

# Article Summary: Questions and Answers About the Annual Report to the Nation on the Status of Cancer, 1975–2008

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## Key Points

- Overall cancer death rates have continued to decrease since the early 1990s among men, women, and children. Death rates decreased on average 1.6 percent per year between 2004 and 2008. (Question 8)
- From 2004 through 2008, incidence rates for all cancers combined decreased 0.6 percent per year among men and stabilized among women. (Question 5)
- Excess weight and lack of sufficient physical activity are important, avoidable causes of cancer in the United States and other industrialized nations. (Question 12)

## Questions

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## **Overview**

### **1. What is the purpose of this report and who created it?**

This report provides a regular update of cancer incidence (new cases) and mortality (death) rates and trends in these rates in the United States. The Centers for Disease Control and Prevention (CDC), the American Cancer Society, the National Cancer Institute (NCI) (part of the National Institutes of Health), and the North American Association of Central Cancer Registries (NAACCR) have collaborated since 1998 to create the "Annual Report to the Nation on the Status of Cancer."

The special section of this year's report highlights increased cancer risk associated with excess weight and lack of sufficient physical activity, and emphasizes the importance of promoting healthy weight and sufficient physical activity in reducing the cancer burden in the United States.

### **2. What are the sources of the data?**

Cancer mortality information in the United States is based on causes of death reported by physicians on death certificates and filed by each state's vital statistics offices. The mortality information is processed and consolidated in a national database by CDC through the National Vital Statistics System, which covers the entire United States.

Information on newly diagnosed cancer cases occurring in the U.S. is based on data collected by registries in CDC's National Program of Cancer Registries (NPCR) and NCI's Surveillance, Epidemiology and End Results (SEER) Program. NAACCR evaluates data annually from registries in both programs and provides combined data for this analysis.

Long-term (1992 through 2008) trends for all races for all cancer sites combined and for the 15 most common cancers were based on SEER incidence data covering about 14 percent of the U.S. population. Data from combined NPCR and SEER population-based cancer registries were used to estimate cancer incidence rates and short-term (1999 through 2008) trends for each of five major racial and ethnic groups: white, black, Asian and Pacific Islander, American Indian/Alaska Native, and Hispanic. For the time period 2004–2008, 48 registries (covering 96 percent of the U.S. population) met NAACCR data quality criteria, and for the time period 1999–2008, 41 registries (covering 86 percent of the U.S. population) met these criteria.

### **3. Which reporting periods were chosen as a main focus of the report?**

The period from 2004 through 2008 was used for describing the U.S. burden of cancer (rates), and the period from 1999 through 2008 was used for describing trends in cancer incidence and death rates among the country's five major racial and ethnic groups. The period from 1975 through 2008 was chosen to represent the best perspective on long-term trends in cancer death rates among all races combined, while the period from 1992 through 2008 was chosen to represent the best perspective on long-term incidence trends.

### **4. What is detailed in the Special Feature of this year's report?**

In this year's Special Feature, the authors highlight the effects of excess weight and lack of sufficient physical activity on cancer risk. Several cancers, including esophageal adenocarcinoma and cancers of the colon and rectum, kidney, pancreas, endometrium, as well as breast cancer among postmenopausal women, are associated with being overweight or obese; several of these cancers also are associated with not being sufficiently physically active.

## **Update on Incidence and Mortality Trends for All Cancer Sites Combined and the Top 15 Cancers**

### **5. What is happening with cancer incidence trends overall?**

From 2004 through 2008, incidence rates for all cancers combined declined 0.6 percent per year among men. Among women, cancer incidence rates declined 0.5 percent per year from 1998 to 2006, with rates leveling off from 2006 to 2008 (see table 1 of the manuscript).

Declines in cancer mortality rates are always good news; the same is not always true for incidence rates. Declines in cancer incidence rates may occur as a result of decreased modifiable risk factors or, for example, increased use of colorectal and cervical cancer screening tests that prevent cancer by removing precancerous growths. Alternatively, the incidence of some cancers could appear to decrease over time if screening rates fall and, thus, cancers are not detected and/or they are found at an advanced stage.

### **6. What is happening with long-term incidence trends for the top 15 cancers?**

Among men, incidence rates for 5 of the 17 most common cancers—prostate, lung and bronchus, colon and rectum (colorectal), stomach, and larynx—decreased between 1999 through 2008. In contrast, rates among men increased from 1999 through 2008 for 7 cancers: kidney and renal pelvis, pancreas, liver and intrahepatic bile duct, thyroid, melanoma of the skin, leukemia, and myeloma.

