NAACCR Summer Forum

ABSTRACT BOOK

NAACCR Summer Forum

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PLENARY PRESENTATIONS

Data Sharing as the Common Good

Dr. Thomas Patrick Hill
Rutgers University

The presentation will provide an ethics framework within which to justify secondary data sharing as a moral imperative in the interests of cancer surveillance and research and thereby in the interests of the common good.

Learning Objectives

1. To appreciate the nature and function of ethics
2. To appreciate the relation of ethics to law
3. To understand the role of ethics in justifying secondary data sharing as a moral imperative in the interests of the common good

Plenary #1 - Cancer PathCHART

Alison Van Dyke, MD, PhD
Director, SEER-linked Virtual Tissue Repository Pilot Studies, Surveillance, Epidemiology and End Results Program, National Cancer Institute

Kay Washington, MD, PhD
Professor of Pathology, Microbiology and Immunology, Vanderbilt University Medical Center

Lois Dickie, CTR
Public Health Analyst, Surveillance, Epidemiology and End Results Program, National Cancer Institute

Loria Pollack, MD, MPH
Senior Medical Officer, National Program of Cancer Registries, Centers for Disease Control and Prevention

This series of four presentations about the Cancer Pathology Coding Histology and Registration Terminology (Cancer PathCHART) will inform attendees about the concept of it, rationale for it, and the major associated products planned for January 2024 implementation. The processes for review of tumor site-histology combinations and associated histology terminology and coding will be explained, including the creation of a single source of such validated standards. Speakers will describe how these validated standards will be used to generate updated lists (Impossible List and SEER Site/Type Valid List) and edits for unlikely/rare tumor site-histology combinations. The benefits of and potential impact of this initiative for cancer registration will be emphasized as well as the role of NAACCR in initiative leadership.

By the end of this presentation, the attendee will understand the

- Rationale for and concept of Cancer PathCHART
- Benefits of Cancer PathCHART to tumor registrars
- Review processes, involving pathologists, registrars from different settings, and epidemiologists
- How pathologists and CTRs will contribute to the vetted standards
- Role of NAACCR in this initiative

Plenary #2 - Multi-Cancer Early Detection Testing in Cancer Surveillance and Cancer Control

Development of Multi-Cancer Early Detection tests and the Role of Surveillance Data

Dr. Christina Clarke Dur
Research & Development, GRAIL, Inc.

Development of Multi-Cancer Early Detection tests and the role of surveillance data will describe the rationale, technology and clinical development for GRAIL's multi-cancer early detection test, Galleri. I will also discuss the integral role that SEER and other cancer surveillance data played in its development.

Learning Objectives

- To understand the population health rationale for multi-cancer early detection (MCED)
- To understand the plasma cell-free DNA methylation signal technology underlying the MCED approach
- To understand the role that SEER and other cancer surveillance data play in describing the current burden of late-stage cancer and the potential benefit of MCED

History and Policy Implications of Multi-Cancer Early Detection tests for Cancer Surveillance and Cancer Control

Matthew Sturm
Senior Director, Government Affairs, GRAIL, Inc.

Vision perspective: Policy and the history of access to cancer screenings in public programs, using multi-cancer early detection as a case study for how the Medicare program was originally conceptualized and how it has evolved in the context of innovation of preventive services

Learning Objectives
Foundations of Medicare coverage and reimbursement structure Medicare treatment of preventive services Efforts to establish multi-cancer early detection pathways.

Plenary #3 - CDC's Data Modernization Initiative

CDC's Data Modernization Initiative

Daniel Jernigan, MD, MPH
Deputy Director for Public Health Surveillance, Centers for Disease Control and Prevention

This 15-minute presentation gives an overview of progress and plans for CDC's Data Modernization Initiative (DMI), including notable data improvements made during the pandemic, DMI's five main priorities, and the future benefits of data modernization for cancer reporting and public health overall.

The presentation's objective is to educate and inspire attendees around the potential of data modernization, and to set the stage for further discussion on specific topics related to projects and improvements.

Public Health Data Modernization Initiative and Cancer Surveillance

Mr. Joseph Rogers[1], Ms. Sandy Jones[1], Ms. Kasey Diebold[1], Ms. Caitlin Kennedy[1], Mr. Sean Porter[1], Dr. Vicki Benard[1], Dr. Lisa Richardson[1], Mr. Sanjeev Baral[2], Mrs. Michelle Esterly[2], Mrs. Jen Wike[2], Mr. Ian McClendon[2]
[1]*Centers for Disease Control and Prevention, Atlanta, USA,* [2]*Katmai Government Services, Anchorage, USA*

Background: The Centers for Disease Control and Prevention (CDC) has embarked on a multi-year, billion-plus dollar effort to modernize core data and surveillance infrastructure across the federal and state, tribal, local, or territorial (STLT) public health landscape. This effort is known as the Data Modernization Initiative (DMI). CDC/National Program of Cancer Registries (CDC/NPCR) has made considerable progress in implementing key priority objectives aligned with the overall DMI strategic implementation plan.

Purpose: This presentation will provide an overview of the CDC DMI strategy and progress to date and the roadmap for the coming years. Consistent with the CDC DMI strategy, CDC/NPCR has prioritized resources to achieve real-time reporting, developed standards for interoperability, created innovative solutions to automate data collection/processing, and defined data governance standards that will break down siloed data systems. These efforts will also be presented in context with piloting the cancer surveillance cloud-based computing platform (CS-CBCP).

Methods/Approach: Over the past five years, CDC/NPCR has developed new and innovative methods to improve data exchange methods, timeliness, quality, and completeness. These methods are being implemented based on requirements gathered from subject matter experts (SMEs) and existing CDC/NPCR DMI workgroup members.

Results: The presentation will detail the CDC/NPCR DMI efforts and discuss plans to pilot the CS-CBCP with data reporters and central cancer registries (CCRs). These projects result in increased cancer surveillance interoperability.

Conclusion: By modernizing cancer surveillance, a fully integrated approach to upstream data collection and processing can be achieved. This approach has the potential to break down barriers that inherently exist within traditional systems used for data collection, processing, and analysis. These barriers exist because systems are siloed, fragmented, require manual intervention, and lack standards to seamlessly exchange data between systems. The CS-CBCP has the potential to overcome these barriers by modernizing and improving electronic data exchange, as well as improving the timeliness of data reporting.

CDA Tools with EHRs for Cervical Cancer

Dr. Mona Saraiya[1], Ms. Jean Colbert[2], Ms. Geeta Bhat[2], Dr. David Winters[2], Ms. Sharon Sebastian[2], Mr. Mick O'hanlan[2], Ms. Ginny Meadows[2], Miss Rose Almonte[2], Dr. Tom Richards[1], Ms. Maria Michaels[1], Ms. Julie Townsend[1], Dr. Jacqueline Miller[1], Dr. Rebecca Perkins[4], Dr. George F. Sawaya[5], Dr. Nico Wentzensen[3], Dr. Lisa Richardson[1]

[1]Centers for Disease Control and Prevention, Atlanta, USA, [2]Mitre, Mclean, USA, [3]NCI, Bethesda, USA, [4]Boston University, Boston, USA, [5]UCSF, San Francisco, USA

Objective: The complexity and frequent updates of cervical cancer screening and management (CCSM) guidelines makes it challenging for clinicians to follow the latest evidence, especially in rural or setting with limited systems. In collaboration with key audiences, CDC supports a multi-year initiative to develop computable guidelines for CCSM and clinical decision support (CDS) tools to increase awareness and adoption of the latest evidence-based CCSM guidelines. The American Society for Colposcopy and Cervical Pathology (ASCCP) mobile application is a valuable point of reference which this work complements.

Methods: A comprehensive environmental scan was performed to examine CCSM guidelines along several dimensions: guideline evidence, clinical practice, patient experience, electronic health records, laboratory systems, health information technology (IT) standards, quality measurement, and existing CDS tools. The scan encompassed audience interviews with over 20 expert groups, a literature review inclusive of over 90 sources of guidelines, standards, evidence-based research, and publicly available software.

Results: Findings showed a general need to (1) increase awareness and understanding of current cervical cancer guidelines, (2) align CDS to the clinical workflow of clinicians and pathologists to deliver evidence-based care, and (3) address inequities in patient care and clinical settings where screening and treatment is managed.

Conclusions: When written and computable clinical guidelines are co-developed, the likelihood of guideline mistranslation across healthcare ecosystems is reduced. The CCSM CDS tool developed for this project is a shareable, computable resource that facilitates improvements in the number of women appropriately and equitably screened and treated for cervical precancer.

Plenary #4 - Thirty Years of the National Program of Cancer Registries: A Retrospective

Vicki Benard, PhD
Chief, Cancer Surveillance Branch, Centers for Disease Control and Prevention

A retrospective look over 30 years of the importance of establishing the National Program of Cancer Registries

Learning Objectives

1. To provide a detailed history of cancer surveillance
2. To provide an overview of the National Program of Cancer Registries
3. To provide a timeline of significant NPCR initiatives

Plenary #5 – Update on Standards

Decisions, Decisions, Decisions: Process for Standards

Stephanie Hill, MPH, CTR
Associate Director, North American Association of Central Cancer Registries

This presentation will discuss the complex change control process used for implementing new and revised data items in the NAACCR record layout.

Learning Objectives

1. Understand the need for a formal change control process for cancer registry standards
2. Describe the process by which new and revised data items are implemented
3. Illustrate the many factors considered in the shared decision-making process

Impact of COVID-19 on Completeness

Serban Negoita, MD, DrPH
Chief, Data Quality, Analysis and Interpretation Branch, Surveillance Research Program, National Cancer Institute

Cancer registration completeness measures rely on the assumption of gradual change in the counts of incident cancer cases and deaths. Early evidence is available to suggest that COVID-19 pandemic led to unusual rapid changes in the number of cancer cases. This presentation will discuss available evidence pointing toward a reduction in the number of incident cases, review possible causes of the reduction, and discuss methodological options to quantify the change. In addition, the presenter will discuss options to adjust data quality assessment methods to the current data collection context.

Learning Objectives

1. Understand early epidemiologic evidence regarding changes in the number of incident cancer cases
2. Explain ways to quantify a rapid change in the number of incident cases or death
3. Interpret changes in the registry completeness measures

Impact of COVID-19 on Completeness

Manxia Wu, MD, MPH
Lead Epidemiologist, Division of Cancer Prevention and Control, Centers for Disease Control and Prevention

Case completeness status of 12-month preliminary data from NPCR 2021 submission

Learning Objective
To understand the magnitude of cancer incidence decreases due to the COVID 19 impact on cancer diagnosis and reporting for 2020

Plenary #6 - National Cancer Institute Initiatives

Data Quality for the National Childhood Cancer Registry

Gonçalo Forjaz de Lacerda, DVM, MSc
Senior Research Associate, Westat

Fernanda Michels, PhD, MSc, CTR
Program Manager of Data Quality and Integration, North American Association of Central Cancer Registries

We will give an overview of the National Childhood Cancer Registry and focus on the goals and work developed by one of its working groups, the Data Quality WG.

Learning Objectives

1. Learn about the National Childhood Cancer Registry (NCCR), including participating registries and sponsoring organizations
2. Learn about the type and structure of the NCCR Working Groups (WG)
3. Learn about the mission, objectives and work of the NCCR Data Quality WG, including future plans

New "Two-Month" Reporting

Eric ("Rocky") Feuer, PhD
Branch Chief, Surveillance Research Program, National Cancer Institute

Serban Negoita, MD, DrPH
Chief, Data Quality, Analysis and Interpretation Branch, Surveillance Research Program, National Cancer Institute

Standard reporting of SEER data occurs 22 months after the end of each diagnosis year. While this lag is due to the time it takes to gather and consolidate information, it is frustrating to those who want to monitor the impact of recent cancer control advances in a timely manner. "Real-time" reporting describes a program to potentially shorten this lag time to 2 months. This talk explores the role of delay adjustment to adjust for the undercount that would occur in 2-month submissions, and how advances in electronic reporting (especially of pathology reports), natural language processing, and creation of a path only partially incomplete Consolidated Tumor Case (CTC) using SEER*DMS may make this possible.

Learning Objectives

1. Describe a program aimed a reducing the lag time from the end of a diagnosis year to submission from 22 to 2 months
2. Understand the role of delay adjustment to adjust for the undercount of cases at 2 months
3. Understand how electronic reporting of pathology reports, natural language processing of their contents, and rapid development of a partially incomplete consolidated tumor case, may make this possible

Modelling Outcomes using Surveillance Data and Scalable Artificial Intelligence for Cancer (MOSSAIC)

Dr. Elizabeth (Betsy) Hsu
Branch Chief, Surveillance Research Program, National Cancer Institute

This presentation will provide an overview of the National Cancer Institute-Department of Energy collaboration MOSSAIC (Modeling Outcomes using Surveillance Data and Scalable AI for Cancer), which aims to develop scalable natural language processing (NLP) and machine learning tools for deep text comprehension of unstructured clinical text to enable accurate, automated capture of reportable cancer surveillance data elements.

Current activities focus on:

- Extraction of four key data elements from pathology reports
- Determination of whether a pathology or radiology report is related to cancer
- Extraction of relevant biomarker information
- Identification of recurrence and metastatic disease

Learning Objectives

1. Application of natural language processing to pathology reports
2. Deployment of novel tools in registry workflows
3. Approaches to training machine learning models for automated extraction of information

CONCURRENT ORAL PRESENTATIONS

A Future Enhancement to the VPR-CLS: Secure, Encrypted, Automated Linkages

Mr. William Howe[1]
[1]*Information Management Services, Inc., Calverton, USA*

The Virtual Pooled Registry Cancer Linkage System (VPR-CLS) is an NCI-sponsored online service that efficiently connects researchers with 46 U.S. cancer registries to facilitate minimal risk linkages with established cohort studies to identify incident cancers among study participants. Currently, the VPR-CLS provides secure transmission of the study cohort file to participating cancer registries who then perform the linkage behind their firewall. This process has been well-received by registries; however, distribution of sensitive study data to multiple registries carries some inherent risks.

To address this concern, Information Management Services, Inc. (IMS), which serves as the Honest Broker and developer of the VPR-CLS, will discuss future enhancements that will enable secure, encrypted, automated linkages to take place through the VPR-CLS website. This new functionality will allow a registry to encrypt their VPR data file using Match*Pro and, subsequently, upload the encrypted file to the VPR-CLS website. The uploaded registry data file will be securely stored in a registry-specific, partitioned location on an IMS server and will be automatically linked with the appropriate study cohort file without the need for IMS intervention or access to the registry file. Information on what happens to the encrypted registry data file once it's been linked to the study cohort file, how the registries will be notified upon completion of the linkage, and how registries will retrieve their linkage results file will also be discussed in this presentation.

A Spatial-Statistical Application Using Residential Histories Linked to Cancer Registry Data: A Use Case of CTCL in New Jersey

Mr. Aniruddha Maiti[1], Dr. Daniel Wiese[2,3], Dr. Antoinette Stroup[4,5], Dr. Gerald Harris[4,5], Dr. Kevin Henry[2,6], Dr. Slobodan Vucetic[1]

[1]Temple University, Computer and Information Sciences, Philadelphia, USA, [2]Temple University, Geography and Urban Studies, Philadelphia, USA, [3]American Cancer Society, Philadelphia, USA, [4]New Jersey State Cancer Registry, Trenton, USA, [5]Rutgers Cancer Institute of New Jersey, New Brunswick, USA, [6]Fox Chase Cancer Center, Philadelphia, USA

Background: In spatial epidemiology, researchers often use residence at the time of diagnosis to identify statistically significant clusters or high-risk regions when residential histories are not available. However, for diseases with long latency, such as cancer, residence at the time of diagnosis may not be sufficient to understand both spatial and temporal disease risk. We present a statistical method using spatially regularized logistic regression to identify statistically significant high-risk regions of Cutaneous T-Cell Lymphoma (CTCL) in New Jersey, taking into account temporal changes in residence prior to diagnosis.

Method: Our approach models disease risk as a weighted average of risk estimates based on all the known residential locations prior to diagnosis through spatially regularized logistic regression model. The method assumes that neighboring geographical locations have similar disease risks. Statistical significance is determined using Monte Carlo simulation, where the test statistic is calculated using permutation of the original data set to approximate the distribution of the statistic under the null hypothesis.

We also evaluated our method using both a simulated dataset and real-word data based on CTCL incident cases from New Jersey diagnosed between 2006-2014. Cancer data from New Jersey State Cancer Registry (NJSCR) were linked to the LexisNexis database to obtain residential histories.

Results: The results from the simulated data showed that the proposed approach using spatially regularized logistic regression was able to correctly identify the artificially generated geographic regions with significantly significant high disease risk. When using the CTCL cases, we detected areas of statistically significant CTCL risk in New Jersey that were similar to previous studies (Henry et al., 2021).

Conclusion: This new method provides an estimate of geographic disease risk along with the statistical significance of that estimation, while accounting for longitudinal residential locations.

Assessing Central Registry Fitness-for-Use of Cause of Death Data for Cause-Specific Survival.

Mr. Chris Johnson[1], Dr. Bozena Morawski[1], Dr. Meichin Hsieh[2], Dr. Manxia Wu[3], Dr. Angela Mariotto[4], Dr. Recinda Sherman[5]

[1]Cancer Data Registry of Idaho, Boise, USA, [2]Louisiana State University Health Sciences Center, New Orleans, USA, [3]Centers for Disease Control and Prevention, Atlanta, USA, [4]National Cancer Institute, Rockville, USA, [5]NAACCR, Springfield, USA

Background Both net cancer survival and crude probability of death statistics can be calculated using either cause of death information or expected survival based on life tables. In instances when life tables do not account for risk factors that influence the risk of mortality from cancer and other competing causes of death, e.g. smoking status, using cause of death information may be advantageous. The SEER cause-specific cause of death (NAACCR Item #1914) variable was created for use in cause-specific survival and designates that the person died of their cancer. SEER, NPCR, and NAACCR request cause of death in annual data submissions, and it is not possible to calculate SEER cause-specific cause of death information for records that are missing cause of death.

Purpose This presentation will describe how fitness-for-use criteria were developed for the SEER cause-specific cause of death variable for use in NAACCR CiNA products.

Methods We used the CiNA Survival/Prevalence database from the November 2020 NAACCR data submission to calculate 60-month cause-specific survival among persons aged 15–99 at time of diagnosis using the SEER cause-specific cause of death variable. We treated missing/unknown causes of death in three ways: excluded from analysis, included as dead from this cancer, included as censored at time of last follow-up. Autopsy only or death certificate only cases were excluded from survival analyses. We calculated the proportion of deaths with unknown/missing cause of death by registry and demographic variables.

Results In general, 5-year cause-specific survival estimates differed by ≥ 1% between the three approaches in instances where ≥ 3% of deaths had missing/unknown cause of death. When applying a standard of <1% in cause-specific cause of death estimates, 34 registries were deemed fit-for-use for cause of death. The proportion of deaths with missing/unknown cause of death varied by primary site, age at diagnosis, race/ethnicity, and registry.

Conclusions Establishing fitness-for-use criteria for key analytic variables is an important role for NAACCR. It is hoped that standards for cause-specific cause of death, which strike a balance between scientific integrity and registry inclusiveness, will be designated as another NAACCR Fitness-for-Use Recognition by NAACCR.

Assessing Differences in Pediatric Cancer Survival by U.S. Registry Jurisdiction Using a Model-based Approach, 2000-2018 Diagnosis Years

Dr. Bozena Morawski[1], Mr. Chris Johnson[1], Dr. Angela Mariotto[2], Dr. Dennis Deapen[3], Dr. Amie Eunah Hwang[3], Dr. Recinda Sherman[4], Ms. Stephanie Hill[4]

[1]Cancer Data Registry of Idaho, Boise, USA, [2]Division of Cancer Control and Population Sciences, National Cancer Institute, Bethesda, USA, [3]University of Southern California, Los Angeles, USA, [4]North American Association of Central Cancer Registries, Springfield, USA

Background: The National Childhood Cancer Registry (NCCR), part of the National Cancer Institute's Childhood Cancer Data Initiative, is a rapidly developing resource supporting pediatric cancer research in the United States. NCCR data are being used to develop new data products, including statistics describing childhood cancer survival. Development of these data products revealed differences in 5-year relative pediatric cancer survival among registries. We used a model-based approach to identify factors contributing to survival differences by registry.

Methods: We used Royston-Parmar models to calculate 60-month relative survival (RS) with NAACCR Cancer in North America (CiNA) data from 23 registries. Patients were diagnosed with a malignant tumor at ages 0–19 years during 2000–2018 (follow-up through 2018). We calculated registry-specific RS for all sites combined and primary sites I (leukemias, myeloproliferative & myelodysplastic diseases), II (lymphomas and reticuloendothelial neoplasms), and III (CNS and miscellaneous intracranial and intraspinal neoplasms), based on the 2017 International Classification of Childhood Cancer (ICCC) recodes. All models adjusted for 5-year age categories, sex, race/ethnicity, residency in metro versus non-metro counties, census tract poverty level, registry, stage, and diagnosis year; all sites combined models also adjusted for primary site.

Results: From 179,053 tumors across 23 registries, all sites combined RS estimates by registry ranged from 78.4 (95% CI: 75.9–80.9) to 84.3 (95% CI: 81.5 –87.2) for 2000–2004, 80.6 (95% CI: 76.9–84.4) to 86.5 (95% CI: 84.1, 89.0) for 2005–2009, 82.2 (95% CI: 78.6–85.9) to 88.7 (95% CI: 85.4 –92.0) for 2010–2014, and 77.4 (95% CI: 70.9–84.6) to 90.3 (95% CI: 87.6–93.1) for 2015–2018. The inclusion of ICCC primary site and tumor stage at diagnosis independently improved model fit, and attenuated survival differences by an average of 0.7% for each time period. For specific cancer sites, differences in registry- and year-specific maximum survival with other registry- and year-specific estimates were median of 5.6%, 4.9%, and 12.1% for ICCC sites I, II, and III, respectively.

Conclusions: The inclusion of stage and primary site attenuated RS differences across registries, but differences in pediatric RS remained. Further investigation into reasons for these differences – clinical or operational – are warranted.

Assessing Environmental Exposure and Socioeconomic History Prior to Cancer Diagnosis

Dr. Bian Liu[1], Ms. Furrina Lee[2], Dr. Li Niu[1], Mr. Francis Boscoe[2, 3]
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Background: Exposure assessment solely based on the address at cancer diagnosis assumes fixed exposure over time, while ignoring exposures from other addresses prior to cancer diagnosis. We examined excess exposure risks of non-asbestos air toxics and socioeconomic status (SES) estimated over available residential history for mesothelioma patients.

Methods: Patients' residential histories were obtained by linking mesothelioma cases (n=1,015) diagnosed during 2011-2015 from the New York State Cancer Registry to LexisNexis administrative data and inpatient claims data. Percentile ranking of lifetime cancer risk from inhalation of non-asbestos air toxics was based on the National Air Toxic Assessment. SES was measured by Yost index, which is a percentile ranking derived from U.S. Census data. Excess exposure risk was calculated by dividing exposures at individual census tracts by the state-level average and subtracting one. We used a generalized linear regression model with the generalized estimating equation to compare the excess exposure risk in years prior to and at cancer diagnosis.

Results: The median number of census tracts lived per patient was 4 (interquartile range (IQR) 2-6). Approximately 43% of the study sample had a residential history prior to the cancer diagnosis for up to 30 years, and 94% up to 5 years. The excess exposure risks at the cancer-diagnosis tracts were below the state average, with means ranging from -0.22 to -0.11 for air toxics, and from -0.23 to -0.18 for SES. Excess exposure risks for both air toxics and SES tended to be higher in earlier addresses than addresses at cancer diagnosis. However, the effect size was relatively small with the median difference between years prior to and at cancer diagnosis being 6.2% (IQR 2.5% to 6.7%) for excess air toxics risk, and 1.3% (IQR -0.2% to 5.3%) for excess SES risk.

Discussion and Conclusion: This project demonstrated the feasibility of including residential history in cancer research and revealed differences between multiple approaches of estimating residence-related exposure risks over time. As the findings may be unique to the mesothelioma patients studied, future examinations using different exposure indicators and among different patient populations including those with other cancer types are needed.

Assessing the Accuracy of Primary Payer Information in Cancer Registry Data: the Colorado Experience

Dr. Marcelo Perraillon, **Ms. Rifei Liang**, Dr. Cathy Bradley, Dr. Lindsay Sabik, Dr. Richard Lindrooth

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Background: The primary payer at diagnosis field is intended to collect information on the patient's insurance status at the time of initial diagnosis. Primary payer at diagnosis has been used to study patterns of care, outcomes, and disparities, as it can be a proxy for socioeconomic status.

Objective: To determine the accuracy of primary payer at diagnosis from cancer registry data for identifying insurance type.

Methods: We leveraged a linkage between the Colorado All-Payer Claims Database (APCD) and the Colorado Central Cancer Registry (CCCR) to compare the primary payer field with actual insurance enrollment ("gold standard") from the APCD for ascertaining the misclassification reported by the registry. Insurance enrollment was extracted from APCD eligibility files and primary payer from CCCR for those with a first cancer diagnosis in 2012-2017. Analyses were stratified by age (younger than 65 versus 65 and older). We estimated the Kappa coefficient measuring agreement between health insurance classifications, sensitivity, positive predictive value (PPV), and the proportion of individuals who switch insurance within a year after diagnosis.

Results: For individuals younger than 65 (N=30,304), the Kappa coefficient was 0.70 (95% CI, 0.69-0.70). PPV was 97.5% and 86.5% for Medicaid and private insurance, respectively. However, sensitivity was 69.8% and 88.4% for Medicaid and private insurance, respectively. For individuals 65 and older (N=59,344), the Kappa coefficient was 0.48 (95% CI, 0.69-0.70). PPV was 73.9% and 81.0% for Traditional Medicare and Medicare Advantage, respectively. However, sensitivity was 72.4% and 57.1% for Traditional Medicare and Medicare Advantage, respectively. For dually enrolled (Medicare and Medicaid), PPV was 27.1% and sensitivity 28.6%. Few patients transitioned from one payer to another within a year after diagnosis: 3.11% (95% CI, 2.91,3.33) for the under 65 and 0.90% (95% CI, 0.81,0.99) for those 65 and older.

