortality usually is 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 – 1975–2005

Trends

All sites combined: Death rates increased through 1990, then stabilized until 1993 and fell from 1993 through 2005

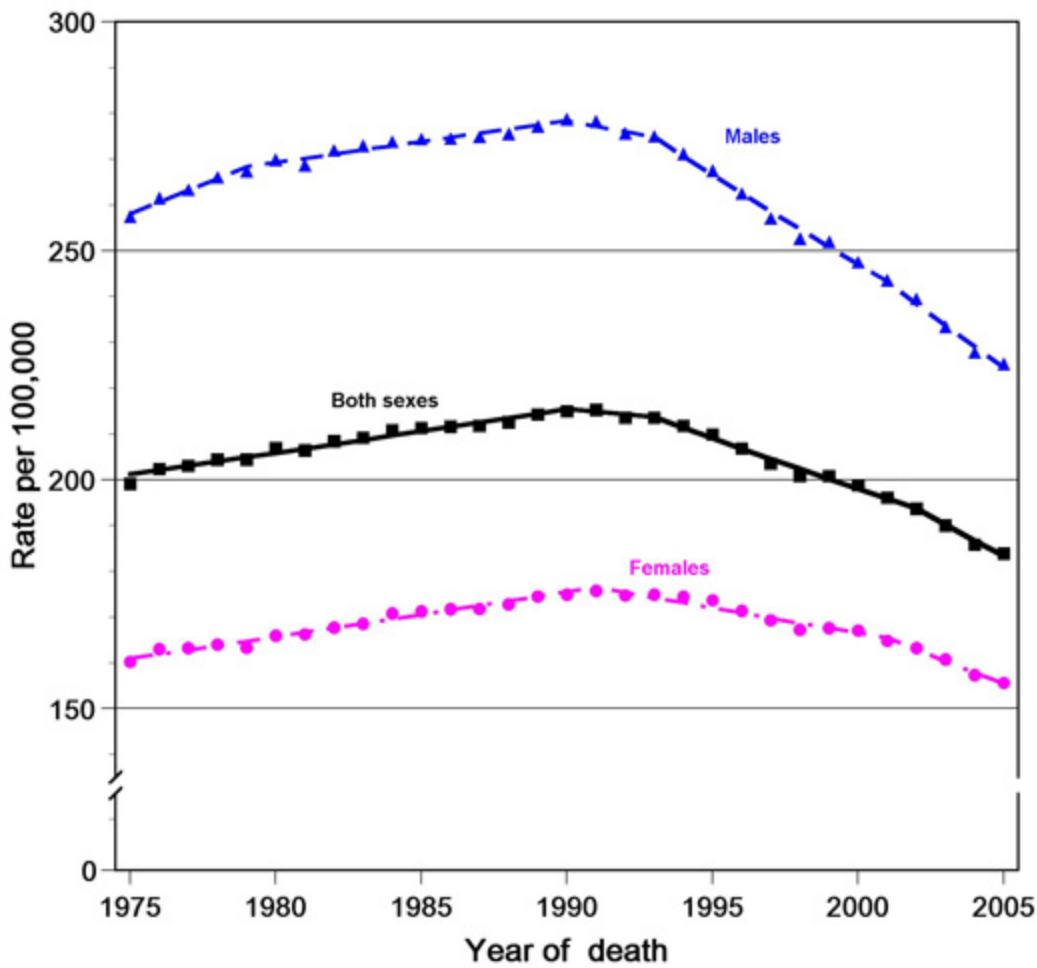
Colorectal cancer: Death rates have been falling since 1975

Female breast cancer: Death rates have been falling since 1990

Lung cancer: Death rates have been falling since 1995 due to declines in lung cancer in men and plateau of death rates in women