Among women, incidence rates decreased from 1999 through 2008 for 6 of the 18 most common cancers: lung, colorectal, urinary bladder (bladder), cervix uteri (cervix), oral cavity and pharynx (oral cavity), and stomach. Incidence rates among women increased from 1999 through 2008 for 6 cancers: thyroid, melanoma of the skin, kidney and renal pelvis, pancreas, leukemia, and liver.

### **7. What is happening with incidence trends for breast cancer?**

Breast cancer incidence rates, which increased 1.3 percent per year from 1992 through 1999, declined 2.0 percent per year from 1999 through 2005 and leveled off from 2005 through 2008. The factors that influence breast cancer incidence are complex, including changes in reproductive status, obesity, the prevalence of mammography screening, and others. Recent reports suggest that the decrease in breast cancer incidence may be related to the rapid discontinuation of hormone replacement therapy, a known risk factor for breast cancer, and also because of a plateau in mammography screening prevalence.

### **8. What is happening with cancer mortality trends overall?**

Among men and women, overall cancer death rates have continued to decrease since the early 1990s and declined an average of 1.6 percent per year between 2004 and 2008. For 2004 through 2008, this decline was slightly more pronounced among men (1.8 percent per year) than among women (1.5 percent per year). For children ages 19 years or younger, cancer death rates have declined since the 1970s. Death rates are the best indicator of progress against cancer.

### **9. What is happening with death rates for the top 15 cancers among men and women?**

Among men, death rates decreased from 1999 through 2008 for 11 of the 17 most common cancers including lung, colon and rectum, prostate, larynx, kidney, brain, stomach, oral cavity, leukemia, non-Hodgkin lymphoma, and myeloma. Death rates among men increased during this time period for pancreatic and liver cancers and melanoma of the skin.

Among women, death rates decreased from 1999 through 2008 for 14 of the 18 most common cancers including lung, breast, colon and rectum, ovary, kidney, brain, stomach, oral cavity, leukemia, non-Hodgkin lymphoma, myeloma, urinary bladder, esophagus, and gallbladder. Death rates among women increased during this time period for cancers of the pancreas and corpus uterus (uterine). After decades of decline, cervical cancer death rates showed little change in the most recent period.

**10. If cancer death rates continue to fall, does that mean the number of people dying from cancer will also continue to fall?**

Not necessarily. The data described in the report are rates (number of deaths per 100,000 persons in the United States) and are adjusted for age, so they are comparable across various factors, such as race, time, and region. The actual number of people dying from cancer (sometimes called the count) can be influenced by several factors, including the growth in the number of older people in the United States (cancer is primarily a disease of aging) and the increase in size of the population.

Therefore, while the cancer death rate may go down in a given year, the actual number of cancer deaths could go up because the number of older Americans is increasing and the size of the population overall is increasing.

**11. What is happening with childhood cancer rates?**

Cancer incidence rates increased 0.6 percent each year from 1992 through 2008 among children aged 19 years or younger. However, considerable progress has been seen for many types of childhood cancers, resulting in overall declines in death rates for cancer among children since at least 1975. Death rates declined 2.7 percent per year between 1975 and 1996 and declined 1.3 percent per year between 1996 and 2008.

**Cancers Associated with Excess Weight and Lack of Sufficient Physical Activity**

**12. What is the importance of excess weight and lack of sufficient physical activity to cancer?**

Excess weight and lack of sufficient physical activity are *avoidable* (can be modified) causes of cancer in the United States. The International Agency for Research on Cancer concluded that one-quarter to one-third of common cancers in the United States and other industrialized nations were caused by the joint effects of excess weight and lack of sufficient physical activity. For people who do not smoke, maintaining a healthy weight and getting sufficient physical activity may be among the most important ways to prevent cancer.

**13. What cancers are associated with excess weight and lack of sufficient physical activity?**

An [extensive literature review](#) of more than 7,000 studies on the relationship between nutrition, physical activity, and excess weight on cancer risk concluded there is convincing evidence of an association between excess weight and increased risk for several cancers. They are—

- Adenocarcinoma of the esophagus
- Colon and rectum cancer
- Kidney cancer
- Pancreatic cancer
- Post-menopausal female breast cancer
- Corpus uterus (uterine) cancer

There also is some evidence that excess weight is probably associated with other cancers including thyroid, liver, gallbladder, and hematopoietic (leukemia and myeloma) cancers.

This review also concluded that the evidence of an association between lack of sufficient physical activity and increased risk of cancer is considered convincing for colon cancer and probable for post-menopausal breast and endometrial cancers.

