NATIONAL CANCER INSTITUTE
Division of Cancer Control & Population Sciences

https://surveillance.cancer.gov/ | https://seer.cancer.gov/

SURVEILLANCE RESEARCH PROGRAM

eNewsletter | Fall 2019

In This Issue

Welcome

SRP Associate Director's Message

Greetings from the Surveillance Research Program! We've accomplished quite a lot since our last issue of this newsletter. We're making new connections (Welcome, ClinCORE experts!), continuing long-term projects with our partners (Hello to DOE, CDC, ACS, NAACCR, NCRA, and all our other collaborators!), and working with the SEER Program to enhance the utility of our data (Thank you, SEER Registries!).

Along with our regular updates to current resources, we also have new content to share. In *Updates and Initiatives*, you can read all about the Cancer Medications Enquiry Database (CanMED). In New on the 'Net, we have several new SEER Stat Fact Sheets for you to use. And in Our Tools, we have the brand-new CP*Trends website as well as exciting new features in SEER*Explorer.

Since our last newsletter, we have collaborated with the CDC, ACS, and NAACCR on the Annual Report to the Nation on the Status of Cancer (ARN). In addition to the annual updates of trends in the most common cancer types, this year's special section highlighted trends among adults ages 20-49. The SEER website hosts the ARN microsite, which includes shareable and tweetable graphics and statistics.

We are looking forward to seeing many of you in Seattle at our next SEER Manager/PI Meeting in April! As always, thanks for your collaboration. Whether you're one of our partners or someone who is interested in learning about what the Surveillance Research Program has to offer, we hope you enjoy reading these updates.
Sincerely,

Lynne Penberthy
Associate Director
Surveillance Research Program

Our Team

Job Opportunities

Come work with us!

We are accepting applications for several Cancer Research Training Award (CRTA) Fellow positions in SRP:

Project Management: Surveillance Informatics	Statistics	Cancer Surveillance: Data Quality

For full descriptions of each position and application information, visit https://surveillance.cancer.gov/jobs/.

New Staff

Melissa Bruno, MPH works as a Cancer Research Training Award (CRTA) Fellow at the National Cancer Institute. Her current research projects focus on topics including metrics to quantify electronic pathology reporting pathways, characterizing neoadjuvant treatment receipt with existing data elements, and the relationship of cancer, medication management, and health-related quality of life. Melissa also provides project management support to NCI efforts. She completed her masters at Emory University School of Public Health in Epidemiology. Her broad research interests include chronic diseases, social determinants of health, and mental health.

Patrick Godette Jr., MPH has joined the Communications Team of the Surveillance Research Program (SRP) through the NCI Communications Fellowship (NCF). He will be supporting SRP's communication and dissemination efforts, including the SEER *Did You Know?* Video Series. He completed his Master of Public Health at Virginia Commonwealth University. His professional interests include health communication and data analysis.

Gielle Kuhn, MPH joined the communications team of the Surveillance Research Program (SRP) as a Cancer Research Training Award (CRTA) fellow. She supports communication and dissemination efforts of the SRP program. She attended the University of Michigan School of Public Health in Ann Arbor, MI, where she earned her Master of Public Health in Health Behavior and Health Education and specialized in health disparities and research methods. Her interests include intercultural health communication, supporting patient education, and promoting cancer survivorship outcomes.

Annelie Landgren, MPH, PMP joined the Surveillance Research Program (SRP) as a Project Manager in the Office of the Associate Director in November of 2018. She supports several SRP initiatives including the Virtual Pooled Registry (VPR), the Data Source to Data Release project, and in the pilot studies of de-identification of clinical narrative text and Natural Language Processing (NLP). Annelie completed her MPH in Epidemiology online through a Swedish University. Since 2016, she has upheld a Project Management Professional (PMP) certification from the Project Management Institute (PMI).

New Staff

Tara McConville, MPH has joined the communications team of the Surveillance Research Program (SRP) through the Health Communications Internship Program (HCIP). She graduated from the University of Texas Health Science Center at Austin where she earned her Master of Public Health in Epidemiology. Tara supports a variety of SRP communications activities such as curating Twitter content for @NCICancerStats, creating SEER in the News blog posts, planning conferences, and updating fact sheets. Tara is also involved with projects through the Quality Improvement Experts (QIE) group.

Ella Saccon, PhD joined the Surveillance Informatics Branch (SIB) of the Surveillance Research Program (SRP) as a Cancer Research Training Award (CRTA) fellow. Ella completed a PhD in linguistics at Harvard University with joint coursework at the Massachusetts Institute of Technology. She brings her expertise in natural language processing (NLP), data analysis, and software development to support SIB projects and collaborative initiatives with the Department of Energy.

Connor Valenzuela, MPH joined the Data Quality, Analysis, and Interpretation Branch as a Cancer Research Training Award fellow. He earned his MPH in epidemiology from Emory University in Atlanta, GA. He supports projects of the SEER Virtual Tissue Repository (VTR) pilot studies. Connor also incorporates his background in biology and chemistry, as well as his public health skill set, into additional SRP projects.

Meghan Watkins, MPH joined the communications team of the Surveillance Research Program (SRP) through the NCI Communications Fellowship (NCF) Program. She will be assisting with various SRP projects and communication efforts. Meghan graduated from the University of Michigan, where she completed her Master of Public Health in Health Behavior and Health Education and earned a specialization in Health Communication. Her interests include patient advocacy, patient-provider communications, and the relationship between physical and mental health.

Rashika Rahmen joined SRP as a high school Fall intern. She received academic and career mentoring and worked with SRP's Virtual Tissue Repository (VTR) Program, where she learns about basic data entry and management.

Remembering Paul Fearn

In late 2018, the Surveillance Research Program (SRP) learned of the loss of our friend and colleague, Paul Fearn. Paul joined SRP as the Chief of the Surveillance Informatics Branch and his work involved supporting cancer surveillance. He spearheaded the NCI Department of Energy (DOE) Pilot 3 Collaboration, in which he utilized informatics tools such as natural language processing and machine learning techniques to advance the SEER Program. Paul was also instrumental in the development of the Data Acquisitions and Linkages Initiative by championing thoughtful consideration of new data linkages and related topics such as data provenance, data integration, and data security.

Paul had an unparalleled ability to connect researchers and foster collaborations. Paul inspired his teams with sustainable strategies rather than short-term solutions. He was also deliberate in making time for trainees and fellows, continually focusing on training and building others to reach their goals. His true talent was making every person feel valued.

We especially remember Paul Fearn for his innovative approaches, openness to new ideas, calm advice, and genuine laugh.

Pictured: Paul (third from right) and colleagues from SRP.

"Whenever I was with him, I had a sense that, together, we could tackle any challenge the world of cancer could throw at us."

"Paul's enthusiasm, quick-thinking intelligence, openness to new ideas, ready smile and laugh, and great sense of humor made our project meetings both exceptionally fun and productive."

"Remembering Paul for his eternal kindness, everlasting smile, and superb intellect and cherishing memories of work collaboration and times of fun."

Updates & Initiatives

Data Acquisitions and Linkages (DAL): Enhancing Clinical Data for Surveillance within the SEER Program

The Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute (NCI) supports the collection of cancer registry data (i.e., detailed data on tumor characterization, information on first course of treatment) from population-based cancer registries covering 35% of the total US population. With increasingly complex treatment decisions, rapid drug development, discovery of new biomarkers, genomic testing integration, and the varied landscape of health care settings (pharmacies, hospitals, ambulatory clinics, radiology labs, pathology labs, and other facilities), there is a need to collect relevant diagnostic and treatment data for enhanced cancer surveillance. Furthermore, as survivorship increases with emerging novel treatments, the collection of key data elements in cancer surveillance is paramount.

The Data Acquisitions and Linkages (DAL) Initiative formally began in 2016. DAL's objective is to acquire data that provide a more comprehensive understanding of the patient trajectory to quantify patient health outcomes. Outcomes include adverse events/late effects, response to therapy, progression, and recurrence. The vision of DAL is to evaluate, design, and facilitate large-scale heterogenous data linkages and data infrastructure to enhance the availability of treatment-related data. This will support precision cancer surveillance efforts and epidemiologic research to improve understanding of patient health outcomes.

DAL currently supports 16 linkage pilots at various stages in the process (Figure 1). As pilot projects and linkages become more involved and complex, we need to better understand the methods and potential biases of linked data as well as the appropriate uses of linked data of the following types:

1. Clinical Trial and Observational Study,
2. Demographics and Vital Status,
3. Cancer Surveillance Abstracting (Medical Records),
4. Pathology,
5. EHR,
6. Laboratory data,
7. Medical Claims,
8. Pharmacy,
9. Population Surveys,
10. Radiation Oncology,
11. Radiology/Imaging, and
12. Sources Outside the Health Care System.