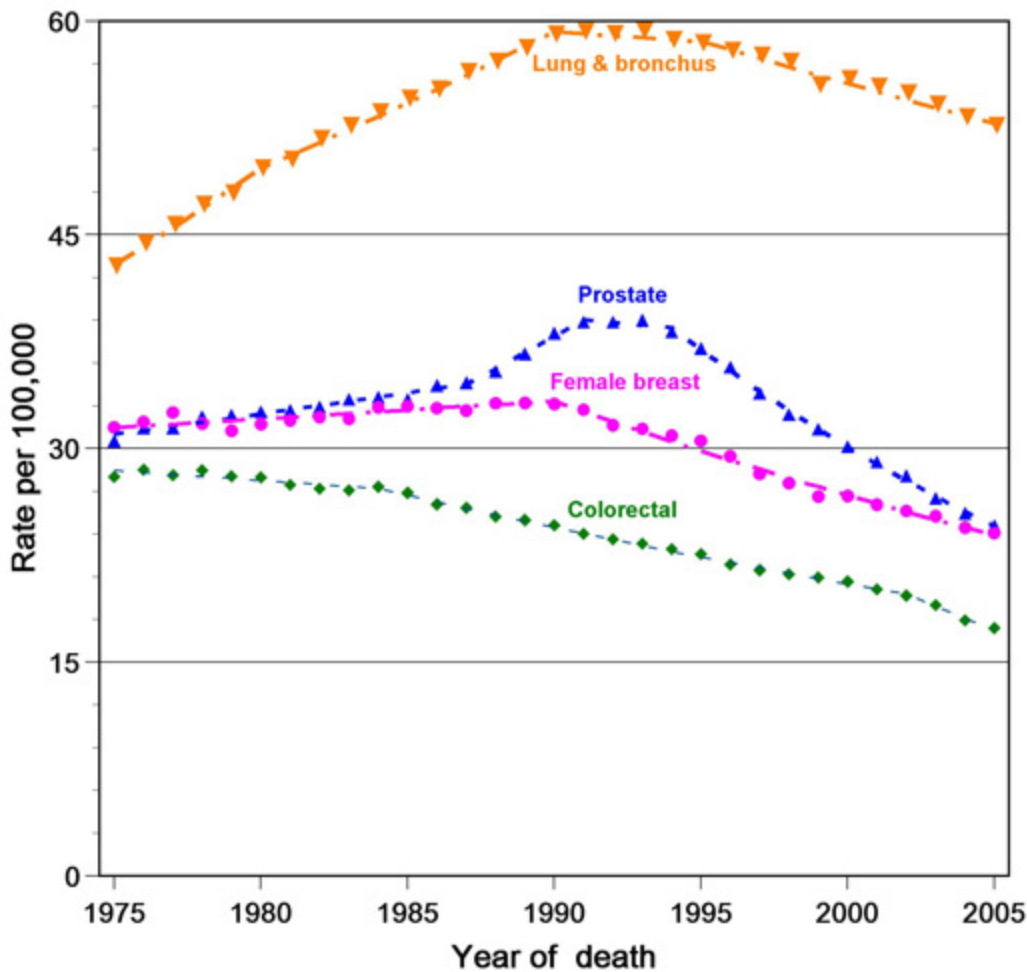
Prostate cancer: Death rates have been falling since 1994

Figure E1. Death rates for all cancers: 1975-2005



1. Source: National Center for Health Statistics data as analyzed by NCI.
2. 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 as defined by NCHS <http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>.

Figure E2. Death rates for common cancers: 1975-2005



1. Source: National Center for Health Statistics data as analyzed by NCI.

2. 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 as defined by NCHS <http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>.

Most Recent Estimates

In 2005, the death rate for all cancers was 184.0 cancer deaths per 100,000 people per year.

