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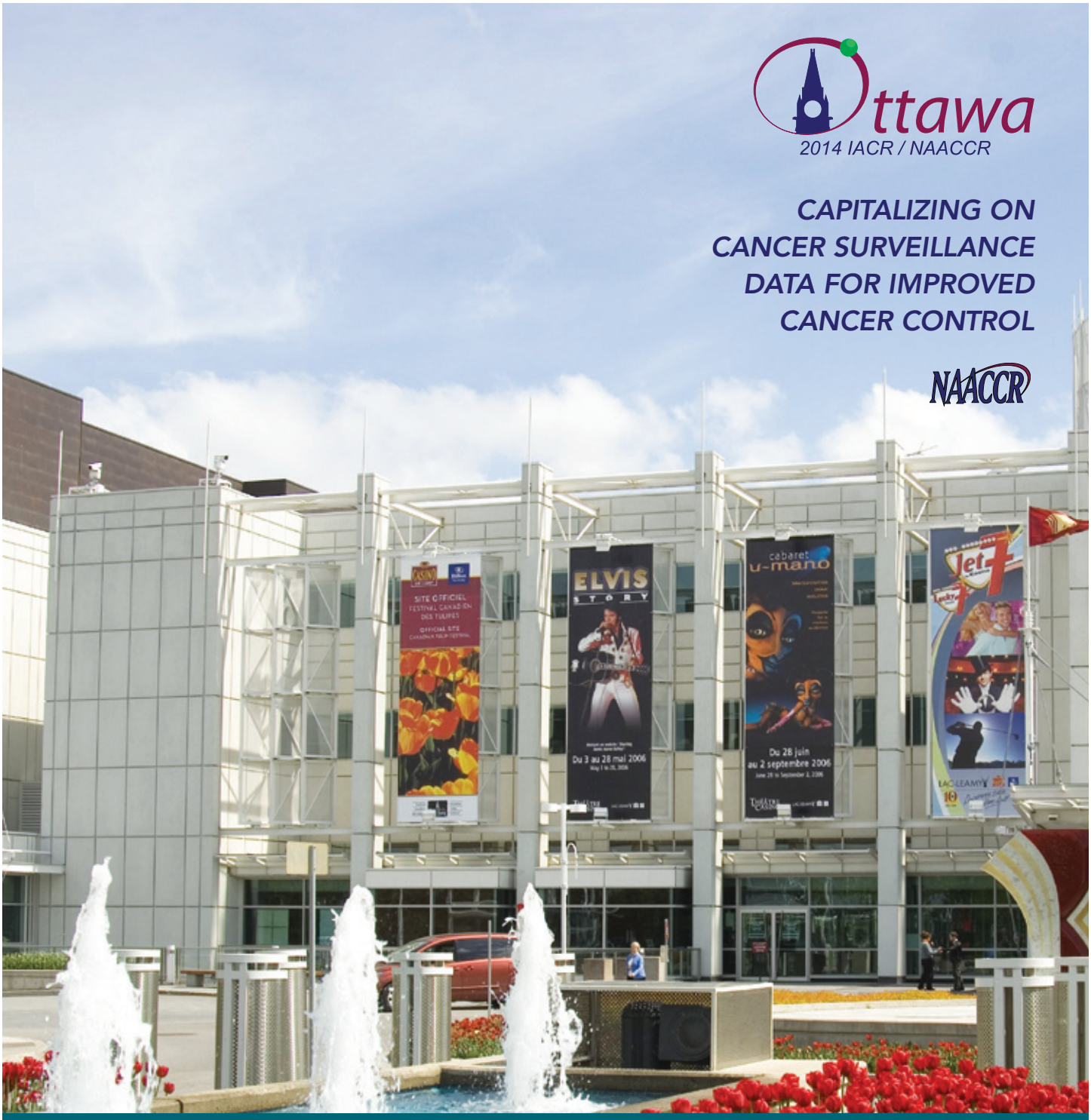
2014 IACR / NAACCR

CAPITALIZING ON CANCER SURVEILLANCE DATA FOR IMPROVED CANCER CONTROL

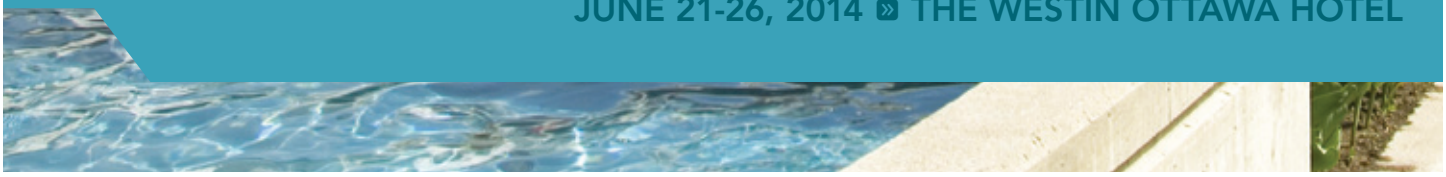
NAACCR



NAACCR FINAL PROGRAM - CONCURRENT SESSIONS AND POSTERS

NORTH AMERICAN ASSOCIATION OF CENTRAL CANCER REGISTRIES

2014 NAACCR ANNUAL CONFERENCE
JUNE 21-26, 2014 ◙ THE WESTIN OTTAWA HOTEL



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NAACCR
2014 CONFERENCE
Final Abstract Program

NAACCR would like to thank the poster and concurrent session oral presenters for their contributions to the conference.

Electronic versions of the posters and oral presentations will be made available online at NAACCR.org/2014 after the conference.

POSTER LISTINGS

All delegates are encouraged to take the opportunity to visit the posters to become familiar with some of the latest advances and research in the field.

Posters will be available at the following locations and times:

Confederation Ballroom on Level 4
Monday, June 23 5:30 pm to 7:00 pm
Tuesday, June 24 7:00 am to 5:00 pm
Wednesday, June 25 7:00 am to 3:30 pm

Confederation 2 & 3 on Level 4
Thursday, June 26 7:00 am to 3:45 pm

Confederation 1 & 2 on Level 4
Friday, June 27 7:00 am to 6:30 pm
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P-02 A New Model for Annual Incidence Cancer Reporting
B Riddle

P-03 An Audit of ePath Case Finding Completeness. Los Angeles Cancer Surveillance Program
SR Stoyanoff

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H Huang

P-05 A Comparison of Methods for Assessing Completeness of Case Ascertainment in Data from the National Program of Cancer Registries
AB Ryerson

P-06 Referral and Treatment Patterns for Rectal Cancer Patients in New Brunswick
J Bu

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J Bu

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CONCURRENT PRESENTATIONS

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SECTION A - IMPACT OF ELECTRONIC MEDICAL RECORDS

001

CHALLENGES AND OPPORTUNITIES FOR CANCER REGISTRIES WITH MEANINGFUL USE STAGES 2 AND 3

I Zachary[1,2], J Jackson Thompson[1,2,3], C Schmaltz[1,2], A Headd[1,2], E Simoes[1,2,3]
[1]University of Missouri , Health Managment and Informatics, Columbia, MO, United States; [2]University of Missouri Missouri Cancer Registry, Columbia, MO, United States; [3]University of Missouri , Informatics Institute, Columbia, MO, United States Minor Outlying Islands

Background: Public health registries are part of Meaningful Use (MU) stage 2 (cancer reporting) and stage 3 (to increase interoperability and enable public health data exchange). Healthcare entities that participate in Health Information Exchanges (HIEs) need to prepare not only for expanded security and information environments but also for interoperability and data sharing. The mandate requires more than a transition to the electronic health record (EHR); standardization, interoperability and data exchange must move forward to include many different standards and entities. There is not general agreement on what and how data should be collected and exchanged; data on various diseases are collected with different standards and formats.
Purpose: Review and describe different data standards that are used in the field of disease registries.
Methods: We reviewed data elements, formats and standards that are used by different disease registries, e.g., cancer, Alzheimer, dementia, congenital malformation, diabetes and trauma.
Results: We compiled tables that showed data elements, formats and standards for different diseases and conditions. We showed similarities and differences and identified areas where consensus is needed.
Conclusions: Disease registries are part of the puzzle for HIE and need to be able to accommodate to receive, process and store large amounts of data that are expected to be streamed from a variety of EHRs. We discuss key components for disease registries that move the reporting of disease to the next level where integration and interoperability can be achieved.

Notes

002

MEANINGFUL USE OF ELECTRONIC HEALTH RECORDS: ELECTRONIC PHYSICIAN REPORTING TO STATE CANCER REGISTRIES

W Blumenthal[1], S Jones[1], W Scharber[2], B Weatherby[2], L Ryan[2], S Van Heest[1], J Rogers[1]
[1]CDC, Atlanta, United States; [2]DB Consulting, Atlanta, United States

Background: In August 2012, the Centers for Medicare and Medicaid Services (CMS) published its final rule for Stage 2 of Meaningful Use (MU) of Electronic Health Records (EHRs). This final rule includes an optional objective for ambulatory providers (Eligible Professionals) to report cancer cases to state public health cancer registries. Physicians may begin reporting to cancer registries on January 1, 2014.
Purpose: To help central cancer registries prepare for MU.
Methods: CDC and NAACCR have worked collaboratively with the cancer registry community, EHR vendors, Office of the National Coordinator for Health Information Technology, CMS, immunization registry programs, and other partners to perform tasks for successful implementation of electronic physician reporting to cancer registries.
Results: CDC and NAACCR formed several workgroups to: 1) develop guidance documents to help registries work with various partners; 2) develop use cases, business requirements, and data element mapping rules and translations to help registries and inform software development for receiving and processing the electronic physician reports; and 3) develop education and communication tools to help cancer registries prepare for and implement MU cancer reporting, including guidance on the MU processes of onboarding and testing. CDC used the requirements identified by the workgroups to enhance the software application, eMaRC Plus, that cancer registries can use to receive and process physician reports. CDC also developed a new tool, CDA (Clinical Document Architecture) Validation Plus, to be used by EHR vendors, providers, and cancer registries to validate files for improved interoperability.
Conclusions: This presentation will describe the activities of CDC and the cancer registry community to prepare for MU Stage 2 reporting. It will also report on progress to date and lessons learned after implementation has begun in January 2014.

Notes

SECTION A - IMPACT OF ELECTRONIC MEDICAL RECORDS

003

TUMOURTEXTRACT – A LARGE VOLUME NLP PIPELINE NETWORK TO DELIVER AND EXTRACT CONTENT FROM IMAGING REPORTS FOR CANCER REGISTRIES

J Patrick[1], P Asgari[1], M Li[1]
[1]Health Language Laboratories, Sydney NSW, Australia

Introduction: The Victorian and New South Wales Cancer Registries embarked on a study to assess the effectiveness of large scale Natural Language Processing (NLP) for the automatic delivery and extraction of content from imaging reports.
Study Purpose: The objective was to develop a fully automated NLP pipeline that would collect all imaging reports from each imaging service, classify them, and then transmit the cancer reports to Registries. Subsequently, a tumour extraction engine inferred tumour staging information at the time of diagnosis or recurrence from a range of extracted data.
Implementation Process: The pipeline technology was designed as four fully automated stages to deliver cancer reports to the Registries and then extract the required content. Stage one is a classifier that is located at each imaging service. All their daily imaging reports were collected and then computationally filtered for reportable cancers, which were forwarded automatically to the registry. Stage two is a Report Purpose document classifier that identifies the 9 classes including Diagnosis, Recurrence, Treatment Evaluation, Complications, Treatment Planning, etc. Stage three classifies the reports for 15 tumour streams. The fourth stage was data extraction of pertinent material from the reports and inferencing the staging scores. The sensitivity and specificity of the reportable tumour classifier was 98.5 and 95.0% respectively, tested on a held out set. Within this mix of content there was also the need to properly recognise and differentiate negated expressions, diagnosis as distinct to just a reference to a disease, multiple primary sites, local and distant metastases, and primary lesions from recurrence.
Conclusions: The TumourTExtract NLP pipeline offers a solution for the accurate and timely collection of data for cancer monitoring from radiology reports. The generic technology can be extended to other imaging content and to pathology reports.

Notes

004

ENHANCING EARLY CAPTURE OF POPULATION-BASED CANCER SURVEILLANCE DATA THROUGH INTER-STATE HEALTH INFORMATION EXCHANGE

E Durbin[1], S Grannis[2]
[1]Kentucky Cancer Registry, Lexington, KY, United States; [2]Regenstrief Institute, Indianapolis, IN, United States

A limitation of U.S. cancer surveillance programs is the length of time required to capture complete surveillance data. Cancer cases for residents diagnosed in neighboring states typically suffer the longest reporting delays. These limitations are being addressed by a novel early case capture system for pediatric and young adult cancers that is being developed by the Kentucky Cancer Registry (KCR) and the Regenstrief Institute through a project sponsored by the Centers for Disease Control and Prevention. Health information exchanges are evolving into potential sources of important cancer surveillance data. The Regenstrief Institute operates the Indiana Health Information Exchange (IHIE), one of the largest and most mature HIEs in the nation. The Regenstrief Institute and KCR are collaborating to establish an exchange of standardized pathology and clinical data for Kentucky residents that have been diagnosed and/or treated for cancer at participating IHIE facilities. Pathology reports are formatted using national Health Level Seven (HL7) standards defined by the North American Association of Central Cancer Registries. A unique challenge has been the determination of Kentucky residential status for cancer patients in the IHIE. We developed the capacity to reconcile a patient's address timeline to their clinical observation times, and securely transmit appropriate cancer data from the Indiana HIE to the KCR, including address history in the HL7 transaction. Using address history we are able to identify many more cancer cases than if we had access to only the current address. These efforts have resulted in near real-time transmission of electronic pathology reports to the KCR. KCR has succeeded in capturing nearly complete population-based data for pediatric and young adult cancer cancers within 90 days or less. Our methods, challenges and successes will be presented.

Notes

SECTION B - SURVIVAL METHODS I

005

ON THE ESTIMATION OF EXCESS HAZARD AND NET SURVIVAL IN THE PRESENCE OF MISSING COVARIATE DATA: AN EMPIRICAL STUDY

M Falcaro[1], **U Nur**[1], B Rachet[1], J Carpenter[2]
[1]Cancer Research UK Cancer Survival Group, Department of Non-Communicable Disease Epidemiology, London School of Hygiene and Tropical Medicine, London, United Kingdom; [2]Department of Medical Statistics, London School of Hygiene and Tropical Medicine, London, United Kingdom

Background: Net survival is the survival probability we would observe if the disease under study were the only cause of death. When estimated from routinely collected population-based cancer registry data, this indicator is a key metric for cancer control policy. Unfortunately, such data typically contain a non-negligible proportion of missing values on important prognostic factors (e.g. tumour stage). Missingness completely at random is usually an implausible assumption in this context.
Methods: We carried out an empirical study to compare the performance of complete records analysis and several multiple imputation (MI) strategies when net survival is estimated via a flexible parametric proportional hazards model which includes tumor stage, a partially observed categorical co-variate. We used routine population-based cancer data for which the cause of death is not reliably known, and there for all our analyses is within the relative survival framework. Starting from fully observed registry data we induced missing values on stage under three different scenarios. For each of these scenarios we simulated 100 incomplete data sets and evaluated the bias and accuracy of the different strategies.
Results: MI models using ordinal logistic regression performed very poorly under all scenarios. Estimates of net survival using complete records analysis were severely biased, even when the missingness mechanism depended on covariates and not on survival. In our study the best MI strategy used a multinomial model for stage and included, alongside all the substantive model predictors, the Nelson-Aalen cumulative hazard estimate and the event indicator.
Conclusion: As key covariates are unlikely missing completely at random, studies estimating net survival should not use complete records. Instead, MI using our best strategy should be used and be complemented by sensitivity analysis.