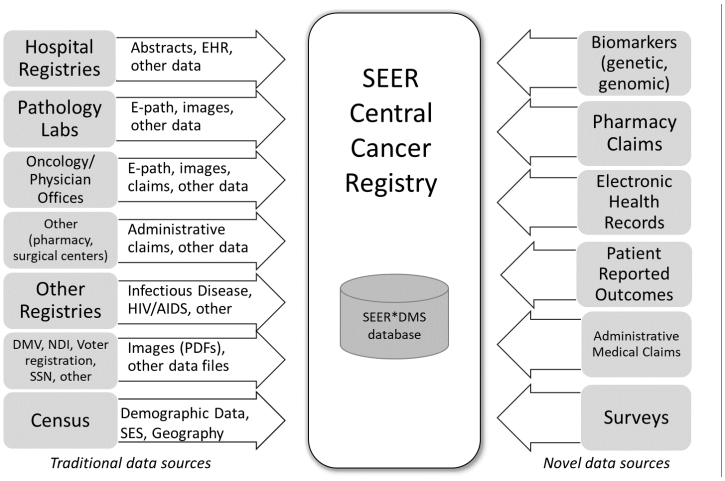


Figure 1

Each of these clinical data types provide a component of the trajectory to evaluate and quantify key real-world patient health outcomes, such as adherence and recurrence, for precision cancer surveillance efforts and epidemiologic research.

Within the past year, DAL has interviewed each registry to evaluate registry-level and national-level projects. These interviews were conducted to better understand previous, existing, or planned efforts to enhance data with linkages. The DAL team presented the results of this inquiry to Senior Leadership to inform systematic approaches and improve research utilization for the expansion of linkages, including the use of standard protocols, best practices, and automation algorithms.

Updates & Initiatives

NCI-DOE Pilot 3 Collaboration

The SEER Program is collaborating with the Department of Energy (DOE) in a 5-year pilot project to leverage the capabilities of high-performance computing to support the implementation of a more advanced population-based cancer surveillance program.

Our focus has been on developing an incremental and iterative approach to more efficiently capturing data and to increase the accuracy, consistency, and timeliness of the data we report. Using deep learning methods, DOE researchers have been creating robust Natural Language Processing (NLP) tools to capture key data elements (primary site, subsite, histology, laterality, behavior, and grade) from pathology reports. Our team has been iteratively testing and refining these tools with support from Information Management Services (IMS).

The initial results from algorithm testing have demonstrated high accuracy, with all five elements correctly extracted from 43% of 3.3 million pathology reports. There was also a marked increase in efficiency in completion time: the algorithm ran 615,000 reports in 55 minutes in comparison with the 4,048 hours it takes to be extracted manually. The automation will be implemented as a prototype in participating registries and planned to scale to all SEER registries over the next two years. We aim to reduce the burden on cancer registrars, allowing them to realign their focus on abstracting more complex variables.

The team is currently collaborating with SEER registries to collect additional information that will help classify incoming pathology reports into categories. The goal of this process is to parse out specific categories of pathology reports - including surgical, biopsy, molecular, and others - from all incoming reports and use them to enhance current algorithm processing. We also hope to use this process to guide the development of specific algorithms for elements such as biomarkers or metastatic disease.

Our next steps will be to expand the data elements automatically abstracted to capture recurrence and abstract biomarker information. The collaboration is partnering with a wide variety of academic and commercial entities to bring diverse longitudinal data from various sources together to further recurrence collection efforts and to develop a data-driven modeling and simulation environment for predicting health trajectories of cancer patients.

Capturing recurrence requires a broad and multidisciplinary approach and represents one of the most challenging problems for the NCI Surveillance system. This challenge is due to the complexity of how recurrence is diagnosed, the variation in interval to recurrence, the broad set of specialties and health care settings in which recurrence can be diagnosed, and the longitudinal component required to understand recurrence.

The Cancer Medications Enquiry Database (CanMED): An Oncology Treatment Resource for Claims-Based Research

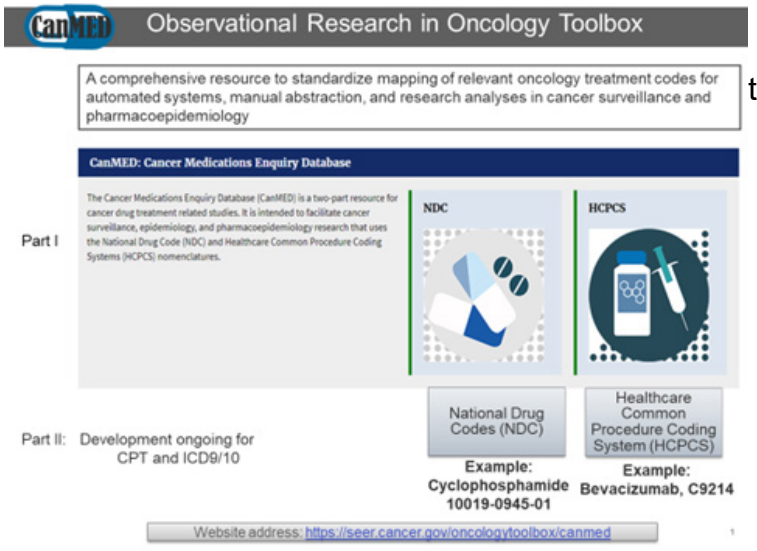
Background

Observational research in oncology relies on the accurate identification of individual therapies using specific and current coding classifications. The purpose of the Observational Research in Oncology Toolbox is to meet this need by guiding systematic, standardized, and reproducible extramural research for observational studies that require the use of specialized nomenclatures to understand medications, procedures, diagnoses, and treatments during study design.

Toolbox Phase I

The Cancer Medications Enquiry Database (CanMED) is a two-part resource for cancer drug treatment-related studies. CanMED has been launched as Phase I of the Observational Research in Oncology Toolbox. Medication dispensing and administration are commonly captured using two main classifications: Healthcare Common Procedure Coding System (HCPCS) or National Drug Codes (NDCs). HCPCS codes and NDCs can also be mapped to larger ontologies (e.g., RxNorm) to allow for interoperability with other common coding languages and data models. CanMED includes all oncologic therapies that a) have an FDA-approved indication for cancer treatment or treatment-related symptom management; b) are present in National Comprehensive Cancer Network (NCCN) guidelines; or c) carry an orphan drug designation for treatment or management of cancer.

CanMED is accessible to the extramural community at https://seer.cancer.gov/oncologytoolbox/. Results are exportable to Excel for use with common programming languages such as SAS and R.



Objective of the CanMED

The primary objective of CanMED is to provide current, comprehensive, and clinically relevant databases that allow standardized selection of oncology medications for utilization in various areas of cancer research, including surveillance, epidemiology, pharmacoepidemiology, outcomes, and health services research. The vision is to support treatment research standardization and reproducibility of high-quality observational studies.

Toolbox Phase II

The second phase of the Observational Research in Oncology Toolbox is going to provide procedure and diagnostic nomenclatures for research utilization.

For additional questions or comments, please contact oncologytoolbox@imsweb.com.

Updates & Initiatives

Clinically Relevant Cancer Surveillance through the Clinical Consultants for Oncology Research and Evaluation (ClinCORE) Program

The purpose of Clinical Consultants for Oncology Research and Evaluation (ClinCORE) is to identify and connect clinical and specialty expertise with new and ongoing Surveillance Research Program (SRP) projects through a formal collaboration.

SRP makes decisions about data collection, including identifying data items and linkage methods for the SEER Program, as well as other strategic initiatives and projects. The program has a growing need for clinical and subspecialty guidance in vital areas such as quality improvement, data collection methods, clinical data reporting, registry operations, and surveillance infrastructure development, which motivated the inception of ClinCORE in early 2019.

ClinCORE will integrate specialty guidance to support SRP decisions regarding

- data coding recommendations,
- identifying surveillance gaps,
- manual versus automated collection, and
- statistical evaluation consultation.

The priority specialty areas for ClinCORE expertise include pathology (bone and soft tissue, breast, digital, endocrine, gastrointestinal, gynecological, hematopathology, and urological), clinical oncology, hematology, hematopathology, immunotherapy, pharmacy, radiation oncology, and radiology. ClinCORE also includes a CORE (Consultants for Oncology Research and Evaluation) group composed of methodological consultants in areas such as advanced methods and real-world data.