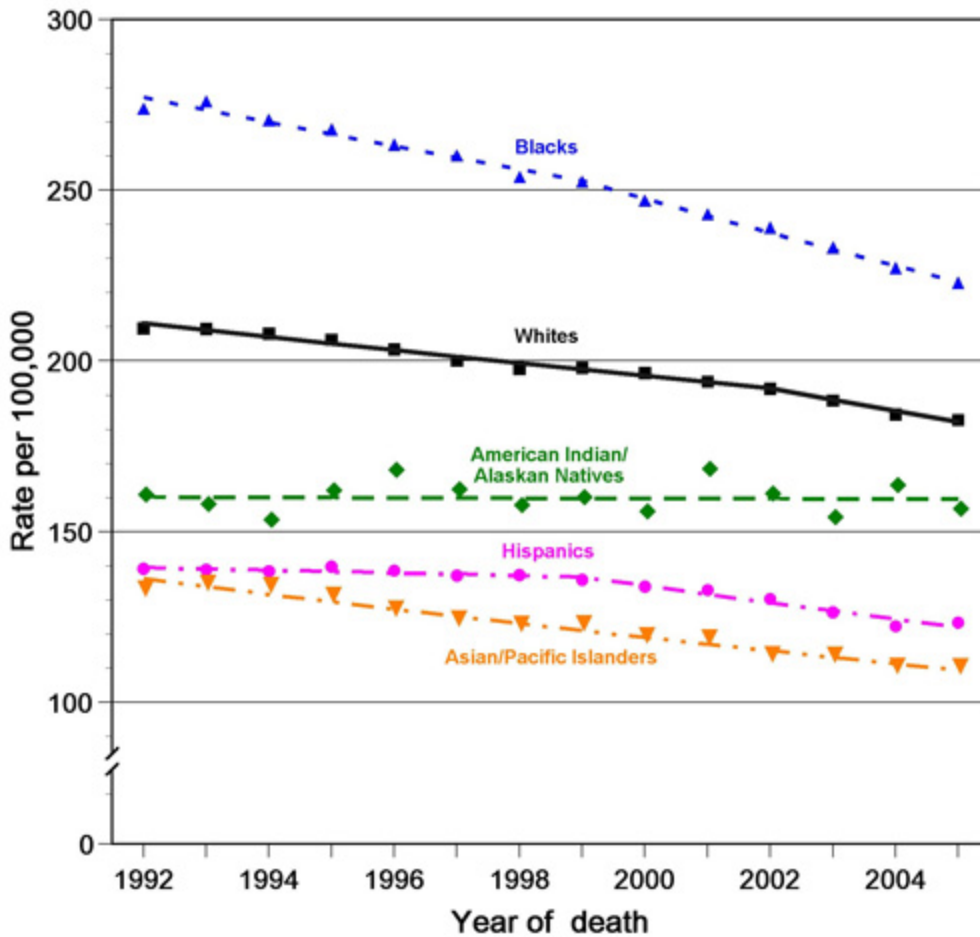
Healthy People 2010 Target

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 have the highest overall rates for cancer deaths, followed by Whites.

Figure E3. Death rates for all cancers, by race / ethnicity: 1992-2005



1. Source: National Center for Health Statistics data as analyzed by NCI.

2. 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 as defined by NCHS <http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>.

Key Issues

Although overall death rates are on the decline, deaths from some cancers, such as esophageal, liver, and thyroid cancers, are increasing.

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 2008
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>

Cancer is responsible for more estimated years of life lost than any other cause of death.

Person-Years of Life Lost (PYLL)

Death rates alone do not give a complete picture of the burden that deaths impose on the population. Another useful measure, which adds a different dimension, is person-years of life lost (PYLL)—the years of life lost due to early death from a particular cause or disease. PYLL due to cancer helps to describe the extent to which life is cut short by cancer. On average, each person who dies from cancer loses an estimated 15.5 years of life.

Measure

PYLL due to a particular disease or cause: The difference between the actual age of death due to 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 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.

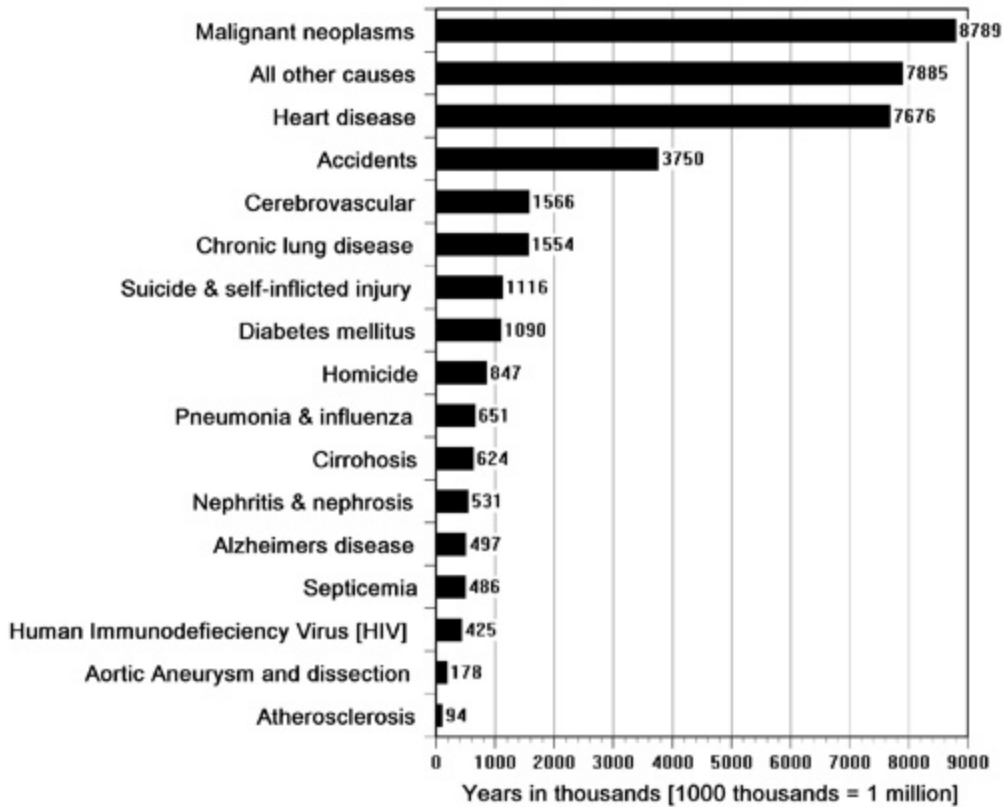
Period – 2005

Trends – No trend data are available.