Conclusions: Because of low sensitivity, comparisons between some payers have the potential to be biased due to misclassification. Nonetheless, cancer registry data could be used to identify enrollment in Medicaid and private insurance for individuals younger than 65 but the field does not accurately capture information in Medicare plans. Comparison across states is needed.

BRANY IRB as Central IRB for Review of VPR-CLS Linkage Requests: Purpose, Progress and Plans for 2022

Ms. Laura Donohue[1], **Ms. Raffaella Hart**[1], Ms. Linda Reuter[1], **Ms. Kimberly Irvine**[1]
[1]*Biomedical Research Alliance of New York, Lake Success, USA*

Cancer researchers can request data from U.S. central cancer registries to ascertain cancer outcomes for their existing study cohorts. To streamline the process, the National Cancer Institute (NCI), North American Association of Central Cancer Registries (NAACCR), and Information Management Services (IMS) have developed the Virtual Pooled Registry Cancer Linkage System (VPR-CLS), which provides an integrated system to efficiently facilitate study requests to link with and receive cancer outcome data from 46 U.S. registries.

Acquiring IRB approval from each registry takes time and resources from the requesting researcher and each involved registry and their IRB. The VPR-CLS is now adopting use of a Central IRB (CIRB) to simplify IRB review and comply with the Department of Health and Human Services regulations, which require single IRB review for research projects involving more than one institution. NCI has contracted with the Biomedical Research Alliance of New York (BRANY) IRB to serve as the CIRB for review of requests for individual-level data associated with VPR-CLS linkages. BRANY IRB will leverage the existing VPR-CLS application process to perform a single, centralized IRB review that covers all agreeable registries, thereby decreasing administrative burden and time to study initiation.

This presentation will describe and provide updates on the following multi-step process used to incorporate the BRANY IRB into the VPR-CLS. First, teleconferences between participating registries and BRANY IRB took place to better understand the local IRB review requirements for VPR-CLS requests. Second, reliance agreements were established allowing the registry's IRB to cede to BRANY IRB for review of these requests. Third, local, state, and organizational nuances were documented in a Local Research Context form, so BRANY IRB can account for them during the review process. Fourth, the CIRB will be pilot tested with an existing VPR-CLS study request to work through the CIRB review process, identify any issues, develop appropriate policies, and put in place a more informed workflow. Following the pilot, procedures for the CIRB process will be incorporated into the VPR-CLS workflow and continue to be refined for future requests expected to be received and reviewed by the CIRB throughout the remainder of 2022.

Breast Cancer Incidence and Trends among the Haudenosaunee Compared to the East Region and the United States, 1999-2018

Ms. Melissa Jim[1], Dr. Michelle Huyser[2], Dr. Stephanie Melkonian[1], Dr. Shannon Seneca[2], Ms. Corinne Abrams[2], Ms. Whitney Ann Henry[2], Mr. Cody Kelso[2], Dr. Rodney Haring[2]
[1]Division of Cancer Prevention and Control, Centers for Disease Control and Prevention, Albuquerque, USA, [2]Center for Indigenous Cancer Research, Roswell Park Comprehensive Cancer Center, Buffalo, USA

Identifying breast cancer incidence and trends are imperative steps toward early screening, treatment, and improved population health. Breast cancer incidence, stage at diagnosis, and trends of non-Hispanic American Indian and Alaska Native (NH AI/AN) populations were compared with those of non-Hispanic Whites (NHW) across the Haudenosaunee Nations regions in New York State (NYS), Indian Health Service (IHS) East region, and the United States (US). Tumor subtype based on estrogen receptor (ER) and progesterone receptor (PR) status in addition to human epidermal growth factor/neu receptor (HER-2) status were also examined. Data from the United States Cancer Statistics AI/AN Internal Analytic Database, which includes results from the linkage of IHS registration records with central cancer registries, were used for the analyses.

Results found that Haudenosaunee women in NYS developed breast cancer 1.4 times more than other tribes in the East region of the US between 2004-2018. Incidence rates (per 100,000) for Haudenosaunee women in NYS increased significantly by 2.7 percent annually between 1998-2018, while rates in East NH AI/AN women remain stable. Results also showed that early-stage breast cancer was higher in Haudenosaunee women compared to NH AI/AN women in the East (RR=1.51, 95% CI=1.21-1.89) but significantly lower than early-stage disease in NHW women in the US (RR=0.82, 95% CI=0.68-0.99). Rates of ER/PR positive breast cancers were higher in Haudenosaunee women compared to NH AI/AN women in the East (RR=1.34, 95% CI=1.09-1.65). Rates of HER-2 negative breast cancers were significantly higher in Haudenosaunee women compared to NH AI/AN women in the East (RR=1.43, 95% CI=1.11-1.83).

Findings provide guiding information that can help shape solutions for health care needs, screening, and patient navigation direction for the Haudenosaunee in NYS Indian Health Service clinics, not-for-profits working on and near territories, and adjacent safety-net providers.

Cancer Among Mainers 65 Years and Older and Differences in Stage at Diagnosis by Age

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Background: Maine has one of the oldest and most rural populations in the U.S. More than half (2018: 58.1%) of incident cases and nearly three-quarters (2018: 72.6%) of cancer deaths are among Mainers 65 years and older, yet little is known about differences in stage at diagnosis within this group.

Methods: We used SEER*Stat to analyze MCR incidence data, diagnosis years 1999-2018, by age (under 65 years, 65 years and older, 65-74 years, 75-84 years, and 85 years and older). We analyzed mortality using vital records from the same time period. These data were compared by sex, site, and stage at diagnosis to assess differences across age groups. We also explored differences in stage by geography, type of facility and area poverty. Joinpoint was used to assess trends over time.

Results: Cancer incidence and mortality rates in the 65 years and older group declined significantly over the last two decades (1999-2018). However, rates were higher than the U.S. which mirrors overall trends in cancer incidence and mortality. Site-specific cancer rates were consistently higher among Maine males than females 65 and older. A larger proportion of prostate, colorectal, lung and bronchus, and pancreas cancer diagnoses among the 85 and older age group were late or unstaged compared with the 65-74 and 75-84 year age groups. More than half of unstaged cancers among the oldest age group (85 and older) were reported only through death certificates. No clear trend emerged when exploring differences in stage at diagnosis by metropolitan versus non-metropolitan county or poverty area in Maine.

Conclusion: Mainers age 85 years and older were disproportionately diagnosed with late or unstaged cancer compared with all other age groups. The majority of unstaged cancers were reported through death certificates. As this segment of the population grows in the coming years, a more detailed understanding of the cancer experience across older age groups would benefit cancer prevention, treatment, and end-of-life care. Further exploration of underlying causes of differences in stage at diagnosis across age groups might inform efforts to improve care, diagnosis, and treatment for Mainers age 65 and older.

Cancer Among Refugees Resettled to Idaho During 2008-2019: A Proof-of-Concept Study

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Background: Disparities in cancer burden and outcomes according to socioeconomic characteristics have been extensively characterized for US populations. The cancer experience of refugees, who may share characteristics of other socioeconomically disadvantaged populations and also experience distinct barriers to care, has not been described previously. We conducted a proof-of-concept study evaluating our ability to characterize cancer incidence in refugees resettled to Idaho via a novel linkage of cancer data and administrative data characterizing refugee arrivals to Idaho.

Methods: In July 2021, the Cancer Data Registry of Idaho probabilistically linked cancer surveillance data and refugee arrival data (2008–2019 diagnosis and arrival years) collected through the Centers for Disease Control and Prevention's Electronic Disease Notification (EDN) System. We used SEER*Stat to calculate standardized incidence ratios (SIR) for malignant tumors and benign/borderline malignant brain and other nervous system (ONS) tumors using Idaho-specific and Surveillance, Epidemiology, and End Results (SEER) Program referent incidence rates.

Results: 60 malignant and 7 benign brain and ONS tumors were diagnosed among 9,499 refugees resettled to Idaho. Refugees had fewer than expected malignant tumors overall (57 observed vs 96.0 expected; SIR, 0.60; 95% CI, 0.45–0.77). An excess of tumors of the esophagus were diagnosed among Southeast Asian refugees (4 observed vs 0.64 expected; SIR, 6.3; 95% CI, 1.7–16.0). We also used EDN data to update country of birth for linked persons.

Conclusions: Linking EDN refugee data to cancer surveillance data presented unique challenges. However, we used a novel data source to augment cancer data and characterize incidence in refugees, potentially improving our ability to serve this vulnerable population.

Cancer Incidence in Young Adults in Alaska

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Background: The Alaska Cancer Registry (ACR) investigated cancer incidence rates for young adults (ages 20-49) versus older adults (ages >=50) for various cancers in Alaska residents. While incidence trends for most cancers for both age groups show a decreasing trend over time (such as lung and bladder), there are a few cancers that show an increasing trend for both age groups (such as thyroid and melanoma). But the most striking contrast between these two age groups is for colorectal cancer, which has a decreasing trend for older adults but an increasing trend for young adults. This revelation in national studies published over the last few years resulted in changing the minimum age for national colorectal cancer screening guidelines from 50 to 45 in 2021.

Purpose: To investigate why colorectal cancer incidence trends in Alaskan young adults and older adults are different.

Methods: Only 14.1% of all colorectal cancer cases occur in young adults. When analyzed by sex, both young adult males and females exhibit this increasing trend over time. So what makes this age group different from its older counterpart? Obesity and tobacco use are both risk factors for colorectal cancer. National studies have suggested that these two risk factors probably contribute to the young adult trend, but more definitive supporting data has been lacking. ACR collects data on height, weight, and smoking history of cancer patients at diagnosis. Using this information, ACR examined BMI and tobacco use of colorectal cancer patients for these age groups to investigate if they may contribute toward the observed incidence trends.

Results: BMI trends over time for colorectal patients who are overweight or obese show an increasing trend over time for young adults but no change over time for older adults. Smoking trends over time for colorectal cancer patients who are former or present smokers show a slight increasing trend over time for younger adults and a slight decreasing trend for older adults.

Conclusions: These data support the theories put forward by national researchers and is one of the first times that cancer registry behavioral risk factor data have been used in this way.

Census Tract-Level Socioeconomic Variables and Breast Cancer Characteristics and Outcomes in California and New York State: Validated Analyses of Synthetic Census Tract Cancer Registry Data

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Background: In 2020, the National Cancer Institute solicited projects using synthetic census tract data for California, with the goal of comparing and validating results using synthetic versus actual census tracts. The New York State (NYS) Cancer Registry examined associations of census tract-level socioeconomic variables with breast cancer stage, grade, subtype, and survival in California and NYS, to assess the impact of regional socioeconomic factors on breast cancer prognosis and outcomes.

Methods: The analysis included invasive, first primary breast cancers diagnosed between 2006-2017 in females aged ≥18 in California (N=237,156) or NYS (N=149,789). Exposures including percent unemployed, uninsured, without a high school diploma, or below the poverty line, median household income, and Gini index of income inequality, as well as area deprivation index (ADI) at the block group level for NYS, were categorized in quintiles with quintile 5 corresponding to the greatest disadvantage or inequality. We used SAS 9.4 GLIMMIX and PHREG procedures to conduct multivariable-adjusted logistic and Cox proportional hazards regression analyses of stage, grade, subtype, and overall and cancer-specific survival. We conducted separate analyses for California and NYS and compared the results for the two states as well as the synthetic (with 10 iterations per case) versus actual census tract data for California.

Results: Results for the actual California census tract data are presented, but estimates for the synthetic data were similar. With the exception of income inequality, greater disadvantage for each socioeconomic variable was statistically significantly associated with more advanced stage, higher grade, higher-risk subtypes, and poorer survival in both California and NYS. In both states, higher non-completion of high school was most strongly associated with advanced stage at diagnosis. In California, lower median household income, higher percent uninsured, and higher non-completion of high school were most strongly associated with overall and cancer-specific mortality, while in NYS lower median household income and higher ADI had the strongest associations with mortality.

Conclusion: Our results indicate that residence in more disadvantaged census tracts is associated with poorer breast cancer prognosis and outcomes. These associations were similar across states and using synthetic California census tract data to approximate actual census tracts.

Choice of Survival Metric and its Impacts on Survival Estimates for American Indian and Alaska Native People; Variations by Cancer Site, Age, and Purchased/Referred Care Delivery Area.

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Background: Different survival metrics (net, crude) utilize different methodologies, and have different applicability in clinical practice and research. Results from studies utilizing different metrics may not be directly comparable; doing so may bias our understanding of cancer health disparities. In this presentation, we share results of a study to evaluate how choice of survival metric influences assessment of cancer survival specifically among American Indian and Alaska Native (AIAN) people. A secondary objective was to present survival probabilities for the leading cancers among AIAN people.

Methods: Five-year age-standardized cancer survival was estimated in SEER*Stat using the NAACCR Cancer in North America dataset. We estimated survival probabilities among AIAN people, compared to non-Hispanic whites (NHW) using four approaches: 1) observed (crude) survival, 2) cause-specific survival, 3) relative survival using age- and sex-adjusted lifetables and 4) relative survival using life tables additionally adjusted for race, geography, and socioeconomic status. For AIAN people only, we also evaluated how survival varied by age, stage at diagnosis, and Indian Health Service (IHS) region.

Results: As expected, there were differences in five-year probability estimates for each of the survival metrics evaluated. For instance, observed survival methods produced the lowest estimates, and with the exception of prostate cancer, cause-specific methods produced the highest survival estimates. Among AIAN people, there were differences in relative survival estimates calculated using the more general, versus the newer race and SES-adjusted life tables. Survival measured with each metric was lower among AIAN people than NHW.

Conclusions: Conclusions related to cancer survival disparities among AIAN people are unlikely to be substantially affected by choice of survival metric, as long as the same metric is used in comparisons.

COVID-19 Hospitalizations among Cancer Patients: A Linkage of Claims Data from a New York State Hospital Discharge Database to the New York State Cancer Registry (NYSCR)

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Background: Patients with a past diagnosis of cancer may be more susceptible to severe COVID-19 due to immunosuppression, comorbidities, or ongoing treatment. We linked claims data on COVID-19 hospitalizations to cancer diagnoses from the NYSCR to examine associations between prior cancer diagnosis and hospitalization for COVID-19.

Methods: New York State (NYS) residents diagnosed with invasive cancer before 7-1-2021 who were alive on 1-1-2020 were identified from NYSCR data. Claims data for 2020 and the first half of 2021 were obtained from NYS's Statewide Planning and Research Cooperative System (SPARCS), which includes ambulatory, emergency, inpatient, and outpatient claims. Only inpatient records with COVID-19 as the primary diagnosis were used for this study. We calculated descriptive statistics for cancer cases with, versus without, COVID-19 hospitalization for the following demographic and tumor characteristics: age, gender, race/ethnicity, region of residency (NYC or non-NYC), cancer type, stage, recency of cancer, and vital status at discharge. We used multivariable-adjusted logistic regression and Chi-square tests to estimate associations between the above variables and COVID-19 hospitalization. All analyses were conducted in SAS 9.4.

Results: Our analysis included 1,257,377 individuals with a prior cancer, 10,210 of whom had a subsequent primary COVID-19 hospitalization. Factors independently associated with COVID-19 hospitalization among cancer patients included: older age; male gender; non-Hispanic Black race; Hispanic ethnicity; diagnosis with late-stage cancer or with multiple tumors; recency of cancer; and NYC residency. In unadjusted analyses of 24 cancer types, the highest rates of COVID-19 hospitalizations were among patients with multiple myeloma, leukemia, lung cancer, other hematopoietic cancers, liver cancer, and non-Hodgkin lymphoma. Among 77,338 total primary COVID-19 hospitalizations, unadjusted analyses of vital status at discharge indicated a statistically significant higher percentage of death at discharge among patients with versus without a history of cancer (22.8% versus 14.7%; p<.0001). Among the 10,210 linked cases with a prior cancer, those with active cancer diagnosis claim codes had a higher percentage of death at discharge than patients without active cancer codes (25.3% versus 21.7%, p<.0001).

Conclusion: This claim-based study identified higher proportions of COVID-19 hospitalizations in certain demographic and diagnostic groups. Additional analyses are ongoing.

Data Quality Evaluation of CDC's National Program of Cancer Registries: Completeness Results

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Background: The CDC's National Program of Cancer Registries (NPCR) Data Quality Evaluation (DQE) is an ongoing activity auditing Central Cancer Registries (CCR)'s data collection. The aim is to timely identify best practices to address challenges, and to determine training needs to improve data quality.

Purpose: To share recent DQE results on completeness of staging and treatment data items across 47 NPCR-funded Central Cancer Registries (CCRs) and to discuss follow back findings of 17 CCRs.

Methods/Approach: We used NPCR 2020 submission data to evaluate completeness of staging and treatment data items of melanoma of the skin, urinary bladder, pancreas, kidney and renal pelvis, and ovary cases diagnosed in 2018. We included 47 CCRs, excluded DCO cases, and defined incomplete as the proportion of cases coded to unknown by primary site and data item. We identified CCRs above the upper fence for percentage of unknown. Upper fence was calculated as Q3 + 1.5 (Q3 - Q1), where Q3 indicated the 75th percentile and Q1 indicated the 25th percentile. Seventeen CCRs were then selected to follow back on selected data items to obtain unknown information and to identify reasons for "unknown". Each CCR followed back on a sample of 375 cases maximum.

Results: The following data items had the highest percentage of unknown for each site: melanoma of the skin with regional nodes examined (12.5%) and summary stage 2018 (9.0%), urinary bladder with grade post therapy (51.5%) and tumor size summary (44.4%), pancreas with grade post therapy (28.3%) and tumor size summary (17.1%), kidney and renal pelvis with grade post therapy (63.9%) and grade pathological (15.1%), and ovary with grade post therapy (39.0%) and tumor size summary (32.4%). The data items with the highest number of CCRs above the upper fence for unknown values with all cancers combined were RX Summ--Surg/Rad Seq (33), RX Summ--Systemic/Sur Seq (33), reason no radiation (25), and reason no surgery (23).

Conclusions/Implications: The results provide information about the areas where CCRs could focus to complete unknown values. These findings could be used to inform CCRs' training activities and future decisions on data collection.

De-identification Tool for HL7 Formatted Reports

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Background: Developing and testing new software requires a vast amount of sample data for testing. Sample data must resemble real data as closely as possible, but the identifying information from the real data needs to be masked per HIPAA rules. To assist in the development of the NPCR National Oncology rapid Ascertainment Hub (NPCR-NOAH) for the STAR project, the Nebraska Cancer Registry (NCR) developed a de-identification tool to generate sample HL7 files from real HL7 files.

Purpose: HL7 messages contain 49 data fields that need to be de-identified per the "Safe Harbor" method of the HIPAA Privacy Rule. The NCR needed to create a tool to replace the 18 types of identifiers of the individuals or of relatives, employers, or households.

Methods: The tool looks for identifiable data fields in the HL7 file and replaces identifiers with pseudodata. The most challenging field was OBX-5, which records the text of the pathology report and was vitally important for abstraction. Identifiers, such as the patient's name or provider's name, might also be embedded in the text. The tool needs to retain as much diagnostic text as possible, while masking all identifiers. The current solution is to check if identifiers in the other 48 fields are present in OBX-5, and then mask those identifiers rather than the entire text. The limitation is that the tool cannot mask identifiers that are not in those 48 fields, especially the provider's information. To reduce the chance of missing identifiers in OBX-5, the tool further allows users to add extra identifiers that could possibly appear in OBX-5.

Results: Manual de-identification usually takes 10-30 minutes to process one HL7 message, while automatic de-identification, using this tool, takes only 3-30 seconds to process 10,000 messages, depending on the message length. The tool accurately pinpoints the identifiers for 98% of data fields that need to be de-identified and the remaining 2% (OBX-5) are manually processed.

Conclusions: The de-identification tool has greatly increased efficiency and was applied to ePath for Nebraska and other states. More improvements are under development, including building a user interface and employing Natural Language Processing (NLP) models.

Developing a Process to Enhance the Accuracy of Geocoded Residential Addresses

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Background: The places people reside throughout their lives play an important role in their health and health-related behavior. The growing interest to incorporate residential histories into cancer surveillance and research also demands higher geocoding accuracy. This project aimed to streamline the process of cleaning residential addresses and improve the geocoding results returned by the Automated Geospatial Geocoding Interface Environment (AGGIE) system, a geocoding platform for open use by U.S. cancer registries, with additional open-source geocoding services.

Methods: We retrieved the residential histories of New York State (NYS) residents diagnosed with mesothelioma during 2011-2015 from the NYS Cancer Registry, the NYS inpatient claims data, and LexisNexis. We used AGGIE to parse and reconstruct the addresses. We geocoded addresses using AGGIE, Google, and the US Census Geocoder. We validated geolocations returned by AGGIE with a matching status of "review" or "non-match" by comparing them with those returned by Google or the Census Geocoder at 2010 block group level.

Results: Excluding PO Boxes, zip-only addresses, and addresses with partial information, there were 5,134 unique addresses after a total of 7,612 raw addresses were parsed and reconstructed. Of these unique addresses, 2,922 (56.9%) were geocoded by AGGIE with a matching status of "review" or "non-match". Of these, 307 (10.5%) returned different block group values or failed to be geocoded by other geocoding applications. Of these, we accepted the geolocations of 120 addresses returned by the Census Geocoder since their geocoding status was "match - exact" or they had the same block group values as retrieved by Google. As to the remaining 187 addresses, manual review was still needed to assess the validity of the address itself and/or the accuracy of the geolocation returned by AGGIE.

Discussion and Conclusions: Each of the three geocoding applications used by this study has its own strength and weakness. The parsing/reconstructing step increased the number of addresses that were geocoded by Google and the US Census Geocoder. By using other applications to verify geolocation returned by AGGIE, we greatly reduced the number of records requiring manual review, while retaining maximal information for future data analysis.

Disparities in Cancer Rates, Trends and Stage by Persistent Poverty, Race, and Ethnicity

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Background

The U.S. Department of Agriculture (USDA) Economic Research Service has defined areas of persistent poverty (PP) as counties where 20 percent or more of residents were poor as measured by each of the 1980, 1990, 2000 censuses, and 2007-11 American Community Survey 5-year average. NCI has worked with USDA to identify census tracts across the U.S. that meet this same definition. Classifying PP at the census tract allows for more accurate identification of areas with extreme poverty, particularly for distinguishing poor areas that may fall within cities or counties with large variability in economic status.

Methods

A flag was added to a specialized SEER incidence dataset in SEER*Stat that identified cases that live in PP census tracts, allowing for the comparison of individuals living in PP with those who do not. This analysis looks at incidence rates, trends, and stage distribution by PP for cases diagnosed between 2006 and 2018 and investigates if the impact of PP varies by race/ethnicity. Sites where selected that have significant opportunity for screening or prevention: female breast, colorectal, cervical, lung and bronchus, and liver and intrahepatic bile duct.

Results

Generally, PP census tracts had higher incidence rates than non-PP tracts, except for female breast cancer where non-PP tracts had higher rates. Cases in PP census tracts had a higher percent of late-stage disease in all sites considered, with the smallest difference seen in liver cancer. Difference in level and trends for PP compared with non-PP varied by race/ethnicity. Smaller differences were seen within non-PP census tracts, suggesting poverty may play a large role in observed differences between race/ethnicity. Non-Hispanic American Indian/Alaska Native had lower rates in PP areas for lung and liver cancer.

Conclusion

Focusing on areas of PP is important to understand the impact of long-term poverty on cancer risks. Areas of PP are associated with increased risk, delays in diagnosis and treatment, and worse survival. Accounting for this important variable in cancer statistics can help researchers identify and develop interventions to address and reduce inequities.

Early- and Late-Stage Colorectal Cancer (CRC) Survival for Young People in California by Health Insurance Type, 1997-2017

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Background

Colorectal cancer (CRC) incidence rates have been increasing among young people in California. However, impacts of health insurance type on 5-year relative survival are unclear for young persons under the age of 50.

Purpose

To investigate the association of health insurance type with 5-year relative survival for younger patients diagnosed with early- and late-stage CRC in California.

Methods/Approach

We used SEER*Stat software for patients 20-49 years old diagnosed from 1997 to 2017 identified in the California Cancer Registry. Health insurance type was divided into four groups (Private, Medicaid, Not Insured, and Other), with age grouped into 10-year intervals. Five-year relative survival percentages and 95% confidence intervals were compared to evaluate differences in survival by health insurance type.

Results

Among 8,498 patients with early-stage CRC, significantly higher survival was observed in 30-39 and 40-49 age groups with private insurance (97.1%, 95.7%) compared to those who were uninsured (89.1%, 90.9), had Medicaid (84.6%, 83.0%), or other insurance type (89.5%, 82.3%). Among 17,804 patients with late-stage CRC, survival was significantly higher among the 20-39 age groups with private insurance (57.3%, 60.0%) compared with the uninsured (36.3%, 42.4%) and Medicaid (32.1%, 42.6%) groups. Those with late-stage CRC, diagnosed when 40-49 years old, and with private insurance had significantly higher survival (58.2%) than those uninsured, with Medicaid or other insurance (44.0%, 39.4%, 40.8%), respectively.

Conclusion

Among young people in California diagnosed with CRC, those with private insurance had significantly higher survival. To address observed disparities, patients need reliable health insurance that provides comprehensive care.

Early-Onset Colorectal Cancer Survival and Mortality in the American Indian and Alaska Native Population

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Background: Colorectal Cancer (CRC) incidence and mortality is declining overall but increasing in young adults, especially among American Indian and Alaska Native (AIAN) individuals, who already bear a disproportionate burden of disease. Information has not been reported on early-onset CRC outcomes in this population and how they compare to that in Whites.

Purpose: Comprehensively examine nationwide CRC mortality and PRCDA-restricted survival adjusted for racial misclassification in medical records in ages 20-54 years among AIAN individuals compared to Whites.

Methods: All-county mortality data (1998-2019) for non-Hispanic decedents were obtained from the National Center for Health Statistics (NCHS) and stratified by age. Racial misclassification adjustment ratios were provided by NCHS. Rates and rate ratios (RR) with 95% confidence intervals (CI) were calculated using SEER*Stat (version 8.3.9). The 10-year average annual percent change (AAPC) in rates was calculated using Joinpoint regression. Five-year relative survival rates were based on cases among non-Hispanics, in PRCDA counties for AIAN individuals, in the SEER 18 registries during 2011-2017 followed through 2018.