Notes

006

ESTIMATING RELATIVE SURVIVAL FOR CANCER: AN ANALYSIS OF BIAS INTRODUCED BY OUTDATED LIFE TABLES

L Ellison[1]
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Background: Relative survival analyses of cancer data often incorporate outdated information about expected survival if current information is not readily available. The assumption is that any bias introduced into the estimation of expected survival, and hence, into the estimate of relative survival, will be negligible. However, empirical studies of potential bias have yet to be published.
Purpose: This study examines the impact of using historical rather than current life tables to estimate expected survival in calculations of relative survival ratios (RSRs).
Data and methods: Data are from the Canadian Cancer Registry with mortality follow-up through record linkage to the Canadian Vital Statistics Death Database. Period method RSRs for 2005-2007 were derived using life tables centred on the 2006 Census of Population to estimate expected survival. The analysis was repeated using life tables from 5 and 10 years earlier.
Results: Deriving expected survival from life tables 5 years out of date resulted in increases in RSRs for all cancers. These increases became greater with lengthening survival duration. For example, increases in 1-, 5- and 10-year RSRs were 0.2, 0.8 and 1.7 percentage units, respectively, for all cancers combined. Increases in 5-year survival were highest for prostate (2.0) and bladder cancer (1.6); among males (1.2); and among people aged 75 to 99 at diagnosis (1.9). Differences were approximately double when life tables that were 10 years out of date were used.
Conclusion: The use of historical rather than current expected survival data in calculating RSRs for cancer may lead to consequential overestimation of survival. The increasing adoption of period survival methodology underscores the need for up-to-date information on expected survival.

Notes

SECTION B - SURVIVAL METHODS I

007

MODEL SELECTION AND EXPLAINED VARIATION OF SURVIVAL FROM CANCER

C Maringe[1], L Woods[1], J Stare[2], **B Rachet**[1]
[1] Cancer Research UK Cancer Survival Group, Department of Non-Communicable Disease Epidemiology, London School of Hygiene and Tropical Medicine, London, United Kingdom; [2]Department of Biostatistics and Medical Informatics, University of Ljubljana, Ljubljana, Slovenia

Background: Cancer prognosis is determined by patient factors, tumour factors and healthcare system factors. Their individual effects can be estimated using flexible (splines) multivariable models on the cumulative log-excess hazard scale which provide better understanding of the drivers of cancer survival. Measures of explained variations are needed to understand what factors are driving higher survival.
Purpose: Rigorous model selection criteria need to be applied to select complex multivariable survival models. Model selection is crucial, in particular to defining a structure that not only fits the data on which it is applied but will yield plausible and trustworthy predictions of survival.
Methods: We review the tools available in survival analysis that assess the adequacy of a model to the data. We present an adaptation of the Re measure of explained variation[a] developed for event-history data to net survival data.
Findings: The practical use, relative importance and assets of different types of residuals, AIC-based statistics and explained variation measures will be illustrated based on both simulated data and population-based cancer registry data. Special attention will be given to the behaviour of these statistics when used in the context of planning cancer-care policy.
Interpretations: We show that these tools for model selection can be employed to produce relevant and insightful results to the healthcare policy makers. The Re measure of explained variation proves valuable in estimating the respective effect of each factor on cancer survival. It is essential that the models, from which the survival estimates are derived, are validated using thorough and transparent quality checks.

[a] Stare J., Pohar-Perme M., Henderson, R. A Measure of Explained Variation for Event History Data, ***Biometrics* 67**, 750-759

Notes

SECTION C - DATA QUALITY

008

ASSESSING THE FITNESS FOR USE OF THE PRIMARY PAYER AT DIAGNOSIS VARIABLE. PART A: THE NATIONAL VIEW

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Background: Health insurance status is associated with cancer prognosis and is important for addressing health disparities. Recognizing the importance of this information, in 2012 NAACCR requested member registries voluntarily submit the primary payer (DX) variable (Item 630). However, before this variable can be used uniformly, it is important to assess its "fitness for use."
Methods: We assessed the completeness of the primary payer data submitted to NAACCR by registry, year of DX and several factors including stage at DX, reporting source, race/ethnicity, and age at DX.
Results: Among U.S. registries, 5 have primary payer from 1995, but the majority had primary payer starting in DX year 2007. For DX years 2007-2010, only 5 of the 55 NAACCR registries did not submit primary payer. The percent of cases missing payer data among the registries ranged from 1.4% to 38.9%, with the majority of registries having fewer than 12% of cases missing payer data. Cases coded based on source records from a) physician's office, b) laboratory only, or c) radiation treatment centers were missing payer data in 46%, 70.8% and 92.3% of these records, respectively. The fewest records missing payer data were based on source records from hospital inpatient/outpatient (4.6%), and hospital outpatient or surgery center (6.9%). Among cases coded as unknown stage or in situ about 28% and 17% of these records were missing payer data, respectively. Age at DX was not an important predictor of missing payer data. Differences in missing payer data by race/ethnicity were small with the exception of unknown race where about 45% of all cases were missing payer information.
Conclusion: The percent of records missing payer data could limit the utility of this data item. To improve completeness of this data item, registries will need to either obtain these data from non-hospital sources or link records missing payer data with additional data sources like all-payer claims databases.

Notes

SECTION C - DATA QUALITY

009

ASSESSING THE FITNESS FOR USE OF THE PRIMARY PAYER AT DIAGNOSIS VARIABLE. PART B: WHY NEW YORK HAS NOT SUBMITTED THIS DATA ITEM.

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Background: There is wide interest in using "Primary Payer at Diagnosis" to analyze patterns of care and survival by insurance type. The SEER program included insurance recode in its most recent public use file, and 50 NAACCR registries submitted this item in the 2012 call for data. However, lack of reliability could limit the utility of this data item.
Purpose: To assess the item Primary Payer at Diagnosis collected by the New York State Cancer Registry for invasive and in situ tumors diagnosed 2004-2010 (n=787,752).
Methods: Compare the payer distribution for tumors with only a single reporting source (n=430,667) and more than one source (n=357,085). Validate these values against hospital discharge records.
Results: 19% of tumors with more than one source have multiple insurance types reported. The plurality of these (9%) show both Medicare and private insurance. 71% of these patients were 65 or older at the time of diagnosis, suggesting that the Medicare/private pairing is not driven by patients aging into Medicare post diagnosis. The number of unknowns (15% for single-source, 5% for multiple-source tumors) also concerns. Linkage with discharge records was in progress at the time of this writing, but preliminary results suggest substantial inconsistency.
Conclusions: Ambiguity, inconsistency and missingness are all problems in analysis. Some patients change insurance as a direct consequence of cancer (e.g. those uninsured or with mini-med private insurance becoming eligible for Medicaid), making both payer at diagnosis and payer at treatment of interest, but CTRs have had to consolidate this into a single value. The ambiguous description in NAACCR's Volume II ("primary payer/insurance carrier at the time of initial diagnosis and/or treatment") is problematic. NAACCR has recognized these unresolved issues, and the Primary Payer task force is endeavoring to find a way to capture payer information in a more reliable, and possibly even interoperable, way.

Notes

SECTION C - DATA QUALITY

010

EXPLORING THE DISEASE INDEX IMPACT ON CANCER REGISTRY DATA COMPLETENESS AND DEATH CLEARANCE CASEFINDING IN MARYLAND

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Background: NAACCR certifies central registries. To achieve the highest NAACCR standard for complete, accurate, and timely data, registries must meet the following criteria:

- Case ascertainment has achieved 95% or higher completeness.
- A death certificate is the only source for identification of fewer than 3% of reported cancer cases.
- Fewer than 0.1% duplicate case reports are in the file.
- All data variables used to create incidence statistics by cancer type, sex, race, age, and county are 100% error-free.
- Less than 2% of the case reports in the file are missing meaningful information on age, sex, and county.
- Less than 3% of the cases in the file are missing meaningful information on race (US only).
- The file is submitted to NAACCR for evaluation within 23 months of the close of the diagnosis year under review.

To this end, the MCR sought to assess and improve registry data completeness and casefinding for the death clearance process.
Purpose: This study aims to assess efficacy of using the hospital disease index to the improve registry cancer reporting completeness and casefinding during the death clearance process.
Methods: The MCR requested disease indices from all Maryland reporting hospitals. The disease indices were matched to the MCR database and to patients and tumors of Maryland residents who died in 2011 by use of SAS programming and manual review. Completeness reports and death follow back forms were produced from these efforts and were sent to hospital facilities.
Results/Conclusion: This presentation will reveal the results from the disease indices matching for case reporting completeness and death casefinding efforts; discuss how the disease indices impacted MCR data; and identify the most common findings for the yielded results. We will also discuss the challenges to disease index case matching and case follow back as well as lessons learned.

Notes

SECTION C - DATA QUALITY

011

GETTING THE BEST OUT OF BRAIN TUMOR CANCER REGISTRY DATA

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The Central Brain Tumor Registry of the United States (CBTRUS) database contains the largest aggregation of population–based data on incidence of primary brain and central nervous system tumors in the United States. On an annual basis, CBTRUS receives data from the National Program of Cancer Registries (NPCR) and the Surveillance, Epidemiology and End Results (SEER) Program. These data are then combined into one data set for analysis. For the 2013 CBTRUS Report, data was included from 50 central cancer registries (45 NPCR and 5 SEER) for the diagnosis years 2006 to 2010.

There are many factors affecting completeness and accuracy of registry data, and addressing these factors is an ongoing process. In order to refine the data for accuracy, CBTRUS has developed a program that edits the data in order to form the analytic dataset used for its annual report and other scientific publications. This edits program is based on the CBTRUS Site/Histology Validation list, updated in 2012 by consulting neuropathologists and takes into account changes in definition of paired sites, the 2007 Multiple Primary and Histology Coding Rules, and reconciles duplicate records.

For the years 2006 to 2010, CBTRUS received data on 329,119 primary brain tumors from NPCR and SEER. After these were combined, a total of 2,408 records (0.73%) were removed using the CBTRUS edits program, resulting in an analytic dataset of 326,711.

CBTRUS works diligently to support cancer surveillance efforts, especially in regard to improvement of primary brain tumor data collection and reporting. Reporting of non-malignant brain tumors (mandated as of 2004) increases the complexity of these tasks, due to the increased proportion. This conservative edits program aims to ensure the accuracy of each record and may underestimate brain tumor incidence.

Notes

SECTION D - USING DATA FOR CANCER CONTROL I

012

DOES COMPLIANCE WITH COC GUIDELINES FOR MINIMUM LYMPH NODE COUNT REALLY MATTER?

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[1]Loma Linda University School of Public Health, Loma Linda, CA, United States; [2]SEER Cancer Registry of Greater California, Loma Linda, CA, United States; [3]Loma Linda University School of Medicine, Dept Surgery, Loma Linda, CA, United States

Introduction: In 2013, American College of Surgeons Commission on Cancer (CoC) endorsed gastric cancer quality measures including 15+ lymp nodes (LN) in resected non-metastatic non-proximal gastric cancers.
Problem: We sought to determine if hospital CoC-accreditation predicts compliance with this guideline, if 3-month post-gastrectomy survival differs for CoC ***vs*** non-CoC hospitals and if CoC LN count compliance predicts survival, independent of CoC accreditation.
Methods: We conducted a non-concurrent population-based cohort study in the California Cancer Registry assessing survival through July 2012 in gastrectomy patients having AJCC stage I-III adenocarcinoma of the non-proximal stomach, 2004-2010. Logistic regression assessed whether CoC accreditation (yes/no) predicted odds of compliance (yes/no) with the CoC minimum LN count. Cox proportional mortality hazard assessed survival 3-months post gastrectomy for operations in CoC hospitals (yes/no) and if hazard differed by compliance with the CoC LN guideline (yes/no), independent of CoC accreditation. Adjusted covariates included age, race/ethnicity, and diagnostic stage and year.
Results: Of 3,321 stage I-III gastric cancers, 50.5% had gastrectomies in CoC and 30.1% in non-CoC hospitals. 44.7% of patients in CoC ***vs*** 34.8% in non-CoC hospitals had 15+ LNs resected. Adjusting for covariates, current CoC-accreditation (yes/no) independently predicted removal of 15+ ***vs*** 1-14 LN (OR=1.61;95%CI=1.36-1.91). Adjusted Cox proportional hazards revealed that CoC-accreditation did not independently predict survival (HR CoC yes/no=0.98;95%CI=0.87-1.09), although compliance (yes/no) with the CoC LN count recommendation predicted lower mortality hazards (HR $LN_{15+ \text{ vs. } LN1-14}$=0.69;95%CI=0.62-0.76), independent of CoC.
Conclusions: Having 15+ LN was more likely in CoC accredited hospitals, but survival did not differ by CoC accreditation. CoC LN count compliance predicted improved survival, regardless of CoC accreditation.

Notes

SECTION D - USING DATA FOR CANCER CONTROL I

013

INDICATIONS FOR POSITRON-EMISSION TOMOGRAPHY SCANS IN NOVA SCOTIA: A VALIDATION OF TIMING RULES AND RECORDED REASONS FOR SCAN IN NON SMALL-CELL LUNG CANCER

R Dewar[1], D Raha[1], A Ross[2], J Payne[3]
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Background: Positron-Emission Tomographic (PET) scanning is a powerful tool for cancer diagnosis, staging, treatment planning and monitoring of treatment, including the whole-body detection of distant metastasis. In a recent project supported by the Canadian Partnership Against Cancer, designed to present consistent monitoring data on the use of PET in the context of non-small cell lung cancer, not all participating provinces could provide information on the indication for the scan. Nova Scotia`s PET requisition database was used to validate several case rules to infer indication for PET from available dates including date of PET scan, surgery, diagnosis, and initial radiotherapy.
Methods: Cases were restricted to Nova Scotia residents with no history of cancer, diagnosed with a first ever primary of non-small cell lung cancer in the period 2009-2011. Data were obtained from the provincial PET requisition database (indication for scan, scan date), the provincial hospital discharge file (surgery date) and the provincial cancer registry (date of diagnosis).
As is commonly done for the evaluation of screening tests, sensitivity and specificity were calculated for each case rule and the optimal rule was derived by way of receiver-operator curves (ROC curves). Indication for scan was simplified into two disjoint categories: initial diagnosis and staging, including diagnosis of suspected cancer; and treatment planning and follow-up, including monitoring for disease progression.
Results: For cases of non-small cell lung cancer registered by way of histology, the optimal case rule was to assign an indication of `diagnosis` to cases where the PET scan was performed prior to, or within 5 weeks of, diagnosis date (sensitivity = 0.64, specificity = 0.71). These values translate to a positive predictive value of .94 and negative predictive value of .21
Conclusions: The use of this case rule will contribute to the ability to monitor the utilization of PET in Canada.

Notes

014

DEVELOPING A TEMPLATE TO USE CANCER SURVEILLANCE DATA TO INVESTIGATE CANCER DISPARITIES

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Background: A number of components need to come together in order to identify and address cancer disparities. These include documentation of the problem with data such as cancer incidence, mortality, and Behavioral Risk Factor Surveillance data. Other components include identifying stakeholders who can then implement action steps. A recent example involving cervical cancer in Massachusetts can serve as a model for addressing other cancer disparities. In Massachusetts, despite high rates of screening, Black non-Hispanic women are more likely to be diagnosed late for cervical cancer, and have the highest cervical cancer mortality rates compared with women of other racial or ethnic groups (2.5 per 100,000 for Black non-Hispanic women vs. 1.4 per 100,000 for White non-Hispanic women).
Purpose: To develop a step-by-step strategy to coordinate efforts for cancer control initiatives.
Methods: As an example, the MCR, BRFSS, Office of Clinical Prevention Services, and the Comprehensive Cancer Control Program collaborated to prepare presentations on incidence, mortality and screening to illustrate cervical cancer disparities in Massachusetts. The approach led to a series of focus groups with consumers, providers and community leaders to explore and identify factors contributing to a late stage at cervical cancer diagnosis.
Results: As an example, the cervical cancer project led to summaries of each focus group which led to overall recommendations from a consumer, provider, and community leaders perspective. This whole experience resulted in the development of the template for future projects.
Implications: A step-by step template for cancer control efforts to address disparities as well as other issues leads to a more well-organized and efficient use of resources.