**14. What is known about the relationship between obesity and breast cancer?**

The relationship between obesity and breast cancer may be affected by the stage of life in which a woman gains weight and becomes overweight or obese. Some studies indicate that overweight and obesity are associated with a reduced risk of premenopausal breast cancer. In contrast, after menopause, when the risk of developing breast cancer is higher than before menopause, gaining weight or being overweight or obese is associated with an increased risk of breast cancer. While many risk factors for breast cancer are out of a women's control,

maintaining a healthy weight throughout life and getting sufficient physical activity may help women protect themselves against developing breast cancer.

### **15. What is happening with incidence rates for cancers associated with excess weight and lack of sufficient physical activity?**

- Colorectal cancer incidence rates decreased from 1999 through 2008, partially due to significant improvements in adherence in the use of colorectal cancer screening, which can prevent cancer development through removal of precancerous adenomatous polyps.
- Rates of postmenopausal breast cancer stabilized from 2005 through 2008 after declining from 1999 through 2005, mostly due to the rapid discontinuation of hormone replacement therapy, a known risk factor for breast cancer.
- Kidney cancer incidence increased from 1999 through 2008 by approximately 2.9 percent per year among men (accelerating to 4.1 percent from 2004 through 2008) and by 3.3 percent among women; increases are evident in all racial and ethnic groups.
- Pancreatic cancer incidence rates increased approximately 1.2 percent per year from 1999 through 2008 (accelerating slightly from 2004 to 2008) among men and women. This increase was confined to whites.
- For corpus uteris (uterine) cancer, a significant increase from 1999 through 2008 was observed among black, Asian and Pacific Islander, and Hispanic women; a non-significant increase was observed among white and American Indian/Alaska Native women.
- From 1992 through 2008, adenocarcinoma of the esophagus increased 2.6 percent per year among men and 3.3 percent per year among women; these increases were restricted to white and Hispanic men and white women.

### **16. What are the recommendations for weight and physical activity for children and adults?**

The [Dietary Guidelines for Americans, 2010](#) recommends that people prevent or reduce excess weight and obesity through improved eating and physical activity behaviors. Children ages 6 to 17 years should do at least 60 minutes of physical activity each day and adults should do at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity or an equivalent combination of moderate- and vigorous-intensity activity every week. To prevent cancer, the [American Cancer Society recommends](#) that individuals "be as lean as possible throughout life without being underweight" and that adults "engage in at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity activity each week, or an equivalent combination."

### **17. Why are there disparities in the prevalence of obesity rates throughout the nation?**

Substantial differences exist in obesity prevalence across racial/ethnic groups. Some reasons for these differences include social and cultural factors coupled with environments that have limited opportunities for physical activity and an abundance of high-calorie foods. For example, neighborhoods with large minority populations tend to have fewer chain supermarkets and produce stores, often making it more difficult and costly for residents to obtain healthier foods. Also, breastfeeding, which is associated with reduced prevalence of childhood obesity, is more common among white women than black women. Further, data show that blacks and Mexican Americans are less likely to get regular leisure physical activity than whites. Most data are on leisure time physical activity; blacks and Mexican Americans may be getting occupational activity.

Social and cultural factors concerning body weight may also play a role in racial/ethnic differences in obesity prevalence. It has been reported that black and Hispanic women are more satisfied with their body size, making it less likely that these groups will try to lose weight than white women. Additionally, cooking preparation methods can impact diet quality among regional and racial/ethnic groups.

There are also differences in obesity prevalence by household income level, according to a recent national nutrition and health survey report. Among non-Hispanic white boys, girls, and adult females, the prevalence of obesity decreased as income level increased; in other words, in these groups, low-income individuals had a higher prevalence of obesity than high-income individuals.

## **18. What is being done to address obesity disparities?**

An increased emphasis on systems change and environmental strategies that support healthy eating and active living opportunities within communities may reduce these disparities. CDC supports programs that use environmental approaches to improve access to healthy foods in underserved communities, such as increased accessibility of supermarkets and convenience stores that carry healthier products; expanding programs that promote the delivery of regionally grown farm produce to community institutions, Women, Infants, and Children farmers' markets, and to individuals via green carts and mobile vans in inner city neighborhoods; and promotion of food policy councils that consider both food security and improvements of the food environment at the state and local levels. School and child care initiatives include support for healthier beverage and food offerings such as water and fruits and vegetables. Strategies to increase low- or no-cost physical activity opportunities in communities include providing trails and parks, shared-use agreements with public venues such as schools, and sidewalk improvements. These strategies can potentially reduce disparities in obesity.

Additionally, nationwide efforts, including federally supported state, tribal, and local prevention initiatives and the federal government's Let's Move campaign are helping to mobilize public and private resources and partnerships, which, in turn, provide guidance and funding to states and communities to encourage use of strategies to improve diet and physical activity.