The ClinCORE program is managed by Dr. Donna Rivera (Oncology, Pharmacy & CORE Expert Coordinator), Dr. Alison Van Dyke (Pathology Expert Coordinator), and Melissa Bruno, MPH (Project Manager). The ClinCORE team reviews agreements and evaluates projects on an ongoing basis as scientific or methodologic program needs arise.

The management team is still seeking pathology experts in melanomas as well as a medical oncologist specializing in neoadjuvant therapy. If you are interested in learning more about ClinCORE, please contact Melissa Bruno: melissa.bruno@nih.gov.

Updates & Initiatives

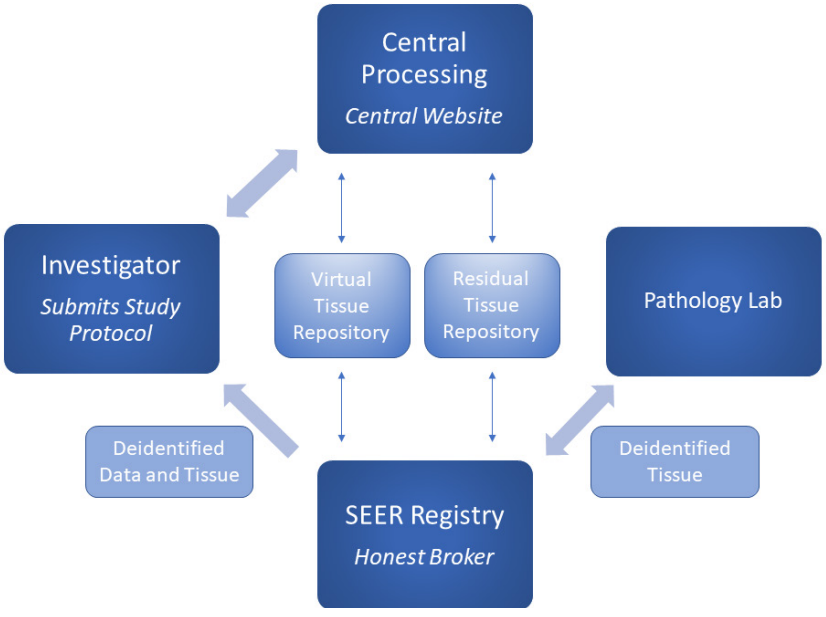
SEER-Linked Virtual Tissue Repository

The bulk of tissue-based molecular studies (e.g., sequencing) involving cancer patients is conducted via clinical trials and/or single institutions, which may include study populations that are not representative of the US population

The Surveillance Research Program (SRP) is developing the SEER-Linked Virtual Tissue Repository (VTR) to enable cancer researchers to access de-identified, linked clinical data as well as diagnostic, formalin-fixed, paraffin-embedded (FFPE) tissue on a population level through the SEER registries.

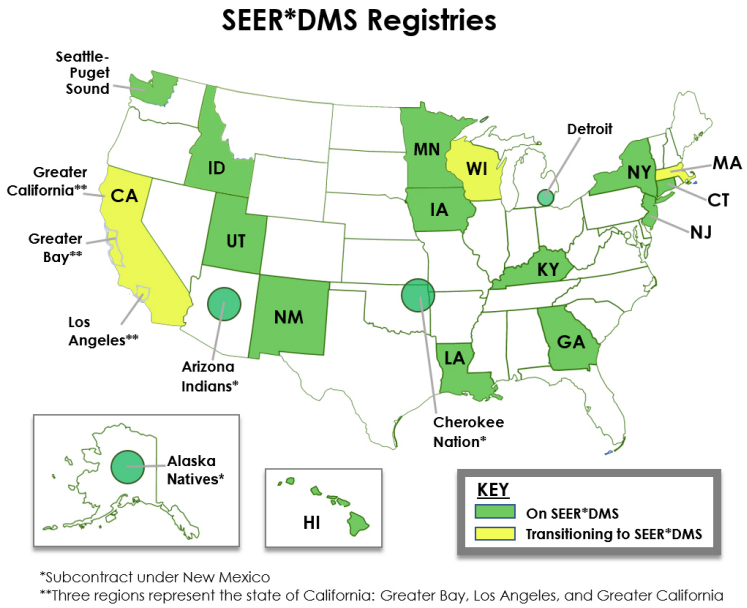
To establish the VTR, SRP has been conducting the VTR Pilot Program, which includes an inventory of laboratories' policies for and willingness to share tissue for research, a whole slide imaging project, and two genomics studies examining unusual outcomes in breast cancer and pancreatic ductal adenocarcinoma (PDAC). The PDAC study involves comparing 100 cancer cases with survival of at least 5 years following diagnosis with 100 similar cancer cases with survival of less than 2 years since diagnosis. These comparisons are made utilizing molecular, clinicopathologic, treatment-related, and tumor-infiltrating lymphocyte (TIL) patterns data. Our preliminary data on a subset of the PDAC pairs indicate that good-quality DNA and whole-genome and whole-exome sequencing data can be obtained from FFPE PDAC and normal tissue specimens. Similarly, we are comparing 100 breast cancer cases with lymph node-negative disease at the time of diagnosis with survival of less than 30 months with 100 similar breast cancer cases with survival of at least 5 years following diagnosis. We project that tissue and data collection on both pancreas and breast cancer molecular studies will take another 20 months.

The NCI VTR Team is planning to scale the VTR in conjunction with the expansion of the Residual Tissue Repository (RTR) system. The RTR system captures tissue being discarded by laboratories once the minimum tissue retention requirement by the College of American Pathologists has been met. The National Cancer Institute will fund the future program through personnel and information technology infrastructure. Researchers will cover other fees for specimen requests, pathologists' review, tissue block selection, tissue processing, shipping, custom clinical data collection, and digital slide scanning.



Updates & Initiatives

SEER*DMS



The Surveillance, Epidemiology, and End Results Program's Data Management System (SEER*DMS) is a system that provides support for all core cancer registry functions, including data importation, editing, linkage, consolidation, and reporting. SEER*DMS aims to improve cancer surveillance cost efficiency, knowledge sharing among registries, and data quality and consistency, as well as to reduce duplication of work. We are excited to announce that in 2018, registries from Idaho and Massachusetts joined the SEER*DMS community.

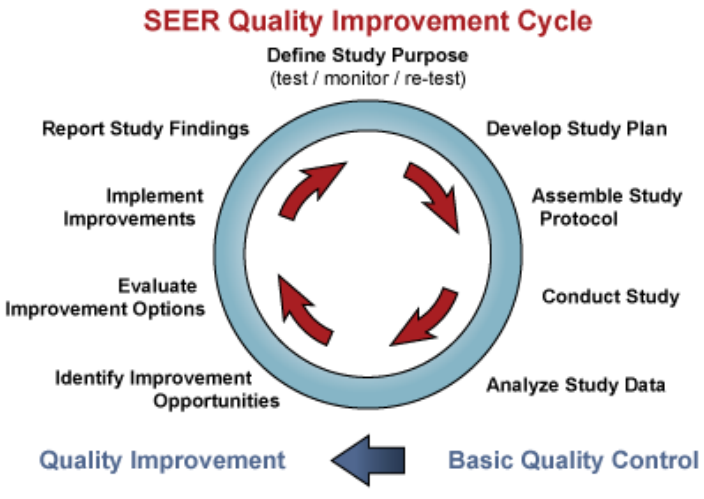
To learn more about SEER*DMS, visit https://seer.cancer.gov/seerdms/portal/about.

Quality Improvement

The SEER Quality Improvement Program manages activities to ensure quality improvement and quality control of SEER data. NCI experts from this program completed four Quality Audit Plans (QAPs) this past winter and spring. They presented the results and corrective action plans for these four QAPs during the April 2019 Principal Investigator/Managers meeting and at both the Quality Improvement Experts (QIE) meetings. The NCI QIE team will convert the circumferential resection margin QAP into a full-focused audit.

In August 2019, the team presented and discussed the protocol information and plans for this full audit at the QIE meeting at NCI Shady Grove. They also reviewed plans for the next round of QAPs, which involve an evaluation of treatment status variables.