Notes

SECTION D - USING DATA FOR CANCER CONTROL I

015

YOU CAN'T MANAGE WHAT YOU DON'T MEASURE: SETTING THE STAGE FOR MEASURING IN SIXTY, THE MANITOBA CANCER PATIENT JOURNEY INITIATIVE

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Background: IN SIXTY is Manitoba's Cancer Patient Journey Initiative, aimed to reduce the time from clinical suspicion of cancer to treatment to 60 days or less. Five cancer sites have been targeted, beginning with breast cancer. To demonstrate progress, a baseline measure of the current state of "suspicion to treatment" is needed.
Purpose: The Manitoba Cancer Registry (MCR) was used to determine a base cohort of breast patients and demographics, before data was merged with other provincial data sources to measure the cancer patients' journey from suspicion to treatment.
Methods: Record linkage combined the cohort of breast patients with population-based health services and clinical datasets for Manitoba women diagnosed in 2010 & 2011 (pre-Initiative and beginning of Initiative respectively). With clinical advisors, we developed an algorithm for assigning key points along the journey including suspicion, diagnostic testing, diagnosis and treatment. Chart review validated a random sample of cases before population level analyses. Standard summary statistics and cumulative incidence (time to event) curves were used to describe the journey and compare between years.
Results: The 60 day target was achieved by 28% of women with a first-time, invasive breast cancer diagnosed in 2010 (median, 77.5 days; 90th percentile, 165 days). In 2011, the target was achieved by 18% of breast patients (median, 93.5 days; 90th percentile, 182 days). Little difference was observed by age and region of residence. However, women with Stage IV breast cancer moved through the cancer system faster than women with Stage I-III breast cancer in both years ($p<0.001$).
Conclusions: These results demonstrate the ability of existing data to inform and monitor cancer policy initiatives over time, and provide evidence of challenges needing to be addressed. They also highlight the potential to expand and adapt methods to other cancer sites such as colorectal, lung and lymphoma.

Notes

SECTION E - TREATMENT DATA

016

COMPARISON OF THE CHARACTERISTICS AND OUTCOMES OF COLON CANCER PATIENTS TREATED WITH LAPAROSCOPIC COLECTOMY VERSUS OPEN OR OTHER COLECTOMY

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Background: Laparoscopic colectomy has recently become a surgical treatment option available for colon cancer patients, in addition to the standard open procedure.
Purpose: The purpose of this study was to describe the characteristics of colon cancer patients treated with laparoscopic colectomy versus those treated with open or other colectomy, and to examine predictors of survival in patients who underwent laparoscopic or open colectomy as treatment for colon cancer
Methods: The study population was comprised of colon cancer cases diagnosed and reported to the Nebraska Cancer Registry between 2008 and 2011. To identify surgically-treated cases, the cancer registry and state hospital discharge files were linked. This linked database identified 302 patients who were treated with laparoscopic colectomy and 760 who were treated with open or other colectomy.
Results: Colon cancer patients treated with laparoscopic colectomy were significantly younger (mean=67.8 vs. 70.4 years) than those treated with open or other colectomy, and were significantly more likely to have been diagnosed at an early stage (in situ or local) than open or other colectomy patients (54.0% vs. 41.2%). Other demographic factors (gender, race, ethnicity) and diagnostic factors (primary site, histology, tumor size, grade/differentiation) were not significantly different between the two treatment groups. Laparoscopic surgical treatment resulted in significantly shorter length of hospital stay (mean=6.0 vs. 8.5 days) and lower total hospital charges (mean=$45,888 vs. $55,132) compared to treatment with open or other colectomy.
Conclusions: Laparoscopic surgery has quickly become a significant treatment option for colon cancer patients, particularly for early-stage cases. This research also demonstrates how a linkage with hospital discharge data can expand the analytical capabilities of cancer registry data specific to treatment.

Notes

SECTION E - TREATMENT DATA

017

IMPACT OF RACE/ETHNICITY AND SOCIOECONOMIC STATUS ON ADJUVANT CHEMOTHERAPY USE AMONG ELDERLY PATIENTS WITH STAGE III COLON CANCER

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Background: It is well recognized that stage III colon cancer patients who received postoperative chemotherapy can reduce the risk of recurrence and improve survival rate. This study examined the impact of race/ethnicity and socioeconomic status (SES) on receipt of postoperative chemotherapy among stage III colon cancer patients enrolling in Medicare Parts A and B and trends of utilizing adjuvant chemotherapy.
Methods: Stage III colon cancer patients diagnosed between 2000 and 2007 were obtained from the Surveillance, Epidemiology and End Results-Medicare data. Multilevel logistic regression was used to estimate the association between predictor variables and adjuvant chemotherapy, and the Cochran-Armitage test was used to assess the linear trend.
Results: Of 13,608 stage III colon cancer patients aged 66 and older, 56% received adjuvant chemotherapy within 4 months of surgical resection. Blacks were less likely to receive the adjuvant chemotherapy than whites before and after adjusting for race/ethnicity and other independent variables. For SES, only patients residing in the least affluent area were less likely to receive adjuvant chemotherapy than those residing in the most affluent area after adjustment. A significantly decreasing trend was observed, from 58% in 2000 to 53% in 2007, for all patients combined. The trends were various more in racial/ethnic groups than in SES groups.
Conclusions: After adjusting for demographic and clinical factors, there are persistent racial/ethnic and SES disparities in the use of adjuvant chemotherapy among Medicare-insured elderly patients with stage III colon cancer. The shortage of chemotherapy drugs and the change of Medicare drug administration reimbursement could be attributable to the decline of using adjuvant chemotherapy.

Notes

018

DECLINING USE OF LIVER TRANSPLANTATION FOR HEPATOCELLULAR CANCER IN CALIFORNIA

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Background: Incidence and mortality of hepatocellular carcinoma (HCC) have increased in the US over the past two decades. Incidence is highest in Asian and Pacific Islanders (Asian/PI). Prognosis with HCC is poor, but a survival benefit for eligible patients who receive a liver transplant has been demonstrated. A previous analysis of California Cancer Registry (CCR) data showed a narrowing of the disparity in receipt of liver transplant between Asian/PI and NH white patients between 1998 and 2005.
Purpose: The purpose of this study was to update the earlier analysis of CCR data to ascertain whether disparities in receipt of liver transplant for HCC by race/ethnicity continued to decline after 2005.
Methods: California HCC cases diagnosed 2004-2010 were identified through the CCR. Only cases eligible for transplant were included: those diagnosed at Stage I to III with a tumor size less than or equal to 51 mm and without either lymph node involvement or distant metastasis. Univariate and multivariable analysis were used to determine the probability of receipt of liver transplant after adjustment for other variables.
Results: The number of eligible HCC cases almost doubled during the time period. The proportion of eligible patients who received a liver transplant increased from 2004 to 2006, then declined from 2007 through 2010. A similar trend was seen in all race/ethnic groups. Asian/PI patients had lower probability of receiving a liver transplant than white patients, and this disparity increased over the time period.
Conclusion: An increase in HCC incidence and a decline in use of liver transplant was observed in California between 2004 and 2010, along with an increase in the disparity between NH white and Asian/PI patients. Reasons for the decline are currently unknown but may be attributable in part to a decline in the availability of healthy livers.

Notes

SECTION E - TREATMENT DATA

019

SOCIODEMOGRAPHIC DISPARITIES IN PATIENT-REPORTED PRE- AND POST-TREATMENT SEXUAL FUNCTIONS FOR LOCALIZED PROSTATE CANCER

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Background: Due to the uncertainty about optimal treatment for clinically localized prostate cancer (PCa), there is a pressing need to collect and analyze patient-reported outcomes for evaluation of the effectiveness of various treatments. The objective of this study was to examine sociodemographic disparities in patient-reported pre- and post-treatment sexual functions for clinically localized PCa.
Methods: Sexual function data were obtained from the baseline (pre-treatment) and 6-month follow-up (post-treatment) surveys completed by 673 Louisiana PCa patients (Age $\leq$80 yrs) enrolled into the Comparative Effectiveness Analysis of Surgery and Radiation study. We compared the summary scores of the EPIC-26 sexual functions (6 questions about ability, quality, and frequency of erections) in the two surveys by sociodemographics; the scores scaled from 0-100 with higher scores representing better functions. Chi-square, ANOVA, and multivariate linear regression were performed.
Results: The overall summary scores for the sexual functions were 58.3 at the baseline and 32.9 at 6 months. At the baseline, older age ($\geq$ 75 yrs), low income ($\leq$$30,000), low education (some high school or less), and public insurance were significantly associated with lower scores; the association was not significant for race. At 6 months, sociodemographic disparities in sexual functions diminished. Sexual functions worsen after treatment for all sociodemographic groups; younger age (<65 yrs), high income (>$50,000), high education (college graduate or higher), private insurance, which were more likely to receive surgery, had more significant changes compared with their counterparts.
Conclusion: Sexual functions varied by sociodemographic among localized PCa patients before PCa treatment. After treatment, the sociodemographic disparities diminished in a short term, which may be attributed to differences in type treatment received by various sociodemographic groups.

Notes

020

GEOGRAPHIC INEQUALITIES IN NON-SMALL CELL LUNG CANCER SURGICAL TREATMENT AND MORTALITY

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Background: Lung cancer is the most common cancer diagnosed in the world. We investigate geographical variations in one-year mortality and surgical treatment of Non-Small Cell Lung Cancer (NSCLC) by Primary Care Trusts (PCT) in England.
Methods: All adults within the age range of 15-99 diagnosed with lung cancer between 1998 and 2006 and registered with the National English cancer registry were identified. Multilevel models are designed for data grouped in clusters or hierarchies. We fitted two multi-level logistic models to predict mortality within one year of diagnosis, and surgical treatment for NSCLC patients by PCTs. With these models we can evaluate how much of the variability is attributed to the patients and how much is attributed to PCTs. Funnel plots are graphical tools used to inspect variation in performance of institutional comparison of an outcome measure; they allow visualisation of how much a specific value differs from a reference quantity. We used funnel plots to plot the random effects derived from the two fitted statistical models.
Results: For lung cancer, patients diagnosed at a later stage of life, males and deprived patients all have a higher chance of death in the first year after diagnosis. The chance of death for patients who were not treated by surgery in the first year after diagnosis was more than 14 times higher. Deprived patients had lower chance of surgical treatment compared to affluent patients. Around 18% of PCTs had significantly below average uptake of surgery. The variability of surgery was higher than that of mortality by PCTs.
Discussion: The study show substantial geographical variation in surgical treatment, for lung cancer patients served by PCTs. The clear variation in curative surgery by PCT was not explained by age at diagnosis, year of diagnosis, deprivation and sex. However there was no clear evidence that PCTs with below average in surgical resection are those with higher than average mortality rates.

Notes

SECTION A - REGISTRY OPERATIONS & QUALITY CONTROL I

021

SYNOPTIC PATHOLOGY REPORTING: COLLABORATIVE APPROACH TO NATIONAL IMPLEMENTATION

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Background: The Canadian Partnership Against Cancer (the Partnership) launched the Electronic Synoptic Pathology Reporting Initiative (ESPRI) to advance the implementation and promote the adoption of standardized synoptic pathology reporting tools.
Purpose: The Partnership recognized the value of standardize cancer pathology reporting to support treatment decision making and launched the Electronic Synoptic Pathology Reporting Initiative. This presentation will highlight strategies to ensure success and lessons learned.
Approach: As the landscape with respect to pathology varies across the country, the initiative was divided into two phases – planning and implementation. Key approaches to promotion of adoption and implementation included share lessons learned, coordination of Pathologist and Vendor-led education sessions, establishment of expert panels and assignment of Canadian representatives to CAP Cancer Protocol Review Panels. The Partnership continues to collaborate with standards organizations including NAACCR.
Results: The Partnership has had much success in engaging with provincial partners from across the country with the conclusion of the planning phase and launch of the implementation phase. With the launch of the multidisciplinary expert panels and the assignment of Canadian representatives to CAP's Cancer Committee and Protocol Review Panels, feedback from the Canadian pathology community was sent to CAP to support maintenance of the standards. The Partnership, with CAP-ACP, has partnered with pathology communities from the US, UK, and Australasia to form the International Collaboration on Cancer Reporting (ICCR) to collaborate on internationally-harmonized core datasets for cancer pathology.
Conclusions: Adoption of structured pathology reporting in Canada will enable better patient care, improve data quality, create efficiencies and enable interoperability. Through adoption and implementation efforts, this will impact patient care.

Notes

022

STANDARDIZATION FOR REPORTING CANCER BIOMARKER TEST DATA

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Background: There has been a significant increase in the number of new molecular diagnostic cancer assays for germline variants and somatic mutations in malignant cells. As a result of advances in immunotherapies and molecularly-targeted cancer therapies, the cancer registries will have an increased amount of data to manage.
Purpose: The Centers for Disease Control and Prevention (CDC) has worked with national laboratories to explore reporting of molecular data to state cancer registries. Several issues were identified related to using molecular test data from multiple laboratories for population-based surveillance.
Approach: The College of American Pathologist (CAP) previously developed standardized electronic cancer checklist templates for reporting pathologist's review of test results. However, these templates do not adequately address the reporting of molecular test data. We also reviewed the LOINC (Logical Observation Identifiers Names and Codes) coding system and found that many of the molecular tests are not represented with a unique code to include common protein-level and RNA level cancer biomarkers of clinical relevance.
Result: Staff from CDC, CAP, HL7-Clinical Genomics, American Society of Clinical Oncologists (ASCO), National Center for Biomedical Informatics (NCBI), LOINC, pathologists and informatics experts are working collaboratively: 1) to develop templates for reporting biomarker/molecular data and 2) to extend the LOINC model so that standards for molecular test data are included in and integrated with the NCBI's ClinVar and MedGen databases.
Conclusion: This presentation will describe the issues that were identified with reporting molecular test data; activities to address standardization issues within laboratories and national coding systems, such as LOINC; and activities required to implement interoperable standards for collecting and reporting molecular test data across the country.

Notes

SECTION A - REGISTRY OPERATIONS & QUALITY CONTROL I

023

THE SASKATCHEWAN CANCER REGISTRY: INNOVATIVE USES AND OPPORTUNITIES TO ACCELERATE IMPROVEMENT IN QUALITY OF CANCER SERVICES

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By legislative authority, the Saskatchewan Cancer Agency (SCA) is responsible for all aspects of cancer control in the province of Saskatchewan (SK). Part of the SCA, the Saskatchewan Cancer Registry (SCR) is a vital source of information for cancer epidemiology and planning cancer services in the province. SCR data is used for routine surveillance, planning and evaluation of cancer control activities, cancer outcomes research, and quality improvement (QI) initiatives. The SCR is one of the oldest in the world, housing complete and comprehensive data. More than a static repository of information, the SCR and its dynamic capabilities allow for the collection of new information in order to pursue innovative methods to evaluate service quality. As SK's health care system undergoes reform by applying Lean managerial concepts, the SCA and health regions are adopting a patient-first approach which aims to create efficiencies and effectiveness in programs and processes to improve quality of patient care. As a data-driven methodology, Lean provides an opportunity for the SCA to raise the profile of the SCR through leveraging data to advance QI activities. It also marks opportunities for the identification of new data fields to add to the SCR to accelerate improvement in service quality. As an example, the SCA has begun to examine patient access pathways through the use of value stream mapping. This Lean technique maps out all the services and activities a patient encounters throughout the continuum of the cancer journey in order to visualize interrelated activities as a complete process. The potential value in linking screening and follow-up data with registry data to capture sentinel events to create a complete picture of the cancer journey is also explored. The purposes of this presentation are to: (1) describe current uses of registry data in the assessment of quality of services; and (2) outline emerging opportunities for the addition of new data fields in the SCR.