While policy and environmental approaches can support individuals' decisions regarding healthy eating and physical activity, individual choices regarding what to eat and whether to exercise also play an important role in obesity prevention. For children in particular, parents must be aware of and take steps to promote healthy child feeding practices, family meals, modeling healthy eating and physical activity, and ensuring access to healthy foods in the home, as well as reducing children's sedentary television and screen time while finding fun and inexpensive opportunities for physical activity in the home and neighborhood environment.

## **19. What is the economic burden attributed to excess weight and lack of sufficient physical activity?**

The economic burden due to excess weight and lack of sufficient physical activity is substantial. According to recent [data](#), per capita medical spending in the U.S. in 2008 for an obese individual was 42 percent higher (\$1,429) per year compared with someone of normal weight, resulting in a national burden of \$147 billion, or about 9.1 percent of all medical spending. In addition to medical costs, indirect costs of obesity include decreased years of disability-free life, increased mortality before retirement, earlier retirement, higher disability pensions, increased work absenteeism, and reduced productivity.

## **20. What is the summary evidence linking obesity, physical inactivity, and cancer?**

Evidence on the association between obesity and cancer has been building since the 1970s. Evidence on the association between physical activity and cancer has been accumulating in the last 20 years. Several analyses of these studies have been conducted by independent researchers.

In 2001, the World Cancer Research Fund, along with the American Institute for Cancer Research (WCRF/AICR), commissioned 20 review panels to conduct systematic literature reviews on the association among food, nutrition, physical activity, and the prevention of cancer (available for cancers of the mouth, pharynx and larynx, nasopharynx, esophagus, lung, stomach, pancreas, gallbladder, liver, colon and rectum, breast, ovary, endometrium, cervix, prostate, kidney, and skin, as well as colorectal polyps). More than 7,000 studies were reviewed in the process. These findings were reported in the [2007 Second Expert Report](#), the [2008 Policy Report](#), [a](#) and the [Continuous Update on Breast Cancer](#) in 2010. WCRF/AICR concluded that there is convincing evidence of an association between excess weight and increased risk of several cancers, including adenocarcinoma of the esophagus, colon and rectum cancer, kidney cancer, pancreas cancer, post-menopausal female breast cancer, and endometrial cancer. WCRF/AICR also concluded that the evidence of an association between physical inactivity and increased risk of cancer is considered convincing (colon cancer) or probable (post-menopausal breast and endometrial cancers).

In 2002, the International Agency for Research on Cancer (IARC) Working Group on the Evaluation of Cancer, Preventive Strategies published a [comprehensive evaluation](#) of the available scientific literature, including studies in people and animals, weight, physical activity, and cancer. IARC concluded that excess weight increases the

risk of developing cancers of the colon, breast (in postmenopausal women), endometrium, kidney, and esophageal adenocarcinoma, and that physical activity prevented colon and breast cancers.

## How to Read This Report

### 21. How are cancer incidence and death rates presented?

Cancer incidence rates and death rates typically are measured as the number of cases or deaths per 100,000 people per year and are age-adjusted to the 2000 U.S. standard population. When a cancer affects only one sex—for example, prostate cancer—the number is per 100,000 persons of that sex. The numbers are age-adjusted, which allows for comparison of rates from different populations with varying age composition over time and in different regions. It is noteworthy that breast cancer occurs in both men and women, although it occurs less frequently in men.

### 22. What is annual percent change or APC?

The annual percent change (APC) is the average rate of change in a cancer rate per year in a given time frame (how quickly or slowly a cancer rate has increased or decreased each year over a period of years). The APC was calculated for both incidence and death rates. The number is given as a percent, such as an approximate 1 percent per year decrease. The APC is calculated using joinpoint regression (see below for an explanation of joinpoints).

A negative APC describes a decreasing trend, and a positive APC describes an increasing trend. In this report, all trends mentioned in the text are statistically significant ( $P < .05$ ) unless noted otherwise. For non-statistically significant trends, terms such as "stable," "non-significant increase," and "non-significant decrease" were used.

### 23. What is average annual percent change or AAPC?

This year's report uses the average annual percent change (AAPC) as an addendum to the underlying joinpoint (see below for an explanation of joinpoints) annual percent change (APC) trends as a summary measure to compare fixed-interval trends among racial and ethnic groups. The AAPC quantifies the average trend over a fixed period of multiple years.

Similar to the APC, a negative AAPC describes a decreasing trend, and a positive AAPC describes an increasing trend. In this report, all trends are statistically significant ( $P < .05$ ) unless noted otherwise. For non-statistically significant trends, terms such as "stable," "non-significant increase," and "non-significant decrease" were used.