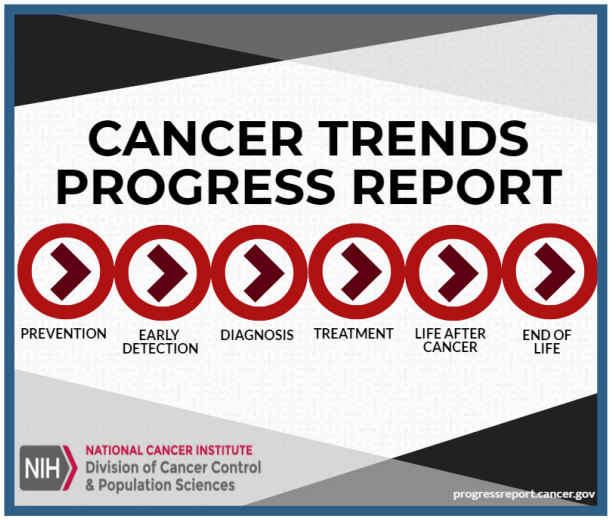
To learn more about SEER Quality Improvement, click here: https://seer.cancer.gov/qi/.



Cancer Trends Progress Report (CTPR)

Online Summary of Trends in US Cancer Control Measures | Progressreport.cancer.gov

As part of a collaboration across the Division of Cancer Control and Population Sciences (DCCPS), the Surveillance Research Program released the latest Cancer Trends Progress Report in February this year.



The Cancer Trends Progress Report is an annual online report that summarizes the nation's advances against cancer in relation to Healthy People 2020 objectives. It includes key measures of progress along the cancer control continuum—including prevention, early detection, diagnosis, treatment, life after cancer, and end of life—and uses national trend data to illustrate where improvements have been made. New measures this year include Processed Meat Consumption, Genetic Testing, Long-Term Trends in Adult Cigarette Use, Inorganic Arsenic Exposure, UV Exposure and Sun-Protective Behaviors by Sun Sensitivity, and Overweight in Cancer Survivors. The website offers the ability to generate custom reports and view trend data by several variables, including sex, age, race, ethnicity, income, and education. Additionally, DCCPS Director Robert Croyle, PhD, shares his thoughts about advancing scientific progress and research in the Director's Message. The report is especially useful for policy makers, researchers, and public health professionals.

Noteworthy points from this year's report:

- Recent trends for inorganic arsenic exposure have been decreasing.
- A new e-cigarettes measure for 2011-2018 will be added to the Youth Tobacco Use section of this report once data from the Centers for Disease Control and Prevention's (CDC) and US Food and Drug Administration's (FDA) National Youth Tobacco Survey become available.
- Estimates of national expenditures for cancer care in 2018 for the top five cancer sites were $19.7, $16.6, $15.3, $14.6, and $14.2 billion for female breast, colorectal, prostate, lymphoma, and lung, respectively.
- In 2017, 53.1% of girls and 44.3% of boys, aged 13-17, were up-to-date with the HPV vaccine.
- In 2016, the adjusted combined annual expenditure for advertising and promotion was $8.7 billion for cigarettes and $759.3 million for smokeless tobacco products—amounting to about $26 million every day.

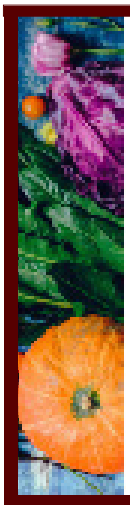
Visit https://progressreport.cancer.gov/ to view the full report and stay tuned for updated data and new measures next year!

New on the 'Net

Cancer Trends Progress Report

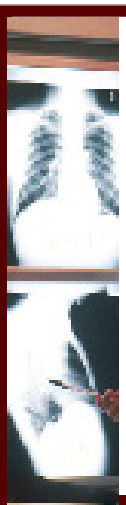
An Online Summary of Trends in US Cancer Control Measures

The Cancer Trends Progress Report presents measures organized into chapters that correspond with the cancer control continuum: prevention, early detection, diagnosis, treatment, life after cancer, and end of life. See below for the measures included in each chapter:



Prevention

- Tobacco Use, Secondhand Smoke, Smoking Cessation, Policy, and Regulatory Factors *(new measure on Long-Term Trends in Adult Cigarette Use)*
- Diet, Physical Activity, and Weight *(new measure on Processed Meat Consumption)*
- UV Exposure and Sun-Protective Behavior
- HPV Immunization
- Genetic Testing *(new!)*
- Chemical and Environmental Exposures *(new measure on Inorganic Arsenic Exposure)*



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. This section describes trends in the use of cancer screening tests, including

- Breast Cancer Screening
- Cervical Cancer Screening
- Colorectal Cancer Screening
- Lung Cancer Screening
- Prostate Cancer Screening

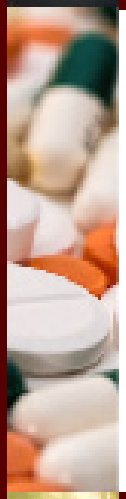
Diagnosis

- Incidence

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

- Stage at Diagnosis

The stage of a cancer shows how far the disease has progressed and spread within the body. The earlier the stage at diagnosis, the better the chances are for a cure.



Treatment

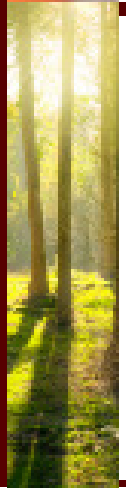
This section includes treatment trends for cancer sites for which there are available data trends and definitive treatment guidelines based on rigorous evidence of benefit to patients, including

- Bladder Cancer
- Breast Cancer
- Colorectal Cancer
- Kidney Cancer
- Lung Cancer
- Ovarian Cancer
- Prostate Cancer

Life after Cancer

Medical advances are improving both quality of life and length of survival among people diagnosed with cancer. This section summarizes

- Financial Burden of Cancer Care Survival
- Cancer Survivors and Smoking
- Cancer Survivors and Physical Activity
- Cancer Survivors and Weight (*includes new measure on Overweight in Cancer Survivors)*



End of life

- Mortality

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.

- Years of Life Lost

National data on the years of life lost to cancer emphasizes the tragedy of common cancers that strike people at a relatively young age.

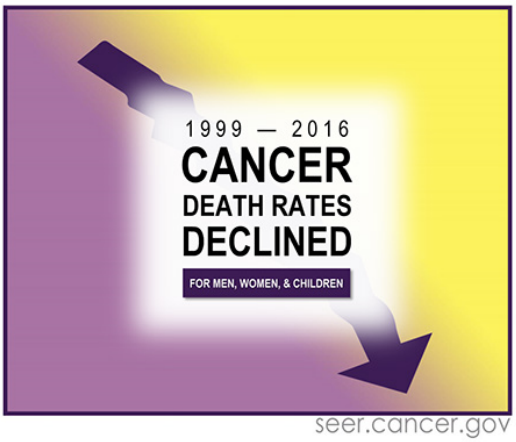
Annual Report to the Nation on the Status of Cancer (ARN)

The Annual Report to the Nation on the Status of Cancer (ARN) is a collaborative update from the National Cancer Institute (NCI), American Cancer Society (ACS), Centers for Disease Control and Prevention (CDC), and the North American Association of Central Cancer Registries (NAACCR). It provides the most recent data on rates of new cases, death rates, and trends for the most common cancers in the United States.

REPORT HIGHLIGHTS

The report was published in the Journal of the National Cancer Institute on May 30, 2019. The report provides short- and long-term trends on cancer mortality (deaths), new cases (incidence), and survival for different types of cancers.

The researchers determined that cancer mortality rates for men, women, and children continue to decline. Overall death rates decreased 1.8% per year in men and 1.4% per year in women. The researchers also found that overall cancer incidence rates also continue to decrease among men while they remain stable among women. The report also shows continuing racial and ethnic disparities in cancer incidence and mortality.



Further information about rates of new cases and deaths for different types of cancers are detailed below:

- Incidence: Between 1999 and 2015, overall cancer incidence rates (new cases of cancer per 100,000 people in the US) decreased at approximately 2.1% per year among men and remained stable among women. Between 2011 and 2015, incidence decreased for 8 of the 17 most common cancers and increased for 7 cancers among men. Among women during the same time period, 6 of the 18 most common cancers showed decreases in incidence, while incidence increased for 9 other cancers.

- Mortality: From 1999 to 2016, cancer mortality (cancer death rates) declined for men, women, and children. From 2012 through 2016, 10 of the 19 most common cancers in men showed decreases in mortality, and 13 of the 20 most common cancers in women showed decreases in mortality. Among men, mortality increased for 6 cancers, with the steepest increases for liver cancer, oral cavity and pharynx cancer, and non-melanoma skin cancer. Among women, mortality increased for 5 cancer types, with the steepest increases for cancers of the uterus and liver.

- Differences in rates and trends by race and ethnic group remain. For example, when data for people of all ages were combined and compared by sex across racial and ethnic groups, black men and black women had the highest cancer death rates, both for all cancer sites combined and for about half of the most common cancers in men and women.