Notes

024

AN INTEROPERABLE DOCUMENT STANDARD TO IMPROVE QUALITY OF CANCER CARE ACROSS MULTIPLE LOCATIONS

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Background: Cancer care is by nature interdisciplinary and increasingly depends on seamless electronic transmission of clinical data. Health information exchange and semantic understanding are critical for improved outcomes, personalized medicine, comparative effectiveness research, and cost control. Sharing patient information remains difficult due to a lack of standardization and general incompatibility between electronic health record products.
Purpose: There is a need for well-designed, oncology-specific interoperability standards. The American Society of Clinical Oncology (ASCO) is developing standards to improve the quality and insight of cancer care.
Methods: ASCO volunteers formed a Standards Work Group in 2012, and engaged an independent consulting firm to perform the technical work. The Work Group first developed an interoperable standard with broad application that would also be a foundation for future standards work. They adapted ASCO's Breast Cancer Adjuvant Treatment Plan and Summary (Breast TPS) paper-based form. This adaptation required extensive input from medical and surgical oncologists. This preparatory work was vital to define and disambiguate clinical concepts. Some value sets in the original Breast TPS were replaced with National Cancer Institute value sets. Multiple oncology and standards stakeholders reviewed the draft to ensure accurate representation of the data and harmonization with related standards.
Results: The standard was developed using the HL7 International Clinical Document Architecture, a widely used XML-based markup standard with international recognition. The Breast Cancer Adjuvant Treatment Plan and Summary Standard was successfully balloted through HL7 in May 2013 and published for trial use in late 2013.
Conclusions: The standard will improve quality by allowing providers to efficiently transmit clinical data with semantic meaning to health professionals, patients, quality improvement initiatives, and registries.

SECTION B - SURVIVAL & SPECIAL POPULATIONS

026

CANCER SURVIVAL IN FIRST NATIONS AND MÉTIS: FOLLOW-UP OF THE 1991 CENSUS MORTALITY COHORT

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Background: Owing largely to a lack of ethnic identifiers in Canadian cancer registries, little is known about cancer survival in Aboriginal people in Canada.
Purpose: The aims of this work are (A) to describe the site-specific relative survival from cancer among First Nations and Métis adults in Canada and (B) to compare survival in First Nations or Métis to that in the general Canadian population.
Methods/Approach: A recent linkage of the 1991 Canadian Long-form Census to the Canadian Mortality Database and the Canadian Cancer Registry has provided an important opportunity to measure cancer survival in First Nations and Métis adults in Canada. The cohort consists of 2.7 million respondents to the 1991 Canadian Long Form Census aged 25 and older, of whom approximately 62,400 are First Nations and 11,000 are Métis. Cohort members have been followed up for incident cancers between 1992 and 2003 and deaths between 1992 and 2006, with an anticipated update of both up until 2008. We will calculate age-standardized site-specific relative survival rates for those cancer sites that have a sufficient number of cases for analysis in the First Nations and Métis.
Results: The work will be completed over the next 6 months and results will be ready for presentation in June.
Conclusions/Implications: This work aims to provide First Nations and Métis people and their cancer control partners a description of their cancer survival, and a metric by which to determine how they compare to each other and to the general population, and in so doing, to generate the information necessary to plan and provide effective, culturally-appropriate cancer management and control programs.

Notes

027

CHARACTERIZATION OF COLORECTAL CANCER SURVIVAL IN NEW MEXICO

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Background: Historically, American Indians (AI) and Hispanics (H) in New Mexico (NM) have had poorer survival from colorectal cancer (CRC) than the state's non-Hispanic white (NHW) population.
Purpose: About 15 years have passed since results from a systematic investigation of CRC survival in NM have been published in the scientific literature. It is likely that recent advances in colorectal screening and treatment have influenced colorectal cancer incidence, stage at diagnosis and survival in NM in recent decades. However, it is not known if such advances equally benefited all segments of NM's diverse populations.
Methods: Data were queried from the NM Tumor Registry to identify all incident cases of CRC that were diagnosed among NM residents from 1995 to 2004. Differences in stage of disease at diagnosis by age, sex, and race/ethnicity were assessed with the chi-squared statistic. Survivorship was assessed with life table methods of Kaplan Meier and with the Cox Proportional Hazards Model.
Results: Cause-specific 5-year survival for H (57.8%) and AI (55.5%) was lower than NHW (61.7%,p-value=0.0074). The difference between H and AI was not significant (p-value=0.3042). After adjusting for stage at diagnosis, age, sex and time period, H and AI still had poorer survival compared to NHW (H:NHW hazard ratio=1.098,p-value=0.0435; AI:NHW hazard ratio=1.243,p-value=0.0296).
Conclusions: Results from this investigation may provide insight into opportunities for CRC prevention and control in NM.

Notes

028

INDIVIDUAL- AND NEIGHBORHOOD-LEVEL PREDICTORS OF SURVIVAL IN FLORIDA COLORECTAL CANCER PATIENTS (2007-2011)

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Background and Purpose: Colorectal cancer (CRC) is responsible for approximately 50,000 deaths/year in the US. We examined individual-level and neighborhood-level predictors of survival in CRC patients diagnosed in Florida in order to identify high-risk groups for targeted clinical and social support interventions.
Methods: Demographic and clinical data from the Florida Cancer Data System registry for CRC patients diagnosed between 2007 and 2011 (n=47,872) were linked with Agency for Health Care Administration and US Census data. Cox hazard regression models were fitted with known predictors of CRC survival.
Results: Controlling for age, gender, race/ethnicity, cancer site, and treatments (surgery, radiation, chemotherapy), there was a 15% higher risk of death per additional Elixhauser comorbidity ([hazard ratio=1.15]; 95% confidence interval=1.15-1.16). Patients with distant stage disease at diagnosis were at six times the risk of death relative to localized cases ([6.07]; 5.77-6.39). Compared to those with private insurance worse survival was seen in uninsured ([1.22]; 1.11-1.35), Medicaid ([1.42]; 1.30-1.54), and Military/Veteran ([1.19]; 1.03-1.39). Relative to those living in high socioeconomic status (SES) neighborhoods at the time of diagnosis, those living in middle-low and lowest SES neighborhoods had a survival disadvantage ([1.13]; 1.08-1.19) and ([1.19]; 1.13-1.26), respectively. Worse survival was also seen in divorced/separated ([1.22]; 1.15-1.30), single ([1.29]; 1.22-1.35), and widowed ([1.19]; 1.14-1.25) compared with married patients.
Conclusion: CRC patients with more comorbidity, living in lower SES neighborhoods, without adequate insurance, and who are unmarried are at higher risk of death. Targeted interventions designed to address these disparities, including patient navigation and social support, are needed in these high-risk groups.

Notes

029

CANCER IN LOS ANGELES COUNTY: TRENDS IN ADOLESCENTS AND YOUNG ADULTS 1988-2011

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Introduction: Cancer is the leading cause of non-accidental death among adolescents and young adults (AYA) ages 15-39 years in the US with more than 62,000 individuals diagnosed each year, eight times more than the number under age 15. Despite major improvement in survival outcomes for children and older adults with cancer over the past three decades, there has been little or no improvement among AYA. Understanding this unique population is a critical first step in developing effective clinical and research programs for AYA cancer patients and in targeting effective cancer control. The diversity of Los Angeles County (LAC) provides a unique opportunity to identify disparities in outcomes among subgroups (e.g. race/ethnicity, socioeconomic status (SES)) that can be leveraged in cancer control and in directing effective cancer research.
Methods: We used high-quality data collected by the Los Angeles Cancer Surveillance Program (CSP). The data include individuals diagnosed with an invasive cancer between the ages 15-39 years, residing in LAC during 1988-2011. The SEER classification scheme for AYA patients to standardize the classification of cancer sites for this age group was used.
Results: The incidence trend of all AYA cancers combined in LAC is stable when the steady decline in Kaposi sarcoma among males and increase in thyroid cancer in females are excluded. Rates increase by age with higher overall rates among females. Substantial diversity is observed by race/ethnicity with nearly a two-fold difference between the highest and lowest groups and a striking gradient by SES is found among Hispanic whites in both sexes and in non-Hispanic white females.
Discussion/Future Work: A monograph, Cancer in Los Angeles County: Incidence Trends Among Adolescents and Young Adults 1988-2011 will provide data for major AYA cancer sites. Future work will examine patterns of survival and geographic distribution to support cancer control initiatives.

Notes

030

NORTHWEST TERRITORIES CANCER REPORT 2001-2010

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Introduction: The Northwest Territories (NWT) is a Canadian territory spanning over 1,000,000 km2, north of the 60th parallel. With a population of 43,000 it has one of the lowest population densities in North America. Forty-nine percent of the population is Aboriginal which can be further divided into First Nations, Inuit, and Métis persons. Cancer rates are increasing, and many believe the increase is associated with mining and oil and gas developments. The objective of this analysis was to examine cancer incidence in the NWT, as well as examining what contributing factors may influence these rates.
Methods: Age-standardized cancer rates by sex, community size and ethnicity from 2001-2010 were calculated for the NWT. For comparisons between the NWT and Canada, the 2005 estimate for cancer types was used, while for geographical estimates StatsCan CANSIM tables were used.
Results: 1107 new cancer diagnoses were reported from 2001-2010, with colorectal, breast, lung and prostate being the most common. In both males and females, colorectal cancer incidence was significantly higher in the NWT than in Canada. Lung cancer incidence was higher in NWT women than Canadian women. Also, First Nations persons had a higher rate of colorectal cancer than non-aboriginal persons in the NWT. Finally, non-aboriginal NWT persons had a higher rate of prostate cancer than First Nations persons.
Conclusion: The cancers identified as higher in the population in the NWT, and particularly in the Aboriginal population, are likely associated with lifestyle factors. Rates of smoking, obesity, and inactive lifestyles are higher in the NWT than elsewhere in Canada, potentially accounting for the high rates in colorectal and lung cancers. Few cases of rare or cancer types typically associated with environmental exposures would indicate that lifestyle choices are a more likely source of increasing cancer rates in the NWT than industrial development.

Notes

SECTION C - USING DATA FOR CANCER CONTROL II

031

EXAMINING INCOME DISPARITIES IN ESTIMATED STAGE-SPECIFIC INCIDENCE RATES FOR BREAST AND PROSTATE CANCER IN CANADA

T Forte[1], R Rahal[1], K DeCaria[1], G Lockwood[1], H Bryant[1], SPSCA Technical Working Group[1]
[1]Canadian partnership Against Cancer, Toronto, ON, Canada

Background: Cancer screening and early detection is critical for improving survival for many cancers. Patterns in stage-specific incidence rates and how they vary by income may be considered a marker for inequities in access to early detection. For the first time on a national level, this analysis examines stage-specific incidence rates for prostate and breast cancer by income.
Methods: Stage-specific incidence rates were estimated using 2010-2011 stage data from the provincial cancer registries and 2007 age-standardized incidence rates from the Canadian Cancer Registry. Actual stage-specific incidence rates updated to 2010 will be available and presented at the time of the conference. Income was defined at the neighbourhood level using patient's postal codes.
Results: Men from low-income neighbourhoods were less likely to have their prostate cancer diagnosed at an early stage (13.2 vs. 18.3 per 100,000, respectively) or intermediate stage (70.8 vs. 93.4 per 100,000, respectively).The income gradient in advanced-stage prostate cancer was less pronounced with high income men more likely to be diagnosed with advanced-stage disease (26.3 per 100,000 vs. 28.8 per 100,000) despite higher PSA testing rates among high income men. The data for breast cancer also show lower incidence of early-stage breast cancer among low compared to high income women (39.1 vs. 51.8 per 100,000, respectively), however, the incidence of advance-stage breast cancer was similar across neighbourhood income quintiles and was about 18.8 per 100,000.
Conclusions: Despite lower access to early detection testing and screening among low income Canadians, there is little impact on incidence of advance-stage cancers. More PSA testing among high income men may be leading to an excess of detection of early-stage prostate cancers without a reduction in advanced-stage cancers, and suggests over-diagnosis, and potentially over-treatment. Further analyses are needed to confirm these findings.

Notes

032

INNOVATIVE UTILIZATION OF A STATE CANCER REGISTRY TO CONTACT YOUNG BREAST CANCER SURVIVORS AND THEIR HIGH-RISK FEMALE RELATIVES TO INCREASE BREAST CANCER SCREENING

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Background: Breast cancer survivors and their female relatives are at 2-fold higher risk for breast cancer compared to women without a personal or family history of the disease. Breast cancer at a young age is suggestive of a possible hereditary cancer syndrome. Earlier and more frequent screenings and genetic consultation are recommended for these high-risk women.
Purpose: In 2011, the Centers for Disease Control and Prevention awarded a 3-year project to the University of Michigan (UM) Prevention Research Center, the UM School of Nursing and the Michigan Department of Community Health to determine the feasibility of using a state cancer registry to identify and contact young breast cancer survivors (YBCS) and their high-risk relatives to increase breast cancer screening.
Methods: In 2012, the Michigan Cancer Surveillance Program (MCSP) identified 3,000 YBCS who received an invitation, informed consent form and baseline survey for this study. Based on the YBCS baseline surveys, up to two eligible high-risk female relatives were selected to participate. The YBCS were asked to contact these high-risk relatives and recruit them in the study. High-risk relatives who agreed to participate returned a signed consent with their completed baseline survey.
Results: In total 883 YBCS accepted participation in the study (33.2% response rate). There were 281 YBCS with no eligible high-risk relatives and 522 YBCS with 856 eligible relatives. In total 442 relatives accepted participation in the study (51.6% response rate).
Conclusions: This is the first project that successfully used a central state-wide cancer registry to reach YBCS and their high-risk relatives. The relative response rate indicates that this recruitment method can be employed to reach high-risk populations who currently do not receive screenings appropriate to their risk status.

Notes

SECTION C - USING DATA FOR CANCER CONTROL II

033

KOMEN COMMUNITY PROFILES NEEDS ASSESSMENT

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[1]Susan G. Komen , Dallas, TX, United States; [2]Westat, Inc., Rockville, MD, United States

Susan G. Komen supports ground-breaking research, community health outreach, advocacy and programs in more than 30 countries and through a network of 118 Affiliates across the US. The local Komen Affiliates conduct a Community Profile process every five years to identify the key areas of need in their communities and to develop a Mission Action Plan to address the identified needs. To support this planning process, Susan G. Komen partnered with Westat to produce a Quantitative Data Report for each Affiliate and each state. The report presents data on breast cancer incidence, late-stage incidence, mortality, screening, and population characteristics. The data are used to identify areas of highest priority within an Affiliate's service area for further community level exploration.

The presentation will outline Komen's Affiliate Community Profile process and how the Quantitative Data Report is combined with other information on community resources to form the basis for the five-year Mission Action Plan. Data sources used for the Quantitative Data Report including NAACCR CiNA data together with NCHS data on mortality, BRFSS data on mammography screening, census data on demographic and socioeconomic factors, and HRSA data on medically underserved areas. The reports use the most recent available data. The geography of Komen's Affiliate service areas will be described by using samples of the breast cancer tables and maps that were developed using the data.

Notes

034

DEVELOPING AND REPORTING ON EVIDENCE-BASED TARGETS FOR CANCER SYSTEM PERFORMANCE MEASURES

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[1]Canadian Partnership Against Cancer, Toronto, Ontario, Canada

Background: The Canadian Partnership Against Cancer's System Performance initiative works with provincial partners to set develop indicators and set evidence-based targets in order to identify gaps between current and desired performance levels, and to signal where priorities for performance improvements may be.
Methods: Over 100 indicators have been developed and published by the Partnership since 2009. In 2013, work began on setting targets for set of treatment indicators based on: national and international benchmarks, information from the literature, and expert-informed consensus supported by chart reviews. Evaluation criteria and a target review and selection process was overseen by a *Targets and Benchmarks Working Group* with experts and decision-makers from across the country. Evidence-informed targets were set for three guideline concordance indicators addressing for colon, lung, and rectal cancers. Work has begun to develop targets for 2014/15 and beyond.
Results: The three targets approved for reporting starting with the 2014 Cancer System Performance Report are: 70% of Stage II and III rectal cancer patients treated with pre-operative radiation therapy; 90% of colon cancer resections having 12 or more lymph nodes removed; and 55% of stage II and IIIA non small cell lung cancer patients over the age of 70 receiving adjuvant chemotherapy following surgery. Except for the lymph node dissection, based on a provincial best practice, no province has yet achieved any of these targets although trends for many provinces are in the direction of the targets.
Conclusions: Performance indicator reporting is a necessary but insufficient tool for informing system improvements. Reporting targets along with indicator results can help inform the directionality and magnitude of required improvement efforts. To be effective, however, the targets cannot be arbitrarily set but rather must be based on rigorous evidence informed by leading experts and decision-makers.