Results: In 2015-2019, CRC mortality in ages 20-49 years was higher among AIAN individuals than Whites (4.78 versus 3.09 deaths per 100,000 population, RR: 1.55; 95%CI,1.43-1.67) and was similarly elevated among those aged 50-54 (21.73 versus 14.16 deaths per 100,000 population, RR: 1.54; 95% CI,1.39-1.68). From 2010-2019, the pace of the annual increase in mortality among AIAN individuals was double that among Whites, 3.2% (95%CI,1.7%-4.8%) versus 1.8% (95%CI,1.4%-2.3%) in ages 20-49 and 2.6% (95%CI,1.0%-4.3%) versus 1.0% (95%CI,0.6%-1.4%) in ages 50-54. Five-year relative survival is lower among AIAN individuals aged 20-49 years overall (60% versus 69%) and for all stages of diagnosis (e.g. 72% versus 82% for regional stage disease). Survival disparities are much wider for rectal cancer than for colon cancer (e.g., 49% versus 82% for regional stage rectal cancer compared to 83% versus 82% for colon cancer).

Conclusions/Implications: Early-onset CRC mortality among AIAN individuals exceeds that among Whites and is increasing rapidly. The disproportionate burden is partly explained by wide survival deficits for every stage of disease, highlighting the need for national prioritization of improved access to high-quality cancer care for AIAN individuals.

Endometrial Cancer Survival Disparities amongst Populations of African Descent in Florida and the French Caribbean

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Background: Racial/ethnic disparities in endometrial cancer (EC) represent one of the greatest health inequalities in the US, following decades of structural racism and socioeconomic disadvantages. Women of African descent are disproportionately affected by nonendometrioid (e.g., serous and carcinosarcoma) versus endometrioid histologies. A comparison between populations of African descent from countries with a high development index is lacking.

Purpose: To examine the survival outcomes amongst African descent women with EC residing in the US (US-born and Caribbean-born Blacks) and comparable population in Guadeloupe and Martinique (part of the Republic of France).

Methods: We analyzed EC cases (n=5,147) from Florida (2005-2018), Martinique (2005-2018), and Guadeloupe (2008-2018) Cancer Registries. Chi-square tests, Kaplan-Meier methods, and all-cause Cox proportional hazards models were used in the analysis.

Results: Nonendometrioid histologies were present in a higher proportion of ECs in the US (31% for US-Born and 33% Caribbean-born Blacks) than in the French Caribbean (25%) ($p<0.001$). For all EC cases combined, after adjusting for age, histology, stage at diagnosis, grade, receipt of surgery, and poverty level, women in the French Caribbean had a higher risk of death from all causes (HR 1.17, 1.02-1.34) in comparison to US-born Black women while Caribbean-born Black women in the US had lower all-cause mortality (HR 0.83, 0.74-0.92). For endometrioid histologies, there were no differences between US-born Blacks and the French Caribbean (HR 1.00, 0.82-1.22). However, French Caribbean women with nonendometrioid carcinomas had a 36% (HR 1.36, 1.11-1.68) higher risk of death than US-born Black women. Caribbean-born Black women in the US did not differ from their US-born counterparts (HR 0.95, 0.81-1.12).

Conclusion: Survival between the US and the French Caribbean is similar for endometrioid but worse in the French Caribbean for the more fatal nonendometrioid histologies. Causes of this disparity, including interaction with the health system, compliance with treatment protocols for serous and carcinosarcoma ECs, and possible other local exposures linked to the severity of tumors in the French territories, deserve further research.

Enhancing Cancer Surveillance Capabilities: Lessons Learned from Colorado's Statewide Collection of Emergent Biomarkers

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Background: Given new oncology discoveries, including opportunities for personalized medical treatment based on genomics and biomarkers, there is growing interest in collecting new and emerging prognostic factors to determine whether and how these data can impact clinical and individual decision making and inform public health along the cancer continuum. Historically, central cancer registries have not been nimble in their ability to add new data items for population-based data collection.

Method: The Colorado Central Cancer Registry (CCCR) embarked on a multi-phase effort to examine the availability of select biomarkers, established statewide requirements for their collection, and assessed the overall feasibility and barriers to the collection of select prognostic factors to the state cancer registry. Using medical records from cancers diagnosed in 2017, the CCCR reviewed hospital-documented biomarker data to determine data available for coding and analysis. The CCCR aligned facility coding with the College of American Pathologists (CAP), Site Specific Data Items (SSDI), American Joint Committee on Cancer (AJCC), and National Comprehensive Cancer Network (NCCN) guidelines to create a standardized code set for each biomarker. Colorado incorporated new biomarker coding standards into CCCR software and trained facility registrars on data collection procedures, code sets, quality control procedures and edits for incorporation into their electronic data collection systems. Additionally, CCCR surveyed registrars to evaluate their overall experience in the collection of new data items.

Results: Starting with diagnosis year 2018, CCCR required facilities to document select biomarkers in text fields. Hospitals modified software, implemented existing electronic pathology reporting protocols, and updated infrastructure so that the biomarker data for 2019 diagnoses could be directly coded. We will present on 2018 and 2019 data submitted to CCCR, comparing the text-field and coded biomarker data, along with information from hospital registrar questionnaires.

Conclusion: Rigorous steps to vet new data items are required to ensure that they are available in medical records, collected consistently and meaningful for research and public health action. CCCR will use biomarker submission results and the input from hospital registrars to assess the sustainability of biomarker data collection as a permanent part of Colorado's required cancer data fields.

Establishing Data Governance Requirements to Modernize Cancer Surveillance for Data Collection, Processing, and Analytics

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Background: More than 1.7 million new cases of cancer are reported every year and that number is expected to grow. In July 2021, Centers for Disease Control and Prevention/National Program of Cancer Registries (CDC/NPCR) commenced a Data Modernization Initiative (DMI) with the goal of modernizing and improving electronic data exchange and timeliness of data reporting to Central Cancer Registries (CCRs). To ensure that data reporters have the ability to submit cancer data in real-time as a part of the DMI efforts, CDC/NPCR is developing and testing the cancer surveillance cloud-based computing platform (CS-CBCP). The goal of the platform is to assist CCRs with data acquisition, processing, storage, and reporting, while alleviating privacy and security concerns in light of increased cybersecurity threats. Data governance and security of the environment ("cloud") where the activities are performed on the data are of the utmost importance to CDC/NPCR as development of the CS-CBCP is underway.

Purpose: The CDC/NPCR established a Data Governance Workgroup (DG-WG) to craft the requirements for CS-CBCP. The DG-WG has the goal of producing a final report that outlines the key requirements of what is necessary to govern and maintain multi-state cancer surveillance data in the CS-CBCP.

Approach: The DG-WG met with CCRs on a monthly-basis over twelve months to incorporate their suggestions and address the concerns identified in a consensus-driven approach towards the development of requirements for the CS-CBCP.

Results: This presentation will discuss the DG-WG's governance structure along with an outline of activities crafted for the year-long engagement sessions with CCRs such as – (1) data access standards, (2) security standards (FISMA, NIST, and FedRAMP), (3) roles and responsibilities of the key actors in CS-CBCP (CDC, states/grantees, honest broker, and cloud service provider), (4) honest broker relationships, and (5) business service agreements to ensure the success of the CS-CBCP.

Conclusion: Policies related to data ownership, user access, security controls, data integrity and recovery, liability, and agreements are found to be pivotal for the CCRs towards the development of a cloud environment for the maintenance of a multi-state cancer surveillance data.

Estimating the Number of Men Living with Metastatic Prostate Cancer in the United States

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Background: Metastatic prostate cancer (MPC) includes metastases detected at diagnosis (de novo) and those occurring later (recurrent). We use cancer registry data to estimate the number of men living with MPC in the US [1].

Methods: We apply a back-calculation method to estimate MPC incidence and prevalence from US prostate cancer (PC) mortality and MPC survival [2]. The method is based on an illness-death process and assumes that each observed PC death is preceded by a de novo or recurrent MPC diagnosis. We extracted PC mortality and de novo MPC relative survival from the Surveillance, Epidemiology, and End Results (SEER) registry using data from 18 registries between 2000 and 2017. We assumed equal survival for de novo and recurrent MPC.

Results: We estimate that on January 1, 2018, there were 120,368 men living with MPC in the US, with 45% diagnosed with de novo MPC and 55% diagnosed with early-stage disease who progressed to MPC. The proportions of prevalent cases diagnosed with de novo MPC were similar for White and Black men. Nearly 13% of prevalent cases have been living with MPC for more than 10 years. By 2030, 192,540 men are expected to be living with MPC in the US.

Conclusions: Recent increases in MPC prevalence may reflect improvements in treatment including novel anti-androgen. Our prevalence projections may be an underestimate as new imaging techniques with improved detection of metastases, such as PSMA-PET, may increase the numbers of men diagnosed with MPC in the future.

Impact: The anticipated increase in MPC prevalence and the large fraction of recurrent MPC among prevalent cases highlight the importance of surveillance and the need for improved management of high-risk localized disease and biochemical recurrence.

References

1. Mariotto A, Etzioni R, Hurlbert M, Penberthy L, Mayer M. Estimation of the number of women living with metastatic breast cancer in the United State. *Cancer Epidemiol Biomarkers Prev* 2017;26:809-15.

2. Verdecchia A, Capocaccia R, Egidi V, Goldini A. A method for the estimation of chronic disease morbidity and trends from mortality data. *Stat Med* 1989;8:201-16.

Extending the National Interstate Data Exchange Agreement to Caribbean National Cancer Registries

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The IARC Caribbean Cancer Registry Hub, based at the Caribbean Public Health Agency (CARPHA), supports efforts to improve the availability of high-quality data on cancer incidence in the Caribbean. In many Caribbean countries, the facilities required for timely diagnosis and treatment of cancer are limited and consequently, persons seek medical services abroad, including in the United States (US). Information on cases seen abroad is currently not shared with the cancer registry in the corresponding country of residence, and this represents a major challenge to the completeness of registry data in the Caribbean region.

The IARC Caribbean Cancer Registry Hub worked with NAACCR to facilitate a solution to this challenge via data exchange between the US and Caribbean cancer registries. A single National Interstate Data Exchange Agreement ("Agreement"), developed and managed by NAACCR, allows US Central State registries to exchange data on cases diagnosed or treated in other US States that have also signed the Agreement (1). NAACCR indicated that it would be appropriate and acceptable for national cancer registries in the Caribbean to sign this Agreement.

The Bermuda National Tumour Registry expressed an interest in obtaining data on Bermudian residents diagnosed and treated in Massachusetts. The Agreement used to facilitate this exchange was signed by the Bermuda National Tumour Registry in January 2020. In February 2021, the Massachusetts Cancer Registry shared data on 1,139 cases diagnosed between 1995 and 2020. An average of 266 cases were registered annually by the Bermuda registry between 2007 and 2016; this potentially represents many missing cases. One challenge was re-formatting this data into a version compatible with the Bermuda National Tumour Registry applications. Once this is completed, the records will be matched using CanReg5 (2) and Match*Pro (3) and the results compared and provided. Records will then be updated, or new case records added to the Bermuda dataset.

We expect this data exchange to improve data completeness for the Bermuda National Tumour Registry significantly. Based on the Bermuda experience, this approach will be extended to the other Caribbean countries.

1. https://www.naaccr.org/national-interstate-data-exchange-agreement
2. IACR - CanReg5
3. https://surveillance.cancer.gov/matchpro/

From Case-Finding to Tumor Abstraction to Clinical Trials Matching - Advances in AI/NLP

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Free text medical reports contain a wealth of information, and the volume of these reports is increasing almost exponentially each year. The automated interpretation of these data promises to achieve all sorts of benefits in terms of accuracy, reduction in human labor, higher throughput and increased opportunities for analysis. Currently automated systems such as E-Path perform some level of data extraction but are limited to specific use-cases like the identification of reportable tumors. The ability to extract a much larger corpus of information would provide added automation to things like tumor abstraction, data collection for studies and even matching patients to clinical trials.

We present advances in medical report processing that significantly increases the number and variety of data elements which can be reliably extracted. Not all data elements are the same though, some can be interpreted directly from text such as tumor size, lymph node or margin involvement, whereas others need domain knowledge and require interpretation of several data points, for example, determining the SEER 2018 tumor primary site, morphology, topography, laterality and grade. For these "inferred" data values, an explanation of the reasons or rules for the determination as well as a confidence level is an important aspect for system useability.

We show real life impact where this technology reduces the effort for tumor abstraction, data gathering and quality monitoring and greatly reduces the time for clinical trials accrual. There is potential for even more impact if utilized on a larger scale as in automated data collection from the SEER network.

Identifying Duplicate Cancer Cases across State Boundaries: Pseudonymization as a Method to Encrypt Identifiers

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Identifying potential duplicate cancer cases across state boundaries has been a topic of interest for many years. Duplicate cases may distort our understanding of the burden of cancer in a state, region, or nationally, and waste cancer surveillance resources. We report a pilot quality improvement project to use a publicly available tool to encrypt a standard set of patient identifiers and then link cases across state boundaries to identify and reconcile possible duplicate cases among a group of neighboring states – Maine, New Hampshire, Rhode Island and Vermont. Encryption of identifiers allows states to identify duplicates without sharing protected health information for cases that may not belong to the other states. This approach can address complex issues around data release. Registries benefit by resolving duplicate reports including potential death clearance only (DCO) cases. We will describe the protocol, challenges, and preliminary results, and suggest future efforts. We will make the protocol and SAS code freely available.

Identifying Individual and Neighborhood Level Factors for Female Breast Cancer Treatment and Survival

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Background: Breast cancer is the most common cancer in women. Both individual-level and neighborhood-level factors affect its occurrence, treatment, and survival. We applied a classical statistical learning method, least absolute shrinkage and selection operator (LASSO), to identify important predictors of breast cancer treatment and survival.

Method: We analyzed records of 62,206 patients diagnosed between 2014 and 2017 in the Synthetic California Breast Cancer Registry data. Potential predictors for cancer treatment (surgery, radiation, chemotherapy, or any of the above three treatment) and survival (overall and breast-cancer-specific) included 8 individual-level factors and 8 census-tract level factors. We applied LASSO with cross validation (7:3 training/test ratio) to select important predictors, which were then used in a logistic and Cox regression model to respectively investigate their associations with the treatment and survival outcomes measured by odds ratios (OR) and hazard ratios (HR).

Results: All individual-level factors (age, race, Hispanic ethnicity, marital status, insurance type, cancer stage, grade, and laterality) were selected as important predictors for all six outcomes. Among census-tract-level factors, median household income and urbanicity were consistently selected, but not the others (education, poverty, unemployment, working class, median house value, and median rent). Higher odds of having any treatment were among patients who had localized (OR=4.89 95%CI 3.08-7.78) or regional stage (OR=4.00 95%CI 2.43-6.58) than those with distant stage, and patients resided in tracts with higher median household income (OR=1.16 95%CI 1.07-1.25). Better overall survival was among patients who were younger (22-54 vs 55-64 years: OR=0.62 95%CI 0.55-0.69), Hispanic (HR=0.81 95%CI 0.73-0.89), married (HR=0.72 95%CI 0.66-0.79), insured (HR=0.83 95%CI 0.77-0.91), and with localized (HR=0.09 95%CI 0.08-0.10) or regional stage (HR=0.23 95%CI 0.21-0.25) and lower grade cancer (HR=0.76 95%CI 0.67-0.86), as well as lived in tracts with higher education level (HR=0.60 95%CI 0.39-0.94) and higher income level (HR=0.96 95%CI 0.94-0.98).

Conclusion: Our analyses demonstrate the utility of the LASSO in identifying key predictors for breast cancer treatment and survival. The patterns of the selected variables may suggest there exist inherent variables for understanding cancer treatment and outcome. However, further verifications are needed with inclusion of a wider set of potential candidate variables.

Implementation of Version 9 AJCC Cancer Staging System

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In 2022, the AJCC will update and publish several disease sites in Version 9 Cancer Staging Protocols for clinicians and cancer registrars. The session will provide an overview of how the AJCC has moved from Editions to Versions, chapters to protocols, and provide a preview of the disease sites that will be published in the coming months. Learn about the AJCC's ongoing collaboration with cancer surveillance partners, software vendors, and the greater cancer community for the implementation of the staging changes. See the timelines for availability of new AJCC content and software implementation, as well as a preview of anticipated updates for 2023.

Improving Cancer Registry Processes Workflow, Monitoring, and Accountability using Power BI

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Problem: Cancer registries receive data from multiple sources in various forms. Tracking that data and accounting for all cases is a tedious task. Data processing involves several software tools and databases, so tracking a file across various stages of the overall process is challenging.

Solution: Myriddian, the vendor of the Maryland Cancer Registry, utilized Microsoft Power BI to generate interactive reports that collate data from the different sources, regardless of their formats, and compile them in a single layout.

Results: The layout delineates which stage of quality assurance processing the data is in. The data are presented as HIPAA compliant reports, making it possible to share such reports widely. The reports are also customizable so that they can be easily tailored to meet the end-user's needs. These include the Facilities Report, Web Plus Submission Status Report, Web Plus Export Status Report, and MU Submissions File Report.

The Facilities Report shows data abstracts based on diagnosis year, previous years' performance, facility type, pending status, and void status to help track the progress towards completion.

The Web Plus Submission Status Report tracks all files that were uploaded to Web Plus. This report shows the record counts as they are processed and transition from Web Plus, to Prep Plus, and finally to CRS Plus. Any data discrepancies from one stage to the next are highlighted in red for quick review.

The Web Plus Export Status Report is used to track data bundles that were exported from Web Plus and tracks the record counts for each database highlighting any differences. This report also lists any files that have missing cases in CRS Plus for review.

The Meaningful Use Files Report allows Myriddian to track all cases that were uploaded to the FTP server and Web Plus.

Conclusion: Introducing Power BI tracking has allowed Myriddian to:

- Track facility submissions dynamically
- Prioritize work assignments based on caseload
- Eliminate labor-intensive manual tracking
- Improve tracking and monitoring of progression of files processing
- Identify and review any missed cases and/or files; and,
- Improve accountability of all files submitted to the Central Registry.

Improving Documentation Accuracy of Patient Research Participation Choices

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Background:

Cancer registries are a robust source of data for population-based studies of cancer patients and survivors. Registry databases typically include a "do not contact" (DNC) flag and accompanying reason codes to identify individuals who should be excluded from interview-based research studies. Differences in DNC reason codes over time and across studies may inaccurately exclude patients from research.

Purpose:

We evaluated the agreement between current DNC codes and supporting documentation within SEER*DMS for the Utah Cancer Registry database, to standardize DNC reason definitions and procedures to better represent research participation preferences.

Methods:

We identified 903 patients with DNC codes (current and historic) in SEER*DMS, with cancers diagnosed from 1957-2021. We reviewed scanned images of correspondences with patients and patients' physicians, audit logs, comments in SEER*DMS, and linked research databases, and identified three categories: 1. Evidence to support the DNC code; 2. Evidence to support a different DNC code; or 3. Insufficient evidence for any code. Findings informed updates to DNC coding and procedures for handling the placement of a DNC flag and assigning a reason code.

Results:

The distribution of the 903 DNC records into current DNC reason codes was: patient request no contact (55%), physician denied (19%), patient is not aware they have cancer (12%), patient is mentally disabled (3%), and other reason codes not reviewed for this project (11%). Evidence supporting the current DNC code, a different DNC code, or insufficient evidence for any code, existed for 72%, 6%, and 22% of the records. Most records with insufficient evidence for any DNC code occurred in the earliest diagnosis years. 65% of the records with code "physician denied" had been coded this way because of ambiguity on a historic form and lacked other evidence for a DNC code.

Conclusion:

Our review identified historic DNC reason codes with outdated terminology (e.g., "patient is mentally disabled") and codes that may not accurately reflect patient research preferences (i.e. physician denied). To address this, we identified a new set of reason codes and provided recommendations for revising procedures for DNC coding.

Incidence of Rare Cancers in North America

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Background: SEER has recently updated a list of rare cancers (RCs) to include clinically relevant, histologically defined cancers with an annual crude incidence rate smaller than 6 per 100,000. Collectively, these cancers account for a substantial proportion of all cancers and are increasingly a priority area for research, clinical, and public health practice. A Rare Cancer (RC) Recode variable was created in SEER*Stat to identify these cancers for inclusion in CiNA. CiNA provides a unique opportunity to describe the demographic and geographic characteristics of RCs in both Canada and the United States.

Methods: CiNA data from 51 US and 10 Canadian cancer registries were used to assess the utility of the RC Recode. To evaluate the RC Recode, we identified RCs among adults aged 20+ years and diagnosed between 2014-2018. SEER*Stat was used to calculate age-adjusted incidence rates and rate ratios standardized to the US Population Standard.

Results: Out of a total of 10,221,338 cancers reported in Canada and the US between 2014-2018, 3,018,298 (29.5%) were identified as RCs. Of the RCs where incidence rates significantly differed by at least 1.0 per 100,000: 4 were higher in the US and 3 were higher in Canada. Sites for these cancers included liver and IBT, thyroid, oropharyngeal, and myelodysplastic and myeloproliferative neoplasms.

Conclusions: Reasons for the different incidence in RCs between Canada and the US may relate to distribution of risk factors and registration practices. Further investigation of these cancers by age, geographic region, and race/ethnicity (US only) will be presented. We propose that these cancers be presented in CiNA monographs, and the RC Recode variable be included in CiNA datasets and related data products.

Investigation of Hysterectomy-Corrected Cervical Cancer Mortality Trends by Age and US Geography (1990-2019)

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BACKGROUND: Previous studies showed that cervical cancer mortality rates without adjustment for hysterectomy underestimate risk and may mask trends and disparities as hysterectomy prevalence varies by population and over time. Contemporary trends in US hysterectomy-corrected cervical cancer mortality by age and state have not been reported.

METHODS: Data on age-specific cervical cancer deaths (20-49, 50-64, ≥65 years) were obtained from the National Center for Health Statistics (1990-2019). Fourteen states were excluded from state-level analyses due to sparse data. Annual hysterectomy prevalence was estimated using the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System data (1990-2020), with odd-numbered years during 2001-2019 approximated based on two-year averages of adjacent years. Hysterectomy-adjusted mortality rates, expressed per 100,000 women, were calculated by dividing death counts (via SEER*Stat software) by the estimated number of women without a hysterectomy for each stratum (population*(1-hysterectomy prevalence)). Joinpoint regression was used to quantify changes in adjusted rates over time, including the 5-year average annual percent change (AAPC) from 2015-2019.

RESULTS: Adjusted cervical cancer 5-year mortality rates for all ages combined varied up to fourfold across states (7.0 vs 1.7 per 100,000 in Alabama and Vermont, respectively). Rates were generally highest in the South, where declines are lagging, and lowest in the Northeast, where the decline has been steepest. US-combined mortality rates declined across all age groups from 2015-2019. Declines were slower among the youngest women (AAPC: -0.5%, 95% CI: -0.8%, -0.2%) compared to the oldest (AAPC: -1.7%, 95% CI: -2.0%, -1.3%). Rates were stable or declining in the most recent 5-year period in all age groups and states except among women 20-49 years in Indiana, who experienced a 4.8% (95% CI: 0.9%, 8.9%) annual increase from 2009-2019.

CONCLUSION: Cervical cancer mortality declined for all ages of women in most states, with steeper declines in Northeastern states. However, progress has lagged in many states with the highest burden.

Linking Cancer Registries with Imaging Repositories, Collaborative Annotation Capabilities and Machine-Learning Pipelines to Facilitate Investigative Research and Clinical Decision Support

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The large-scale and expansive nature of the biomedical research community demands a data informatics infrastructure that can support both existing and new, investigative research projects in a robust, user-friendly, and secure environment. In some subspecialties of medicine and investigative research, the capacity to generate data has completely outpaced the methods and technology used to aggregate, organize, access, and mine this information. The overarching objective of this paper is to outline the design, development and maintenance of a flexible Intelligent Retrieval and Interrogation System (IRIS) that exploits the combined use of computational imaging, genomics, and data-mining capabilities to facilitate clinical assessments and translational research in oncology. The system includes a multi-modal, repository that is integrated with a suite of computational and machine-learning tools that provide insight into the underlying tumor characteristics that would not be apparent by human inspection alone. This work is motivated by the growing emphasis on establishing Learning Healthcare Systems in which cyclical hypothesis generation and evidence evaluation become integral to improving the quality of patient care. To facilitate wider adoption and implementation of IRIS, we have integrated a Web-enabled software framework that enables pathologists to collaboratively annotate and Q/C digital pathology images in a standard, high-throughput fashion. This integration supports iterative prototyping and optimization of deep learning-based analysis algorithms to extract and classify imaging features. Our team is currently testing the collaborative annotation and mark-up capabilities and analysis functionality through a set of collaborative, man-machine performance studies. The studies are underway with a panel of board-certified pathologists at Stony Brook, Emory, U Kentucky and Rutgers. We believe that once the studies have been completed that IRIS could potentially be deployed to other institutions that wish to contribute to the growing "gold-standard" repository of enriched data sets to support other large-scale projects in oncology, pathology and education.

Linking Residential Histories to Cancer Registry Data. Review of Spatial-Statistical Applications.

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Background: To advance cancer disparities research, it is important to design population-based studies that go beyond cross-sectional approaches and to incorporate residential histories to examine longitudinal place-based effects.

Methods: We describe two studies that use residential histories from LexisNexis linked to New Jersey State Cancer Registry (NJSCR) data to examine geographic disparities in cancer risk and survival. Geospatial statistics including Jacquez's Q-Statistic, Bernoulli-based and Poisson-based scan statistics were used to assess the degree to which pre-diagnosis residential histories are associated with Cutaneous T-Cell Lymphoma (CTCL). Time-varying Cox proportional hazard regression models were used to estimate the importance of residential histories in colon cancer survival.