- Trends reflect improvements in treatment and early detection. Downward trends in mortality are the gold standard for evidence of progress against cancer. For instance, recent rapid declines in death rates from melanoma of the skin likely result from the introduction of new therapies that have improved survival rates for advanced melanoma.

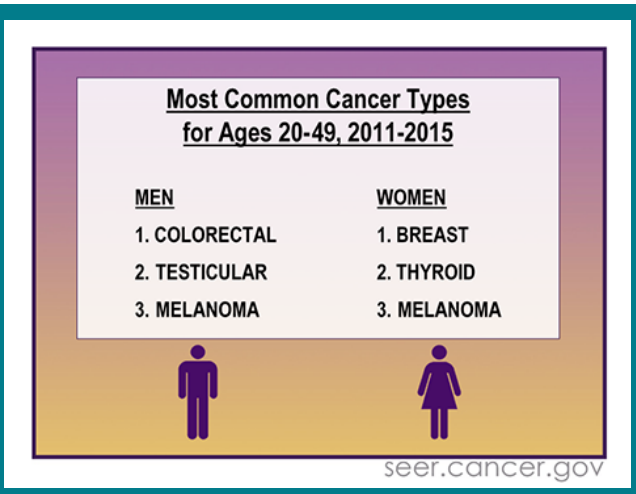
Annual Report to the Nation: Special Topic

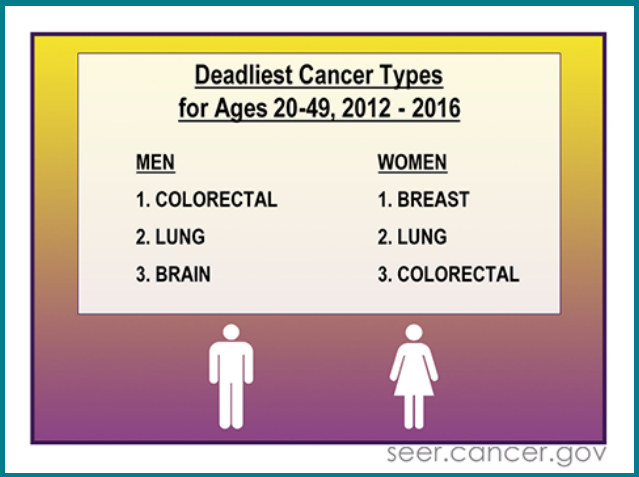
SPECIAL TOPIC HIGHLIGHTS
Cancer Among Adults Aged 20-49

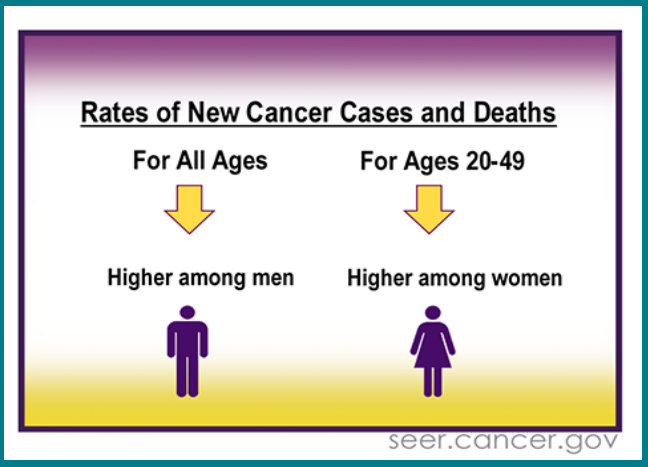
The Annual Report to the Nation's Special Topic is about rates of new cases and deaths for cancer in adults aged 20-49. In particular, it includes long-term overall trends, recent overall trends, recent trends for the most common cancers, and trends by race. Additionally, this feature includes specific trends for breast, brain, colorectal, and testicular cancers in the 20-49 age range.

- The most common cancers in this age group were breast, thyroid, and melanoma for women, with breast cancer far exceeding any of the other cancers; and colorectal, testicular, and melanoma for men.
- The most common causes of cancer death in this age group were colorectal, lung and bronchus, and brain and other nervous system for men and breast, lung and bronchus, and colorectal for women.
- Death rates for cancers of all sites combined decreased for both men and women aged 20–49. For people aged 20–49, black men and women have the highest death rate of any racial and ethnic group for all cancer sites combined.
- Among people of all ages, overall cancer incidence and death rates were higher in men than in women, whereas among adults aged 20–49 years, incidence and death rates were lower among men than women.

To learn more about the 2019 Annual Report to the Nation on the Status of Cancer, visit https://seer.cancer.gov/report_to_nation/.







New on the 'Net

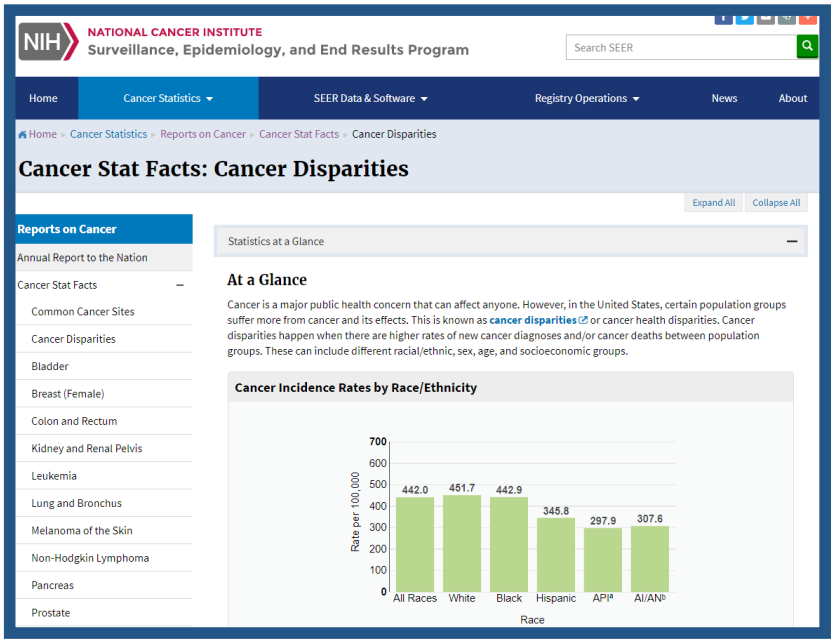
SRP Blog

SRP has a blog series in which we share updates with the public about the initiatives that SRP is spearheading.

The blog's commentaries report on key collaborations and other efforts that aim to build and improve our cancer surveillance infrastructure. This past year, blog posts included a report of the 2018 SEER*DMS Face-to-Face(F2F) meeting held last September where members of the surveillance community met to discuss SEER*DMS enhancement projects, address relevant topics, and to network. Another important blog post introduces readers to the NCI Tobacco Policy Viewer, which provides a geo-view of historical patterns of smoke-free policy coverage in the US. To check these and other blog posts, visit https://surveillance.cancer.gov/blog/.

SEER Cancer Stat Facts

More interactive Cancer Stat Facts are now available! We have new pages on Female Breast Subtypes, Cancer Disparities, Childhood Brain and Other Nervous System Cancer (Ages 0-19), Childhood Leukemia (Ages 0-19), Chronic Lymphocytic Leukemia, Small Lymphocytic Lymphoma (CLL/SLL), Diffuse Large B-Cell Lymphoma (DLBCL), Follicular Lymphoma, and Lip, Tongue, and Soft Tissue including Heart cancers. More pages are on the way, including a page on Cancer among Adolescent and Young Adults.



Cancer Stat Facts are a collection of statistical summaries for a number of common cancer types. They were developed to provide a quick overview of frequently requested cancer statistics. Available statistics may include incidence, mortality, survival, stage, prevalence, and lifetime risk. Links to additional resources from NCI, including risk factors, treatment, and clinical trials, are also provided. The statistics will be updated annually to coincide with the SEER data release. To view the Cancer Stat Facts, visit https://seer.cancer.gov/statfacts/.

New on the 'Net

Update on the Did You Know? Video Series

The *Did You Know?* Video Series provides 3- 4 minute informational videos on various cancer topics. The videos communicate key statistical data on different types of cancer in clear and concise language.

Ten *Did You Know?* videos are in the NCI's top 20 videos list on YouTube. Our video on HPV Statistics in Spanish has more than 36,000 views, HPV Statistics has over 32,200 views, Cancer Statistics has more than 29,300 views, and Breast Cancer Statistics has over 22,800 views. Additionally, Leukemia Statistics has more than 19,300 views, and Risk Factors for Cancer has more than 16,800 views!