The APC and the AAPC are similar when trends are relatively stable over time. For most long-term trends in this report, the AAPCs for the most recent five years, 2004 through 2008, were similar to the APCs for the most recent time period. When trends fluctuate over time, the 10-year (1999–2008) AAPCs may differ from the most recent APCs, e.g., all sites combined for men and women, and cancers of the prostate and pancreas in men, and cancers of the breast, pancreas, and ovary in women.

Long-term trends can obscure shorter term changes. Differences in the five-year and 10-year AAPCs typically identify types of cancer, where the 10-year average trend may mask important recent changes. For example, in this report the trend for lung cancer deaths shows a more rapid decline when looking at the five-year AAPC than the 10-year AAPC.

## Data Adjustments

### 24. Why were rates adjusted for delays in reporting incidence data to SEER?

The report presents analyses of long-term trends in cancer incidence rates with and without adjustment for reporting delays and more complete information. Adjusting for these delays and accumulating more complete and accurate information provides the basis for a potentially more definitive assessment of incidence rates and trends in the most recent years for which data are available. Cancer registries routinely take two to three years to compile their current cancer statistics. An additional one to two years may be required to have more complete

incidence data on certain cancers, such as melanomas and leukemias when they are diagnosed in outpatient settings. Cancer registries continue to update incidence rates to include these cases. Consequently, the data initially reported for certain cancer incidence rates may be an underestimate. Long-term reporting patterns in NCI's Surveillance, Epidemiology and End Results (SEER) registries have been analyzed, and it is now possible to adjust incidence rates for all cancers combined and for site-specific cancers with a correction for expected reporting delays and more complete information. However, SEER registries do not cover the entire population; thus combined data from SEER and CDC's National Program of Cancer Registries are important for assessing the incidence of cancer in the U.S. Methodological research is in progress to adjust for reporting delays of pooled data.

## **25. What is joinpoint regression analysis and how does it account for the different time periods used for trends analysis in this report?**

*Joinpoint regression analysis* is a statistical method that describes changing trends over successive segments of time, and the amount of increase or decrease within each segment. This analysis involves fitting a series of joined straight lines to the age-adjusted rates and choosing the best-fitting point or points, called *joinpoints*, where the rate of increase or decrease changes significantly. Thus, each joinpoint denotes a statistically significant change in trend. The resulting line segment between joinpoints can be described by an annual percent change that is based on the slope of the line segment. Joinpoint analyses were performed for incidence and mortality trends.

## **26. What other data issues need to be considered?**

This report uses population data from the U.S. Census Bureau to calculate incidence and death rates. Differences between the true population counts and postcensal population estimates may increase as time passes from the 2000 Census. These differences may result in incidence and death rates being either underestimated or overestimated.

Incidence data for 2005 through 2008 were affected by data sharing restrictions within the Veterans Health Administration (VHA). VHA hospitals traditionally have been a critical source of data for cancer cases diagnosed among veterans served by those institutions. The new requirements restrict the submission of cancer cases to central cancer registries, however, resulting in incomplete reporting of VHA hospital cases in some registries. VHA cases account for at least 3 percent and possibly as much as 8 percent of all cancer cases diagnosed among men. Therefore, incidence rates for men may be underestimated. Since late 2008, VHA facilities and states with central cancer registries have worked to establish data transfer agreements that may help cancer registries receive missing VHA cases over time and provide a more complete estimate of national cancer incidence.

## **27. Where is this report published?**

To view the full report in *CANCER*, please go to <http://wileyonlinelibrary.com/journal/cancer-report2012>.

**Reference:** Ehemann C, Henley SJ, Ballard-Barbash R, Jacobs EJ, Schymura MJ, Noone AM, Pan L, Anderson, RN, Fulton JE, Kohler BA, Jemal A, Ward E, Plescia M, Ries LAG, Edwards BK. [Annual report to the nation on the status of cancer, 1975–2008, featuring cancers associated with excess weight and lack of sufficient physical activity](#). *Cancer* 2012;118(9):2338–2366.

## **28. Where can I find out more about the report?**

For a press release on this report, go to [http://www.cdc.gov/media/releases/2012/p0328\\_Cancer\\_deathrates.html](http://www.cdc.gov/media/releases/2012/p0328_Cancer_deathrates.html)

CDC: [Division of Cancer Prevention and Control](#); [National Program of Cancer Registries](#); [National Vital Statistics System](#)

[American Cancer Society](#)

[National Cancer Institute: Surveillance, Epidemiology, and End Results Program](#)

[North American Association of Central Cancer Registries](#)