Notes

035

STAGING TOOL SIMPLIFIES THE COLLECTION OF VALID TNM STAGING DATA

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[1]Princess Margaret Cancer Centre, Toronto, Ontario, Canada

Princess Margaret Cancer Centre in Toronto has a hospital based cancer registry that has been in operation since 1958. TNM staging has been an integral part of the registry since the 1970's. The current staging information collected mainly by the registrar uses UICC TNM 7th edition that becomes a part of the patients' electronic record. This data is used extensively for research and administrative purposes as well as clinically.

In order to ensure complete, accurate and timely staging information, in 2002 a tool was built to allow for the collection of the required staging information based on the UICC 5th edition by either physicians or registry staff. The tool was designed so that the demographic information could be downloaded daily from the data sources that register new patients. On a monthly basis the registry staff complete the diagnosis and staging information for cases not completed by the physicians using the options from drop down lists. With the permission of UICC the individual T, N and M values for each cancer site have been incorporated into the tool. Once the TNM values have been entered, the stage group is calculated. For those cancer sites that require grade or any other prognostic variables, the tool allows for them to be collected. The tool includes UICC 5th, 6th and 7th edition with the appropriate values appearing based on the first appointment date. The web based tool is accessible through the hospital's electronic patient record.

Over the years the tool has been enhanced to collect additional data elements such as date of diagnosis and morphology. It can easily be adapted to collect clinical decisions making variables such has ER, PR and Her2neu. All of the backend tables can be updated by the registry staff. An audit process has been built into the tool to ensure that staging is captured for all patients.

A demo of the tool will be provided.

Notes

036

AUTOMATED TNM STAGING

D Dale[1], J Brierley[1], C Eggert[1], G Zufelt[1]
[1]Princess Margaret Cancer Centre, Toronto, Canada

Princess Margaret Cancer Centre in Toronto has a hospital based cancer registry that has been in operation since 1958. TNM staging has been an integral part of the registry since the 1970's. The current staging information collected mainly by the registrar uses UICC TNM 7th edition that becomes a part of the patients' electronic record. This data is used extensively for research and administrative purposes as well as clinically.

For a number of years the registrars would review the pathology, operative, imaging and clinical notes to obtain the clinical and pathology TNM. The data was entered into an in-house developed application that would then calculate the stage grouping based on the T, N and M values entered. A labour intensive process, therefore the search for methods to streamline and automate the process was investigated.

Since the Radiation Oncologists are required to enter staging into their treatment system, as part of the prescription, methods were investigated to transfer that data directly into the staging application. That process went live in November 2011. Synoptic pathology reporting has been a requirement for a few years, therefore a process to transfer the pathology staging into the application was also developed and implemented in April 2013.

Both of these initiatives have reduced the need for manual stage collection and improved the quality in the registry. In an average month there were 781 malignant cases to be processed of which 46.2% had information downloaded from the electronic sources. The additional sources of data also identified 42 otherwise missed cases, second malignancies and recurrences.

The automatic import of the TNM values from these two sources has increased our case ascertainment and allowed for the ease of capture of second primaries and recurrences. In addition, this allowed the Registry to reduce the time required to stage a case.

Notes

037

THE IMPACT OF THE COLLABORATIVE STAGE TRANSITION ON SEER SUMMARY STAGE

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Summary Staging represents a basic method of categorizing a newly diagnosed cancer in terms of its spread from its point of origin. Under this staging scheme cancers can be localized, confined to the site of origin, regional, spread beyond the original site either directly or through regional lymph nodes, or distant, through direct extension or metastasis. The Surveillance, Epidemiology, and End Results (SEER) program has utilized various versions of Summary Stage to provide information on staging which maintains consistency of definitions across multiple decades for the study and modeling of long terms trends. Throughout its history Summary Stage has been coded utilizing the various versions of Extent of Disease (EOD) and with the introduction of Collaborative Stage (CS) through the CS data items which correspond to the old EOD.

The retirement of CS and its replacement with direct coding of T, N, and M for cases diagnosed in 2016 and beyond means that the data items currently used to derive SEER Summary Stage will no longer be collected. The continuation of the most currently used version of SEER Summary Stage (SEER Summary Stage 2000) would therefore require the direct coding of this variable. This places a burben on our data collection staff which will also have to be trained to directly code T, N, and M. An alternative solution is to develop a new variation of Summary Stage, SEER Summary Stage 2016, which utilizes T, N, and M to derive localized, regional and distant for cases diagnosed 1988 forward.

The purpose of this presentation will be to discuss this new proposed version of Summary Stage and illustrate the differences which exist between it and SEER Summary Stage 2000.

Notes

NOTES

SECTION A - REGISTRY OPERATIONS & CASE ASCERTAINMENT I

038

ENHANCING UTILITY OF A PEDIATRIC CANCER REGISTRY THROUGH EARLY CASE CAPTURE

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Background: Cancer is the 2nd leading cause of death in children under 20, but survival has improved 50% since 1976 due to research and clinical trial enrollment. However, incidence data is unavailable until 2 yrs. after diagnosis, which may hinder research. To improve utility, a pediatric cancer Early Case Capture (ECC) program was implemented in 7 state cancer registries
Methods: We used a mixed-methods approach to qualitatively assess ECC effectiveness and quantitatively assess data quality. We interviewed staff at 7 state cancer registries to determine practices, difficulties, and goals. Interviews were recorded, transcribed, and coded to identify common themes. Data were managed with NVivo 10. Data quality was assessed by comparing demographic and clinical characteristics from ECC data to 1 and 5-year data for each state individually and in aggregate to all national data.
Results: Common themes were improved electronic reporting, improved relationships with reporting facilities, and difficulties in rapidly obtaining cases not reported electronically and staff turnover. Age, gender, tumor site, and behavior of ECC data were equivalent to distributions of national data. ECC data was not representative of national data for race ($P<0.001$) and diagnostic confirmation ($P<0.001$). At the state level, two states were not representative for race ($P<0.001$-0.023), and four for diagnostic confirmation ($P<0.001$-0.01).
Conclusions: ECC provides data more rapidly and closely models national data, with differences only in race and diagnostic confirmation. ECC allowed for expanded rapid reporting infrastructure, which could increase data completeness and reporting timeliness for all cases. Difficulties remain in manual case abstraction, staff turnover, and completeness of race information and need to be addressed to maintain data completeness, quality, and efficacy. There are indications that researchers may reliably use this data for some pediatric cancer studies.

Notes

039

USING SCANNERS AND OPTICAL CHARACTER RECOGNITION FOR PATHOLOGY REPORT COLLECTION

JT Casagrande[1], M Villa[1], M Leventhal[1], **D Morrell**[1], D Kerford[1], D Deapen[1]
[1]Los Angeles Cancer Surveillance Program, Department of Preventive Medicine, University of Southern California, Los Angeles, CA, United States

Background: The Los Angeles Cancer Surveillance Program collects pathology reports for all histologically confirmed cases. While the majority is collected via ePath, many are obtained by field staff as they visit facilities. To avoid insecure transportation of paper documents, a process improvement project was initiated to expedite the acquisition and processing of these cases in a "paperless" manner.
Purpose: The purposes of this project include:
1. Decrease the effort of field staff to acquire and process pathology reports.
2. Create the capacity for capture of key data elements using optical character recognition (OCR).
3. Merge the information collected from the "paperless" reports with ePath reports.
4. Obtain a machine-readable copy of all reports for downstream processing.
5. Increase security by eliminating the use of paper pathology reports.

Methods: The original process for acquisition of non-ePath reports required field staff to photocopy or print these reports and transport them to the central registry. A new process was developed that replaces copying and printing with a portable computer and scanner. Software was created to allow on-site scanning of the reports to an encrypted laptop. The reports are then uploaded from the laptop to the registry's server for processing. Templates for OCR processing were created for over 100 unique pathology report formats.
Results: The field staff has scanned and uploaded over 26,000 paperless reports for OCR processing. With a two-step review process the OCR process achieves nearly 100% accuracy.
Conclusions: Based on initial results we are encouraged that this use of technology has improved productivity, minimized duplicative data entry, and increased the security compared to previous paper-based processes.

Notes

SECTION A - REGISTRY OPERATIONS & CASE ASCERTAINMENT I

040

CNS TUMOURS IN CANADA: WHO ARE WE MISSING?

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Background: The Canadian Cancer Registry (CCR) is a collation of cancer information from every provincial and territorial cancer registry across the country. It contains close to 100% of all malignant tumours in Canada but capture of non-malignant tumours varies by geographic region and tumour site. Specifically, the capture of non-malignant tumours of the central nervous system (CNS) varies regionally, but the extent of under-ascertainment is unknown. As these tumours often have similar symptoms and outcomes to malignant tumours, including them in estimates of CNS tumour burden is critical.
Purpose: The objectives of this analysis are to: describe the number and rate of malignant and non-malignant CNS tumours currently captured in Canada; estimate which tumours are incomplete and in what regions; and begin to identify actions required to increase capture.
Methods: All primary tumours diagnosed in the brain, meninges, spinal cord, cranial nerves, pituitary or pineal glands between 2005 and 2009 were extracted from the CCR. Cases were classified by histology using definitions published by the Central Brain Tumour Registry in the US (CBTRUS). Counts and ASIRs of malignant and non-malignant CNS tumours were calculated by sex, age at diagnosis, site, histology, year of diagnosis and province. ASIRs from CBTRUS were applied to Canadian population data to estimate expected number of non-malignant CNS tumours.
Results: Approximately 3500 CNS tumours per year were included in the CCR between 2005 and 2009. One-third were non-malignant (n=825). Non-malignant CNS tumours were more common in females and were less likely to be microscopically confirmed. Capture of non-malignant CNS tumours varies by province and histology. Presently coverage in the CCR represents approximately 20% to 30% of expected.
Conclusions: The CCR is missing a significant portion of non-malignant CNS tumours based on expected rates from the US. Options for improving ascertainment will be explored.

Notes

041

EVALUATING THE ABILITY OF THE OHIO CANCER INCIDENCE SURVEILLANCE SYSTEM TO CAPTURE INCIDENT CASES OF CANCER

S Koroukian[1], P Htoo[1], L Giljahn[2], H Sobotka[2], M Bittoni[2], M Jean-Baptiste[2], B Pryor[2], G Cooper[1], P Bakaki[1]
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Objective: To evaluate the extent to which data in the Ohio Cancer Incidence Surveillance System (OCISS) captures incident cases of cancer, we analyzed the proportion of cases found both in OCISS and Medicare files, using Medicare fee-for-service (FFS) claims data as the gold standard.
Methods: OCISS data for diagnosis year 2009 were linked by the Centers for Medicare and Medicaid Services with 2008-2010 Medicare administrative data. Incident cases based on claims data were identified by ensuring that the first occurrence of a cancer-related diagnosis code was in 2009, and by requiring the presence of at least one inpatient claim or two outpatient claims, at least one day apart. We also identified cancer treatment from claims data. For each anatomical cancer site (female breast, prostate, and melanoma), we calculated the *matched proportion* (proportion of cases identified through claims data that were also found in the OCISS), and analyzed variations by demographics, as well as by combinations of diagnosis and procedure codes. We conducted multivariable logistic regression analysis to identify factors associated with the identification of incident cases in both data sources.
Results: Of incident cases identified through FFS Medicare claims data with a high level of certainty (i.e., through combinations of diagnosis and relevant treatment procedure codes), the OCISS captured 82.9%, 68.0%, and 57.0% of female breast cancer, prostate cancer, and melanoma cases, respectively. The presence of treatment information was associated with higher matched proportions for breast and prostate cancer, but not for melanoma.
Conclusion: Using Medicare data as the gold standard, the matched proportion in the OCISS was reasonably high in female breast cancer patients, but lower in patients with prostate cancer or melanoma. The findings support targeted efforts among subspecialists to increase cancer reporting, especially among those practicing in non-hospital settings.

Notes

SECTION B - STATISTICS & MODELING

042

MODEL-BASED RISK FACTOR ESTIMATES FOR USE IN DISEASE MAPPING SURVEILLANCE EMPLOYING BAYESIAN METHODS

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Background: Disease mapping methods in epidemiology can leverage cancer registry data to map cancer risk by small geographic areas, even at the neighbourhood level. While useful for surveillance and hypothesis generation, a lack of relevant risk factor data at the neighbourhood level is an important limitation
Purpose: To adjust small-area estimates of primary liver cancer within the Greater Toronto Area (GTA) for relevant risk factors, two model based estimates – heavy alcohol consumption and excess body weight – are derived using the Canadian Community Health Survey (CCHS).
Methods: Multiple cycles of the CCHS were geocoded and pooled to increase statistical sample size. Under the assumption of a Bernoulli distribution for each observation, a Bayesian hierarchical logit regression model is used to estimate heavy alcohol consumption and excess body weight by small geographic areas. These area-based estimates are used in Bayesian hierarchical log-linear Poisson regression models to investigate associations between several risk factors and primary liver cancer.
Results: Model results will be presented and mapped by neighbhourhood-level geographic within the GTA for the period of 2004 to 2008 for i) an age-adjusted cancer incidence model ii) two risk factors, and, iii) a covariate adjusted cancer incidence model utilizing the risk factor estimates. Associations between significant risk factors and liver cancer risk and the extent to which they attenuate the spatial patterns of incidence will be discussed. We will also discuss the limitations and assumptions associated with model-based estimates using sample surveys such as the CCHS and the Behavioural Risk Factor Surveillance System (BRFSS)
Summary: By employing Bayesian hierarchical methods to estimate risk factors by small area geographies, more detailed insights into etiologic hypotheses are attainable to inform future studies and health promotion activities

Notes

043

A DISCUSSION ON THE STABILITY OF DIRECT AGE-ADJUSTED RATES

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When cancer registries publish direct age-adjusted rates one topic that is often discussed is how stable is the rate. One measure of rate stability is the relative standard error (RSE), which is the ratio of the standard error to the rate typically expressed as a percentage. A rate with a small RSE is considered to be more stable than a rate with a large RSE. This presentation will use SEER Research Data 2001-2010 to develop direct age-adjusted rates and their associated RSEs for all combinations of race, gender, type of cancer, ethnicity, registry, county at diagnosis, and year of diagnosis. Single-year rates, rolling five-year rates and ten-year rates were calculated for diagnosis years 2001-2010. Counter-intuitively, the range of the RSE is larger for the five-year rate than the single-year rate for case counts ranging from 1 to 70 cases. This analysis suggests that rate variability actually increases when aggregating years instead of deceasing as might be expected. For case counts greater than 70 the range of the RSEs for the five-year rate is smaller than the range for the one-year rates as one would expect. Reasons for this unexpected increase in variability were explored.