Results: In an investigation of CTCL risk in New Jersey, we accounted for residential histories up to 15 years prior to the diagnosis years 2006-2014 and identified temporal and geographic clustering of cases compared to controls based on past residences in the study area from 1992. We did not detect any CTCL clustering when using locations from diagnosis time only (Henry et al., 2021). This may be evidence of geographic clustering of CTCL cases in New Jersey based on past residences.

We also investigated whether residential histories and related changes in the neighborhood environment over time would impact the colon cancer mortality risk estimates (Wiese et al., 2020a; Wiese et al., 2020b). We compared the results based on neighborhood poverty at the time of diagnosis to time-varying poverty values based on residential histories during the follow-up period. Our findings suggest that residential changes during the follow-up period may be associated with a 30% higher risk of colon cancer death among cases in high-poverty areas. While the risk estimated from neighborhood poverty were generally similar across all models, there was some difference in the geographic patterns of mortality risk estimates because 11% of colon cancer patients moved from New Jersey to another state.

Conclusion: These studies demonstrate how various epidemiologic and geographic methods can be applied to cancer data with residential histories. Including residential histories may help reduce estimation biases when using a single location and increase precision in identifying target areas for public health interventions.

Local Socioeconomic and Racial/Ethnic Residential Segregation and Receipt of 21-Gene Recurrence Score Assays Among Breast Cancer Patients in California, 2006-2017

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Background: 21-gene recurrence score (RS) assays refine estimates of breast cancer recurrence risk and benefit from chemotherapy, which can inform treatment decisions to improve outcomes. Racial/ethnic disparities in receipt of RS assays are documented, however, no studies have looked at the role of residential segregation, a fundamental cause of health inequities.

Methods: We appended measures of local (census-tract level) segregation to a population-based cohort of 156,823 women diagnosed with breast cancer in 2006-2017 from the California Cancer Registry. We used logistic regression to examine associations between the index of concentration of extremes (including measures of income, education, race/ethnicity and racialized income) and receipt of RS assay, adjusting for clustering by census tract, age at diagnosis, year of diagnosis, and marital status. For economic residential segregation models, we further adjusted for race/ethnicity and tested for heterogeneity by race/ethnicity. Model fitting and selection were based on synthetic census tracts developed by the National Cancer Institute (NCI), and final models were applied to the confidential, real census tracts to obtain the real data results. All results reported were cleared by the NCI.

Results: For economic segregation (education, income), compared to those residing in the most privileged neighborhoods (i.e., highest concentration of residents with higher income or higher education), those residing in less privileged neighborhoods had decreased odds of assay receipt (education OR=0.75, 95% confidence interval (CI):0.71-0.80; income OR=0.78, 95% CI:0.74-0.82). These patterns were observed across racial/ethnic groups. For racial/ethnic segregation, those residing in less privileged neighborhoods had decreased odds of assay receipt (Asian American OR=0.79, 95% CI:0.70-0.89; Black OR=0.83, 95% CI:0.63-1.10; Hispanic OR=0.70, 95% CI:0.62-0.78) compared to those residing in the most privileged neighborhoods (i.e., highest concentration of White residents). Similar patterns of associations were observed for racialized income segregation.

Discussion: Disparities in receipt of RS assays exist by socioeconomic and racial/ethnic segregation were observed, identifying neighborhoods where residents do not have equal access to breast cancer care. To ensure that women throughout their catchment areas are provided similar care, healthcare systems may implement community-based interventions, patient navigation and initiatives to address structural racism in healthcare.

Long-Term Cancer Survival Trends by Updated Summary Stage

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Background: Stage is the most important prognostic factor used to understand cancer survival trends. Summary stage (SS) broadly classifies cancer into in-situ, localized, regional, and distant depending on how far a cancer has spread from its point of origin. Staging systems are continuously updated to keep up with new scientific evidence, but this brings additional challenges to stage comparisons over time. We aim to use a consistent SS classification and present long-term survival trends for 23 cancer sites using the new joinpoint survival method (JPSurv).

Methods: We used a site-specific modified SS variable based on the SS 2000 definitions and applied it to as many diagnosis years as possible, 1975–2017. We then applied the JPSurv to relative survival data for cancer patients diagnosed with 23 cancer sites in SEER-18, 1975–2017 and followed through December 31, 2018. To interpret survival trends in terms of advances in detection and treatment and demonstrate the consistency of SS, we also report incidence trends using the joinpoint method.

Results: For 11, 3, 8, and 1 sites, the site-specific SS was consistent from 1975, 1983, 1988, and 1998 forward, respectively. Five-year relative survival improved for each cancer site and stage during these periods except for distant-stage thyroid cancer. The largest improvements were observed in localized-stage pancreas cancer, which increased by two percentage points annually between 2005-2017, followed by esophagus and liver cancers, each of which increased by one percentage point annually after 1975. Survival for distant-stage thyroid cancer decreased by 0.2 percentage points annually since 1975.

Discussion: This is the first time long-term survival trends using the JPSurv method are presented by SS for a large number of cancer sites. We report the largest increases in survival for three cancers that have traditionally had a poor prognosis and no organized screening programs and the survival increase likely reflects advances in managing and treating these cancers. The downward trend in survival for distant-stage thyroid cancer should be investigated. The development of SS variables for additional sites such as prostate, cervix uteri, and stomach is underway. Changing stage definitions prevented the analysis of some cancers back to 1975.

Mapping and Displaying Sub-County Cancer Data – Phase Two

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Background: CDC's National Environmental Public Health Tracking Program (Tracking Program) is increasing its availability and accessibility of sub-county data and recently partnered with the CDC's Cancer Surveillance Branch to assess the feasibility of mapping cancer data at the sub-county level using the Tracking Program's standardized sub-county geographies.

Purpose: To display sub-county cancer data on the public-facing Tracking Program Data Explorer, test spatiotemporal aggregations for additional cancer types, pilot new geographies, discuss nationally consistent data and measures, make recommendations for display options on the Data Explorer, and develop use cases.

Methods: In mid-2021, National Program of Cancer Registries (NPCR) registries reviewed the sub-county cancer data display options recommended by Phase 1 pilot participants on a restricted-access Tracking Data Validation Portal. Phase 2 was initiated in late 2021, and twenty-one states are participating. To facilitate discussion, registries were divided into two regional teams. Cases were developed to help show the feasibility and utility of displaying finer resolution cancer data. The teams are testing selected cancers that were not tested in Phase 1, including bladder, kidney, leukemia, pancreatic, thyroid, and oral cavity and pharynx, and colorectal cancer by sex. To test the feasibility of displaying Phase 2 recommendations on a public-facing portal, we will display these maps on the Tracking Data Validation Portal.

Results: We found it feasible to display combined counties on a public-facing portal. Recommended spatiotemporal aggregations were created for each new cancer type examined to allow for display and dissemination. Examples of ways the data could be used for cancer prevention and control were developed. Sub-county data for cancer occurrence during 2001–2018 for 27 states will be released on the Data Explorer in February 2022.

Discussion: The project allowed states to test spatiotemporal aggregations and make recommendations for multiple sub-county cancer display options on the Tracking Network with the potential of data being displayed on a public-facing portal. Having high-quality cancer surveillance data at the local level and public-facing displays of data at the local level allows for routine monitoring of cancer incidence and can highlight local variation, improve surveillance, and allow for better understanding of exposures and health outcomes.

Molecular Biomarker-Defined Brain Tumors: Epidemiology, Validity, and Completeness in the United States

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Background: Selected molecular biomarkers were incorporated into U.S. cancer registry reporting for patients with brain tumors beginning in 2018. We investigated the completeness and validity of these variables, which were collected through the brain molecular markers (BMM) site-specific data item (SSDI, NAACCR item #3816) , and described the epidemiology of molecularly-defined brain tumor types.

Methods: Brain tumor patients with histopathologically-confirmed diagnosis in 2018 were identified within the Central Brain Tumor Registry of the United States and NCI's Surveillance, Epidemiology, and End Results Incidence databases. The BMM SSDI was assessed for coding completeness and validity. 1p/19q status, MGMT promoter methylation, and WHO grade SSDIs, and new ICD-O-3 codes were additionally evaluated. These data were used to profile the characteristics and age-adjusted incidence rates (AAIR) per 100,000 population of molecularly-defined brain tumors with 95% confidence intervals (95%CI).

Results: BMM completeness across the applicable tumor types was 75-92% and demonstrated favorable coding validity. IDH-wildtype glioblastomas' AAIR was 1.74 (95%CI: 1.69-1.78), as compared to 0.14 for WHO grade 2 (95%CI: 0.12-0.15), 0.15 for grade 3 (95%CI: 0.14-0.16), and 0.07 for grade 4 (95%CI: 0.06-0.08) IDH-mutant astrocytomas. Irrespective of WHO grade, IDH mutation prevalence was highest in adolescent & young adult patients and IDH-mutant astrocytomas were more frequently MGMT promoter methylated. Among pediatric-type tumors, the AAIR was 0.06 for H3 K27M-mutant diffuse midline gliomas (95%CI: 0.05-0.07), 0.03 for SHH-activated/TP53-wildtype medulloblastomas (95%CI: 0.02-0.03), and <0.01 for both C19MC-altered ETMRs and RELA-fusion ependymomas.

Conclusions: Our findings illustrate the success and value of developing dedicated, integrated diagnosis SSDIs for providing critical molecular information about brain tumors related to accurate diagnosis.

Multilevel Mediation Analysis on Time-to-Event Outcomes: Exploring Racial/Ethnic Disparities in Breast Cancer Survival in California

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Background: Third-variable effect refers to the effect from a third-variable that explains an observed relationship between an exposure and an outcome. Depending on whether there is a causal relationship from the exposure to the third variable, the third-variable is called a mediator or a confounder. The multilevel mediation analysis is used to differentiate third-variable effects from data of hierarchical structures.

Data Collection and Analysis: We developed a multilevel mediation analysis method to deal with time-to-event outcomes and implemented the method in the mlma R package. With the method, third-variable effects from different levels of data can be estimated. The method uses multilevel additive models that allow for transformations of variables to take into account potential nonlinear relationships among variables in the mediation analysis. We apply the proposed method to explore the racial/ethnic disparities in survival among patients diagnosed with breast cancer in California between 2006 and 2017, using both individual risk factors and census tract level environmental factors. The individual risk factors are collected by cancer registries and the census tract level factors are collected by the Public Health Alliance of Southern California in partnership with the Virginia Commonwealth University's Center on Society and Health. The National Cancer Institute work group linked variables at the census tract level with each patient and performed the analysis for this study.

Results: We found that the racial disparity in survival were mostly explained at the census tract level and partially explained at the individual level. The associations among variables were depicted.

Conclusion: The multilevel mediation analysis method can be used to differentiate mediation/confounding effects for factors originated from different levels. The method is implemented in the R package mlma.

New Jersey State Cancer Registry's Data Quality Dictionary

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Background: The New Jersey State Cancer Registry (NJSCR) provides cancer data to a variety of cancer research studies. By characterizing the quality of the Registry data, the researchers better understand the limitations of the data and the strength of their study's conclusions. Additionally, the Registry benefits by identifying data that could be targeted for quality improvement.

Purpose: The purpose of this work is to assess and improve the overall quality of the Registry data and to better characterize the quality of our data to researchers. We focus on describing the completeness of the data.

Methodology: The variables most commonly used in NJSCR linkage studies and those most commonly requested by researchers were identified. This list included patient-specific variables and tumor-specific variables. Patient data included identifiers (not released to researchers) and demographics fields. Tumor data included diagnosis information, staging, and first course treatment fields. Cancer site-specific fields were evaluated for some common cancers including breast, prostate, lung, and melanoma of the skin.

For each variable we determined the appropriate denominator (e.g., total number of patients or tumors), the numbers of "known/not missing", "missing", and "unknown" responses. Then the percentage of records falling into each category (unknown, missing, known/not missing) was calculated using SQL, SAS, and Excel. The final tables reside in an Excel workbook that can be easily updated.

Results: For several variables identifying the appropriate counts is a complex task. The response and denominator counts require identifying the years a particular field was used and the valid codes, including tracking changes in codes over time.

We found that for the most commonly used identifiers, demographic data, and basic diagnosis fields had the highest percent complete. Address including geocoded information also had high completeness. The staging and site-specific variables had somewhat lower completeness. The first course treatment fields tended to be the least complete of those evaluated. We discuss the implications for the Registry and for data users.

OCISS Registry Reports -- A Data Quality Tool

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A desktop application was developed for the Ohio Cancer Incidence Surveillance System (OCISS) to assist cancer registry staff with data quality efforts. Although OCISS edits all incoming data, runs edits during record consolidation, and runs Call for Data and inter-record edits, there are some additional data quality checks that need to be conducted at the central registry for which there are no edits.

OCISS worked with its Office of Information Services to develop an application to generate data quality reports that can be produced by all staff and which do not require understanding of SQL, SAS, or other analytic software. The reports include Age – three reports: age at diagnosis greater than 100 years, age at diagnosis less than 1 year, and current age greater than 100 years; Male Breast Cancer, potential Duplicates (people and tumors), potential Name Gender mismatches, Unknown County, Unknown Race, Unknown Primary Site, Unknown Stage, and Duplicate Social Security Numbers. Each of these reports produces a line-level listing of cases. There is also a Completeness report that generates information on total number of abstracts submitted by reporting facilities that provides monthly and yearly totals for a single year or several years.

The reports generate quickly and produce results that are visible on screen and which can be outputted as an Excel spreadsheet. Each of the reports can be run either for one or for multiple years based on dates of diagnosis. Most reports have been configured to only look at cases diagnosed in Ohio, but others can be run on all cases.

The reports consider the values in several Ohio-specific data quality fields that demonstrate if a data quality issue has been previously checked and verified. These include verification of Age, Deduplication, Male Breast Cancer, and Name Gender. This prevents data quality checks being done repeatedly on the same cases, thus improving registry efficiency.

OCISS will demonstrate functionality of OCISS Registry Reports as part of this presentation.

Pandemic-Related Issues at the New Jersey State Cancer Registry: Then, Now, and What's Next?

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Background: The cancer community faced many hurdles throughout the COVID-19 pandemic. New Jersey was hit hard during different phases of the pandemic when the virus was spreading rapidly with increased mortality among cancer patients. Cancer reporting by the medical facilities was also affected during this period. In this report, we analyzed (1) the mortality among cancer patients, (2) cancer reporting trends in New Jersey.

Method: To investigate mortality among cancer patients, we analyzed all deaths certificates received at the New Jersey State Cancer Registry (NJSCR) in 2020-21 in comparison with the preceding three years, 2017-19. To investigate the reporting trends, we studied the NAACCR Abstracts (NAs) and HL7 epath reports received at the NJSCR during this period.

Results: In 2020, we observed a 29% increase in deaths among cancer patients. Our analysis also showed evident racial disparities. The deaths among Whites, Blacks, and Asians were increased by 23%, 47%, and 70% respectively. Hispanics were also disproportionately affected with an 86% increase in deaths compared to non-Hispanics with a 24% increase. The increase in mortality among male cancer patients was higher than females (33% vs 25%). In 2021, the number of deaths per month among cancer patients continued to be high with an overall 12% more deaths reported so far.

In 2020, the NAACCR Abstracts (NAs) and HL7s were 23% and 10% lower than the pre-pandemic averages respectively. In 2021, the total number of HL7s received at the time of this writing had almost recovered to the pre-pandemic levels. The NAs for 2021 are still being received therefore it is too early to analyze them.

Conclusion: The increased vulnerability of immunocompromised patients to the COVID-19 infection has been extensively reported in scientific literature. Our analysis reaffirms this susceptibility in cancer patients and further measures its magnitude. Moreover, this report identifies the disproportionately affected subpopulations among cancer patients. Finally, we report a significantly lower cancer reporting during the pandemic compared to the pre-pandemic average. Unfortunately, these issues are the tip of the iceberg as we continue to learn the hardships of the pandemic in the cancer community.

Pilot Test Update on a Secure Cloud-Based Environment for Remote Data Analysis of Cancer Registry Data

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Current access to cancer registry data and registry-linked data allows the transfer of the data to researchers' local machines for analysis. This access method limits owner control and oversight over the data. For cancer registries linking with and including more sensitive data, this is especially problematic. In addition, for large national studies linking with multiple registries with the intent of disseminating data to the research community, the current method may also conflict with data sharing restrictions in registry data use agreements.

The National Cancer Institute (NCI) has initiated a pilot study to move cancer registry data to NCI's cloud environment for researchers to conduct secure remote analyses without the ability to download data locally. The Virtual Cancer Data Access System (VCDAS) utilizes a number of security controls to ensure that the data are securely stored and only authenticated users are authorized to access the approved data. VCDAS uses SAS Viya, which is cloud-ready analytic software that also accommodates R and Python programming, as well point-and-click capabilities for non-programmers. In addition, VCDAS allows multiple approved researchers from anywhere in the world to collaborate within the same cloud-based project, while NCI maintains control over the data.

This presentation will describe the design of the system, including NCI's cloud-based Cancer Research Data Commons (CRDC) infrastructure, the data protections in place, pilot test user experiences, and plans to expand the system to foster adoption by other studies with cancer registry-linked data.

Data sharing is essential for progress in cancer research. The benefit of a remote access system such as this is the ability to maintain control of the data and ensure that usage is consistent with data use agreements. VCDAS is intended to satisfy the requirement to make data more accessible for important cancer research while protecting the data entrusted to NCI.

Prevalence of Comorbidity and Impact on Survival Among Persons with Cancer - An Analysis Using the Population-Based Linked SEER-Medicare Data

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Objective: Comorbidity is an important measure to control for in cancer research. The existence and severity of comorbidities prior to a cancer diagnosis strongly influence treatment choice but also the probability of dying from noncancer causes as well as cancer causes. Currently, cancer registries do not collect information on comorbidity. However, claims have been used extensively to provide a measure of pre-diagnosis comorbidity. The first aim was to create a database with standardized comorbidity measurements and then to report on the prevalence of comorbidities prior to cancer diagnosis and impact on survival under competing risks.

Methods: We used data from patients diagnosed with breast, prostate, lung, or colorectal cancer between 2000 and 2017 from the SEER-Medicare 18 registries. Comorbid conditions were identified in the year prior to diagnosis. Comorbidity groups (none, mild, moderate, severe) were defined using a comorbidity score and clinical considerations. We present estimates of the prevalence of each comorbid condition and comorbidity severity groups and the probabilities of death from cancer, death from other causes and survival accounting for competing causes of death by comorbidity groups.

Results: The most common comorbid conditions at cancer diagnosis overall were diabetes (25%), COPD (22%), congestive heart failure (12%) and peripheral vascular disease (13%). The severity score varied by cancer site with a majority of lung cancer patients having a high score whereas the majority of female breast and prostate patients had a low score. Survival probabilities varied by stage, cancer site, comorbidity and age. Comorbidity and age had a large effect on the probability of dying from other causes. Comorbidity slightly increases the probability of dying from cancer for prostate and breast cancer patients. Patients with advanced cancer stage had the highest probabilities of cancer death.

Conclusion: Diabetes and COPD were the most common conditions among individuals with these cancers. We show the impact of comorbidity, stage, and age on non-cancer causes of death. We also demonstrate the utility of this database that will be available to researchers. The benefit of this database is standardized coding of comorbid conditions and ease of analysis.

Prevalence of Primary Brain and CNS Tumors in the United States, 2018

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Background

Complete prevalence is used to determine disease burden on a particular population. Previous prevalence estimates with Central Brain Tumor Registry of the United States (CBTRUS), was limited to malignant tumors, due to restrictions in survival data available for non-malignant brain and other CNS tumors. This analysis benefits from newer, more complete survival and incidence data including 14 years of data on non-malignant brain and CNS tumors, and continues to investigate the full burden of primary brain and CNS tumors on the U.S.

Methods

Primary brain and CNS tumor incidence, stratified by histology, malignancy, and behavior, were obtained for the years 2004-2018 from CBTRUS. These data and SEER 9 incidence estimates from 1975-2018 were used to estimate complete incidence during this period. Survival data for these same strata were obtained from CDC's National Programs of Cancer Registries (NPCR) Survival Analytical Database from 2001-2017, as well as from SEER 9 1975-2018. Complete prevalence was estimated for December 31, 2018 and all rates are age-adjusted per 100,000 population with 95% confidence intervals.

Results

During the study period 1974-2018, the total estimated case count of primary malignant and non-malignant brain and CNS tumors was 236,931 and 1,050,249. Among the youngest age group (0-19 yrs.), the most prevalent tumor types were pilocytic astrocytoma (14,206 cases), non-malignant tumors of the seller region (12,546 cases), and malignant other gliomas (7,926 cases). Among the oldest group (75+ yrs.), the most prevalent tumor types were non-malignant meningiomas (197,648 cases), tumors of the cranial and spinal nerves (52,552 cases), and tumors of the seller region (31,037 cases).

Conclusions

Prevalence estimates for primary brain and CNS tumors are critical for measuring the burden of disease while informing future clinical research, policy, and practice. Increasing completeness in cancer registration through improved collection of non-malignant brain and CNS tumors, improves the precisions of these estimates as well as our understanding of brain cancer epidemiology.

Racial Disparity in COVID-19 Related Hospital Admission among Breast Cancer Patients

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Background. Breast cancer is the most commonly diagnosed cancer among women in the United States, except for skin cancers. Research on the impact of COVID-19 on breast cancer survivors is scarce. Studies have indicated that black women have a higher risk of COVID-19 infection and severer symptoms than white women. Because black women have a higher prevalence of chronic diseases and the severity of COVID-19 is related to chronic diseases, the black-white difference in the severity of COVID-19 may be partially attributable to racial disparities in the chronic disease prevalence. The study aims to assess the impact of chronic diseases on the black-white difference in female breast cancer patients' COVID-related hospitalization.

Methods. We linked Louisiana Tumor Registry (LTR) data with the statewide COVID-19 data and hospital in-patient discharge data (HIDD) to identify COVID-19 patients who were diagnosed with female breast cancer (in situ and invasive) in 2015-2019 and had a COVID-related hospitalization in 2020. To capture complete chronic disease data among the COVID-19 breast cancer patients, we used the chronic disease data from the 2012-2020 HIDD files to supplement comorbidity data from LTR. Bivariate and multivariable logistic regressions were used. Multicollinearity of covariates in the multivariable model was examined.

Results. Of 1,288 COVID-19 breast cancer patients, 35% were black, 65% were white, and 0.8% were of another race. The percentage of COVID-related hospitalization was significantly higher among black women than white women (23.7% vs.10.7%). Old age, higher poverty, and chronic diseases were associated with elevated odds of hospitalization ($p<0.05$). After adjusting for age, poverty, diabetes, heart disease, peripheral vascular and cerebrovascular diseases, pulmonary disease, and other chronic diseases, the odds of hospitalization were still more than two-hold for black women than white women (OR=2.56; 95% CI: 1.74-2.77). The multicollinearity in the multivariable model was not statistically significant.

Conclusion. Black race, older age, higher poverty, and chronic illnesses predict an increased likelihood of COVID-related hospitalization among COVID-19 breast cancer patients. However, black patients have significantly higher odds of hospitalization even after controlling these factors. More research is warranted to determine the underlying factors of the observed racial disparities in hospitalization.

Rhode Island Women's Breast Cancer Screening Prior to and After Cancer Diagnosis: Use of All-Payer Claims Database Linked with Central Cancer Registry

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Background: Rhode Island Cancer Registry (RICR) breast cancer (BC) records were linked to All-Payer Claims Database (RI-APCD), to study women's regular mammography screenings prior to and after BC diagnosis, and identify predictors of regular screenings.

Method: RI women diagnosed with BC (including in-situ) during 2014-2018 (n=4,453), were linked with mammography claims from 2012-2019 RI-APCD, using full name, date of birth, and social security number. Four study cohorts were created: (1) women who ever received mammography by Women's Cancer Screening Program (WCSP), the state-facilitated program for un/der-insured women and were diagnosed with BC ('high risk' group: n=149)), (2) women diagnosed with BC outside of WCSP (BC-control group: n=4,304), (3) women with a history of screening at WCSP but no BC diagnosis (n=7,174), and (4) general RI women with no BC diagnosis (n=21,555). Logistic regressions were conducted to identify the predictors of screening adherence, including cancer diagnosis, risk, age, comorbidities, use of preventative exams, and insurance type.

Results: Screening rates prior to BC diagnosis were not different between the high-risk group and the BC-control group (55% vs. 55%). Associated with cancer outcome, women in the BC-control group who were adherent to mammography screening prior to their BC diagnosis had higher odds of being diagnosed at an early-stage tumor (OR=1.439, p<0.001). The BC-control group also showed higher screening rates following BC diagnosis, compared to the high-risk group (67% vs. 64%). Women with Medicaid insurance were significantly less likely to be compliant with mammography screening (OR=0.142, p=0.0025).

Among women without breast cancer, a lower proportion of women with a history of screening at WCSP were adherent to mammography screening till the follow-up year 2020, compared to general RI women (38% vs. 65%).

Discussion: RI-APCD data linkages with RICR provide excellent opportunities to examine adherence to mammography screening among vulnerable RI women and compare their outcomes to the general women population in the state and identify opportunities for improving their BC screening adherence. A measurement gap in the central cancer registries can be effectively reduced by utilizing a statewide claims database.

Sex Differences in Melanoma are Consistent with Small but Cumulative Lifetime Differences in Sun Exposure Behavior

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Rates of melanoma differ by sex. Females have higher melanoma rates at younger ages, while males have higher rates at older ages. Biological (hormonal) and behavioral (ultraviolet exposure) factors are thought to explain these differences, but population-level characteristics for sex differences are not well-described.

We conducted a population-based study of all cutaneous melanoma cases diagnosed in California in 2015-2019. Age- and sex-specific incidence rates were examined by ethnicity (Hispanic and non-Hispanic white (NHW)) and tumor characteristics (thickness, ulceration, nodal involvement, anatomic site); rate ratios (RR; 95%CI) were for comparisons by sex.