Our *Did You Know?* videos are free and available for your use. They are a great tool to help others learn more about cancer. Get the conversation started by sharing them on social media. Embed them on any website or presentation or email them to family and friends. You can find them on our SEER website here: https://seer.cancer.gov/statistics/videos/.

@NCICancerStats reaches 7,500 Twitter followers! Help us continue to grow!

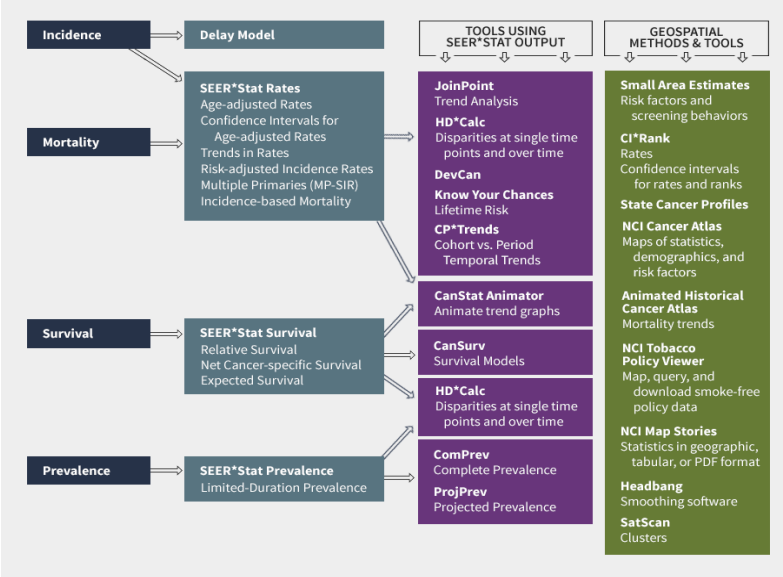
@NCICancerStats provides the latest cancer statistics, information on new online tools, and resources for researchers. Please follow us, retweet us, or like our tweets if you haven't already!

Our Tools

Statistical Tools

In this edition, we'll provide you with information and updates on some of our statistical and geospatial tools and methods including CP*Trends, SEER*Stat, NCI Map Stories, and SEER*Explorer.

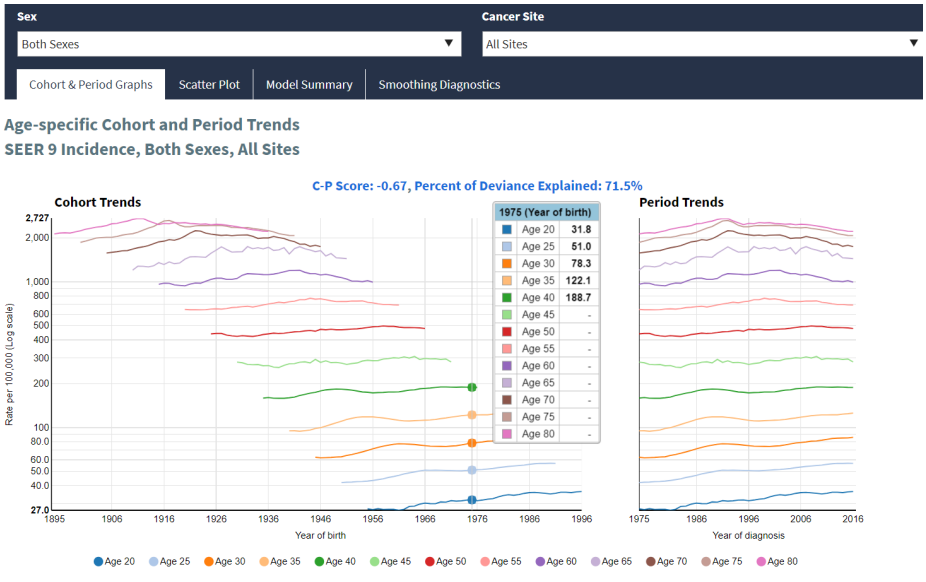
For more information on tools not highlighted in this issue, visit https://surveillance.cancer.gov/tools/.



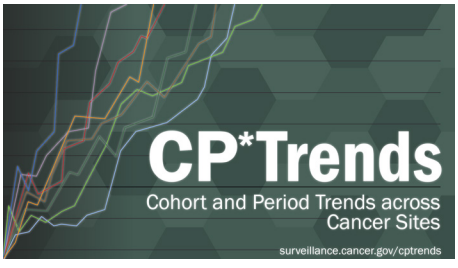
CP*Trends

CP*Trends allows you to compare cohort and period trends across cancer sites. CP*Trends is useful when exploring what factors are driving cancer rates and whether those rates differ more by year of birth (birth cohort) or calendar year (period).

The purpose of this website is to produce a series of graphs for a wide range of cancers that depict the contribution of birth cohort and period factors to changes in rates. On CP*Trends, you can display graphs showing trends by cohort and period for specific ages and cancer sites 'by sex' from 1975-2015. You can determine the relative contributions of cohort and period-related factors in driving trends for a specific cancer. You can also view how a specific cancer compares to a wide spectrum of other cancer sites.



To learn more, visit https://surveillance.cancer.gov/cptrends/.



Our Tools

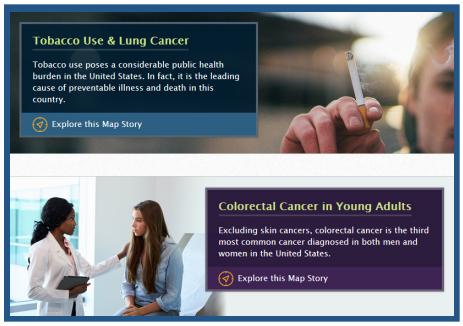
SEER*Stat

SEER*Stat is a statistical software provided by SRP that can be used to analyze SEER and other cancer-related databases to study the burden of cancer on the population.

Version 8.3.6 was released on August 8, 2019. For more information, as well as download and installation instructions, go to https://seer.cancer.gov/seerstat.

NCI Map Stories

NCI Map Stories are GIS, portal-based, interactive maps that support the visualization of cancer-related geospatial data.
These maps are updated periodically to reflect new data and educate the user on a specific cancer topic. Information includes an overview of the disease, risk factors, trends, incidence and mortality data, survival statistics, and risk reduction strategies. See our new updated Map Stories *Tobacco Use & Lung Cancer* and *Colorectal Cancer in Young Adults* here: https://gis.cancer.gov/mapstory/.

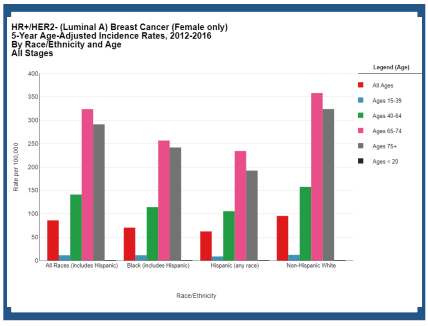


SEER*Explorer

SEER*Explorer is an interactive website that provides access to a wide range of SEER cancer data. It has a user-friendly interface that provides detailed graphs for cancer statistics by cancer site, race/ethnicity, sex, age, and for a selected number of cancer sites, by stage and histology.

The current version of SEER*Explorer provides access to statistics on US mortality, SEER incidence, prevalence, survival, and lifetime risk statistics. These include data for

- Recent Trends, 2000-2016
- Recent Rates, 2012-2016
- Long-Term Trends, 1975-2016
- Rates by Age, 2012-2016



With SEER*Explorer, you can

- Create custom graphs and tables
- Download data and images
- Share links to custom graphs and results

What's Included in the Current Release?

On April 15, 2019, SEER*Explorer was updated with incidence, survival, mortality, prevalence, and lifetime risk estimates based on the SEER November 2018 submission. Another exciting addition to this update is that Seer*Explorer now holds statistics for several subtypes of larger cancer groupings, including breast, esophagus, lung and bronchus, and thyroid cancers. The update included the addition of charts for complete and limited-duration prevalence and charts for 5-year recent rates for incidence and mortality.

What Will Future Releases Include?

The ability to compare cancer sites will be available in future releases. The goal of this project is to replace the SEER Cancer Statistics Review with a more robust and flexible website for accessing cancer statistics.

You can test out SEER*Explorer's latest version here: http://seer.cancer.gov/explorer/.

SEER Releases New Data

The Surveillance Research Program released the SEER Cancer Statistics Review (CSR), 1975-2016 on April 15, 2019.