Notes

SECTION B - STATISTICS & MODELING

044

PROJECTIONS OF CANCER INCIDENCE IN CANADA UP TO 2032

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Background: The projections of cancer incidence provide evidence-based input to the development, implementation and evaluation of cancer control strategy. Currently, there are no widely available long term national projections for Canada.
Purpose: This study provides projections of the future incidence rates and counts of 25 cancers in Canada up to 2028−2032.
Methods: The age-period-cohort models with power-5 link function were used for projections based on the national cancer data from 1983 to 2007.
Results: From 2003−2007 to 2028−2032, the age-standardized incidence rates for all cancers combined in Canada are not projected to change substantially. However, the average annual number of all cancer cases is estimated to increase by 84% and 74% for men and women, respectively, primarily from ageing of the population. The rates are forecast to decrease for the majority of tobacco related cancers, while increasing for non-tobacco related cancers. The rates for cancers associated with excess weight and physical inactivity are estimated to increase by 0.6−16% during the same period for uterus, kidney, pancreas, breast and male esophagus, and decrease by 2−6% for colorectum and female esophagus. The rates of the most common infection-related cancers are expecting to rise for liver by 43% in men and 15% in women, but fall for stomach and cervix by 20−30%.
Conclusions: The study underscores the importance of cancer prevention in strengthening tobacco control, promoting healthy weight and physical activity, and increasing coverage of HPV vaccination, and needs for emphasis on cancer control and care of elderly.

Notes

045

THE IMPACT OF MISSING STAGE AT DIAGNOSIS ON RESULTS OF GEOGRAPHIC RISK OF LATE-STAGE COLORECTAL CANCER (CRC)

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Background: Identifying areas at risk of late-stage cancer can prioritize cancer control screening efforts. But before using results of spatial research to guide public health programs, we must consider whether the results are spurious due to methodological issues, like data quality. Missing or incorrect data can distort research conclusions and result in ineffective public health policy.
Methods: Using colorectal cancer diagnosed in Florida from 2006-2010, we evaluated the impact of missing stage on results of spatial applications for three cancer control questions: Where to target a screening intervention (cluster detection)? How to tailor the intervention to reflect the demographics of the high risk communities (multilevel modeling)? Are disparities driven by unequal proximity to clinical care (distance from services analysis)? We used four approaches of increasing complexity for handling unknown stage (exclude, recode as late, allocate, impute).
Results/Discussion: Results from the exclude method identified fewer, less proximal clusters and reverse area-based associations compared to other methods. Important clusters or associations may be missed by this method, particularly for blacks, due to lack of power or bias. Differences in mean travel time by method were negligible; however, there was little difference in travel time based on stage.
Conclusion: Allocation and imputation creates an unquantifiable level of random misclassification for unknown stage cases, which can underestimate true associations. Recoding unknowns as late is likely correctly classifying >50% of the unknown cases, but the remainder are systematically misclassified. Excluding unknowns, however, reduces power due to a reduction in cases but can also create in selection bias, which can result in incorrect associations. There is currently no definitive standard for handling unknown stage at diagnosis in cancer surveillance studies. But excluding unknown stage cases may be the most biased.

Notes

SECTION C - EMERGING ISSUES: BREAST CANCER

046

US INCIDENCE OF BREAST CANCER SUBTYPES DEFINED BY JOINT HORMONE RECEPTOR AND HER2 STATUS

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Background: In 2010, Surveillance, Epidemiology, and End Results (SEER) registries began collecting Human Epidermal Growth Factor 2 (HER2) receptor status for breast cancer cases.
Methods: Breast cancer subtypes defined by joint hormone receptor (HR, estrogen receptor [ER] and progesterone receptor [PR]) and HER2 status were assessed across the 28% of the US population that is covered by SEER registries. Age-specific incidence rates by subtype were calculated for non-Hispanic (NH)-white, NH-black, NH-Asian Pacific Islander (API), and Hispanic women. Joint HR/HER2 status distributions by age, race/ethnicity, county-level poverty, registry, stage, Bloom-Richardson grade, tumor size, and nodal status were evaluated using multivariate adjusted polytomous logistic regression.
Results: Among cases with known HR/HER2 status, 36 810 (72.7%) were found to be HR+/HER2−, 6193 (12.2%) were triple-negative (HR−/HER2−), 5240 (10.3%) were HR+/HER2+, and 2328 (4.6%) were HR−/HER2+; 6912 (12%) had unknown HR/HER2 status. White women had the highest incidence rate of the HR+/HER2− subtype, and black women had the highest rate of the triple-negative subtype. Compared to women with the HR+/HER2− subtype, triple-negative patients were more likely to be NH-black and Hispanic; HR+/HER2+ patients were more likely to be NH-API; and HR−/HER2+ patients were more likely to be NH-black, NH-API, and Hispanic. Patients with triple negative, HR+/HER2+, and HR-/HER2+ breast cancer were 10%–30% less likely to be diagnosed at older ages compared to HR+/HER2− patients and 6.4–20.0-fold more likely to present with high-grade disease.
Conclusion: In the future, SEER data can be used to monitor clinical outcomes in women diagnosed with different molecular subtypes of breast cancer for a large portion (~28%) of the US population.

Notes

047

MOLECULAR SUBTYPES OF FEMALE BREAST CANCER: THEIR ASSOCIATED FACTORS AND TREATMENT

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Background: Breast cancer is now recognized as a heterogeneous disease with distinct biological molecular subtypes which have different prognoses and treatment options. Variations in the distribution of these subtypes may explain partly the observed racial disparities in breast cancer survival in Louisiana, a racially and socioeconomically diverse population.
Methods: This study included Louisiana women diagnosed with microscopically-confirmed invasive breast cancer in 2011 as part of the CDC-funded Comparative Effectiveness Research project. Based on the joint expression of three biomarkers: estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2), breast cancer cases were categorized into 4 molecular subtypes: Luminal type A (ER and/or PR+ and HER2-), luminal type B (ER and/or PR+/HER2+), basal-like or triple negative (ER-/PR-/HER2-), and HER2 amplified (ER/PR-/HER2+). The incidence of these subtypes and their associated patient and clinical characteristics as well as their concordance with guideline treatment were examined using Chi-Square test and multivariate logistic regression analyses.
Results: Of the 3,181 eligible breast cancer cases, 12% had unknown joint expression of ER/PR/HER2. The luminal type A, characterized by its good prognosis, was the most common subtype (61%) and was more frequent among whites and older patients, whereas the triple negative (13%), a poor prognostic subtype, occurred in about one out of every 5 breast cancer patients among blacks and younger patients (age ≤50 years). The luminal type B and HER2 amplified were rarer subtypes, representing about 9% and 4% of total cases, respectively. Treatment concordance by biomarker guidelines will be presented.
Conclusion: Given the significant paradigm of "personalized" medicine in cancer treatment, cancer surveillance programs should explore means to capture biomarker data that are relevant to current clinical practice.

Notes

SECTION C - EMERGING ISSUES: BREAST CANCER

048

IMPROVING ADHERENCE TO ADJUVANT HORMONE THERAPY AMONG MEDICAID-INSURED WOMEN WITH NON-METASTATIC BREAST CANCER: RESULTS FROM A PILOT STUDY

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Background: Adjuvant hormone therapy (AHT) is known to reduce the risk of recurrence by approximately 40% for women with non-metastatic hormone receptor positive (HR+) breast cancer. Initiation of AHT within a year of diagnosis and continued use for five years is recommended for Stage I-III, HR+ breast cancers. Previous studies that evaluated the initiation of AHT among breast cancer patients aged 20-64 enrolled in the New York State Medicaid program who were candidates for AHT found AHT initiation rates of 68% and 76% for cases diagnosed 2004-2006 and 2010, respectively.
Purpose: Describe the results of a pilot project designed to: identify, within a clinically meaningful time frame, Medicaid managed care enrollees with non-metastatic HR+ breast cancer who are receiving sub-optimal AHT; assess reasons for non-adherence; and, intervene to improve AHT compliance.
Methods: Newly diagnosed breast cancer patients identified from Medicaid claims data using a pre-tested algorithm were linked to the Cancer Registry to ascertain date of diagnosis, stage, and hormone receptor status. The subset of AHT eligible women was restricted to those enrolled in a participating managed care plan. Pharmacy records were reviewed to assess AHT initiation and adherence. Data were shared with care managers at participating plans, who were charged with conducting outreach, including: discussing the benefits of AHT; facilitating communication with providers; and administering a brief survey.
Results: Of the 981 Medicaid insured women with surgeries indicative of breast cancer between May 1 and November 30, 2012, 897 (91.4%) linked to the Cancer Registry. Of these, 478 (53.3%) had non-metastatic HR+ breast cancer. As of July 2013, 255 (53.3%) were enrolled in a participating plan, of which 81 (31.8%) were found to require outreach.
Conclusions: Outreach results as well as next steps will be presented. The potential for ongoing and expanded outreach will be discussed.

Notes

049

LINKED DATA REVEAL HOW PERSONS DYING OF BREAST CANCER DIFFER FROM THOSE DYING OF ALL CANCERS AND NON-CANCER DISEASES

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Persons diagnosed with breast cancer are younger and have longer survival on average than for all cancers. Screening and treatment surveillance has improved, but far less attention is given to surveillance for persons dying of advanced breast cancer (ABC). This study examined characteristics of persons dying of breast cancer compared to all cancer, and non-cancer disease. All 121,458 deaths in Nova Scotia (NS), Canada from 1995 to 2009 were linked to NS cancer, diabetes, and cardiovascular (CVD) registries, and to palliative care program (PCP) enrollment data to identify co-morbid causes of death and generate three outcomes: PCP enrollment, time from PCP enrollment to death, and place of death. The NS cancer registry developed in the 1960s, but diabetes and CVD registries more recently (mid-1990s). Among all deaths, 2.8% had ABC and 32.2% a cancer cause of death. Average age at death was 72.0 years for ABC, 72.1 for cancer, and 75.7 for non-cancer. Average number of causes of death was 2.7 for ABC, 2.5 for cancer, and 3.0 for non-cancer. Among ABC decedents, 12.0% had CVD, 6.6% diabetes, and 6.9% dementia as co-morbid causes of death, versus for all cancer: 11.6%, 6.0% and 3.4%. By 2009, 15% of ABC decedents were in the diabetes and CVD registries. PCP enrollment in three NS health districts increased from 60% to 70% for both ABC and cancer deaths; non-cancer PCP rates grew more rapidly from 5-10% to 25-35%. Overall, and for ABC, late PCP referral was common with over 20% in the last two weeks of life and nursing home residents were less likely to be PCP enrollees. ABC decedents were more likely to be nursing home residents (about 20%) than other women with cancer (15%) and all cancer (12%) decedents. Fewer ABC decedents (60.7%) die in hospital, and more in nursing homes (17.0%), than for all cancer (10.0%, 8.9%). Collaboration across disease programs to enable comprehensive advance care planning is advised for persons with ABC, especially nursing homes residents.

Notes

SECTION D - USING DATA FOR CANCER CONTROL RISK FACTORS

050

RECORD LINKAGE WITH DIABETES AND CARDIOVASCULAR REGISTRIES FOR THE SURVEILLANCE OF COMORBIDITIES TO ENABLE COMPREHENSIVE CARE FOR PERSONS AT END OF LIFE WITH CANCER

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Persons of all ages, but particularly older persons with cancer have comorbidities that affect palliative support needs, e.g., in Nova Scotia (NS), Canada, new guidelines relax glycemic targets for persons with diabetes as they become frail and have limited life expectancy1. In the early to mid-1990's, NS developed diabetes and cardiovascular registries. Increasingly, persons with cancer are also in these registries. For this study, NS cancer, diabetes and cardiovascular programs collaborated to provide new surveillance data for persons at end of life focusing on comorbid causes of death and indicators of quality end-of-life care. All 121,458 deaths in NS, from 1995 to 2009 were linked to NS cancer, diabetes, and cardiovascular disease registries, as well as palliative care program (PCP) enrolment data to identify non-cancer comorbid causes of death for persons dying of cancer and generate outcomes: PCP enrolment, time from PCP enrolment to death, and place of death.
Cancer decedents were: 32.2% of all deaths, average age of 72.1 years, and averaged >2 causes of death. Non-cancer causes of death were: cardiovascular (11.6%), diabetes (6.0%), renal (4.6%), and COPD (13.2%). Over the study period, PCP enrolment increased rapidly for persons dying of non-cancer causes which meant a decrease in the percentage of PCP enrolees dying of cancer from almost 100% to about 70%, while the overall percentage of cancer deaths enrolled in a PCP increased slightly from 60% to 70%. Registration in a disease registry was associated with higher PCP enrolment. Late PCP enrolment was a problem with about 25% enrolled in the last 1-2 weeks of life. High rates of hospital death (70%) also indicate less optimal care. Collaboration across NS disease programs registries to produce these surveillance data has informed how we can better coordinate community-based care for persons at end of life.
1. Mallery et al (2013) Evidence-informed guidelines…. J Am Med Dir Assoc 14(11):801-8

Notes

051

OBESITY AND PHYSICAL ACTIVITY OF MANITOBA YOUTH AND ASSOCIATION WITH ADULT CANCERS

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Background: Obesity and physical inactivity during childhood and adolescence represents a cumulative risk for adult onset of cancer. Healthy weight and physical activity during youth has been associated with a significant reduction in risk for breast, endometrial, colorectal, and renal cell cancers.
Objective: We examined the association between youth obesity and physical activity and socioeconomic status (education level & family income) at the community level along with individual level factors related to obesity and physical activity.We also investigated the spatial relationship between the prevalence of youth obesity and physical activity and prevalence of major types of cancer related to these health behaviors.
Methods: Data sources include the Manitoba Cancer Registry, Manitoba Youth Health Survey(YHS),and the most current census data.Descriptive statistics such as prevalence of risk factors, spatial correlation, and spatial plot were used to understand the variation between communities.Multilevel models were used to identify the relationship between environmental factors and the prevalence of obesity and physical activity among youth. We also investigated the relative contribution of the individual, community, and prevalence of cancer in different geographical areas.
Results: Preliminary results show high correlations and gender differences between youth rates of obesity and physical inactivity with adult cancer incidence in specific regions of Manitoba. Complete study results will be presented at this conference after the official release of YHS data in early 2014.
Conclusion: The finding of this proposed analysis will promote our understanding of the timing and degree of youth obesity and physical activity and how it relates to adult cancers.The results may also provide further evidence as to the importance of both prevention and interventions that promote youth healthy weights and physical activity as a continued strategy to reduce the burden of cancer.

Notes

SECTION D - USING DATA FOR CANCER CONTROL RISK FACTORS

052

COMPARISON OF THREE STRATEGIES TO ENROLL CANCER SURVIVORS IN A LIFESTYLE PROGRAM OFFERED BY A CANCER REGISTRY

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Background: Cancer registries have traditionally monitored incidence of cancer, however additional ways that registries can promote cancer control have been sought. Data from a sample of younger breast and colorectal cancer survivors showed that a majority had suboptimal levels of physical activity and fruits/vegetable intake.
Purpose: We sought to determine if the registry could influence survivors to improve their health behaviors and the most cost effective method of doing so.
Methods: We offered 4,461 cancer survivors free participation in an online program called A Lifestyle Intervention via Email (a.k.a. ***Alive!***) and randomized them into three recruitment strategy groups. All participants received an introductory letter inviting them to participate in the ***Alive!*** program. Those in Group #1 received no additional followup, those in Group #2 were sent a reminder letter after two weeks, and those in Group #3 were called to encourage response and understand reasons for non-participation. Once in the ***Alive!*** program, participants completed a survey to assess their current lifestyle behaviors, then received an email message each week for 12 weeks to help them achieve their goals. Both cost effectiveness of the three recruitment approaches as well as effectiveness of the ***Alive!***program will be assessed.
Results: Each recruitment group included ~1485 survivors. Preliminary results indicate that 60 participated in the phone follow-up group, 73 in the reminder letter group, and 36 in the no-followup group. Estimates of recruitment cost/participant will be provided by group and assessment of the effectiveness of the program on health behaviors of those who participated will be provided.
Conclusions: Preliminary results indicate that a relatively inexpensive follow-up letter is comparable to a more labor intensive phone follow-up. We will provide identification of subgroups most likely to participate and the impact on changing health behaviors of cancer survivors.