Females had higher melanoma rates before age 50, after which males had exponentially higher rates, but trends varied by ethnicity and anatomic site. Specifically, Hispanic females had higher rates until age 65, after which males had higher rates. Hispanic female vs male RR ranged from 3.23 (1.58-6.58) at ages 20-24 to 1.25 (1.05-1.49) at ages 60-64; female rates were attenuated with age, diminishing to 0.97 (0.81-1.17) at ages 70-74. For anatomic site, females had higher risk of lower-limb melanoma vs males across ethnicity and at all ages. For NHW females vs males, the lower-limb RR ranged from 2.79 (1.59-4.89) at ages 20-24 to 1.55 (1.34-1.78) at ages 75-79. Among Hispanic females vs males, the lower-limb RR ranged from 10.41 (1.33-81.31) at ages 20-24 to 1.64 (1.01-2.69) at ages 75-79.

After age 50, females had lower melanoma rates than males. This is consistent with small but cumulative lifetime differences in female skin protective behaviors that may "flatten the curve" for later melanoma risk. Notably, Hispanic females had higher melanoma rates than males until later in life (ages 65+). All females had higher rates of lower-limb melanomas than males across age and ethnicity. Higher melanoma rates for young females vs males remain problematic, also requiring further study. Passive factors (i.e. hair length, non-SPF cosmetics) or active factors (i.e. sunscreen use) should be examined for their potential impact on lifetime melanoma risk. Physician-based skin examinations remain critical for early melanoma detection. After age 50, clinical suspicion of melanoma for lower-limb lesions should be heightened for females, inclusive of patients of Hispanic ethnicity.

Simple Concepts to Help Reporting Facilities Stay on Track

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A challenge for all state/central cancer registries is maintaining a regular flow of data from their cancer reporters. In New Jersey, every health care facility, physician, dentist, other health care provider, and clinical laboratory shall submit all case reports within six months of the date of first contact with the patient for the reportable condition as defined by the NAACCR Data Standards for Cancer Registries.

Using SEER*DMS, the New Jersey State Cancer Registry (NJSCR) created a monthly completion update procedure to use that distributes completeness rates to hospital and CoC accredited reporting facilities. This report is a brief, yet informative overview of the facility's current reporting status as calculated by using a 5-year weighed average for submissions. Reporting facilities are encouraged to review the report and contact NJSCR if they believe there is a discrepancy in the data received. NJSCR facility representatives follow a procedure to assist in correcting the discrepant issue.

NJSCR started this communication process as a regular assignment for facility representatives in July 2020. Reviewing the data for reporting years 2020 and 2021, year 2020 showed a 53% overall completeness rate in January 2021 and year 2021 showed a 57% completeness rate in January 2022.

NJSCR encourages communication between the central registry and its reporting facilities. By providing this information, we continue to support the idea that central registries and hospital registries are partners working to achieve the goal of creating a world with less cancer. Hospital registrars have responded positively to these monthly completeness updates, remarking for example, that the reports are useful to help gauge how on track they are with timely reporting and to compare the cases received to cases transmitted. Other registrars use the report to communicate progress with hospital management.

Additional options currently under consideration for this procedure include adding other important benchmark variables such as race/ethnicity percentages. However, we find keeping information summarized and concise is best when communicating with reporters.

Social Determinants of Late-Stage Hepatocellular Carcinoma Hotspots

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Introduction: Late stage hepatocellular carcinoma (HCC) hotspots, or areas with highest density of late stage cases, in Los Angeles County (LAC) are highly concentrated in communities of low socioeconomic status. Therefore, we hypothesize social determinants of health (SDOH) play a significant role in the late detection of HCC in LAC. Our objective was to examine the association between area-level SDOH measures and residence in a late stage hotspot.

Methods: We identified adults (18+) with incident HCC (C22.0, 8170-8175) in the LAC Cancer Surveillance Program registry between 2008-2017 with available residential address at diagnosis. Patients were linked at the census-tract level to measures across multiple SDOH domains from the 2014-2018 American Community Survey. Commute time from residence to diagnosing facility, closest primary and specialty care clinics, and ultrasound centers were calculated using Google API as measures of healthcare access. Association of SDOH measures with residence in a late-stage hotspot (boundaries defined in previous work using kernel density estimation) were examined with univariate logistic regression.

Results: Of 7509 incident cases, 26.7% resided in a late stage HCC hotspot, with a 10% difference in late stage rates by hotspot status (59.1% vs 49.1%). Hotspot residence was associated with lower education, more working class employment, and more poverty ($p<0.001$). We found a 1.7-fold increased odds of hotspot residence for every $10,000 decrease in median income. Hotspots were associated with more foreign-born and features of ethnic enclaves such as poor English proficiency and higher linguistic isolation ($p<0.001$). Hotspots were also associated with fewer owner-occupied units, lower access to transportation (e.g., no household car, commuting by public transport), and lower access to technology (e.g., no household internet, no computing device) ($p<0.001$). In contrast, hotspots were associated with shorter commute time to HCC diagnosing facility and clinics ($p<0.001$), indicating increased proximity of services and potentially better spatial access to healthcare.

Conclusion: Negative indicators across SDOH domains of education, economic stability, social/community context, and neighborhood/built environment contribute to late stage HCC hotspots. Prospective individual-level study of the impact of these measures on late HCC detection in LAC is warranted.

Standardizing Electronic Surveillance Interoperability with Cancer Content Implementation Guides

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Cancer reporting from hospital, laboratory, and ambulatory providers for public health surveillance is mandated. Data and technology standards are critical to scalable electronic exchange between data providers and public health partners. The CDC's Cancer Surveillance Branch has worked with partners to develop two content implementation guides (IGs) that specify how the existing electronic reference architecture can be leveraged to collect and exchange cancer surveillance data using these protocols.

Two cancer content IGs were developed to facilitate automated transfer of cancer surveillance data: the Central Cancer Registry Reporting Content IG for ambulatory healthcare provider EHR systems and the Cancer Pathology Data Sharing IG for laboratory reporting. Both IGs use existing reference architecture (RA) provided by the Making EHR Data More Available for Research and Public Health (MedMorph). MedMorph is a project to advance public health and patient outcomes research by using emerging health data and exchange standards such as Health Level 7 (HL7) Fast Healthcare Interoperability Resources (FHIR) to develop and implement an interoperable solution that will enable access to clinical data. The MedMorph architecture establishes standard IT infrastructure for data exchange for many use cases, while both cancer content IGs use that existing infrastructure in the context of cancer surveillance data. These two IGs are also compatible with data already being captured in the CAP, electronic Cancer Protocols in IHE Structured Data Capture format.

Leveraging existing MedMorph RA and other FHIR infrastructure streamlines development and use of data collection, terminology, and exchange standards for many healthcare use cases including cancer. This leads to automated, timely, resource efficient exchange of cancer case, laboratory, and treatment information across systems for research needs and public health action. These content IGs facilitate efficient standards for ambulatory and laboratory healthcare providers reporting to central registries. Consequently, this reduces reporting burden and informatics systems may become more interoperable and simpler to implement.

The project develops standards for electronic data collection and exchange for cancer, a mandatory reportable disease. Interoperable systems lead to more complete and robust data, facilitating faster identification of trends, better data for clinical and public health action, and health equity in cancer prevention.

Striking Racial/Ethnic Disparities in Nasopharyngeal Cancer Incidence

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Background: Despite nasopharyngeal cancer being relatively uncommon in the United States, its incidence in Asian Americans has been shown to be seven times higher than non-Hispanic Whites. However, given the diversity of the Asian American population, this may be an overgeneralization, which could overlook important ethnic-specific disparities. Few studies have disaggregated nasopharyngeal cancer incidence data by Asian ethnic subgroup, and none have considered tumor histology.

Methods: We used data from 13 population-based cancer registries in the Surveillance, Epidemiology, and End Results Program from 2000 to 2014. Age-adjusted incidence rates of nasopharyngeal cancer were calculated for each major racial group as well as each Asian American ethnic subgroup and compared to non-Hispanic Whites using incidence rate ratios (IRRs) and 95% confidence intervals (CIs). Sex and tumor histology (i.e. keratinizing squamous cell, differentiated nonkeratinizing, undifferentiated nonkeratinizing) were considered in the analyses.

Results: A total of 7,772 nasopharyngeal cancer cases was included. Incidence among Blacks and, more notably, Asian Americans was significantly higher than non-Hispanic Whites. However, when the results were disaggregated by Asian ethnic subgroup, Laotians were over 14 times and Chinese were approximately 10 times as likely to be diagnosed with nasopharyngeal cancer relative to non-Hispanic Whites (IRR=14.64, 95% CI 11.22-18.77 and IRR=9.86, 95% CI 9.22-10.53, respectively). These differences became more striking for specific histologies; relative to non-Hispanic Whites, incidence of differentiated nonkeratinizing and undifferentiated nonkeratinizing tumors was over 26 times higher in Laotians (IRR=30.98, 95% CI 17.38-51.06 and IRR=26.68, 95% CI 13.00-46.72, respectively).

Conclusions: The higher incidence of nasopharyngeal cancer among Asian Americans observed in previous studies is largely driven by the Laotian and Chinese subgroups, particularly when it comes to the differentiated nonkeratinizing and undifferentiated nonkeratinizing histologies. Future research should focus on these ethnic populations to help identify the environmental, behavioral, and genetic factors that may play important roles in nasopharyngeal cancer etiology.

Structural Equation Modeling of Healthcare Access Dimensions with Ovarian Cancer Treatment: Analysis of the Ovarian Cancer Epidemiology, Healthcare Access and Disparities (ORCHiD) Study

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Background: Racial disparities have been documented in various measures of healthcare access (HCA). Here, we conducted structural equation modeling (SEM) to define healthcare affordability—the ability to afford care, availability-- the type, quality, and quantity of healthcare resources, and accessibility-- the geographic location of healthcare resources and evaluated the direct and indirect associations with ovarian cancer treatment quality measures.

Methods: Black and Non-black patients with primary ovarian cancer of any histologic type ages 65 years or older diagnosed between 2008-2015 were selected from the SEER-Medicare linked dataset. Factor analysis for the three HCA dimensions measurable in SEER-Medicare was used to define HCA latent variables, with factor loadings higher than 0.4 summarized into HCA scores for each dimension. Reliability tests were performed using composite reliability (Ω; 0.7 or greater) and average variance extracted (AVE; 0.5 or greater). Structural Equation Models were performed using Mplus 8 to evaluate total, direct, and indirect associations of race and HCA dimensions with ovarian cancer treatment quality measures.

Results: A total of 8,987 patients with ovarian cancer were included in the analysis; about 7% were Black. Final SEM was conducted with 20 variables and three HCA latent values. The Affordability (Ω: 0.876; AVE=0.689), Availability (Ω: 0.848; AVE=0.636), and Accessibility (Ω: 0.798; AVE=0.634) latent variables showed high composite reliability. Black patients were less likely to visit a gynecologic oncologist (45% vs. 54%, p-value <0.0001) and less likely to receive any ovarian cancer-related surgery in the 12 months following diagnosis (50% vs. 62%, p-value <0.0001). Black patients had lower Affordability and Availability on average, both of which were associated with a lower likelihood of seeing a gynecologic oncologist, which in turn was associated with a lower likelihood of receiving surgery.

Conclusions: Racial differences in ovarian cancer treatment in SEER-Medicare appear to be driven by healthcare affordability and availability. Strategies to mitigate disparities in each of these dimensions will be key to ensuring equity in quality cancer treatment.

Suicide Risk Among Patients with Cancer in the United States, 2000-2016

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Background: Individuals diagnosed with cancer have an elevated suicide risk, although risk factors are not well understood. This study used a recent national dataset to examine a wide range of patients' geographic, racial/ethnic, socioeconomic and clinical factors that may be associated with suicide risk.

Methods: We identified patients diagnosed with cancer from 43 population-based state cancer registries in 2000-2016 with follow-up through Dec 31, 2016. Standardized Mortality Ratios (SMR) and 95% confidence intervals (95CI) were calculated by attained age, sex, and race/ethnicity to compare suicide risks in the cohort vs. the general US population. Hazard Ratios (HR) and 95CI from multivariable Cox proportional hazard models were derived to identify cancer-specific risk factors of suicide among the cohort, controlling for competing risks from other causes of death.

Results: Among 16,771,397 patients, 7,972,782 (47.5%) died during the study period, and 20,792 deaths (0.3%) were from suicide. The overall SMR (95CI) for suicide was 1.26(1.24-1.28), decreasing from 1.67(1.47-1.88) in 2000 to 1.16(1.11-1.21) in 2016. Patients aged 65-69 years (SMR=1.44, 95CI=1.39-1.50), Hispanic (SMR=1.48, 95CI=1.38-1.58), uninsured (SMR=1.66, 95CI=1.53-1.80) or with insurance other than Private or Medicare for ≥65 years had the highest suicide risks compared to the general population. Moreover, the highest suicide risk occurred within two years of diagnosis, during which the suicide risk was higher in patients diagnosed with more fatal cancers, such as cancers of oral cavity & pharynx, esophagus, stomach, brain, lung, and pancreas (HRs ranged 1.23-2.10 vs. colorectal cancer, all $P \leq 0.001$), than less fatal cancers. After two years, patients diagnosed with cancers subject to long-term quality of life impairments, such as cancers of oral cavity & pharynx, female breast, bladder, and leukemia (HRs ranged 1.17-1.54 vs. colorectal cancer, all $P \leq 0.001$), had higher suicide risks.

Conclusion: Suicide risk among patients diagnosed with cancer decreased during the past two decades but remained elevated compared to the general population. Different geographic, racial/ethnic, socioeconomic, and clinical factors, some of which are modifiable, contribute to the increased suicide risk. In addition to comprehensive symptom management, tailored social and psych-oncological interventions are warranted for suicide prevention in this vulnerable population.

Supervised Machine Learning Algorithm Using Claims-Linked Population-Based Registry Data to Predict Recurrence or Second Breast Cancer Event

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Background: Cancer recurrence is important in assessing treatment effectiveness and quality of life but it is not well captured in US population-based cancer registries. We developed a supervised machine learning (SML) algorithm to extract information from linked registry and medical claims data on the occurrence and timing of second breast cancer events (SBCE) (i.e., recurrences and new primaries). The algorithm was developed using a relatively small dataset from a single health network.

Objective: To evaluate and improve the developed algorithm in a large population-based claims-linked cancer registry dataset.

Methods: Stage I-III female breast cancer patients diagnosed in Kentucky 2004-2015 and linked with Medicaid and Medicare claims data were obtained from the Kentucky Cancer Registry. The analytic dataset included 18,239 first primary breast cancer cases. A gradient-boosting algorithm (XGBoost) method and key features including demographics, clinic factors and engineered features based on diagnosis, procedure and medication claims grouping were used for the month-level prediction of pre- versus post- second event. The data were split into training (80%) and test sets (20%) at the patient level. We had to modify the developed algorithm to match the characteristics of the large data set of the Kentucky population. The overall modified prediction process included three phases: 1) Determine criteria for classifying cases as obvious negative, obvious positive, and non-obvious for SBCE status by using all training data. 2) Train SML model using non-obvious samples. 3) Make predictions using the SML model for all test cases.

Results: The SML model achieved a month-specific AUC score of 0.89, accuracy of 0.94, sensitivity of 0.61 and specificity 0.95 on test data. At the patient level, the sensitivity ranges from 0.71 -0.89 and specificity 0.54-0.87 when the prediction probability thresholds varying from 0.1 to 0.5. The median absolute difference between the predicted month and the observed month of SBCE at the 0.5 threshold level is one month.

Conclusion: The modified algorithm showed favorable predictive performance in a population-based large dataset. This work demonstrates that an automated machine learning approach can be a useful tool for identifying SBCEs with linked cancer registry and claims data.

The Impact of Improved Treatments on Survival of US Leukemia Patients: 1990 - 2018

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Background: Survival for leukemia subtypes vary greatly due to availability of novel treatments, which are available for some but not all subtypes. Molecularly targeted therapies such as TKIs have been shown to be effective for treating Ph+ leukemias.

Objectives: To evaluate population level mortality trends by CML, ALL, and CLL subtypes to assess how varying levels of targeted treatments penetrations may impact the mortality trends at the population level.

Methods: We used data from 13 US SEER cancer registries (1992-2017) among US adults. We identified cases of CML, ALL, and CLL using histology codes. Incidence rates were calculated after accounting for reporting delays. To calculate mortality rates, cause of death was ascertained from death certificates during 1992-2018. Finally, we present estimates of 5-year relative survival according to subtype and diagnosis year.

Results: For CML patients, mortality rates began to decline in 1998 at an average rate of 12% annually. Imatinib was approved by the FDA for treating CML and ALL indications in 2001, leading to a clear benefit on CML patients. CML incidence was stable during 1992-1995, decreased from 1995-2002 at 2.4% annually, and then increased gradually beginning in 2002 at 1.5% per year. Five-year CML survival increased dramatically over time, especially on average of 2.3 percentage points per year from 1996-2011. ALL incidence increased gradually 1992-2017. In contrast, mortality decreased slowly during 1992-2012 and then no longer was found to be declining during the study period. Five-year survival increased on average 1 percentage point for each subsequent year of diagnosis. CLL incidence fluctuated during 1992–2017. In contrast, mortality decreased during 1992-2011 and then declined at a faster rate by 3.6% per year starting from 2011.

Conclusions: Our study demonstrates a fluctuation in rates of incidence and survival in all leukemia subtypes with a significant reduction in CML mortality in the U.S. general population, which was primarily due to the introduction to the TKIs starting in 2001. Survival benefit from the TKIs and other novel therapies for treating various leukemia subtypes has been demonstrated in clinical trials. Our study highlights the impact of these therapies at the population level.

The Impact of Medicaid Expansion on Female Breast Cancer Incidence: A Difference-in-Difference Analysis of the Synthetic California Cancer Registry Data

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Background: Medicaid expansion under the Affordable Care Act (ACA) has been shown to expand insurance coverage and access to preventive care for individuals. However, its impact on breast cancer screening and diagnosis across neighborhoods is uncertain. We assessed the impact of the expansion of Medicaid in California (Medi-Cal) in 2014 on breast cancer incidence across neighborhoods with different socioeconomic status during 2010-2017.

Method: A total of 88,075 breast cancer cases in women aged 20 to 64 years were identified over the period between 2010-2017, using the Synthetic California Breast Cancer Registry data. Out of them, 43,414 were diagnosed during the pre-expansion period (2010-2013) and 44,661 during the post-expansion period (2014-2017). We used social vulnerability index (SVI) measured at 8,007 census tracts as the exposure variable. The SVI was categorized into tertiles, indicating the relative socioeconomic status (high, medium, and low) of patients' residence environment. We employed a difference-in-difference (DID) approach to estimate the impact of Medi-Cal expansion in 2014 on age-adjusted breast cancer incidence, using a log linear regression model including the pre-post expansion period, SVI and their interaction. Separate models were run for the overall SVI index and the four SVI domains, including socioeconomic Status, household composition and disability, minority status and language, housing type and transportation.

Results: The age-adjusted incidence was 95, 124, and 148 in the pre-expansion period and 97, 124, and 149 in the post-expansion periods per 100,000 women (20-64 years old) per year for tracts of high, medium, and low overall SVI, respectively. The estimate of the interaction term (post-ACA incidence rate/pre-ACA incidence rate) was 0.99 ($p=0.58$) for the medium SVI, and 1.01 ($p=0.44$) for the high SVI, compared to low SVI. Similar results were yielded from sensitivity analyses for the four SVI domains.

Conclusion: We did not find differential impact of 2014 Medi-Cal expansion on breast cancer incidence across neighborhoods with varied socioeconomic status in California. Future studies may investigate the impact of Medi-Cal expansion across neighborhoods measured by other indices.

The Role of Rurality in Cervical Cancer Survival in California

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Background: Previous studies have reported higher incidence and mortality of cervical cancer among individuals living in rural versus urban areas. This disparity can have implications for public health interventions. However, the effect of rurality may be measure- and population-dependent and it is important to examine it in geographically and racially and ethnically diverse populations, such as in California. Since this has not been done yet, we aimed to examine the association between rurality and cancer survival in Californian women diagnosed with cervical cancer.

Methods: Using the data from the California Cancer Registry (CCR), we identified 29,530 women with invasive cervical cancer diagnosed in 2000-2019. We used Rural-Urban Commuting Area Codes (RUCA) classification to identify rural and urban areas. We plotted Kaplan-Meier curves and estimated hazard rate ratios (HR) from Cox proportional hazards models to examine differences in overall and cervical cancer specific survival by rurality. We also examined these differences stratified by race and ethnicity, neighborhood socioeconomic status (nSES), and insurance status.

Results: Five-year overall survival was 66% (95% CI 65-67%). In a Cox model with underlying stratification by age and year of diagnosis, those living in rural areas had 9% higher overall mortality rate than those living in urban areas (HR = 1.09, 95% CI 1.01-1.18). However, in a fully adjusted model these differences were completely explained by nSES, insurance type, race/ethnicity, marital status, and stage at diagnosis (HR = 0.97, CI 0.89-1.06). In stratified analyses, factors like private insurance, higher nSES, and Non-Hispanic White race played a protective role for rural versus urban residents while others were not associated with overall mortality. We did not find any difference in cervical cancer specific mortality rates by rurality in either minimally or fully adjusted models, or in stratified analyses.

Conclusions: We plan to further investigate geographic disparities in cervical cancer survival in California given that rural regions in California differ in terms of population and environmental characteristics.

Using Health Information Technology Standards to Facilitate Cervical Cancer Screening and Management

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Computable guidelines that support cervical cancer screening and management (CCSM) guidance fulfill a critical need in healthcare. By using health information technology (IT) interoperability standards, implementation of CCSM guidance may be more consistent among healthcare organizations that support these standards. Leveraging patient information in the electronic health record (EHR) can improve clinician adherence to CCSM guidance. Modular and shareable clinical decision support (CDS) via computable guidelines can help maintainability as new evidence is incorporated.

CCSM computable guidelines have been developed using health IT standards, including Fast Healthcare Interoperability Resources (FHIR) and the FHIR Clinical Guidelines implementation guide. These computable guidelines are being leveraged to build CDS that facilitates shared decision-making by providing a summary of pertinent information from the patient EHR as well as recommendations based upon the latest CCSM guidance, including the 2019 ASCCP risk-based management guideline. The CCSM computable guidelines have been released as open-source software; accuracy can be verified via an included test suite.

Publishing the CCSM computable guidelines as open-source software allowed external reviewers and prospective users to more easily provide feedback and propose improvements. Such feedback is critical while preparations are made for a clinical pilot and development of companion electronic clinical quality measures. The CCSM CDS will be continually improved and updated alongside the underlying guidelines.

Interoperable and standards-based CDS provide a potential means to facilitate adoption of updated CCSM guidelines. By leveraging patient data in the EHR, the CDS complements existing capabilities such as the ASCCP mobile application.

Validation Study of Synthetic California Breast Cancer Registry Data Based on Real-world Analyses

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Background: The Synthetic California Breast Cancer Registry Data (SynCan) is a pilot data product of the National Cancer Institute (NCI)'s Surveillance, Epidemiology, and End Results (SEER) Program. SynCan contains all demographic and clinical information on malignant female breast cancers that are released in SEER's research database plus specialized oncotype-dx fields, and five synthetic census tracts generated using classification and regression tree models. Analytic results based on synthetic census tracts are similar to the real census tract results for straightforward descriptive analyses.

Methods: To further test the usefulness of SynCan in supporting real-world studies, NCI awarded five professional service contracts to selected research proposals submitted in responding to a solicitation notice on a validation study of SynCan. Selected proposals represent a wide range of epidemiological and statistical methodological studies. Each awarded research team was provided with the access to SynCan, developed analytic models using SynCan with linked census tract ecologic attributes of interest, and submitted synthetic data results and programming codes of final models to NCI. NCI ran the analyses using the real census tract data behind the firewall. Disclosure cleared real data results were returned to each research group for use in conference presentations and journal publications. NCI evaluated the statistical closeness of synthetic data- and real-data results.

Results: Four of five research proposals used novel census tract attributes that are not in the SEER standard attributes file. Analytic types range from descriptive analysis, logistic regression, survival regression, to cancer incidence rate analysis. The validation process and disclosure clearance process of real data results are manageable. Synthetic data results agree with the real data results in most cases with a few exceptions where synthetic data results tend to show smaller effect.

Discussion: Synthetic census tracts have the potential of enhancing the granularity of cancer clusters, making possible geospatial disparities by census tracts, and expanding cancer disparities by any census tract attributes of interest. Synthetic data is especially useful for model development. Future development of synthetic data that consider more complex real-world analyses may improve the utility of synthetic data.

VPR-CLS: Entering the Adolescent Years

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The Virtual Pooled Registry Cancer Linkage System (VPR-CLS) is an NCI-sponsored online service that efficiently connects researchers with U.S. cancer registries to facilitate minimal risk linkages with established studies to identify incident cancers among study participants. The VPR-CLS uses a two-phase application process. Phase I supports a secure, standardized linkage and provision of de-identified aggregate match counts, while Phase II streamlines the ensuing application process, including necessary agreements, to allow release of individual-level data on the matched cases.

Over the past few years, the VPR-CLS system development and growth phase has resulted in the following:

1. Forty-six participating registries representing 96% of the U.S. Population, plus Puerto Rico;
2. A single linkage software and standard linkage logic resulting in an average sensitivity of 96.5%;
3. Seven Phase I pilot test studies with cohort sizes ranging from 27K to 1.56M identifying high quality match counts ranging from 1,399 to 189,858 per study;
4. Three Phase I pilot tests allowing studies to link with more registries and increase cancer case ascertainment;
5. A Templated IRB/Registry Application and Templated DUA by 36 and 25 states respectively; and
6. A robust system to facilitate and track Phase II requests for data across registries.

The VPR-CLS was officially launched into its adolescent years in February 2022. Twelve Federally-funded studies, from a list of interested researchers, have been selected to initiate the Phase I linkage process while additional Phase II functionality is finalized. Remaining Phase II enhancements include: 1.) incorporation of a newly established, dedicated Central IRB; 2.) an online system for completing, routing, and signing the VPR Templated DUA; 3.) functionality to support recurring linkages; and 4.) templates for annual progress reports and data destruction notification. Efforts are also underway to identify a permanent compensation plan for participating VPR registries. Progress on these initiatives will be shared at the NAACCR Summer Forum.