The updated CSR, found on the SEER website, presents the most recent cancer incidence, mortality, survival, and prevalence statistics. Correspondingly, the Surveillance Research Program's website includes new versions of Joinpoint and DevCan software.

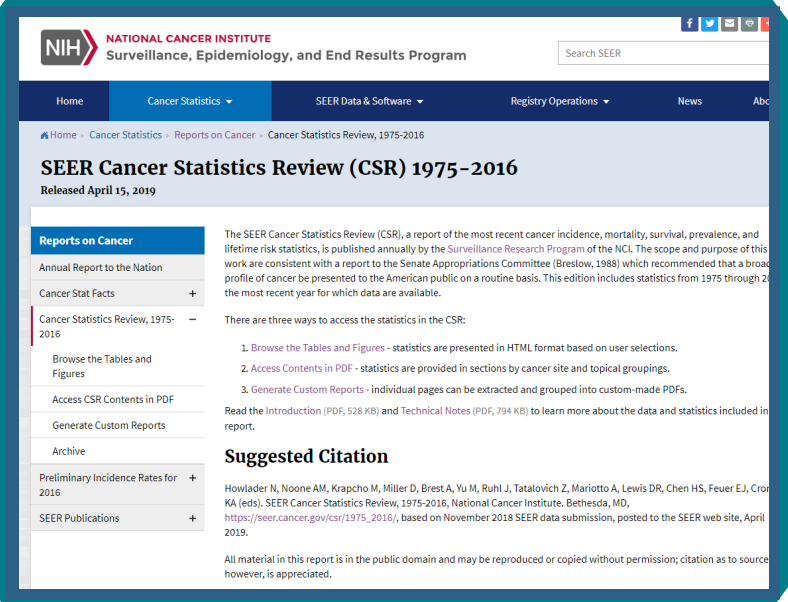
Since the early 1970s, the SEER Program has been an invaluable resource for statistics on cancer in the United States, tracking and reporting trends in incidence, mortality, survival, and prevalence. Researchers at NCI and around the country continue to rely on SEER for the most accurate cancer statistics.

All material in the SEER CSR report is in the public domain and may be reproduced or copied without permission; however, citations of the source are appreciated.

New materials posted include

- Cancer Statistics Review 1975-2016
- Cancer Stat Fact Sheets (now including female breast cancer subtypes!)
- SEER*Explorer
- The Cancer Query Systems
- Cancer Statistics Animator
- SEER Incidence data, 1973-2016
- Specialized Databases

To learn more about this data release, visit https://seer.cancer.gov/csr/1975_2016/.



Publications

SRP Staff Publications

January 2018 through December 2018

Ahn J, Harper S, **Yu M, Feuer EJ, Liu B,** Luta G. Variance Estimation and Confidence Intervals for 11 Commonly Used Health Disparity Measures. JCO Clin Cancer Inform 2018 Dec; 2:1-19. [PubMed Abstract]

Alagoz O, Berry DA, de Koning HJ, **Feuer EJ,** Lee SJ, Plevritis SK, Schechter CB, Stout NK, Trentham-Dietz A, Mandelblatt JS, CISNET Breast Cancer Working Group members. Introduction to the Cancer Intervention and Surveillance Modeling Network (CISNET) Breast Cancer Models. Med Decis Making 2018 Apr;38(1_suppl):3S-8S. PMCID: PMC5862043. [PubMed Abstract]

Babb S, **Liu B**, Kenemer B, Holmes CB, Hartman AM, Gibson JT, King BA. Changes in Self-Reported Smokefree Workplace Policy Coverage Among Employed Adults-United States, 2003 and 2010-2011. Nicotine Tob Res 2018 Sep 25;20(11):1327-1335. PMCID: PMC5897188. [PubMed Abstract]

Cronin KA, Lake AJ, **Scott S**, Sherman RL, **Noone AM, Howlader N**, Henley SJ, Anderson RN, Firth AU, Ma J, Kohler BA, Jemal A. Annual Report to the Nation on the Status of Cancer, part I: National cancer statistics. Cancer 2018 Jul 1;124(13):2785-2800. PMCID: PMC6033186. [PubMed Abstract]

de Koning HJ, Gulati R, Moss SM, Hugosson J, Pinsky PF, Berg CD, Auvinen A, Andriole GL, Roobol MJ, Crawford ED, Nelen V, Kwiatkowski M, Zappa M, Lujan M, Villers A, de Carvalho TM, **Feuer EJ**, Tsodikov A, **Mariotto AB**, Heijnsdijk EAM, Etzioni R. The efficacy of prostate-specific antigen screening: Impact of key components in the ERSPC and PLCO trials. Cancer 2018 Mar 15;124(6):1197-1206. PMCID: PMC5839977. [PubMed Abstract]

Forjaz de Lacerda G, Kelly SP, Bastos J, Castro C, Mayer A, **Mariotto AB,** Anderson WF. Breast cancer in Portugal: Temporal trends and age-specific incidence by geographic regions. Cancer Epidemiol 2018 Jun; 54:12-18. PMCID: PMC5971140. [PubMed Abstract]

Hamidi S, Ewing R, **Tatalovich Z**, Grace JB, Berrigan D. Associations between Urban Sprawl and Life Expectancy in the United States. Int J Environ Res Public Health 2018 Apr 26;15(5). PMCID: PMC5981900. [PubMed Abstract]

Han SS, Ten Haaf K, Hazelton WD, Jeon J, Meza R, Kong CY, **Feuer EJ**, de Koning HJ, Plevritis SK. Re: Think before you leap. Int J Cancer 2018 Apr 1;142(7):1507-1509. PMCID: PMC6013033. [PubMed Abstract]

Howlader N, Cronin KA, Kurian AW, Andridge R. Differences in Breast Cancer Survival by Molecular Subtypes in the United States. Cancer Epidemiol Biomarkers Prev 2018 Jun;27(6):619-626. [PubMed Abstract]

Huang B, Pollock E, **Zhu L**, Athens JP, Gangnon R, **Feuer EJ**, Tucker TC. Ranking composite Cancer Burden Indices for geographic regions: point and interval estimates. Cancer Causes Control 2018 Feb;29(2):279-287. PMCID: PMC5821140. [PubMed Abstract]

Jayasekera J, Li Y, Schechter CB, Jagsi R, Song J, White J, Luta G, Chapman JW, **Feuer EJ**, Zellars RC, Stout N, Julian TB, Whelan T, Huang X, Shelley Hwang E, Hopkins JO, Sparano JA, Anderson SJ, Fyles AW, Gray R, Sauerbrei W, Mandelblatt J, Berry DA, CISNET-BOLD Collaborative Group. Simulation Modeling of Cancer Clinical Trials: Application to Omitting Radiotherapy in Low-risk Breast Cancer. J Natl Cancer Inst 2018 Dec 1;110(12):1360-1369. PMCID: PMC6292816. [PubMed Abstract]

Jayasekera J, Schechter CB, Sparano JA, Jagsi R, White J, Chapman JW, Whelan T, Anderson SJ, Fyles AW, Sauerbrei W, Zellars RC, Li Y, Song J, Huang X, Julian TB, Luta G, Berry DA, **Feuer EJ**, Mandelblatt J, CISNET-BOLD Collaborative Group. Effects of Radiotherapy in Early-Stage, Low-Recurrence Risk, Hormone-Sensitive Breast Cancer. J Natl Cancer Inst 2018 Dec 1;110(12):1370-1379. PMCID: PMC6292790. [PubMed Abstract]

SRP Staff Publications (cont.)