Notes

053

REGIONAL VARIATION AND LINK BETWEEN SMOKING AND LUNG CANCER

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Background: Studies show that smoking is a major risk factor for lung, pancreatic and esophageal cancers. More than 80% of smokers reported that they started smoking before 18 years of age. Current trends in youth smoking rates indicate that reducing smoking rates remains a major public policy issue. To formulate effective policy, tobacco control research needs to identify the link between smoking rates and lung cancer incidence in different regions.
Objective:
- To estimate regional variation in daily smoking rates across Manitoba
- To identify factors that explain this variation, including demographic factors, health factors, smoking restrictions and lung cancer incidence
- To examine the implications of this variation for tobacco control policy at the regional level.

Methods: This study uses the data from the Manitoba Cancer Registry, Manitoba Youth Health Survey (YHS), and the most current census data. We conducted an ecological analysis of age-sex specific daily smoking rates by region within the province of Manitoba, Canada. Generalized linear models were used to identify factors that explain differences in smoking rates by region.
Result: Estimates of smoking rates indicate wide regional variation, from a low of 9% in the most populous regions of Manitoba, to a high of 25% in the Northern regions.These results were mapped using ArcGIS 9 to visualize this regional variation. Additional analyses were conducted by health region using a generalized linear model with the estimated smoking rate as the dependent variable and rates of lung cancer as a predictor. Complete results will be presented at this conference after the official release of YHS data in early 2014.
Conclusion: Regional variation in smoking across Manitoba demonstrates the necessity for consistent approaches to tobacco control across the province. A cartographic display of regional variation can effectively communicate the need for consistent tobacco control strategies to policy makers.

Notes

SECTION E - CANCER EPIDEMIOLOGY & SURVEILLANCE

054

STOMACH CANCER INCIDENCE TRENDS AMONG 10 RACIAL/ETHNIC GROUPS IN CALIFORNIA, 1988-2010

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Background: As the number of immigrants from Asia and Latin America continue to grow in the United States, there are unique research opportunities to examine the disparities in stomach cancer risk patterns and trends among the racially and ethnically diverse populations.
Materials and Methods: A total of 57,729 invasive stomach cancer cases were obtained from the California Cancer Registry. Age-adjusted incidence rates (AAIR) and age-specific incidence rates (ASIR) were calculated by gender, time period and 10 mutually exclusive racial/ethnic groups (Non-Hispanic White (NHW), Black, Hispanic, Chinese, Filipino, Korean, Japanese, Vietnamese, Asian Indian and Pakistani (South Asian), and a combined group of Laotian/Hmong/Cambodian/Thai (LHCT)). Average annual percent change (AAPC) of AAIR and male to female (M:F) ratios of AAIR by race/ethnicity were also examined.
Results: Korean men and women had the highest AAIR and ASIR across time period and age group, followed by two other high-risk groups,Japanese and Vietnamese. NHWs, Filipinos, and South Asians consistently displayed the lowest risk for developing stomach cancer. Both AAIR and ASIR showed declining trends for almost all racial/ethnic populations, except South Asian and LHCT. The M:F ratio of AAIR ranged from 2.3 in NHWs to 1.4 among South Asians. People aged 65 years and older had substantially higher incidence rates than younger ages, regardless of gender and race/ethnicity, and also experienced more substantial decrease in incidence trends.
Conclusions: With disaggregated sub-Asian grouping, our analysis revealed the varied patterns in stomach cancer incidence rates and trends by sex, age, and specific race/ethnicity. These findings underline the need for further examining stomach cancer statistics among the diverse population groups, including immigrants and their descendants, in order to identify etiologic clues and develop more effective interventions.

Notes

055

TRENDS IN KIDNEY CANCER INCIDENCE RATES AMONG AMERICAN INDIANS AND OTHER POPULATIONS IN NEW MEXICO

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Background: Results from previous studies have shown that incidence rates for kidney cancer are higher for American Indians (AI) and Alaska Natives than for non-Hispanic whites (NHW) in several regions of the United States (US). There is also evidence that kidney cancer incidence rates have increased in the US in recent decades.
Purpose: The purpose of this study is to use existing data from the population-based New Mexico Tumor Registry (NMTR) to characterize kidney cancer incidence rates in AI and other populations in New Mexico (NM).
Methods: The investigators queried existing records from the NMTR to identify all incident cases of kidney cancer (ICD-O anatomic site code C64.9) diagnosed among NM residents during the time period 1981-2009. Average annual age-adjusted incidence rates were calculated by the direct method using the US 2000 standard population. Rates were calculated for three time periods, 1981-1990, 1991-2000, and 2001-2009.
Results: For the entire study period, incidence rates for kidney cancer were highest among AI (16.7 per 100,000; 95% Confidence Interval 15.1-18.3), followed by Hispanics (12.1 per 100,000; 95% CI 11.5-12.7) and NHW (9.1 per 100,000; 95% CI 8.8-9.5). AI had the highest incidence rates in each of the three time periods that were examined. Incidence rates increased over time in all race/ethnic groups and for both sexes. The greatest increase in incidence rates during the study period were observed among AI males. Male rates exceeded those for females in all race/ethnic groups.
Conclusions: Risk factors that may increase the risk of kidney cancer include obesity, hypertension, long-term renal replacement therapy, and non-traditional tobacco use. Genetic factors are thought to account for only a small proportion of all cases. Research is needed to document the etiologic factors that may account for excess risk of kidney cancer among NM AI.

Notes

SECTION E - CANCER EPIDEMIOLOGY & SURVEILLANCE

056

THE PAST, PRESENT AND FUTURE BURDEN OF CANCER INCIDENCE IN THE UNITED STATES

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Background: The number of new cancers is determined by the population's risk of developing or being diagnosed with cancer and its age structure and size. Modeling trends in these components can be used to project the future cancer burden.
Methods: Surveillance, Epidemiology and End Results (SEER) data were used to estimate the number of cancers (all sites combined) resulting from changes in risk and demographics over time. Nationwide age-adjusted incidence rates and counts for all cancers combined and the top 25 cancers were projected to the year 2020 using NORDPRED software.
Results: Since 1975, incident cases increased among the white population due primarily to an aging population; and among black population due primarily to a growing population. Between 2010 and 2020, overall age-adjusted incidence rates (proxy for risk) are expected to decrease slightly among black men and stabilize in the other groups. By 2020, total cancer cases (all races) are projected to increase by 24% [-3% risk, 27% demographics] to over 1 million annual cases in men, and by 21% [1% risk and 19% demographics] to over 900,000 annual cases in women. The largest increases are expected in melanoma (whites) and cancers of the prostate, kidney, liver and urinary bladder in males, and of the lung, breast, uterus and thyroid in females.
Conclusions: Despite a stabilizing of overall incidence rates/risk for much of the population, the number of cancer cases is expected to increase substantially. A greater emphasis on primary prevention strategies may counter the effect of a growing and aging population. Projections can be used to anticipate future resource needs, establish cancer control targets and evaluate primary prevention strategies.

Notes

057

GLOBAL SURVEILLANCE OF CANCER SURVIVAL (CONCORD)

M Coleman[1], C Allemani[1], H Carreira[1], R Harewood[1], D Spika[1], X Wang[1], F Bannon[1,2], J Ahn[1], L Marrett[3], D Turner[4], T Tucker[5], H Weir[6]
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Background: Cancer causes 8 million deaths a year, and 16 million new cases a year are expected by 2020, two-thirds in the developing countries least equipped to cope. Even with optimal prevention, millions of patients will need treatment world-wide every year for the foreseeable future.
Purpose: The CONCORD programme will establish global surveillance of cancer survival. Following on from the first study in 2008, CONCORD-2 will provide trends and geographic patterns for comparison of the overall effectiveness of health systems, and to inform national and global policy for cancer control. We will examine survival by stage at diagnosis, race/ethnicity and socio-economic status, where suitable data are available.
Methods: More than 250 population-based cancer registries in 60 countries have provided anonymised tumour records for 30 million adults (15-99 yrs) diagnosed during 1995-2009 with cancer of the stomach, colon, rectum, liver, lung, breast (women), cervix, ovary or prostate, or with leukaemia, and 70,000 children (0-14 yrs) with leukaemia. Standardised quality control procedures are applied to all data sets; errors are checked with the source registry. Net survival will be estimated, corrected for background mortality by age, sex, calendar year (and race) in each country or region. Survival will be age-standardised with the International Cancer Survival Standard weights.
Results: We will present comparative data on quality control, and preliminary results of world-wide patterns and time trends in cancer survival since 1995.
Implications: International inequalities in survival represent large numbers of avoidable premature deaths. Robust comparisons of survival trends and inequalities up to 2009 are expected to prompt improvement of national health systems. The results will contribute to the overarching goal of the 2013 World Cancer Declaration of "major reductions in premature deaths from cancer, and improvements in ... cancer survival".

Notes

SECTION A - REGISTRY OPERATIONS & QUALITY CONTROL II

058

METHODS FOR VALIDATING EDITS

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Computerized edits are essential components of abstracting and registry data management software. If an edit fails when it should not, it may confuse the registrar and result in incorrect coding. An edit that does not fail when it should may adversely affect data quality. Therefore, it is of utmost importance that edits are implemented correctly. This presentation will highlight the challenges in testing edits and automated methods that can be used to overcome those challenges.

A testing framework for edits was developed as part of the SEER*Utils Java library. Programming methods for testing software are applied to the testing of newly written or updated edits; these methods include large numbers of standardized unit tests. Templates are automatically created for each edit to ensure that all fields considered in an edit are included in the tests. Each test uses a different set of values for the fields and many permutations are tested for complex edits.

All unit tests are saved so that they can be auto-executed each time any edit is modified. This process runs behind-the-scenes as part of software integration procedures.

Valid edits improve the quality of registry data by standardizing the methods for validating data items. The edits framework standardizes the way in which the edits themselves are validated.

Notes

059

USING TECHNOLOGY TO INCREASE PRODUCTIVITY AND DATA QUALITY

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Background: The California Cancer Registry (CCR) has established a goal of abstract to research-ready processing with as limited human intervention as possible. The overall objective is to process a high percentage of cases, particularly those that are straight-forward and routine without manual review. Achieving this objective would divert staff time into more complex issues such as data analysis, problem resolution, and/or problem identification.
Purpose: The CCR's Production Automation & Quality Control (PAQC) Unit has been tasked with developing automation solutions for various manual processes that currently occur in our central database. The intent of the automation solutions is to replace manual processes with automation alternatives whenever feasible in an effort to reduce the amount of manual work effort expended in order to complete a case.
Method: A Project Management approach has been utilized to accomplish these goals. Team members were identified from multiple units within the CCR. Three initial automation goals are the current focus. Manual processes that occur for Correction Record Processing, Tumor Linkage, and for Consolidation were evaluated for the first phase. Baseline metrics were obtained to quantify the number of admissions requiring manual processes in order to complete or correct the case. A project plan was developed and team member assignments made for each automation project.
Results: Presentation will provide an overview of the goals and objectives outlined as well as the current projects, baseline metrics for those projects, and progress to-date on these automation objectives.

Notes

SECTION A - REGISTRY OPERATIONS & QUALITY CONTROL II

060

INNOVATIVE DATA QUALITY CONTROL: HOW TO MAKE IT BETTER BY MAKING IT EASIER!

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Background: While all central registries struggle with limited resources and funding reductions, the current environment has forced central registries to not only assess their data but also to review how we currently operate. It is no longer adequate to limit a quality control plan to what impacts current data. Developing strategies for long term data and process improvement solutions must be considered and incorporated into comprehensive cancer data quality control plans.
Purpose: Data quality control activities must evaluate the process as much as the data throughout a given cycle. Analyzing and improving the process allows more time to focus on data quality issues. Are there methods of automating audit processes, so that more time can be spent on data evaluation? What methods can be implemented to assist visual editors in identifying the required CS SSF fields for visual editing? What methods could be considered to assist visual editors with providing feedback to new registrars or low performing registrars? These are all process driven questions which, when properly and effectively addressed, will ultimately improve data quality.
Methods/Approach: Data quality control plans must include activities which evaluate the data as well as the data process. A review of current processes can provide for an assessment for improved methods. Simultaneously, the data involved in that process must be evaluated for accuracy, completeness and timeliness. Data management system reports can also assist in assessing problematic issues and track future improvement.
Conclusions: A summation of data quality control activities conducted by the Cancer Registry of Greater California (CRGC) with evaluation results and outcomes will be reviewed and discussed.

Notes

SECTION B - SURVIVAL METHODS II

061

A NEW SAS MACRO TO FIT FLEXIBLE PARAMETRIC SURVIVAL MODELS: APPLICATIONS OF THE ROYSTON-PARMAR MODELS

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Background: Survival analysis is often carried out using methods such as the Cox proportional hazards model. More recently, parametric survival models (Royston, 2002) allow modelling the baseline hazard function. This is useful for describing and predicting survival patterns in observational cohorts while accounting for risks, including population mortality. However, these models are not available with the SAS® software, the computing platform which has widespread use in the North American cancer surveillance community. We provide a new SAS program which fits flexible parametric models while allowing the user to appreciate explicit (and transparent) computations.
Methods: A suite of SAS macros with clear annotations are provided. The software was tested using published data including clinical trial data (Lee, et al 2012). We compared the results between STATA ® and SAS® software. We present results including estimates of hazard ratios (95% CI), analysis of 'avoidable' early deaths, and net and crude probability of death. We compare results from these models with those from standard survival analysis methods, and discuss how they can be valuable for planners and policy makers, physicians, patients, and the general public.
Results: The results from the SAS software were comparable to within +/- 0.01% of the STATA software, with similar computational timings.
Conclusion: This macro performs well and will be very useful to those wishing to fit flexible parametric models.
References: Royston, P. and M. K. B. Parmar. 2002. ***Flexible parametric-hazards and proportional odds models for censored survival data, with application to prognostic modelling and estimation of treatment effects.*** Statistics in Medicine 21: 2175–2197
Lee SM et al. Lancet Oncol. 2012***. First-line erlotinib in patients with advanced non-small-cell lung cancer unsuitable for chemotherapy (TOPICAL): a double-blind, placebo-controlled, phase 3 trial***; Nov;13(11):1161-70.

Notes

SECTION B - SURVIVAL METHODS II

062

THE IMPACT OF DIFFERENT TYPES OF FOLLOW-UP ON SURVIVAL OUTCOMES FOR ASIANS AND HISPANICS IN THE US

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Cancer registration in the US is unique since 26% of cancer cases are actively followed-up through SEER. The remainders are passively followed-up (presumed alive if not matched in death linkages). Cancer survival among US Hispanics and Asians, who comprise 24% of the US population, has not been fully studied. Using both approaches to follow-up, we examined biases in survival estimates within these groups.

SEER data with follow-up to December 31, 2009 were used to compare survival estimates using both follow-up methods. Completeness of SEER active follow-up at five years post-diagnosis was assessed to understand the accuracy of cancer survival estimates for Whites, Blacks, Hispanics, and Asians, by modelling the risk of lost-to-follow-up in a Cox Proportional Hazards Model.

Passive follow-up overestimated survival compared to active follow-up. Differences were small among Whites and Blacks but were statistically significant among Hispanics and Asians. Completeness of active follow-up was uneven across racial-ethnic groups. Censoring was dependent on stage at diagnosis. Asians, Blacks and Hispanics with distant stage cancer were more likely to have lost follow-up than those diagnosed with localized/regional stage cancers (HRs 1.8, 1.7, 1.4 respectively, $p<0.05$). The proportion of missed deaths was 3% for both Hispanics and Asians, but less than 0.5% among Blacks and Whites.

Passive follow-up inflates survival statistics for Hispanics and Asians. With active follow-up, censoring is not random across race-ethnicity. Problematic death linkages with largely foreign-born populations among Hispanics and Asians overestimate survival, contributing to spurious survival differentials. Follow-up procedures should be revised to improve the accuracy of survival estimates for these growing US populations.