Widening Black-White Disparities in Non-Endometrioid Uterine Corpus Cancer Mortality Rates

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BACKGROUND: Non-endometrioid uterine corpus cancer subtypes have a poorer prognosis than endometrioid subtypes, and incidence is rising for all major racial/ethnic groups in the US. The extent to which histologic patterns have influenced Black-White mortality disparities in uterine corpus cancer has not been reported.

PURPOSE: Describe recent uterine corpus cancer mortality trends by race and histology.

METHODS: Incidence-based mortality data were obtained for non-Hispanic women diagnosed with microscopically-confirmed uterine corpus cancer from 1992 to 2018 with survival time ≤10 years in the 13 oldest Surveillance, Epidemiology, and End Results Program registries. Annual mortality rates for 2002-2018 were calculated per 100,000 women, age-adjusted to the 2000 US standard population and stratified by race (White, Black) and major histologic subtype. Three-year average annual rate ratios (RRs) with 95% confidence intervals (95% CIs) were used to compare disparities over the study period.

RESULTS: From 2002-2004 to 2016-2018, mortality rates were stable in White and Black women for endometrioid subtypes and sarcomas but increased for non-endometrioid subtypes in both groups. The increase was steeper in Black women, among whom rates nearly doubled from 2.5 to 4.6 per 100,000 (RR: 1:81, 95% CI: 1.48-2.23), compared White women (from 1.2 to 1.6 per 100,000 [RR: 1.36; 95% CI: 1.21-1.52]). As a result of these trends, the Black-White disparity widened for non-endometrioid subtypes, with the rate ratio increasing from 2.14 (95% CI: 1.75-2.59) to 2.85 (95% CI: 2.50-3.23), and the rate difference for these subtypes accounting for 73% of the overall Black-White mortality disparity in uterine corpus cancer during 2016-2018, up from 60% during 2002-2004. Black women also had higher contemporary mortality rates than White women for endometrioid subtypes (RR: 1.19, 95%CI: 1:00-1.41, p=0.049) and sarcomas (RR: 2.69; 95%CI: 1.99-3.58).

CONCLUSION: Non-endometrioid cancers account for an increasing share of the Black-White mortality disparity for uterine corpus cancer. Black women also have higher endometrioid mortality despite lower incidence, a disparity likely underestimated without hysterectomy correction. Further research is needed to understand the etiology of non-endometrioid cancers, particularly as it relates to racial differences, as well as the extent to which disparities are explained by treatment differences.

POSTER PRESENTATIONS

A Population-Based Survey of Cancer Survivors to Evaluate State Cancer Plan Health Indicators: Results of a Collaboration Between Utah Cancer Registry and Utah Comprehensive Cancer Control Program

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Background: Cancer survivorship is a priority area of focus for many comprehensive cancer control programs and allied stakeholders. The 2016-2020 Utah Comprehensive Cancer Prevention and Control Plan (State Cancer Plan) identified several priority health indicators for cancer survivors including health status, smoking, physical activity, and survivorship care. The Utah Cancer Registry collaborated with the Utah Comprehensive Cancer Control Program to conduct a population-based survey of cancer survivors to assess status and trends for these indicators and identify subgroups for focused intervention.

Methods: We developed a survey to measure health indicators identified in the State Cancer Plan. Utah cancer survivors diagnosed between 2012-2019 with any reportable diagnosis were eligible for the study. A representative sample was selected from cancer registry records to be surveyed during each year 2018-2021. We calculated weighted percentages and 95% confidence intervals for each health indicator for the full sample and by demographic subgroups and survey year. Analyses were age-adjusted to the adult survivor population.

Results: Based on n=1,793 survivors responding to the survey, most (93.5%) reported their pain was under control, 85.7% were in good or better health, but 46.5% experienced limitations due to physical, mental, or emotional problems. Only 1.7% (95% CI 0.4%-3.0%) of survivors aged 75 or older were current smokers, compared to 5.8% (95% CI 3.8%-7.9%) of 65–74-year-olds and 7.9% (95% CI 4.8%-11.0%) of survivors aged 55-74. Survivors 75 or older were also more likely to report no regular physical activity (30.4%, 95% CI 25.6%-35.3%) than all younger age groups including 65-74-year-olds (20.5%, 95% CI 17.0%-24.0%). The proportion of survivors who received a survivorship care plan increased significantly from 34.6% in 2018 to 40.1% in 2021 (p=0.025). However, survivors under age 55 were significantly less likely to have received a care plan (29.5%, 95% CI 22.6-36.4%) than older survivors.

Conclusions: The survivor survey was an innovative collaboration between a central cancer registry and state cancer control program. The registry provided a complete sample frame for evaluating survivors' health indicators. Results indicate that the cancer control program's efforts to increase the use of survivorship care plans was successful.

Assessing Sociodemographic and Regional Disparities in Receipt of Oncotype DX Genomic Prostate Score Testing

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Background and Objective: The Oncotype DX Genomic Prostate Score® (ODX-GPS™) is a gene expression assay that predicts disease aggressiveness in men with clinically low- or intermediate-risk prostate cancer. The results are used to guide treatment decisions, including whether to pursue active surveillance versus definitive treatment. The objective of this study was to describe sociodemographic and regional differences in the receipt of ODX-GPS testing and identify factors associated with its use among a national population-based sample of men with low/intermediate risk prostate cancer.

Methods: Men diagnosed with localized prostate cancer with a Gleason score of 3+3 or 3+4, PSA ≤ 20 ng/mL, and stage T1c to T2c disease between 2013 and 2017 were identified by 21 Surveillance Epidemiology and End Results registries and linked with ODX-GPS data. Covariates included age, race, ethnicity, neighborhood socioeconomic status, (nSES, census tract pseudo-ID), health insurance, marital status, NCCN risk group, census region, and year of diagnosis. Multivariable logistic regression accounting for clustering by census tract was used to identify factors associated with receipt of ODX-GPS testing.

Results Among 111,434 men with low/intermediate risk prostate cancer, 5.5% received ODX-GPS testing. Of those who received testing, 78.3% were White, 9.6% were Black, 6.65% were Hispanic, 3.6% were Asian American, and 0.1% were Pacific Islander. Black men with prostate cancer had the lowest odds of receiving testing (OR 0.70; 95% CI 0.63-0.76) compared to White men. Compared to those residing in the lowest nSES quintile, those in the highest nSES quintile were 1.64 times as likely (95% CI 1.38-2.94) to have received ODX-GPS testing. Uninsured men with prostate cancer had nearly half the odds (OR 0.57; 95% CI 0.37-0.88) of receiving ODX-GPS compared to insured individuals. The odds of ODX-GPS testing were significantly higher among men with disease residing in the Northeast, West, and Midwest compared to the South.

Conclusions We identified disparities in receipt of ODX-GPS testing among men with low/intermediate prostate cancer by race, ethnicity, nSES, insurance status, and census region. Concerted efforts should be made to ensure that this tool is equitably available to eligible men with prostate cancer.

Breast Cancer Surgical Outcomes by Treatment Settings: Inpatient vs. Ambulatory Surgery Centers

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Background: As the most common cancer among women, breast cancer is generally treated with surgery. Over the past four decades, ambulatory surgery centers (ASCs) have grown in number and popularity in response to demand for high-quality, cost-effective alternatives to inpatient hospital care for surgical services. Increasing volumes of breast cancer surgeries now happen in ASCs with well-established safety and quality standards, cost savings, as well as patient satisfaction. Yet, there has been a lack of population-based assessments of survival differences among breast cancer patients following surgical treatment in ASCs as compared to inpatient settings.

Methods: Using California Cancer Registry (CCR) data linked with the California Office of Statewide Health Planning and Development (OSHPD) records, we identified 191,543 adult women (18 years old and over) diagnosed with first primary breast cancer during 2005-2019 with known disease stage in the CCR data, who also had first breast cancer related surgery records within the period of 2 months before and 12 months after the cancer diagnosis during 2005-2020 in the OSHPD data. We calculated the 5 year survival by cancer stage (localized, regional, or distant), surgery type (lumpectomy or mastectomy), and surgery setting (inpatient or ASC). We also used the Cox proportional hazards model to calculate the hazard ratios (HR) of death probabilities by surgery setting, stratified by surgery type, while controlling for confounders (age, race, socioeconomic status, stage).

Results: The stage distributions of the 191,543 patients were 67% localized, 31% regional, and 2% distant. The proportion of lumpectomy among localized patients was 76%, regional 50%, and distant 36%. The proportion of surgery done in ASCs, as compared to inpatients, was 96% among the localized-lumpectomy patients, 89% regional-lumpectomy, 80% distant-lumpectomy. Use of ASCs is substantially lower among mastectomy patients across stage. The 5-year survival is consistently higher for ACSs than inpatients regardless of stage and surgery type. According to the multivariable HR, survival for ASC group is 28% better than the inpatient group ($p<0.0001$)

Conclusion: The better survival outcomes associated with use of ASCs are reassuring and have a lot of implications for cancer care and health policies.

Challenges in Setting-up Special Registries and its functionality in India

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Introduction: Cancer registries are an essential component of the national effort to initiate cancer control activities by setting up Hospital based cancer registry (HBCR) and Population based cancer registry (PBCR).

Objective: To elucidate and overcome the data accrual hurdles in the Nuclear Power Plant (NPP) locations, special registry areas and obtain incidence and mortality rates in a.

Material and methods: Four PBCRs were set up in NPP areas in India, under Tata Memorial Centre (TMC), Mumbai, since 2012. They are located in Palghar (Maharashtra), Kaiga (Karnataka), Kakrapar (Gujarat), Rawatbhatta (Rajasthan).

Data collection: (i) Visits to hospitals, pathology laboratories, vital statistics department, Primary health care centres (rural), Anganwadi health workers etc. after due notification and permissions (ii) By telephonic calls.

Tools : (i) A pre-designed core proforma after pilot-testing, that included demographic, diagnosis, as site and histology, clinical, as extent of disease, Staging, and treatment details and follow-up was used (ii) Tablet-PC was utilized to capture data and record in real-time, besides a hard copy of the proforma, helping in quick transmission of data to the Central Registry database in TMC, which is useful to check for duplicates, incomplete cases etc. online.

Operations: The functionality included planned `source visits' and data sent by email to the registry. Human resource allocation for data accrual was done diligently. It was a challenge to collect data from a NPP location population due to non-compliance from sources, patients etc. Operational cost was different for each registry. The Cost per case in low-volume registries ranged from Rs. 11,000/- in Palghar to Rs. 14,350/- in Kaiga; To date in the last 8 years, the six registries have accrued more than 10,000 cancer cases and coverage improved over the years due to counselling and better awareness. Details of functionality, hardships faced and solutions to overcome these, and cancer rates will be presented.

Conclusion: Some cost differences by volume is explained by the large fixed costs required for administering and performing registration activities due to difficult geographical terrains and automation will improve data collection potentially and reduce overall costs.

Completeness of Cancer Treatment Data from an Academic Medical Center's Tumor Registry

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Cancer care is often distributed among multiple facilities which makes it difficult to develop a comprehensive description of treatment patterns. Researchers at academic medical centers who examine cancer care with records at their own institutions may reach incorrect conclusions if those records do not include information from other facilities. The purpose of this study was to examine the completeness of treatment information found in the records of patients seen at a Midwestern academic medical center.

Patient-level, NAACCR-formatted records from the medical center's institutional tumor registry were compared to consolidated records from the state's central registry. NAACCR summary treatment variables (e.g., #1290, "RX Summ Surg Prim Site") reflect all treatments known to the reporting facility, including those done at other hospitals. Central registries also use the summary variables to create consolidated abstracts from all facilities. Using these variables, we examined treatment/no treatment concordance between the medical center abstracts and the consolidated state central registry abstracts. This was done for surgery of the primary site, chemotherapy, radiation therapy, immunotherapy, and hormone therapy.

The cohort included 1,071 Iowa residents diagnosed with breast, colorectal, lung, pancreas, or prostate cancer in 2017 or 2018 with an abstract from the academic medical center. Only patients with a single primary tumor were included. Patients were also required to have at least one other abstract from a hospital other than the academic medical center submitted to the state central registry.

Concordance between the hospital registry and the state's central registry was generally high across tumor sites and treatment modalities. Agreement ranged from 89-100% for radiation therapy to 97-100% for surgery of the primary site.

For overall summary treatment variables, there was high concordance between the academic medical center and the central registry, suggesting that analyses of either data source would generally yield similar results. Specific factors that affected concordance will be discussed.

Deterministic Linkage's Effectiveness in Improving Brazilian Population-Based Cancer Registry Information

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Introduction: Population-Based Cancer Registries (PBCR) collect, analyze, and disseminate cancer incidence, mortality, and survival rates in a given geographic region. For these rates to be accurate, good quality information is required. However, PBCRs face many difficulties that diminish the quality of their information. Alternatively, linking techniques between different databases have been increasingly used to improve data quality in various information systems. This study aimed to evaluate the improvement in data quality after deterministic linkage. Methods: Deterministic linkage was performed between São Paulo state mortality database and PBCR-Barretos through technical cooperation. To evaluate the improvement of information, a comparison was made between the databases before and after the linkage, using the following analyses: difference in the absolute number of deaths; mean follow-up time of individuals, applying the Wilcoxon test; survival analysis by Kaplan Meier and the Log Rank test to compare the difference between the survival curves. Results: As a result, 571 deaths were added to the database after linkage. Patient follow-up time showed a significant increase after linkage in all tumor sites except testis. Survival analyses showed decreasing rates at all tumor sites, when applied the log rank test, it showed significant differences for colorectal, female breast, and all cancer sites (excluding non-melanoma skin cancer). Conclusion: Thus, the linkage technique proved to be effective in completing and improving the PBCR data, increasing the number of deaths, decreasing survival rates, and increasing patient follow-up time.

Development of publicly available dashboard for websites and social media channels of Central Cancer Registries (CCRs) with live feeds for cancer and #COVID19 posts

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Motivation: Cancer/Tumor registries are an important tool in the fight against Cancer and help collect accurate and complete cancer data that can be used for cancer surveillance, control and epidemiological research. Websites and social media channels play an important role in the modernization of information dissemination and outreach approaches for cancer care. But there are hardly any studies about the web presence and social media impact of Central Cancer Registries (CCR) or communication about cancer registries and their importance to the public.

Approach: In this study, we used the NAACCR list of CCRs and performed a systematic search to evaluate the web and social media presence of CCRs using Google, Facebook, Twitter & other social media platforms. We created a listing of website and social media accounts used by CCRs all over North America. Further, we identified the nature of the website/social media channel: whether standalone or part of department of health and social services (DHSS) or department of public health (DPH) website. Finally, we developed a dashboard that displays not only the websites and social media channels but also Twitter live streams of each state in relation to cancer and #COVID19.

Results and Conclusions Our results suggest that very few (< 20%) CCRs have a website of their own while the majority (>80%) of CCRs have webpages hosted on the websites of the state health entity such as DHSS or DPH. Further, only three CCRs (~6%) had their own Facebook page and only one CCR had a Twitter account. CCRs have an opportunity of using social media channels to convey the importance of cancer data which currently remains under-unexplored & underutilized. We have built a dashboard that displays the websites, social media channels and Twitter live streams (quick links) of cancer and #COVID19 conversations associated with all 50 states in real time. In future work, we will develop a web tool that allows CCRs to edit and keep their information updated (with collaboration of NAACCR and CCRs). We will also perform social network analysis using cancer nomenclature/keywords/hashtags for each state.

Differences in breast and colorectal cancer incidence by nativity in Asian Americans and Hispanics

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Background: Incidence of breast and colorectal cancer present substantial difference by racial ethnic subgroups and nativity. Accurate estimation of these group-specific incidence rates will provide important information in planning efficient cancer prevention and control efforts. Earlier reports from Japanese migrants to Hawaii have shown that breast cancer incidence rates continued to increase from native Japanese to 1st generation and then to 2nd generation migrants, but colorectal cancer (CRC) incidence rates were nearly identical between 1st and 2nd generation migrants, supporting a greater role of risk factors during early life for breast cancer. Nativity-specific incidence rates based on the 1988-2004 California Cancer Registry have shown that breast cancer incidence rates in US-born Chinese and Filipino Americans and Hispanics were higher than the foreign-born counterparts, but this difference was not seen for Japanese Americans. For CRC, incidence rates among US-born individuals were higher (Chinese men, Filipino men and women), similar (Chinese women), or lower (Japanese men and women) than foreign-born individuals. Further, annual percent changes of breast cancer and CRC incidence rates were different depending on nativity. However, updated analysis of nativity-specific incidence for these immigrant populations have not been conducted due ot the lack of nativity-specific population estimates.

Purpose: We aim to utilize the American Community Survey data to estimate incidence rates of breast and CRC by racial/ethnic subgroups and nativity (US-born vs. foreign-born) among Asian Americans and Hispanics in California.

Methods: We will use the California Cancer Registry data (2011-2015) and compute the average annual age-adjusted incidence rates of breast cancer and CRC (overall and by tumor-receptor status or subsites and sex (for CRC)) by racial/ethnic subgroup and nativity.

Results: We will present the methods utilized to estimate nativity-specific population estimates of Asian American subgroups and Hispanics in California using the American Community Survey data and present graphs and summary tables reporting on the incidence rates and tumor characteristics.

Conclusion: We will discuss the updated incidence rates and tumor characteristics distribution of breast and CRC in the US by racial/ethnic subgroup, nativity, tumor subsite, and sex (for CRC).

Disparities in Lung Cancer Screening Accessibility and Utilization in South Carolina

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Purpose:

1) To investigate the differences in lung cancer screening (LCS) accessibility by county level rurality and other socioeconomic status (SES) factors in South Carolina (SC);

2) To examine the individual and county level predictors of LCS utilization.

Methods: A list of LCS sites were identified from the American College of Radiology. We defined access to LCS as <30 minutes driving time from the centroid of the census block group to the nearest LCS site. At a county level, the access of each block group was weighted by the proportion of population aged 55-80 years in the county. County level rurality was determined by Rural-Urban Continuum Codes. County level income, education, and the prevalence of minority population were obtained from Census 2010. Data from 2017 SC Adult Tobacco Survey (ATS) was used to examine the individual level (age, sex, race, education, marital status, insurance, income, smoking status, chronic obstructive pulmonary disease (COPD)) and county level predictors (rurality, LCS accessibility) of LCS utilization. Chi-square test, Students' t-test, Pearson correlation, and multilevel logistic regression were used in the analyses.

Results: SC has 46 (26 urban and 20 rural) counties. As of August 2021, 72 population-based LCS sites have been established, including 63 sites located in 18 urban counties and 9 sites in 9 rural counties. The driving time to the nearest LCS site ranged from <5 to 60 minutes, with an average of 13.7 minutes. Overall, 74.9% of the residents aged 55-80 had access to LCS. About 85.4% of urban residents vs. 61.3% of rural residents had access to LCS (P=0.004). Counties with worse SES had significantly lower access to LCS (P<0.05). A total of 1,441 current or former smokers aged 55-80 were identified from ATS data, of whom 19.8% used LCS. Being female, black, and having COPD were significantly associated with increased LCS utilization. County level rurality and LCS accessibility were not significant predictors.

Conclusions: In SC, residents in the rural counties and counties with lower SES had less access to LCS. After adjusting for individual level covariates, county level covariates were not significant in predicting LCS utilization.

Effect of Covid-19 on Special Cancer Registry Operations setup in India.

Dr. Rajshree Gaidhani[2], Dr. Ganesh Balasubramaniam[2], Mrs. Mitali Sapkal[2], Dr. Rajesh Dikshit[2], Dr. Pankaj Chaturvedi[2], Dr. Rajendra Badwe[1]
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Introduction: During the COVID-19 pandemic, there were many difficulties and functionality issues in Cancer Surveillance and Operations. globally. The Population based cancer registry (PBCR) setup by Tata Memorial Centre (TMC) in four Nuclear Power plant (NPP) locations in India, Tarapur in Maharashtra, Kaiga in Karnataka, Kakrapar in Gujarat and Rawatbhata in Rajasthan, faced similar hardships. There were delays in diagnosis, referrals, patient care management. PBCR provided valuable inputs into health system disruptions to estimate the direct/indirect impact of pandemic on cancer outcomes. As with many institutions during the pandemic, the operations of PBCR have been affected.

Objectives: In our study we sought to assess the impact of the first wave of Covid-19 of the pandemic on NPP registry operations and outcomes.

Material and Methods: Four NPP registries data accrual was assessed. Comparison of active registration by traditional methods and by innovative methods (electronic) during pandemic was undertaken. In NPP registries, TAB-PC is used investigators for real-time data capture and is made available online.

Results: During the pandemic of 11 weeks between March-June 2020, the registry operations had disruptions, due to non-contact of hospitals, doctors, path labs access etc. However, due to the co-operation of the some of the sources of information by good rapport, data were made available electronically by email and telephonically. During the pandemic, there was a reduction of data accrual by 21.5% overall, but differed in each of the 4 NPP registries ranging from 12.5% in Tarapur to 30.3% in Rawatbhata. 1,785 cases were collected during pandemic period and was compared to 2,270 cases collected in the previous year.

Conclusion: The pandemic has steered the innovation and explore the technology for cancer data accrual. The pandemic has also felt the need of linkage of other PBCRS, hospitals, Municipal Corporations data sharing with PBCRS. There were financial constraints, and the registry staff received less salary (excluding the transportation cost, daily allowance etc.) Details of hardships in data accrual will be presented, both qualitative and quantitative. An active collaboration between different registries with innovative methods will be useful for better outcomes, even in times of pandemic.

Facilitators for Cancer-Related Follow-up Care among Adolescent and Young Adult Survivors of Childhood Cancer: A Cancer-Registry Based Study

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Background: Follow-up care is recommended for childhood cancer survivors (CCS) to mitigate late and long-term treatment effects; however, engagement remains suboptimal. The purpose of this study was to identify facilitators for cancer-related follow-up (CRFU) care among adolescent and young adult CCS.

Methods: Eligible patients (age <20 at diagnosis with any cancer type [stage 2+, except brain which included stage 1+], 5+ years from diagnosis, age 18-39 at study launch in 2015) were identified through the Los Angeles Cancer Surveillance Program. Registry demographic/clinical factors and survey data (CRFU, facilitators) were included. Participants reported their last CRFU visit (*past year, 1-2 years ago, 2+ years, never*) and if any facilitators (12 options, one open text) helped them complete this visit. Pearson's chi-squared tests evaluated differences in sex and race/ethnicity for a given facilitator.

Results: On average, participants (n=1,027; 51% female; 51% Hispanic; mean of 26 years) endorsed 5 facilitators (Mean [SD]=4.9 [+/- 2.7]). Most frequent facilitators and observed differences were: "*I had health insurance coverage for this visit*" (70% overall; 34% male vs. 73% female, X^2=4.57, p<.05; no race/ethnicity differences), "*I like knowing that my health has improved (or stayed the same)*" (56% overall; 50% male, vs. 62% female; X^2=15.44, p<.01; no race/ethnicity differences), and "*I trust this doctor/nurse*" (55% overall; 62% non-Hispanic; 50% Hispanic; X^2=12.65, p<.01; no sex differences). The least endorsed facilitators were: "*It did not cost much*" (21%), "*My friends encouraged me to go*" (12%), and "*My spouse/partner encouraged me to go*" (11%).

Discussion: Health insurance was the most frequent facilitator across groups, followed by knowing improvements to health, with higher endorsement among females (vs. males) for both. Greater healthcare engagement and more preventive healthcare visits at this age range among females may account for this difference. Additionally, differences in endorsement of trust in one's doctor/nurse occurred by race/ethnicity, with Hispanic patients endorsing trust least frequently. Future studies are needed to identify factors to mitigate financial hurdles, increase trust for Hispanic patients, and better engage male CCS in their healthcare.

Factors Associated with Increased COVID-19 Deaths Among COVID-19 Prostate Cancer Patients Varied by Race

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Background: Prostate cancer is the second leading cause of cancer death in American men. Prostate cancer patients with COVID-19 infection have a worsened outcome. Research is warranted to identify the vulnerable groups among COVID prostate cancer patients to optimize health resources. This study aims to assess the factors associated with the increased risk of dying from COVID-19 among prostate cancer patients.

Methods: We linked Louisiana Tumor Registry data on patients aged ≥ 50 years diagnosed with invasive prostate cancer in 2015-19 with the 2020 Louisiana statewide COVID-19 data and hospital in-patient discharge data (HIDD) to identify COVID-19 infection and COVID related hospitalization in 2020. We validated COVID-related deaths that occurred during from April 2020 to January 2021 with the Louisiana vital records. The association of age, smoking, Charlson comorbidities, poverty, body mass index, stage, and Covid-19 related hospitalization with the risk of COVID-specific death was examined using the cause-specific hazard model. Because the race variable did not meet proportional hazard (PH) assumptions, the analysis was stratified by race. Multicollinearity of covariates in the multivariable model was examined.

Results: Of 1,060 COVID-19 prostate cancer patients, 38% were Blacks, and 62% were Whites. Deaths related to COVID-19 were 7.3%, and 2.0% died in other causes. The proportion of former smokers was 31.3%, and COVID-related hospitalization was 21.6%. Among Whites, we found that older age, former smokers, unknown poverty, late-stage prostate cancer, and COVID hospitalization significantly increased the likelihood of dying from COVID. While among Blacks, only older age and COVID hospitalization were associated with an elevated risk of dying from COVID significantly. The multicollinearity in the multivariable model was not statistically significant.

Conclusion: Risk factors associated with increased COVID deaths varied by race. Old age and COVID-related hospitalization significantly elevated the risk of dying from COVID for both white and black COVID-19 prostate cancer patients. Further research is warranted to understand the underlying mechanism.

Feasibility of Cancer Staging in a Caribbean Cancer Registry: Experience from a small island developing state

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Background: The collection of staging data remains a challenge for population-based cancer registries in low resourced settings. Various staging mechanisms have been developed to improve staging comparability and feasibility. We assess feasibility of staging by comparing these mechanisms for colorectal cancer cases registered by the Barbados National Registry (BNR) in 2013 and 2018.