Most Recent Estimates

In 2005, cancer deaths were responsible for nearly 8.8 million PYLL. This is more than heart disease or any other cause of death.

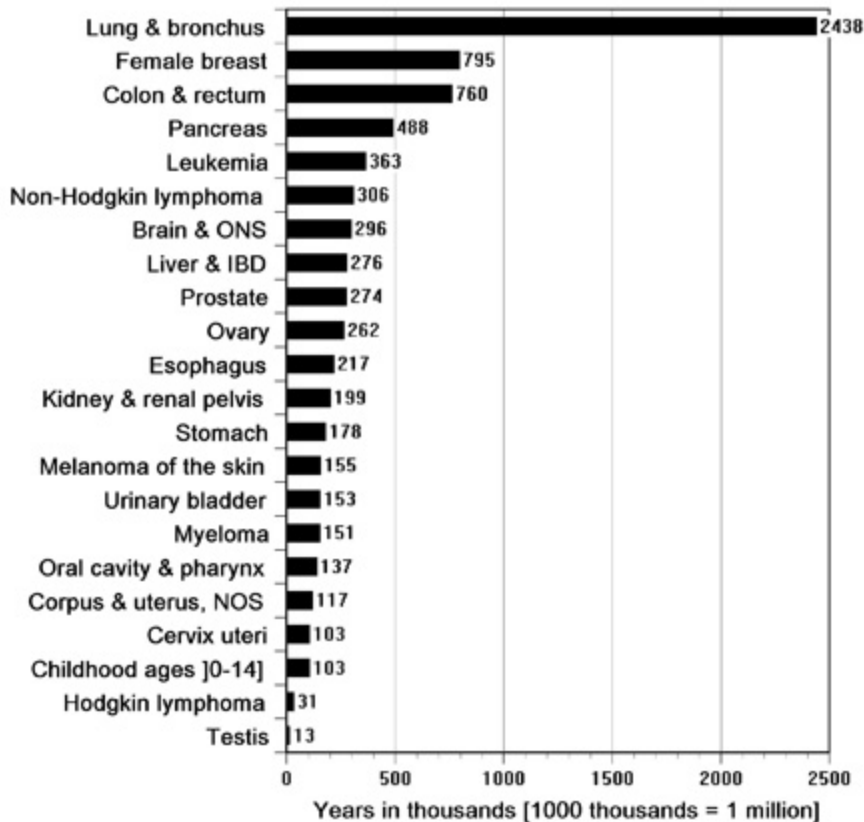
Figure E4. Person-years of life lost due to major causes of death in the U.S.: 2005



1. Sources: National Center for Health Statistics [NCHS] public-use file and NCHS life-tables.
2. Data are not age-adjusted.
3. Estimates produced using 2004 Life Tables [Arias E. United States life tables, 2004. National vital statistics reports; vol 56 no 9. Hyattsville, MD: National Center for Health Statistics. December 28, 2007].

Also in 2005, lung cancer accounted for over 2.4 million PYLL, the most by far for any cancer. In contrast, prostate cancer, which primarily affects older men, accounted for approximately 274,000 PYLL.

Figure E5. Person-years of life lost due to cancer: 2005



1. Sources: National Center for Health Statistics [NCHS] public-use file and NCHS life-tables.
2. Data are not age-adjusted.
3. Estimates produced using 2004 Life Tables [Arias E. United States life tables, 2004. National vital statistics reports; vol 56 no 9. Hyattsville, MD: National Center for Health Statistics. December 28, 2007].

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. Breast and colorectal cancers are also common cancers that strike people at a relatively young age and cause many years of life lost. 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.

Key Issues

The greatest impact on reducing the number of years lost to cancer will come from progress against common cancers—especially lung, 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

- Cancer Statistics Review
http://seer.cancer.gov/csr/1975_2005/index.html

Appendices

[Acknowledgements](#)

[Incidence & Mortality Charts](#)

[Methodology for Characterizing Trends](#)

[References](#)

[Survival Estimation Methods](#)

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The NCI wishes to acknowledge the following Federal agencies as sources for the data used in this report:

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Substance Abuse and Mental Health Services Administration

U.S. Department of Agriculture

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▣ Cancer Incidence and Mortality Rates - United States, 2004

The following tables depict the incidence and mortality rates for the cancers included in the *Cancer Trends Progress Report – 2007 Update*. Click on the cancer name to view additional, more detailed data for that particular cancer. For cancers not included in the tables, please visit the Cancer Statistics Review, 1975-2004 (http://seer.cancer.gov/csr/1975_2004/sections.html).