January 2018 through December 2018

Jeon J, Holford TR, Levy DT, **Feuer EJ**, Cao P, Tam J, Clarke L, Clarke J, Kong CY, Meza R. Smoking and Lung Cancer Mortality in the United States From 2015 to 2065: A Comparative Modeling Approach. Ann Intern Med 2018 Nov 20;169(10):684-693. PMCID: PMC6242740. [PubMed Abstract]

Lee M, **Feuer EJ,** Fine JP. On the analysis of discrete time competing risks data. Biometrics 2018 Dec;74(4):1468-1481. [PubMed Abstract]

Lewis DR, Chen HS, Cockburn MG, Wu XC, Stroup AM, Midthune DN, Zou Z, Krapcho MF, Miller DG, **Feuer EJ.** Early estimates of cancer incidence for 2015: Expanding to include estimates for white and black races. Cancer 2018 May 15;124(10):2192-2204. [PubMed Abstract]

Li Y, **Yu M,** Zhang J. Statistical Inference on Health Disparity Indices for Complex Surveys. Am J Epidemiol 2018 Nov 1;187(11):2460-2469. PMCID: PMC6211244. [PubMed Abstract]

Mandelblatt JS, Near AM, Miglioretti DL, Munoz D, Sprague BL, Trentham-Dietz A, Gangnon R, Kurian AW, Weedon-Fekjaer H, **Cronin KA**, Plevritis SK. Common Model Inputs Used in CISNET Collaborative Breast Cancer Modeling. Med Decis Making 2018 Apr;38(1_ suppl):9S-23S. PMCID: PMC5862072. [PubMed Abstract]

Mariotto AB, Zou Z, Johnson CJ, Scoppa S, Weir HK, Huang B. Geographical, racial and socio-economic variation in life expectancy in the US and their impact on cancer relative survival. PLoS One 2018;13(7): e0201034. PMCID: PMC6059474. [PubMed Abstract]

Mariotto AB, Zou Z, Zhang F, **Howlader N**, Kurian AW, Etzioni R. Can We Use Survival Data from Cancer Registries to Learn about Disease Recurrence? The Case of Breast Cancer. Cancer Epidemiol Biomarkers Prev 2018 Nov;27(11):1332-1341. [PubMed Abstract]

Massarweh SA, Sledge GW, Miller DP, McCullough D, **Petkov VI**, Shak S. Molecular Characterization and Mortality from Breast Cancer in Men. J Clin Oncol 2018 May 10;36(14):1396-1404. PMCID: PMC6075854. [PubMed Abstract]

Moss JL, Liu B, Zhu L. State Prevalence and Ranks of Adolescent Substance Use: Implications for Cancer Prevention. Prev Chronic Dis 2018 May 31;15: E69. PMCID: PMC5985915. [PubMed Abstract]

Moss JL, Xiao Q, Matthews CE. Patterns of cancer-related health behaviors among middle-aged and older adults: Individual- and area-level socioeconomic disparities. Prev Med 2018 Oct; 115:31-38. [PubMed Abstract]

Negoita S, Feuer EJ, Mariotto A, Cronin KA, Petkov VI, Hussey SK, Benard V, Henley SJ, Anderson RN, Fedewa S, Sherman RL, Kohler BA, Dearmon BJ, Lake AJ, Ma J, Richardson LC, Jemal A, Penberthy L. Annual Report to the Nation on the Status of Cancer, part II: Recent changes in prostate cancer trends and disease characteristics. Cancer 2018 Jul 1;124(13):2801-2814. PMCID: PMC6005761. [PubMed Abstract]

Petitti DB, Lin JS, Owens DK, Croswell JM, **Feuer EJ**. Collaborative Modeling: Experience of the U.S. Preventive Services Task Force. Am J Prev Med 2018 Jan;54(1S1): S53-S62. [PubMed Abstract]

Qiu JX, Yoon HJ, **Fearn PA**, Tourassi GD. Deep Learning for Automated Extraction of Primary Sites from Cancer Pathology Reports. IEEE J Biomed Health Inform 2018 Jan;22(1):244-251. [PubMed Abstract]

Qiu JX, Yoon HJ, Srivastava K, Watson TP, Blair Christian J, Ramanathan A, Wu XC, **Fearn PA**, Tourassi GD. Scalable deep text comprehension for Cancer surveillance on high-performance computing. BMC Bioinformatics 2018 Dec 21;19(Suppl 18):488. PMCID: PMC6302459. [PubMed Abstract]

Sauer AG, **Liu B**, Siegel RL, Jemal A, Fedewa SA. Comparing cancer screening estimates: Behavioral Risk Factor Surveillance System and National Health Interview Survey. Prev Med 2018 Jan; 106:94-100. [PubMed Abstract]

Tam J, Levy DT, Jeon J, Clarke J, Gilkeson S, Hall T, **Feuer EJ**, Holford TR, Meza R. Projecting the effects of tobacco control policies in the USA through microsimulation: a study protocol. BMJ Open 2018 Mar 23;8(3): e019169. PMCID: PMC5875683. [PubMed Abstract]

SRP Grants Awarded in Fiscal Year 2018

Newly funded SRP competing grant awardees for fiscal year 2018 are listed below. In addition to these newly funded grants, SRP received and reviewed over 132 new grant applications and currently manages over 100 existing, non-competing grants for continued funding.

KEY
DAB – Data Analytics Branch
OAD – Office of the Associate Director
SIB - Surveillance Informatics Branch
SRAB – Statistical Research and Applications Branch

Program Director	Principal Investigator	Research Project Title	Institution	SRP Branch
Nadia Howlader	Joel H. Saltz	Methods and Tools for Integrating Pathomics Data into Cancer Registries	State University of New York Stony Brook	DAB
Denise Lewis	Liang Li	Estimating the Cost Trajectories and Projecting the Cost of Cancer Care in the United States: Methodology and Application	University of Texas MD Anderson Cancer Center	DAB
Rose Fredua	Alexander Volfovsky	R13 Conference Grant Application for the Institute for Mathematical Statistics New Researchers	Duke University	DAB
Kathy Cronin	Emily Ai-Hua Wang	Incarceration and Cancer-Related Outcomes (ICRO)	Yale University	OAD
Donna Rivera	Guo-Qiang Zhang	An Ontology-Driven Faceted Query Engine for the Kentucky Cancer Registry	University of Kentucky	SIB
Huann-Sheng Chen	James Dai	Statistical Genetics and Genomics for Epidemiologic Research	Fred Hutchinson Cancer Research Center	SRAB
Huang-Sheng Chen	Qianchuan He	Methods for Analyzing Cancer Somatic Mutation Data	Fred Hutchinson Cancer Research Center	SRAB

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Program Director	Principal Investigator	Research Project Title	Institution	SRP Branch
Angela Mariotto	Guergana K. Savova	Natural Language Processing Platform for Cancer Surveillance	Boston Children's Hospital	DAB
Angela Mariotto	Kevin C. Ward	Registering Cancer Recurrences in the Georgia Cancer Registry	Emory University	DAB
Angela Mariotto	Dabao Zhang	Measuring Explained Variation in Survival Analysis	Purdue University	DAB
Rose Fredua	Betsy Kohler	Support of the NAACCR Annual Scientific Conference	Yale University	DAB
Nadia Howlader	Ruth Etzioni	Modeling to Minimize Detection Bias in Cancer Risk Prediction Studies	Fred Hutchinson Cancer Research Center	DAB
Kathy Cronin	Tomi F. Akinyemiju	The Role of Multilevel Healthcare Access Dimensions in Ovarian Cancer Disparities	Duke University	OAD
Kathy Cronin	Cathy J. Bradley	Addressing Urban Rural Disparities in Cancer: The Case for Registry Expansion	University of Colorado-Denver	OAD
Kathy Cronin	Allison Nicole Lipitz Snyderman	Linking Population-Based Data Sources to Examine Health Disparities in Clinical Trial Participation and Outcomes	Sloan-Kettering Institute of Cancer Research	OAD
Susan Scott	Young Chandler	Simulation Modeling to Assess Personalized Benefits and Harms of Extended Endocrine Therapy	Georgetown University	OAD

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Program Director	Principal Investigator	Research Project Title	Institution	SRP Branch
Huann-Sheng Chen	Wenyi Wang	Statistical Methods and Tools for Cancer Risk Prediction in Families with Germline Mutations in TP53	University of Texas MD Anderson Cancer Center	SRAB
Huann-Sheng Chen	Jinbo Chen	Data and Information Integration for Risk Prediction in the Era of Big Data	University of Pennsylvania	SRAB
Huann-Sheng Chen	Yijian Huang	Statistical Methods for Cancer Detection Using Biomarkers	Emory University	SRAB
Huann-Sheng Chen	Martin T. Morgan	Cancer Genomics: Integrative and Salable Solutions in R/Bioconductor	Roswell Park Cancer Institute Corp	SRAB
Benmei Liu	Ching-Yun Wang	Novel Methods for Missing Subtype Data in Colorectal Cancer	Fred Hutchinson Cancer Research Center	SRAB
Zaria Tatalovich	Bian Liu	Exploration of Dynamic Spatiotemporal Exposure Profiles via Patient Residential and Healthcare Utilization History	Icahn School of Medicine at Mount Sinai	SRAB
Zaria Tatalovich	Angeline Sanderson Andrew	Linking Environmental Contamination to Residential History for Risk Identification	Dartmouth-Hitchcock Clinic	SRAB
Mandi Yu	Rebecca Hubbard	Improving Confounder Control in EHR-based Studies of Cancer Epidemiology	University of Pennsylvania	SRAB

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