Methodology: Data from the population-based BNR were collected retrospectively using paper-based reports from public and private pathology labs, hospitals, clinics and national death certificates. All suspected cases were entered into CanReg5. In 2013, physician notes, histology, cytology imaging tests, and surgical findings were used to stage cases. Staging for 2018 cases was based on information in histology reports due to pandemic restrictions. In 2018, all cases were staged according to TNM, Essential TNM and Summary Stage while in 2013, cases were staged using Summary Stage only, however TNM stage by pathologists was also considered Comparisons were made between 2013 and 2018 (notes reviewed for 69% and 8% of cases respectively).

Results: There were 155 and 151 cases of colorectal cancer abstracted in 2013 and 2018 respectively. In 2013, 20% were staged by TNM and eighty-three percent (83%) by Summary Stage. In 2018, 61% were stageable equally by Summary Stage and TNM, and 63% by Essential TNM. Summary staging in 2013 showed: 23% Localised, 37% Regional, 23% Distant, 17% Unknown. Summary staging in 2018 showed: 8% Localised, 41% Regional, 12% distant, 39% unknown. Comparing staging systems in 2018: Stage I: 5% by TNM and 6% by Essential TNM; Stage II: 13% by TNM and Essential TNM; Stage III: 32% by both systems; Stage IV: 11% TNM and 12% Essential TNM, and Unknown: 39% TNM and 37% Essential TNM. Most of the cases were diagnosed by histology of primary: 82% in 2013 and 89% in 2018, with DCOs representing 4% and 7% of colorectal cases in 2013 and 2018 respectively.

Discussion: Irrespective of staging system, a high percentage of colorectal cases were designated 'unknown' based on available information in 2018. Using histology reports alone led to limited staging. Pandemic restrictions highlighted barriers to managing PBCRs in paper-based health systems.

Female Breast Cancer in New Jersey: Geographic Disparities in Incidence, Screening, and Risk Factors

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Background: Breast cancer continues to be the most commonly diagnosed cancer and the second leading cause of cancer death in New Jersey women with a projected estimate of 8,410 new cases and 1,210 deaths annually.[1] Geographic variation in health-related behaviors (alcohol consumption, physical activity, obesity-related), screening, and socioeconomic status (SES) are often associated with a region's cancer incidence and proportion of early detection as measured by stage at diagnosis.

Purpose: Considering the focus among the research community on the importance of and evaluation of population-based breast cancer screening to improve survival outcomes, the authors characterize and geographically display county-level breast cancer burden, alcohol consumption, physical activity, and obesity prevalence, mammography prevalence, and SES among New Jersey's female screening age (40-74) population.

Methodology: New Jersey State Cancer Registry (NJSCR) data were used to capture breast cancer cases diagnosed among New Jersey women aged 40-74 for the years 2014-2018 (2009-2018 for incidence trend). Mammography, alcohol consumption, physical activity, and obesity prevalence data were obtained from the New Jersey Behavioral Risk Factor Survey (NJBRFS). Cancer rates, counts, and annual percent changes (APCs) were generated using SEER*Stat. The Standardized Proportion Ratio (SPR) was calculated to describe late-stage breast cancer diagnoses. Statistically significant differences between county and state measures were determined and are indicated on the maps. Maps were created using Tableau.

Results: Statistically significant variations of breast cancer incidence, late stage SPR, mammography, physical activity, alcohol consumption, and obesity by county are evident, and will be instrumental in identifying higher risk populations and the targeting of breast cancer screening and educational resources.

1. American Cancer Society. Cancer Statistics Center. http://cancerstatisticscenter.cancer.org. Accessed March 7, 2022.

Fundamentals of Abstracting Using the Canvas Platform

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Motivation: Virtual learning has become normal since the arrival of Covid. The team at Missouri Cancer Registry was motivated to create an on-line Fundamentals of Abstracting course to reach a broader audience. The on-line version of the course opened the field of Cancer Registry to those who may not have had an opportunity to attend otherwise due to travel or budget constraints.

Approach/Abstract: Missouri Cancer Registry (MCR) created an on-line Fundamentals of Abstracting course to be available at least twice per year. The class is geared toward new abstractors who are not familiar with the abstracting process. For those that area not familiar with abstracting and/or the required fields, this is a great place to start learning. Students will view fifteen pre-recorded **Voice Thread** presentations of the Missouri Cancer Registry Abstract Code Manual at their own pace. The **Voice Thread** presentation, created by MCR's Education Coordinator, guides users to the MCR website and links used within the website to access standards and coding guidelines such as STORE, SEER and NAACCR. Other members of the MCR QA team assisted with recording the Voice Threads. After completing the **Voice Thread** presentations, students can work through five practice cases using the Missouri Cancer Registry Abstract Code Manual. The fee for the course is $50 which covers the cost of the MCR Abstract Code Manual and postage. The course is available on the University of Missouri Canvas platform. Students are given two months to complete the on-line course.

Results/Conclusion: MCR had a great response to the first offering of the on-line course with thirteen students enrolling. Eleven students completed the course within the 2-month timeframe. Two students did not complete the course for reasons unknown. In comparison, attendance for in-person training usually consisted of 4-6 students. We have been able to reach a much broader audience with the on-line course including out of state and international students.

How does Hospital Discharge Data linkage affect Case Ascertainment for major Cancer sites in Alberta?

Dr. Vidhi Dave[1]
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This poster gives a background of major cancer sites (Brain, Lung, Hematopoietic, Kidney, Colon, Other digestive and Male genital) in Alberta. It outlines the various data sources currently utilized and their impact on case ascertainment for specific cancer sites in the Alberta Cancer registry (ACR). There have been some speculations around the under reporting of some cancers. To validate this hypothesis, hospital discharge data (using the Discharge Abstract Database) was reviewed for possible missed cases by the ACR. This poster discusses the historical background, impediments and procedure to carry out this review in Alberta and its implications. It also discusses the importance of these kinds of reviews based on the results from 2018-2020 hospital discharge reviews. It elaborates on the possible barriers for registration by analyzing the characteristics of the cases that are added from the hospital discharge data review to the registry data. Thus, it lays a foundation for the rationale of incorporating such reviews to include the cases that might be falling through the cracks and thus allocate proper resources at the registries to be able to carry out these functions.

Hysterectomy adjustment factors applied to the United States Cancer Statistics (USCS) data, 2009-2018.

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Background Hysterectomy is one of the most performed surgeries in the U.S. and changes the cancer risk profile for some gynecological cancers (cervical, uterine) of women who undergo the procedure. Adjusting the at-risk population data file could yield better estimates of the burden of these cancers.

Methods I used SAS-callable SUDAAN on Behavioral Risk Factor Surveillance System (BRFSS) data (2010, 2012, 2014, 2016, 2018) to calculate hysterectomy prevalence by 5-year age group and race/ethnicity over time. I applied the age by race/ethnicity specific factors to the female US populations of corresponding age and race/ethnicity to generate a new population file adjusted to remove the estimated number of women who reported hysterectomy. I used this population combined with the 2009-2018 NPCR and SEER incidence data to build a female-only SEER*Stat database using SEER*Prep and compared the rates of cervical and uterine cancers in the adjusted population data to the rates of these cancers generated from the unadjusted data.

Results The incidence rates (per 100,000 persons) for women in the hysterectomy-adjusted dataset are higher in all age groups and race/ethnicities when compared to the unadjusted data. Unadjusted cervical cancer incidence rates are highest in Hispanic women, and hysterectomy-adjusted rates are highest in Black women. Unadjusted uterine cancer incidence rates are highest in White women, and hysterectomy-adjusted rates are highest in Black women. Women aged 75-79 years had the largest difference in hysterectomy-adjusted cervical cancer rates compared to the unadjusted rates and women aged 70-74 had the largest difference for uterine cancer.

Conclusions Hysterectomy reduces or eliminates risk of certain gynecological cancers. The population at-risk of developing these cancers varies by age and race/ethnicity due to differing hysterectomy prevalence by these demographic factors over time. Adjusting the female population data file to account for self-reported hysterectomy prevalence by age and race/ethnicity can provide a better estimate of the true burden of these cancers in a population over time. BRFSS is self-reported data and does not include details on the type of hysterectomy procedure performed (partial, radial), so caution should be used in interpreting the results.

Identifying Factors Associated with Loss to Follow-up among Patients Reported to the New York State Cancer Registry (NYSCR)

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Background: State cancer registries in the U.S are resources for estimating population-based cancer survival. However, the completeness of patient follow-up might affect the accuracy of survival estimates. Like many registries, the NYSCR conducts patient follow-up largely through linkages with other data sources. Even after expending great effort on linkages, a small proportion of patients remain lost to follow-up (LTFU). We intend to identify factors that are associated with the likelihood of LTFU in the NYSCR.

Methods: First primary cancers (sequence number = 00 or 01, excluding DCO and autopsy cases) diagnosed during 2000-2018 among NYS residents were selected for study. All patients were followed through December 31, 2018. Based on patients' vital status and last contact date, follow-up status was categorized into two groups: patients LTFU and patients not LTFU. Patients LTFU were examined by demographic and tumor characteristics. Multivariate logistic regression analyses were performed to evaluate the associations between demographic/tumor characteristics and likelihood of LTFU. For patients LTFU, the timing of LTFU (within 1 year, 1-5, 5-10, or >10 years) was further described. LTFU rates within 5 years after cancer diagnosis were also examined.

Results: Among 1,797,228 patients, 74,722 were lost to follow-up, representing 4.2% of all patients and 7.6% of alive patients. About 61% of LTFU occurred within 1 year after cancer diagnosis. Logistic regression analyses indicated that patients who were female, black or Asian/Pacific Islander, Hispanic, foreign born, insured by Medicaid or uninsured, aged <20 years, or living in NYC or metropolitan counties were more likely to be LTFU compared to their counterparts. Cases reported by laboratories and physician offices also had a higher likelihood of LTFU. Similar patterns and effects were identified when evaluating 5-year LTFU.

Conclusion: Identifying factors associated with patient LTFU is important for cancer registries to improve follow-up data. We found that LTFU is not random, rather certain patient groups have higher LTFU rates than others. For registries that conduct follow-up through linkages, it is critical to collect high quality and complete demographic data, especially for females, children, the foreign born, and minority race/ethnicity groups.

Improving Central Registry Data Processing and Quality Assurance Through Innovation

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Problem: Quality Assurance is a challenge for central registries processing cases from multiple facilities. Changes in software, policy, and procedures increase the difficulty. These data anomalies and duplications originate from several sources. Duplicate abstracts are submitted from hospitals routinely. These manifest as abstract bundles where few cases are duplicates, and the remaining are unique. CRS Plus automatic consolidation rules may override validated values with new conflicting abstract values. Manual consolidation requires CTRs to choose the appropriate value. Certain identifiers such as race, ethnicity, gender, etc., should not change in most circumstances. Any changes must be identified efficiently for the QA team for review and corrective action. Consolidated records may contain values that are inconsistent with write-backs from vital statistics and other data sets. These discrepancies must be identified and reviewed. A quality control process must be established to actively identify and correct or prevent data changes.

Solution: Myriddian has developed the Myriddian Quality Assessment Tool (MQAT), a Web-based application that provides several tools and workflow processes to address the problem. Through a proprietary hashing process, NAACCR V180 and V21 XML bundles received by Web Plus are analyzed by MQAT. This enables the CTR to export unique abstracts that are not present in the Registry Database. By selective processing, a large percentage of duplicates can be prevented before they enter the processing workflow. At times changes occur to race, DOB, SSN, and such key demographic fields during the normal process. MQAT identifies anomalous changes by examining the CRS Plus change log and comparing those changes to rules that highlight cases for manual review. When unexpected changes to fields such as Lat/Long and DxCounty occur, MQAT can identify and automatically correct via supporting scheduled tasks and reference tables in SQL Server.

Results: Data Quality is a keystone of the Cancer Registry. MQAT has allowed Myriddian to become more efficient in managing the complex process of abstract processing, abstract consolidation, and data validation.

- Improved workflow
- Elimination of duplicates
- Identify cases for QA review
- Identify CTR trends for education
- Reduced workload and aggravation
- Cost savings

Initial Method of Detection: The Breast Cancer Registry Missing Link

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Purpose: United States cancer registries don't collect the patient-specific initial method of detection (MOD), such as screening mammography, for women with breast cancer. Initial MOD is the missing link between screening and outcomes. Absence of MOD prevents complete understanding of risks and benefits of screening, allows persistently conflicting recommendations, and misses opportunities to save lives. The purpose of this research is to determine whether patient-specific initial MOD can be accurately assigned prospectively and abstracted into cancer registries.

Material and Methods: This single institution research was approved by our IRB. MOD was defined as the single earliest event or test triggering the work-up and diagnosis of breast cancer. 7 MOD codes were created for image-based screening modalities, 3 for patient or provider detected signs or symptoms, and 1 for rare clinical presentations. Radiologists prospectively added a single MOD to the breast imaging report immediately after recommending tissue sampling of a suspicious (BI-RADS 4 or 5) finding for any patient without an active diagnosis of breast cancer. Registrars searched radiology reports for MOD when abstracting data for new breast cancer cases and transferred it to the corresponding user-defined MOD field in the registry. Radiology reports and images for patients diagnosed with breast cancer from January 2021 through December 2021 were reviewed to determine if MOD was assigned in the report and correct. Registry records were reviewed for completion of the MOD field from July 2021 through December 2021.

Results: From January through December 2021, radiologists assigned MOD in 91% (247/271) of eligible cases and MOD was correct in 93% (230/247) of cases for which it was assigned. From July through December 2021 abstractors discovered and transferred MOD to the registry in 90% (87/97) of eligible cases. 71% (12/17) of incorrect MOD assignments deviated from the existing guidance.

Conclusion: The prospective addition of a single initial MOD to radiology reports by breast imaging experts is feasible. Abstractors can consistently discover and transfer the MOD from radiology reports to cancer registries. Further investigation should include multiple institutions with reinforcement of protocol to improve accuracy, and electronic prompts to improve completion.

Lung Cancer Survival among Male Florida Career and Volunteer Firefighters

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Background: Lung cancer (LC) is a leading cause of cancer incidence and death in the US. Although firefighters smoke at rates lower than many worker groups, they are exposed to many known carcinogens and other chemical compounds via inhalation during and following firefighting activities. Despite these increased risks epidemiologic investigations on LC-survivorship for both career- and volunteer-firefighters are lacking.

Methods: Population-based retrospective observational cancer cohort of patients with primary LC-diagnosis in Florida were used to evaluate the survival among male Florida career- and volunteer-firefighters compared to non-firefighters over a 33-year-period (1981-2014). This study analyzed Florida Firefighter data that consist of linking data from 1) the Florida Cancer Data System incidence cancer records (1981–2014), 2) firefighter certification records from the Florida State Fire Marshal's Office (1972–2012), 3) LexisNexis, a national dataset of news, business, and legal publications, and 4) Florida vital statistics records. The time from LC-diagnosis to LC-specific death in years were analyzed with multivariable Cox regression models with sociodemographics, clinical, treatment specific variables with occupation (career-firefighter, volunteer-firefighter, non-firefighter) as the models' main effect. Adjusted hazard ratios (aHR) and 95% confidence intervals (95%CI) were calculated.

Results: Out of 210,541 male LC diagnosis, there were 449 career-firefighters and 157 volunteer-firefighters. LC-death was higher among volunteer-firefighters (75.2%) then career-firefighters (73.1%) but lower than non-firefighters (80%). In a multivariable model, compared to non-firefighters, career-firefighters had 13% (aHR=0.87;95%CI:0.84-0.97;p-value=0.012) and volunteer-firefighters had 24% (0.76;0.63-0.91; p=0.003) significantly lower risk of LC-death. Among firefighters only, career-firefighters had 15% (1.15;0.93-1.42;p=0.196) higher risk of LC-death than volunteer-firefighters but results were not statistically significant.

Conclusions: LC-survivorship is significantly better among firefighters compared to non-firefighters. Career-firefighters had higher risk of LC-death than volunteer-firefighters, but the difference was not statistically significant. Occupational and environmental exposures may vary widely among firefighters depending on type of work activities, time spent at fires, fire types and use of respiratory equipment and other protective gears. Additional epidemiological studies are needed to determine and link these occupational and environmental exposure data to cancer cohort studies.

Mapping Cancer Incidence among Hereditary Cancer Types in Michigan

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Harmful mutations in the *BRCA1* and *BRCA2* genes substantially increase the risk of developing hereditary breast, ovarian, pancreatic, or prostate cancers, which is an inherited condition known as a Hereditary Breast and Ovarian Cancer (HBOC). Among women younger than 45, breast cancer incidence is higher among Black women than white women. Variations in *MLH1*, *MSH2*, *MSH6*, *PMS2*, or *EPCAM* genes increase the risk of developing another hereditary condition called Lynch syndrome (LS). LS increases the risk of colorectal, endometrial, ovarian and other cancers. Colorectal cancer disproportionately affects the Black community, where the rates are the highest of any racial/ethnic group in the United States. Black Americans are about 20% more likely to get colorectal cancer and about 40% more likely to die from it than most other groups.

To decrease the burden of hereditary cancers on Michigan's population, early identification of HBOC or LS among those who may have a predisposition of hereditary cancer is important. The cancers analyzed in this project have been identified as those most likely to have an underlying genetic predisposition due to HBOC and (LS) (e.g., breast, ovarian, colorectal, endometrial, prostate and pancreatic). Data obtained from the Michigan Cancer Surveillance Program (MCSP) was used to identify areas of high need for genetic counseling based on incidence rates of select hereditary cancers. It was determined that several differences existed among incidence rates between Black and white cancer patients in Michigan. Of note, white women had a higher incidence of breast and endometrial cancer compared to Black women; Black persons had a higher incidence of colorectal cancer compared to white persons; Black men had a higher incidence of both prostate cancer and high Gleason Score prostate cancer compared to white men.

Identifying areas that are high in need for cancer genetic services but are low in usage of these services by different racial groups helps drive program decisions for possible interventions. Genetic counseling with a board certified and/or eligible genetics provider, followed by genetic testing as appropriate, are the recommended first steps for anyone with a personal history or strong family history of these cancers.

Modernization of the National Program of Cancer Registries Cancer Surveillance System (NPCR-CSS) Monitoring Database (MDB)

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Introduction: Rapidly monitoring and analyzing current and historical data is critical for cancer surveillance systems. The National Program of Cancer Registries (NPCR) deployed an enhanced on-line NPCR-CSS MDB system to combine real-time submission tracking and data analysis components with historical data. This system provides a suite of data visualization tools that aid CDC staff and NPCR awardees in monitoring their respective program activities and data quality.

Purpose: This presentation illustrates a secure and modernized on-line tracking system that facilitates NPCR program monitoring, data analysis, and management.

Methods: The enhanced NPCR-CSS MDB system was developed in adherence with the Department of Health and Human Services' Enterprise Performance Life Cycle framework. An application development life-cycle approach for the system's design included a process for planning, programming, testing, and deployment. An evaluation of needs and requirements from awardee users was conducted. Based on those requirements, the development team designed and deployed the modernized system. Screenshots of the reports from the various components will be presented.

Results and Conclusion: Through dashboards, graphs, trend-lines, and maps, the enhanced system visually displays major programmatic components such as data submission status, data quality reviews, program evaluation standards, and interstate data exchange. Awardees can update staff directories, track NPCR-related activities, generate reports, view data trends, and download Data Evaluation Reports and certificates. These enhancements allow more efficient monitoring leading to improved data quality and enhanced program operations.

New Hampshire Childhood Cancer Survivor Experiences: A Qualitative Study

Dr. Angela Ricci[1,2], Dr. Meghan Longacre[3], Ms. Nithya Ramesh[3], Dr. Julie Kim[1,2], Ms. Adriane Burke[4], Ms. Whitney Hammond[4], **Dr. Judy Rees[5]**

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Childhood cancer incidence (2013-2017) was reported as being highest in New Hampshire and the Northeast (Siegel 2018). In response to these findings, and to local concerns over a pediatric cancer cluster, the NH State Legislature set aside funds to explore childhood cancer issues in the Granite State. This funding allowed a multi-disciplinary team led by the New Hampshire State Cancer Registry (NHSCR) to conduct several childhood cancer projects, including a study to understand the experience of childhood cancer patients and their families in NH. Between January and June 2021, we used a virtual platform, Zoom, to conduct focus groups and individual semi-structured interviews to elicit open-ended perspectives from our participants. Transcripts were coded and analyzed using a mixed deductive and inductive approach. Coding and thematic statements were developed via consensus between two analysts. Our study identified significant challenges faced by NH childhood cancer patients and their families both during and after treatment. Particular areas of need include: Interpersonal and mental health support, opportunities to connect NH families experiencing childhood cancer, financial resources, school based support, and more comprehensive and integrated survivorship care. These results are being used to inform program planning for pediatric cancer prevention, treatment, and survivorship.

New Hampshire Childhood Cancer: Lessons Learned from Hosting a Large, Virtual Conference

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Childhood cancer incidence (2013-2017) was recently reported as being highest in New Hampshire and the Northeast (Siegel 2018). Rates of childhood cancers in the New Hampshire Seacoast area raised community concerns about possible environmental causes. In response, the New Hampshire State Legislature set aside funds to explore childhood cancer issues in the Granite State. This funding supported a multi-disciplinary team led by the New Hampshire State Cancer Registry (NHSCR) to conduct several childhood cancer projects, including hosting a free and virtual New Hampshire Childhood Cancer Conference on June 10, 2021. This educational conference was collaboratively designed for a broad audience and included welcome remarks by the Governor of New Hampshire, national expert presentations from diverse scientific fields, as well as the personal experiences of a cancer survivor and a parent. Between January and June 2021, we planned, organized, and executed our conference. A conference vendor organization was hired to support the technical element of the project (e.g., registration website, day of conference hosting, evaluation platform) and to create a written conference summary. Using a virtual platform, Zoom, the conference brought together 348 attendees (cancer registrars, researchers, public health professionals, community members, cancer survivors/families) and offered continuing education credits for Physicians, Nurses and Cancer Registrars. Over 960 hours of education credits were earned by 158 cancer registrars. The scientific summary of the conference proceedings will be used in program planning and identifying priorities to support pediatric cancer patients, survivors and families. The logistical challenges in organizing the conference will be discussed.

New IT Solutions in Cancer Registry Data Collection

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Introduction: Cancer registry is backbone for all cancer research activities. Prior to setting up cancer registry, it is suggested that a cross-sectional survey be conducted to know the cancer. It is a challenging and daunting task to setup registries, especially in rural India. There are 39 Population Based Cancer Registries (PBCR) setup by the National Centre for Disease Informatics (NCDIR), India. Tata Memorial Centre (TMC) setup the first rural registry in Barshi, in 1982. As a continued effort, another rural registry was setup in Ratnagiri district in Maharashtra, followed up in Sindhudurg. Special registry, four, Nuclear Power plant (NPP) locations in India, Tarapur in Maharashtra, Kaiga in Karnataka, Kakrapar in Gujarat and Rawatbhata in Rajasthan, were set up in 2011 onwards. Some of the registries are difficult terrain areas and access to these are very difficult.

Objectives: To describe the Newer ways, with the use of Technology, to collect and record data through Tablet-PC.

Material and Methods: Collection of data for the years 2011 onwards for special registries, was done using Tablet-PC. Tablet-PC were procured and given to field investigators for data collection with Software developed exclusively for this purpose. Field visits were undertaken anyway, but it paved the way for paperless registry and real-time data capture. The data is entered online from the location, and it is transmitted to the Central SERVER located in our hospital. The software has online duplicate checks, location by GPS, immediate analysis of cases collected by each investigator and overall performance between any period of data collection. TAB-PC data collection started from 2017 onwards.

Results: In the NPP registries, till date 523 cases of Palghar, 605 of Uttarkannada, 138 of Rawatbhatta and 411 of Kakrapar, of the years 2017-18. Besides cases of previous years, prior to 2017 were also entered, which constituted 3700 cases registered in all 4 special registries. The TAB_PC helped during the COVID-19 period as well, as cases were obtained by email as well.

Conclusion: The TAB-PC has helped in collection quicker, easier means and also for data validation and analysis, which otherwise would be difficult.

Operationalising Clinical Natural Language Processing (CNLP) for Cancer Registries

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The task of preparing a Cancer Registry for using Clinical Natural Language Processing (CNLP) is an important process that will have significant effect in the workflow processes of staff. Successful implementation should bring greater productivity and enjoyment to existing staff and pave the way for them to be engaged in more interesting and complex work.

However, there are a number of activities that need to be carefully designed and managed.

We delve into the questions that need to be answered for a registry to decide if they have the resources to properly execute a project to introduce CNLP, and if they have the technologically experienced staff to ensure it is effectively commissioned.

1) The types of CNLP available effect the nature of the results a registry will receive and how they will restructure their workflow.

2) How should a cancer registry initiate a new CNLP Process?

    i) Treat it as a project and set up a project management team. It is not just a matter of installing packaged software.

    ii) When the CDC Cancer Surveillance Cloud-based Computing Platform (CS-CBCP) becomes available many considerations will be ensured, but otherwise the Cancer Registry should explore topics about the nature and quality of the training reports , and the functions of the CTR software being able to send documents to the service, receive them back, audit them appropriately, and the CNLP Service's response to prospective changes in coding rules both locally and nationally.

3) If a registry has to start without any prior experience with CNLP they will need to prepare training materials for the software provider including compilation of a training corpus, coded for case identification, and the required NAACCR data items.

4) Operational activities include: Setting up the communication mechanisms for data transfer to and from the CNLP service and ensuring procedures are in place for CTR corrected data to be sent back to the CNLP service.

Post Deployment Considerations include a strategy that defines actions to take if CNLP service is abandoned, and setting a regular schedule for auditing the results and providing feedback to the service provider

Paediatric Cancers Reported in Special Cancer Registries in India

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Background: The paediatric cancer incidence rate in India is estimated to be 6.3 per 10^5 while it is 8.8 per 10^5 Globally. The types of cancers that occur in children vary greatly from those seen in adults. Despite cancer being a rare disease, and major advances in treatment and supportive care, cancer is still the leading cause of death in children younger than 15 years. The present study addresses this rare disease diagnosed in children in Nuclear Power plant (NPP) areas. Four Special Population Based Cancer Registries (PBCR) were set up in NPP areas in India, under Tata Memorial Centre (TMC), Mumbai, since 2011 and these are located in Palghar (Maharashtra), Uttarkannada (Karnataka), Kakrapar(Gujarat), Rawatbhatta(Rajasthan).