Incidence

Cancer	All races			Whites			Blacks		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
All cancers	457.8	534.2	405.0	466.8	537.9	417.9	493.1	637.2	396.6
Lung and bronchus	60.0	73.6	50.2	60.6	72.7	52.0	73.0	100.0	54.9
Breast	67.3	1.2	124.3	68.7	1.2	128.2	68.6	1.6	119.3
Cervix uteri	7.0	---	7.0	6.7	---	6.7	10.3	---	10.3
Colorectal	48.2	56.7	41.7	47.5	56.2	40.7	59.0	70.0	51.7
Prostate	159.5	159.5	---	155.3	155.3	---	238.2	238.2	---
Non-Hodgkin lymphoma	20.4	24.7	17.1	21.3	25.5	17.9	17.4	22.8	13.4
Melanoma of skin	19.6	24.1	16.5	23.8	28.9	20.3	0.8	---	---

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/>).
 --- Statistic not shown. Rate based on less than 25 cases for the year 2004.

Download: [data \(Excel\)](#) | [image \(JPEG\)](#) | [slide \(PowerPoint\)](#)

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. 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 3.0) 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. The maximum number of segments was limited to four (i.e., three joinpoints), because for most practical situations this has been shown to be sufficient, and the calculations become computer intensive when searching for all possible model-fits with many segments.

However, 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.

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>.

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Following are selected major references used in preparing this report.

The data referenced here will not always match the data in the *Cancer Trends Progress Report – 2007 Update*. This is because most of the report's data were age-adjusted to the year 2000 standard population in order to be compatible with data presented in Healthy People 2010.

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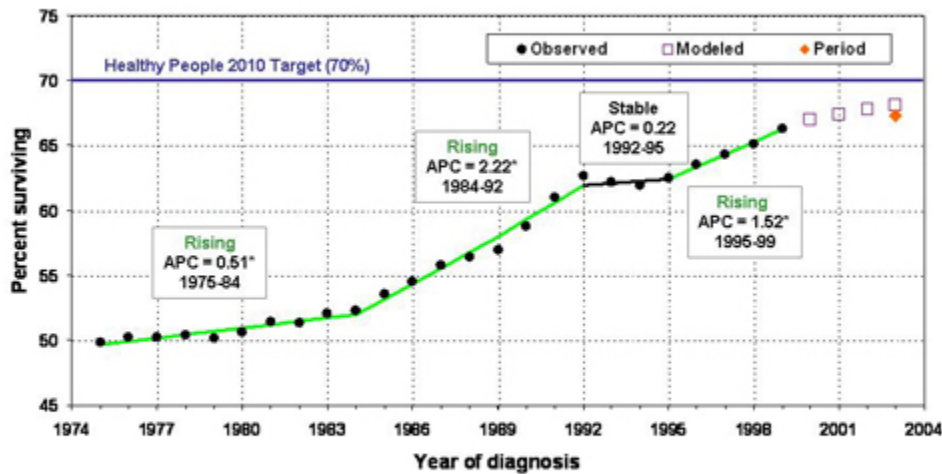
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In Figure L1 of this report, the most recent 5-year estimates of survival are for patients diagnosed in 1999. The estimates are slightly dated due to the lag time in cancer registry reporting of new cases and the time it takes to observe 5-year survival. Since complete follow-up is available only through 2003, the most recent estimates are based on data as follows:

Survival Time	Diagnosis Year
1 year	2003
2 years	2002
3 years	2001
4 years	2000
5 years	1999

Researchers at the National Cancer Institute (NCI) and elsewhere have been considering methods for extrapolating to obtain long-term survival estimates for cases diagnosed recently. 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., 2001-2003). For example, to estimate the 5-year survival in 2003, we use 0- to 1-year survival experience for cases diagnosed in (2001-2003), 1- to 2-year survival experience for cases diagnosed in (2000-2002), who survived at least 1 year, and so on up to 4- to 5- year survival experience for cases diagnosed in (1997-1999), 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 1999 to 2003, 1- to 2-year survival for cases diagnosed in 1999 to 2002, 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 2003 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 2003 computation will more accurately reflect the improved trend compared to the 1999 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.

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