Objectives: To study proportion of paediatric cancer, cancer types reported in NPP locations during 2011-18, and further compare it with Indian national cancer rates.

Methods: During this period, in the four NPP registries, 125 cancer cases were registered.using ICD O-3 for classification of tumor morphology and primary site, and further classified according to the ICCC category (International Classification for Childhood Cancer).

Results: A total of 5065 cancers were reported of which 125 cases are in paediatric group, 65 cases were boys and 60 cases were girls .32 cases from Uttarkannada, 49 from Palghar, 15 from Rawatbhata and 29 from Kakrapar registry was reported from these registries. The proportion of paediatric cancers of all cancers in each registry are 3.4%, 2.0%, 2.0% and 2.7% in Palghar, Kakrapar, Uttarkannada and Rawatbhata respectively. Among the paediatric cancers, proportion of brain & CNS (0.6%), Leukaemia (1.5%) and lymphoma (0.5%) cancers was highest in Palghar. The proportion of childhood cancers across Indian PBCRs relative to cancers in all age groups varied between 0.7-3.7%(NCDIR' 2020). The proportion of leukaemia (43-46%), lymphoma (7-16%) and brain & CNS (6-7%) observed in the Indian PBCRs are comparable to proportion of leukaemia (27-44%), lymphoma (3.4- 15%) and brain & CNS (6-17 %) reported in the special registries.

Conclusion: The specific types of paediatric cancers observed in Special Registries (present study) and India PBCRs are similar and less than those reported elsewhere in the west.

Participation Rates and Characteristics of Participants and Non-Participants in Cancer Patient Contact Studies in New York State

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Background: Cancer research studies involving patient contact often use state or territorial cancer registries to identify eligible patients, with the goal of recruiting a sample that is representative of the underlying population. However, low participation may decrease the representativeness of the sample, introduce selection bias, and limit generalizability. We examined participation rates and characteristics of participants and non-participants in one completed study and five ongoing studies involving contact of cancer patients in New York State.

Methods: Patients who were sent an initial study mailing before November 1, 2021, were included in the analysis. Two studies required patient assent to further contact about the study (active consent), two gave patients the opportunity to decline further contact about the study (passive consent), and two involved survey mailings followed by phone calls to encourage participation (direct enrollment). We conducted descriptive analyses to examine the percent of patients who actively/passively consented or participated in each study, and we used chi-square or Fisher's exact tests to compare demographic characteristics of participants and non-participants. All analyses were conducted using SAS 9.4.

Results: For the studies requiring active consent, 25.3% of patients agreed to further contact about a study involving a dietary intervention vs. 51.3% for a study involving a telephone interview. For the two studies allowing passive consent, 9.4% and 9.7% of patients agreed to further contact, while 78.9% and 75.1% passively consented (no response within four weeks). The two studies with direct enrollment focused on different populations, one more difficult to reach, and resulted in participation rates of 38.0% and 16.5% to date. We observed statistically significant differences between participants and non-participants in age at diagnosis, race, and region/county at diagnosis for one or more studies. Additional analyses of clinical characteristics by participation status are ongoing.

Conclusion: In recent and ongoing patient contact studies conducted by the New York State Cancer Registry, participation rates varied by the study design and contact procedures used. Although studies involving recruitment through state cancer registries identify and contact a population-based group of cases, patient self-selection may lead to a study sample that differs from the underlying population.

Racial disparities in curative surgery, for black early stage non-small cell lung cancer patients in Florida, 2005-2017

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Background: The NIH lists lung cancer as the second most common cancer in the U.S. in both sexes. Over 80% of all lung cancer cases are non-small cell cancer (NSCLC), and about 13% small cell lung cancer. Blacks often seen as a homogenous group in the US, in fact show remarkable diversity in terms of genome, social, economic characteristics. Despite the high number of cases of NSCLC, there is limited research on disparities in receipt of curative surgery for early stage NSCLC among Black subgroups.

Methods: The Florida Cancer Data System (FCDS) identified 80,458 patients diagnosed with NSCLC from 2005 to 2017**.** Discharge data inclusive of comorbidities for each lung cancer patient was linked to FCDS data. Multivariable logistic regression was conducted to identify the role of sociodemographic factors in treatment of NSCLC via curative surgery.

Results: A total of 69,996 patients with early-stage NSCLC were included, 65,326 (93.3%) were White, 3,992 (5.7%) were U.S. Born Black, 184 (0.3%) were Afro-Haitian Black, 311 (0.4%) were West Indian Black and 183 were Hispanic Black (0.3%). The presence of comorbidities was a major determinant of receipt of curative surgery, and so was poverty, stage at diagnosis, age and histology. Patients with a Charlson Comorbidity Index (CCI)≥3 had 33% lower odds of having curative surgery (OR 0.67; 95%CI, 0.63-0.71) compared to patients with 0 comorbidities. A multivariable analysis adjusting for sociodemographic factors (i.e., age, poverty, marital status, insurance, region) and clinical factors (i.e., histology, stage, CCI, smoking status and curative radiotherapy) revealed that US-born Blacks and Afro-Haitians had 37% and 47% lower odds of receiving curative-intent surgery respectively (ORs 0.63; 95%CI, 0.58-0.68 and 0.53; 95%CI, 0.36-0.76), while West Indian Black and Hispanic Blacks (ORs 0.79; 95%CI, 0.60-1.04 and 0.76; 95%CI 0.54-1.06), did not show a significant difference compared to Whites, but possibly due to low number of patients studied.

Conclusion: All Blacks subgroups are less likely to receive curative-intent surgery compared to Whites. Racial disparities, regardless of adjustments for comorbidities, SES, and clinical factors, persist. Future studies should focus on the role of physician-patient encounters as a potential source of racial disparities.

Racial/Ethnic Disparities in COVID-19 Infection among Working-Age Women with Precancerous Cervical Lesion

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Background: Precancerous cervical lesion (PCL) is most likely diagnosed in working-age women. In Louisiana, over 98% of PCL cases were diagnosed at aged 18-65 and women aged 20-34 had the highest incidence rate. Before the Omicron variant spread, COVID-19 prevalence was higher in young and middle aged adults and minorities in the United States. Because most of PCL cases occurred in the similar age group as COVID-19, this study aimed to assess the racial/ethnic disparities in COVID-19 infection on this specific population.

Methods: Women aged 18-65 with PCL, including CIN3, CIS, severe dysplasia, AIS, and high-grade dysplasia for year ≥2019, diagnosed in 2009-2020 were obtained from the Louisiana Tumor Registry. We linked eligible patients with the Louisiana statewide COVID-19 data collected up to June 2021 to identify patients with COVID-19 infection. Race/ethnicity was categorized as non-Hispanic white (NHW), non-Hispanic black (NHB), Hispanic, and others. Other covariates included age at diagnosis, marital status, type of insurance, census tract level poverty, and Louisiana region (greater New Orleans vs. other). Logistic regression was employed to assess the racial/ethnic differences in COVID-19 infection among working-age women with PCL.

Results: Of 13,389 eligible PCL women, 12% of them were diagnosed with COVID-19 and 83% of COVID-19 patients were confirmed with a positive PCR test. NHB had the highest percentage of COVID-19 infection (15.1%), followed by Hispanic (13.6%). The COVID-19 infection rate was similar between NHW and other race/ethnicity, 10.2% and 10.4%, respectively. After adjusting for other covariates, the odds of COVID-19 infection for NHB was 62% higher (95% CI 1.437-1.826) and Hispanic was 41% higher (95% CI 1.114-1.785) than NHW. Additionally, compared to women aged 50-65, those younger age group were more likely to have COVID-19 with adjusted HR 1.545 (95% CI 1.204-1.981) for aged 40-49, 1.372 (95% CI 1.096-1.718) for aged 18-29, and 1.375 for aged 30-39 (95% CI 1.097-1.724).

Conclusions: After adjusting for age and socioeconomic covariates, there is substantial variation in racial/ethnic disparities in COVID-19 infection among working-age PCL women. Other risk factors, such as comorbidities and individual behavior, that could cause these disparities need further investigation.

Receipt of Guideline-Congruent Care Among AYA Patients with Ovarian Germ Cell Tumors

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Background: Germ cell tumors (GCT) are a small subgroup of ovarian malignancies that occur more commonly in adolescents and young adults (AYA: 15-39 years). Because the age range spans that of both pediatric and adult practitioners, AYAs often do not receive uniform care. Little is known about the treatment these patients receive outside of the clinical trial setting. Therefore, the objective of our study was to describe initial cancer care for AYAs with ovarian GCTs, and examine factors associated with receipt of guideline-congruent care and survival in a population-based cohort.

Methods: We identified AYAs diagnosed with a first primary ovarian GCT from 2004-2018 in the California Cancer Registry (CCR). Guideline-congruent care (receipt of surgery with or without chemotherapy and radiation depending on tumor histology and stage) was the primary exposure of interest. This was determined from CCR data, including treatment text fields, which contain granular information on chemotherapy regimens. We used multivariable logistic regression models to evaluate associations of clinical and sociodemographic factors with receipt of guideline-congruent care; flexible parametric models were used to measure the impact of guideline care on survival. Results are presented as odds ratios (OR) or hazard ratios (HR) and their associated 95% confidence intervals (CI).

Results: Of the 613 patients with ovarian GCTs, 55% were treated by OB-GYN/Gynecological Oncology, 25% received all their care at a specialized cancer center (SCC) and 83% received guideline-congruent care. Treatment by Hematology/Oncology vs OB-GYN/Gynecological Oncology (OR=0.57, 95% CI=0.34-0.97), older age, and public insurance vs. private (OR=0.56, 95% CI=0.34-0.93) were associated with decreased odds of guideline-congruent care. Overall survival at 5-years was 96%. Guideline-congruent care was associated with better survival (HR=0.37, 95% CI=0.14-0.96), while older age, public insurance, and treatment by Hematology/Oncology vs OB-GYN/Gynecological Oncology were associated with worse survival. Care at a SCC was not associated with survival.

Conclusion: We found that age, health insurance type, and provider specialty impacted the receipt of guideline-congruent care. Future studies should investigate barriers to receiving guideline care in this patient population and possible interventions that can help improve delivery of optimal treatment and survival.

Review of Childhood Cancer Projects within the New Hampshire State Cancer Registry

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Due to high incidence of pediatric cancers in New Hampshire, the New Hampshire State Cancer Registry (NHSCR) partook in a childhood cancer project to evaluate the accuracy and quality of pediatric cancer data and reporting. First, a *recoding audit* was performed by independent Certified Tumor Registrars to review records for all patients aged <20 years at diagnosis, assess data quality and identify problems in data collection and interpretation. Second, non-hospital affiliated clinics that employ *pediatricians were surveyed* regarding their history in diagnosing, treating, and/or referrals of pediatric cancer patients. This helped us understand whether there is a reliable path for cases to be reported to the NHSCR and understand referral patterns of pediatricians outside the hospital system. Third, we focused on the quality of, and relationship between, *insurance status and stage of cancer* at time of diagnosis among pediatric cancer patients to assess missing data for insurance, stage, and other factors that may be affected by insurance status. Ultimately, it was found that the accuracy rate was very high for NHSCR childhood cancer data. Survey results suggested that it is unlikely that pediatric cancer is underreported in New Hampshire by independent clinics. Findings from the data quality review are being assessed to determine next steps.

Survival Analysis of Head and Neck Cancer Patients Treated in a Tertiary Cancer Hospital in Mumbai, India

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Introduction: As per the GLOBOCAN (2018) estimates there are approximately 200,000 (17%) head and cancer cancers diagnosed annually. There is a male pre-dominance in this cancer. Of the head and neck cancers, oral cancers contribute a major proportion, followed by pharyngeal cancer. The data emanating from the 36 population-based registries and 6 Hospital-based registries from India indicate that, oral cancers are leading cancers in all the registries (NCDIR, 2020). The main risk factor for these cancers are tobacco-consumption. The Tata Memorial Hospital (TMH), a premier cancer hospital in India, registers more than 50,000 cancers annually, of which 35% are head and neck cancers.

Objectives: The present study aims at reporting cancer survival rates of head and neck cancer, by subsites as well, seen and diagnosed at TMH during the years 2012-14.

Material and Methods: The present study subjects are accrued from TMH, Mumbai, during 2012-14. All those who were diagnosed and confirmed as cancers were included in the study. A periodical follow-up was done for patients who missed their appointments, and patient and disease status as per the standard procedure. Life-table methods was applied to compute survival rates and SPSS Version 21.0 Software was utilized for statistical analysis.

Results: The study included 4351 oral cancer, 766 oro-pharyngeal cancer, 612 hypopharyngeal cancer, 544 laryngeal cancers and 244 Nasopharyngeal cancer. The clinical extent of disease on at presentation was based on TNM group staging (UICC,1978). In the study, a major proportion of patients were diagnosed in stage III and stage IV, except in Vocal cord and to a lesser extent in lower lip and anterior tongue. Thus, the treatment offered is either only surgery or in combination with radiotherapy or chemotherapy. The overall 3-year survival rates for oral cancer was 26-43 %, 23-33% for oropharyngeal cancer, 22-28% for hypoharyngeal cancer, 28-53% for laryngeal cancers and 44% for nasopharyngeal cancer.

Conclusion: Prognosis differs by site of disease in this study. The difference in outcome is an indicator of the scope of prevention activities that could be reiterated for better prognosis of head and neck cancer.

Survival Trends in Primary Brain Tumors by Malignant and Non-Malignant Status in the United States, 2004-2017

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Background: Despite advances in cancer diagnosis and clinical care, survival rates for many primary brain and other central nervous system (CNS) histologies remain poor. The overall goal of this study was to assess whether overall survival for these tumors has improved from 2004 to 2017.

Methods: Survival differences by time period of diagnosis were determined using the CDC's National Program of Cancer Registries Survival Analytic file overall, and by the 5 most common histologies within age groups (0-14, 15-39 and 40+ years) for diagnosis years 2004-2017. Survival was compared for time periods: 2004-2007, 2008-2012 and 2013-2017. Kaplan-Meier and age-stratified multivariable Cox proportional hazards models were constructed to evaluate survival differences between time periods. Models were adjusted for sex, race/ethnicity, extent of surgery and radiation. Malignant and non-malignant tumors were assessed separately for all analyses.

Results: Increased survival was observed in the 0-14 year age group for embryonal tumors (logrank $p<0.001$) and ependymal tumors (logrank $p=0.002$). In the 15-39 year old age group, we observed an increased survival in cases diagnosed with anaplastic astrocytoma ($p=0.0084$); and Oligodendroglioma ($p=0.048$). In the oldest age group (40+ years), anaplastic astrocytoma ($p<0.001$), glioblastoma ($p<0.001$), Oligodendroglioma ($p<0.046$) and Hemangioma ($p=0.024$) showed statistically significant improvements in survival over time. When compared to 2004-2007, improvements in survival were seen over time for patients aged 0-14 years in only malignant tumors (HR=0.89, $p<0.001$ in 2008-2012; HR=0.83, $p<0.001$ in 2013-2017), in 15-39 years for malignant (HR=0.94; $p=0.016$, in 2008-2012; HR=0.87, $p<0.001$ in 2013-2017) and non-malignant tumors (HR=0.90; $p=0.024$, in 2008-2012; HR=0.88, $p=0.04$ in 2013-2017) and in patients >40 years for malignant (HR=0.96, $p<0.001$ in 2008-2012; HR=0.95, $p<0.001$ in 2013-2017) and non-malignant tumors (HR=0.92, $p<0.001$ in 2008-2012; HR=0.88 in 2013-2017) .

Conclusions: Overall survival for malignant brain and other CNS tumors diagnosed from 2013-2017 was improved compared to 2004-2007 for all age groups in both malignant and non-malignant tumors. In addition, histology specific differences were observed in survival for time period across age groups. Future monitoring of survival trends is essential to identify population-level effects of diagnostic and treatment improvements.

The Case of the Missing 2020 Cancers: Will Claims Data Provide a Clue?

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Background: As the annual Calls for Data loomed, reaching 95% completeness for 12-month data seemed impossible. The New York State Cancer Registry (NYSCR) turned to claims records in the hope of uncovering more information about the missing reports.

Methods: The New York State (NYS) Statewide Planning and Research Cooperative System (SPARCS) requires reporting of all patient encounters from licensed ambulatory surgery, emergency department (ED), hospital inpatient and outpatient providers. Each record includes patient demographics and up to 17 ICD-10-CM diagnosis codes. For this project, we extracted all 6,725,416 SPARCS records with any malignant neoplasm code for 2018 thru June of 2021 for NYS residents. Using SAS 9.4, we focused on comparing the cancer-related records for 2020 to the records from 2019.

Results: Overall, there were 5% more cancer-related records in 2019 than there had been in 2018 (2,009,600 vs. 1,914,364), but 8.2% fewer records in 2020 (1,844,054 total) than in 2019. Month-by-month, the number of claims in the first two months of 2020 exceeded the numbers from 2019 by 5%, but a decrease started in March 2020, with the biggest drop in April 2020. That month had a deficit of 38.8% for cancer-related encounter reports relative to the same month the previous year. Although the numbers rose after April, the claims for the last half of 2020 were 4% lower than for 2019. Comparing 2020 records to 2019 records by age, sex, type of encounter, and number of encounters per patient showed substantial drops across all categories of each covariate. In analyses of 20 (of 378) high-volume reporting facilities, which accounted for 56% of claims records, facilities in New York City had a more pronounced and more prolonged drop in reporting in 2020 than facilities in the rest of the state.

Conclusions: Although SPARCS data do not provide definitive evidence on incident cancer diagnoses, circumstantial evidence supports the conclusion that there were fewer cancer cases diagnosed among NYS residents in 2020. Additional analyses are needed to assess the impacts on stage at diagnosis and outcomes associated with delays in cancer diagnosis and treatment because of COVID-19.

The Impact of Medicaid Expansion on Female Breast Cancer Treatment and Survival: A Difference-in-Difference Analysis of the Synthetic California Cancer Registry Data

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Background: Medicaid expansion under the Affordable Care Act (ACA) has been linked to improved access to cancer care in states with the expansion. However, the impact within expansion states has not been explored. We assessed whether expansion of Medicaid in California (Medi-Cal) in 2014 had any impact on breast cancer treatment, and survival during 2010-2017.

Method: We identified female patients (20-64 years, n=88,154) in the Synthetic California Breast Cancer Registry data, of which 43,453 were diagnosed during the pre-expansion period (2010-2013) and 44,701 during the post-expansion period (2014-2017). We employed a difference-in-difference (DID) approach to estimate the impact of Medi-Cal expansion in 2014 on cancer treatment (surgery, chemotherapy and radiation) and survival (overall mortality and breast-cancer-specific mortality) using logistic and Cox regression models. We used patients' insurance status (Medicaid/not insured vs insured) as the exposure variable. The analyses adjusted for patient-level factors, including demographic (age, race/ethnicity, marital status) and cancer status (stage, grade, and laterality), and census-tract-level factors, including rurality and social vulnerability index (SVI).

Results: The proportion of surgery, chemotherapy, and radiation in the insurance and uninsured group was 95.22% and 85.56%, 49.29% and 57.09%, and 98.82% and 98.44%, respectively, before the Medi-Cal expansion, while it was 93.84 and 85.73%, 47.84% and 52.67%, and 98.28% and 98.07%, respectively, after the expansion. The overall and cancer-specific mortality rate in the insured and uninsured group was 9.64% and 22.20% before the Medi-Cal expansion, while it was 3.32% and 8.61% after it. Statistically significant effect of Medi-Cal expansion was only found for surgery (the estimated DID probability= -4.69%, p=0.001) and chemotherapy (the estimated DID probability= 2.4%, p=0.019), but not the other outcomes (p>0.05).

Conclusion: Within California, a state that implemented Medicaid expansion under ACA, the expansion had discernable effect among patients with different health insurance status. While the expansion decreased surgery but increased chemotherapy treatment among uninsured patients more than among the insured patients, the effect was not seen for radiation or survival. Future investigations into factors contributing to these discrepancies are needed.

Treatment Patterns in Patients Diagnosed with Advanced Prostate Cancer in California, 2010-2018

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Background: Androgen deprivation therapy (ADT), i.e. hormonal therapy, is the standard of care for men diagnosed with metastatic prostate cancer (mPC). In recent years, novel hormonal treatments and chemotherapy (e.g. docetaxel) have been approved to treat mPC. However, utilization of such treatments has been described in a limited manner in recent years.

Purpose: To assess initial treatment patterns among men diagnosed with mPC.

Methods: California Cancer Registry data from 2010–2018 were used to identify men ≥20 years old diagnosed with stage IV prostate cancer (site code: C619). Only microscopically confirmed primary cancer cases were included. Treatment patterns were examined using variables that captured ADT and chemotherapy utilization as part of initial cancer treatment. Frequency/proportion of patients who received any ADT and/or chemotherapy were calculated overall and by sociodemographic, comorbidity, and tumor characteristics. We further examined whether receipt of ADT and chemotherapy varied by sociodemographic and tumor characteristics using logistic regression models, adjusted for relevant covariates.

Results: We identified 14,215 men who met the study criteria. Of them, about 76% (n=10,867) received some form of ADT and 13% (n=1,802) received a chemotherapy. Among those who received ADT, almost 15% (n=1,580) also received chemotherapy. We observed approximately 12%-42% lower odds of ADT utilization among men 85+ and those in lower SES neighborhoods, but 1.3-6.7 times higher odds of utilization among those with Gleason score≥8, presence of distant metastasis, and those diagnosed/treated at a CoC or NCCN designated facility. These findings were statistically significant after adjusting for covariates. Similar patterns emerged for chemotherapy use for these characteristics except for NCCN designation. Additionally, we observed significantly lower odds (18%-79% lower, p-value <0.05) of chemotherapy utilization among men 75-84, who were Black or Hispanic and those with non-private insurance.

Conclusion: Although ADT is a standard of care for mPC, nearly a quarter of patients still do not receive it. There may also be some disparity in treatment utilization by age, SES, and race/ethnicity, particularly for newly approved treatments. Further study is needed to confirm these disparities, particularly a study that examines complete course(s) of treatments, timing and specific therapies received.

Trends in Hepatocellular Carcinoma Among Asians and Pacific Islanders Compared to Other Races in the United States

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Hepatocellular Carcinoma (HCC) is the most common liver malignancy and accounts for 85-90% of all liver cases worldwide. Hepatitis B virus (HBV) is one of the leading causes of HCC and the global prevalence remains a public health problem although a vaccine has been available since the 1990s. The World Health Organization estimates that the Asian and Pacific Islander (API) population has the highest incidence of chronic HBV worldwide. A large API population resides in the United States, many of which are living with chronic HBV and likely contribute to increasing HCC incidence trends.

The aim of this project is to describe HCC among this at-risk population, compared to other races, in the United States.

Data from the United States Cancer Statistics Incidence Database from the November 2020 submission in SEER*Stat will be used to calculate age-adjusted incidence rates of HCC. Primary invasive HCC is defined by ICD-O-3 site C22.0 and histology codes 8160, 8162, 8170-8172, 8174-8175, 8180, and 8190. Race-recode for USCS will be used to compare rate differences by sex between API, American Indian/Alaska Native (AIAN), African American, and White populations. Mortality trends will be obtained from National Center for Health Statistics for underlying cause of death for liver carcinoma, ICD-10 C22.0.

Findings from 2014-2018 show API populations had the highest age-adjusted HCC incidence rate (9.8 per 100,000, 95% CI: 9.6-10.0), followed by AIAN (8.9 per 100,000, 95% CI: 8.5-9.4), African Americans (8.5 per 100,000, 95% CI: 8.3-8.6), and Whites (5.7 per 100,000, 95% CI: 5.7-5.8). Since 2001, HCC trends increased significantly and then leveled off from 2016 – 2018 regardless of race. Further analysis by sex and race will be presented.

HCC remains a burden in API populations in the U.S. While HBV vaccination programs are key for the reduction of HCC, CDC has a goal of reducing HBV-related deaths by 2025 in those living with the disease by increasing access to testing, treatment, and research and development of new and more effective anti-viral therapies. In turn, the reduction of HBV incidence and related deaths may contribute, in part, to decreasing HCC incidence and mortality.

Trends in Hysterectomy-Corrected Squamous and Adenocarcinoma Cervical Cancers Among Women Aged 30 Years and Older

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Introduction: Previous studies report that cervical adenocarcinoma (AC) incidence increased among younger non-Hispanic White women in the U.S. To assess whether these trends are sustained, we examined hysterectomy-corrected incidence trends for cervical AC and squamous cell carcinoma (SCC) from 1999 to 2018.

Methods: Using population-based cancer registries covering approximately 97% of the U.S. population, we report age-adjusted incidence rates for cervical SCC and AC by race and region among women aged 30 years and older in the U.S. after correcting for hysterectomy prevalence. Hysterectomy prevalence obtained from the Behavioral Risk Factor Surveillance System was used to correct the number of women at risk for cervical cancer. We examined incidence trends using log-linear joinpoint regression models and quantified any change in trends using average annual percentage change (AAPC).

Results: Overall, an average of 7,758 cases (corrected rate of 11.7 per 100,000 women) of SCC and 2,985 cases of AC (corrected rate of 4.5 per 100,000 women) were diagnosed annually over the 20-year period. The corrected rates were highest among non-Hispanic Black women for SCC (19.3 per 100,000 women) and Hispanic women for AC (5.4 per 100,000 women). From 1999 to 2018, the incidence of SCC declined in all age groups. However, the incidence for AC was stable among women aged 30-39 years (AAPC: 1.17; 95% CI: -0.09, 2.45) and 40-49 years (AAPC: 0.99; 95% CI: -0.37, 2.37), and declined among women in all older age groups (50-59, 60-69, 70-79, 80+ years). Incidence also declined for both SCC and AC among non-Hispanic Black and Hispanic women but was stable for AC among non-Hispanic White women (AAPC: 0.04; 95% CI: -0.87, 0.96).

Discussion: The change from increasing incidence rates to stable rates for cervical AC among non-Hispanic White women and decreasing trends in older women are encouraging and could be due to myriad factors, including the temporal changes in the approach to screening, diagnostic testing, and treatment of precancerous lesions over the last 20 years.