Notes

SECTION B - SURVIVAL METHODS II

063

A SEMI-PARAMETRIC METHOD FOR ESTIMATING PERSONAL CURE, A STATISTIC FOR THE PATIENT, SURVIVOR, CLINICIAN, AND CAREGIVER

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Background: Personal cure is the probability that a patient survives long enough to die of causes unrelated to the cancer diagnosis. Personal cure is more relevant than statistical cure to the patient, who lives in the presence of all causes of death. However, parametric models to estimate personal cure rely on extrapolation beyond the observed data, which can be difficult to evaluate.
Methods: To estimate personal cure, we introduce a semi-parametric method for competing risk survival models and apply it to registry data. The method fits a mixture cure survival model to cancer-specific survival data from the SEER registries. Other cause survival is obtained from general life tables matched on age, sex, race, and calendar year, thus the method does not require extrapolation. To assess the method, we provide a comparison with statistical cure (ignoring non-cancer death), and a sensitivity analysis of model assumptions.
Results: Personal cure is more optimistic than statistical cure. The probability of personal cure can improve with age, because it adjusts for the decreasing life span of the aging patient. For colorectal cancer (patients aged 45-74 with a 2007 diagnosis), the probability of personal cure is 72% and statistical cure is 62%. In older patients, this difference increases to almost 30% (60% personal vs. 32% statistical). The method was robust to choice of cancer survival model and extrapolations beyond the observed data. It relies mostly on long-term assumptions of non-cancer survival, particularly for patients under 65.
Conclusions/ Implications: The semi-parametric approach is advantageous because it uses life tables to estimate non-cancer survival and it does not require extrapolations beyond the observed data. The probability of personal cure summarizes in one measure the risks of dying of cancer and other causes. Furthermore, it offers and important statistical tool for clinical decision making.

Notes

SECTION B - SURVIVAL METHODS II

SECTION C - EMERGING ISSUES: RECORD LINKAGE & DATA AUGMENTATION

064

CHARACTERISTICS OF LOST TO FOLLOW-UP CASES IN THE ONTARIO CANCER REGISTRY AND THEIR IMPACT ON SURVIVAL

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In the Ontario Cancer Registry, probabilistic linkage with the provincial morality file is undertaken regularly to update vital status information and provide a death date for patients. If no death match is found, the last contact date with the cancer system is retained. For survival analyses, patients who are not known to be dead are routinely assumed to still be alive. However, if this assumption is false, the result could be inflated survival estimates. Cases lost to follow-up are different from those with a known vital status: they tend to be female, younger, recently diagnosed, missing residence information and have their diagnosis based on a single data source (hospital, pathology or treatment clinic). These characteristics suggest that issues such migration out of the province and inclusion of out-of-province cases may explain some of the loss to follow-up. Changing surnames for women are thought to lead to missing death certificates, while younger patients may be less likely to remain in contact with the cancer system.

To investigate the impact of loss to follow-up on survival estimates, the following methodology has been adopted. Within the strata created by the variables associated with loss to follow-up, the lost cases are randomly assigned to be either alive or dead, depending on the percentage of dead cases observed. The 'alive' cases are censored at the study cut-off date; a survival time is imputed for the 'dead' cases. The resulting crude survival curves tend to follow the liberal 'assume everyone is alive at the cut-off' curve in the beginning, but approach the conservative 'censor everyone at their last date of contact' curve with increasing time. This presentation will provide more results for several cancers with different loss to follow-up characteristics.

Notes

065

USING SAS TO APPROXIMATE A TWO-PASS LINKAGE IN LINK PLUS

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Background: Clerical review in Link Plus consumes inordinate labor resources when analyzing links between data sets with more than one million records each.
Purpose: The project came from a need to save time and improve accuracy in large data linkages.
Methods: The first pass in the linkage takes place in SAS, not Link Plus, and identifies exact (or nearly exact) matches based on SSN, DOB, last name, first name, and sex. This linkage is deterministic and the comparison pairs require no clerical review. The remaining cases have a greater likelihood of missing or inaccurate SSN. To make potentially valid links easier to see, I create a recode field based on a compressed version of street address and five-digit zip code. This recode is for matching only, not blocking. After reviewing the cases in their default order (score), I review them again sorted by class.
Results: The primary output is the data set used to update the death fields in the incidence file. Although these links clearly pertain to the same person, a small subset of them requires review to correct miscoded sex. There is another listing of potential links that require additional research or cleanup, and clearly different people sharing an SSN. If a shared SSN belongs to a decedent, a QA specialist removes it from the incidence record to prevent future false matches.
Conclusions/Implications: As more states link larger data sets, manual review becomes increasingly cumbersome. Removing the links that do not require review in a first pass makes it easier to see high scoring false matches and low scoring true matches. One area that invites additional research is using the advanced settings in Link Plus to optimize the weights given to DOB and street recode to avoid false matches in the second pass when a parent and adult child share an address.

Notes

SECTION C - EMERGING ISSUES: RECORD LINKAGE & DATA AUGMENTATION

066

INTEGRATING BIGMATCH INTO AUTOMATED REGISTRY RECORD LINKAGE OPERATIONS

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Central Registries rely on the gold-standard probabilistic record linkage software, LinkPlus, for record linkage operations such as case finding, non-hospital data file matching, and de-duplication tasks. While LinkPlus has provided a solid foundation for these operations, it is not easily automated and does not run outside of the Windows platform.

The Kentucky Cancer Registry (KCR) performs several annual record linkages that are critical to registry operations such as EHR reporting. The KCR conducted a literature review and evaluated a number of alternative probabilistic record linkage software packages. BigMatch software from the U.S. Census Bureau met the majority of KCR's requirements including, a platform-independent linkage program, easy integration into KCR's operations, automation capabilities, and quality of results comparable to LinkPlus.

A formal evaluation was conducted where we measured Precision, Recall, and F-Scores of 0.94, 0.83, and 0.88 respectively for LinkPlus while BigMatch compared favorably with 0.96, 0.81, and 0.88 on a sample Death Clearance Linkage.

We report on our comparative analysis of record linkage results from BigMatch versus LinkPlus, the challenges we faced adapting this freely available software to our operations, the steps we took to automate record linkage tasks, and demonstrate a custom software application using the BigMatch record linkage engine.

Notes

067

AGREEMENT ON TREATMENT DATA BETWEEN THE OHIO CANCER INCIDENCE SURVEILLANCE SYSTEM AND MEDICARE CLAIMS DATA

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Background: The extent to which the Ohio Cancer Incidence Surveillance System (OCISS) captures treatment data is largely unknown. This study aims at evaluating the level of agreement between treatment data documented in the OCISS and Medicare claims data for female breast cancer, prostate cancer, and melanoma.
Methods: We used OCISS data from diagnosis year 2009 linked with 2008-2010 Medicare enrollment and claims files. The study population was comprised of Medicare-only fee-for-service beneficiaries 66 years of age or older who were also identified in the OCISS. Treatment modalities (surgery, chemotherapy, radiation therapy, and hormonal treatment) were identified from the OCISS and by using the procedure codes from Medicare claims data. In addition to descriptive analysis, we examined agreement levels between the two sources and calculated the Kappa statistic. Because the Kappa statistic is not reliable when the proportion of agreement on the positive classification markedly differs from that on negative classification, we also computed the prevalence and bias-adjusted Kappa statistic.
Results: The study population included 1,994, 1,998, and 757 patients diagnosed with breast cancer, prostate cancer, and melanoma, respectively. Agreement on surgery was 95.5%, 93.2%, and 88.4%, respectively. For radiation therapy, it was 89.1% and 86.8% for each of breast and prostate cancer patients, respectively. Agreement on chemotherapy was 93.2% for breast cancer. For hormonal treatment, agreement was 63.9% for breast cancer patients and 81.3% for prostate cancer patients. The prevalence and bias-adjusted Kappa consistently exceeded 0.7, indicating excellent agreement between OCISS and Medicare data.
Conclusion: Our findings showed high levels of agreement in treatment modalities between the OCISS and Medicare claims data, making the OCISS a viable, stand-alone source of data to evaluate treatment patterns across various subgroups of the population in Ohio.

Notes

SECTION D - STUDENT PRESENTATIONS

068

CERVICAL CANCER INCIDENCE (2007-2010) AND PAP SMEAR SCREENING HISTORY IN SASKATCHEWAN, CANADA

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Background: Cervical cancer (Ca) incidence and mortality rates have decreased across Canada; from 1984 to 2009 age-standardized mortality rates dropped by 51%. In 2013, about 1450 women were diagnosed with and 380 died from cervical Ca. Despite the national decrease, standardized incidence and mortality rate estimates remain higher in Saskatchewan (SK) compared to the national rate. Started in 2003, the Prevention Program for Cervical Cancer (PPCC) works to reduce the disease burden in SK.
Purpose: (1) Describe Ca incidence in SK and illustrate the relationship between cervical Ca and the Pap test; and (2) profile how screening programs impact incidence rates of *in situ* and detection of early stage invasive cervical Ca.
Methods: Ca data (2007-2010) was sourced from the Saskatchewan Cancer Registry (SCR). The SCR (est. 1932) has excellent standards of quality control, completeness, case ascertainment and follow-up.PPCC cytology records back to 2000 were linked with SCR data based on provincial health card number. Duration between last Pap test date and cervical Ca diagnosis date was calculated and grouped into the following categories: 0 to 0.5 yrs, 0.5-3 yrs, 3-5 yrs, > 5 yrs, and no Pap test record. TNM stage distribution and duration between Pap test and Ca diagnosis was also calculated.
Results: From 2007-2010, 1062 cervical Ca cases were registered, of which 82.4% (875) were *in situ* and 17.6% (187) invasive. Among invasive cases, 12.8% (24) had not had a Pap test since 2000; however, about 70% (129) had a Pap test within 5 years. About 40% (72) of the invasive cases were diagnosed as stage I & II and had a Pap test within 5 years.
Implications: Results from the analysis demonstrate that the PPCC is effective in identifying more *in situ* and early stage invasive cervical Ca cases. However, many invasive Ca cases comprise program participants. Linking registry data and screening data allows us to evaluate the PPCC and examine the quality of Pap smears in SK.

Notes

069

SMALL-AREA CANCER SURVIVAL ESTIMATION: METHODOLOGICAL CHALLENGES

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Background: Population-based cancer survival at the small area level is a key measure for surveillance and health strategy both locally and nationally. In England, healthcare provision and policy are organised within well-defined small areas (Clinical Commissioning Groups), which have a mean population of about 252,000. The main challenge in such a setting is to obtain estimates of cancer survival for each small area that are reliable and statistically robust.
Aim: In this study we develop a modelling strategy to improve the estimation of small-area cancer survival, and we use novel data visualisation techniques such as funnel plots and smoothed maps to enhance the presentation of the results.
Material and Methods: Net survival is used to produce estimates of cancer survival after adjusting for other concurrent causes of death. Flexible parametric regression models is fitted within a defined modelling strategy to estimate net survival for each small area. The best fitting models are selected among a limited number of models which include non-linear, non-proportional and potential interaction terms for year and age at diagnosis. The Akaike Information Criterion is used to choose the best-fitting models. We illustrate the modelling strategy using data for all patients diagnosed in England during 1996-2011 with a malignant neoplasm and followed up until 2012.
Results: Funnel plots and smoothed maps provide insightful understanding into the geographical patterns based on the robust survival estimates derived from our modelling approach.
Conclusion: Our study demonstrates the feasibility of using flexible parametric regression models within a defined modelling strategy to provide reliable estimates of survival at the small-area level. Both presentations of the small-area survival estimates (funnel plots and smoothed maps) provide a simple quality control tool that is considered helpful both for local and national health policy-makers.

Notes

SECTION D - STUDENT PRESENTATIONS

070

OPTIMIZING REGISTRY DATA TO IMPROVE TARGETED SCREENING IN HIGH-RISK POPULATIONS

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In the absence of effective and truly population-based screening, understanding the co-location of late stage cancer and populations with limited access to screening could substantially improve the yield of screening efforts. Our goal was to identify populations that would most likely benefit from targeted screening and to measure the value of improved targeting by estimating the sensitivity and specificity of the approach. We applied these methods to melanoma data from Los Angeles County:

1) Identified geographic areas with significant clustering of in situ and invasive melanoma using SaTScan, 2) developed a screening accessibility index (AI) score accounting for factors associated with late diagnosis of melanoma (distance to dermatology centers, socioeconomic status), and 3) generated ROC curves to evaluate the accuracy of the AI score in identifying populations most likely to benefit from targeted screening.

Aside from determining the geographic distribution of melanoma and screening accessibility, we also assessed the impact of using specific AI scores in targeted screening. For example, taking an AI < 1.55 would result in having to target only 28% of the County's population, but would capture 90% of all invasive melanomas (sensitivity), while only 25% of melanomas screened would be in situ (specificity=75%).

This approach makes use of readily-available data to enhance the efficiency of population-based screening approaches for melanoma, and can be used not only to estimate the potential efficacy of screening programs that have limited resources (by optimizing the AI for the proportion of the population for which screening resources are available), but also identify the sensitivity and specificity of any approach that screens only a subset of the total population. This approach would be suitable for other screenable cancers with well-established causes of late diagnosis and complete directories of certified screening facilities (e.g. breast cancer).

Notes

071

CREATING ETHNIC-SPECIFIC LIFE TABLES FROM SMALL POPULATIONS FOR RELATIVE SURVIVAL ANALYSIS: AN EXAMPLE OF FIRST NATIONS AND MÉTIS PEOPLE IN CANADA USING THE 1991 CENSUS MORTALITY CANCER COHORT

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Owing largely to a lack of ethnic identifiers in Canadian cancer registries, little is known about cancer survival in Aboriginal people in Canada. When appropriate life tables are used, relative survival (RS) takes into account differences in background mortality between populations and accordingly is suitable for estimating disparities in cancer survival between populations with differing life expectancies. We aim to construct age-, sex-, ethnicity- and calendar-time specific life tables to be used to calculate RS from cancer for First Nations and Métis in a population-based sample of 2.7 million adults in Canada, approximately 62,400 of whom are First Nations and 11,000 of whom are Métis. The cohort comprises a sample of adults aged 25 and older who completed 1991 Long Form Census of Canada (about 15% of the population). The cohort was probabilistically linked to the Canadian Mortality Database (1991- 2006) and the Canadian Cancer Registry (1992 to 2003). Data from the census and mortality database (to be updated to 2008) will be used to generate life tables specific to the First Nations, Métis and non-Aboriginal population. There are too few deaths among the First Nations and Métis people to generate life tables based solely on observed mortality as is done conventionnally in larger populations. To overcome this, we will model age-specific mortality as a function of age, sex, year, and population group and based on these models, estimate predicted mortality curves and corresponding life tables. The work will be completed over the next 6 months and be ready for presentation in June. The major implications of this work are twofold. First, the availability of First Nations and Métis specific life tables will allow us, for the first time, to calculate RS in these populations. Second, the methods used in this study can be applied to measure RS in other small populations, including for example, those states with small American Indian/Alaska Native populations.

Notes

072

IMPLEMENTING STATEWIDE CANCER CASE REPORTING BY TARGETED PHYSICIAN SPECIALISTS IN NEW YORK

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Background: As cancer diagnosis and treatment are increasingly taking place in outpatient settings, the New York State Cancer Registry has taken measures to include reporting from outpatient treatment centers, laboratories, and most recently, physician practices. This statewide implementation project was developed using lessons learned and tools developed for a 2010 pilot project to encourage reporting by hematologists.
Purpose: We will describe implementation of our physician cancer reporting program.
Methods: Physicians specializing in dermatology, urology, hematology, or medical oncology were identified using state licensure and National Provider Identifier Registry data and consolidated for contact at the practice level. A detailed protocol was designed to standardize the timing and contact methods used for regional outreach. A tracking database, capable of producing action reports that align with the protocol, was developed to maintain practice information and to monitor progress toward successful cancer reporting.
Results: We identified approximately 2,200 physicians located in 1,500 practices in 11 regions. We initiated contact with 121 practices in western NY and 94 practices in central NY in April 2012 and July 2012, respectively. Ninety (41.9%) practices were excluded primarily because the physicians are retired, no longer practicing in NY, or hospital-based. The first six months of outreach among the remaining practices yielded the following: 38 (30.4%) have reported; 75 (60.0%) are engaged but do not have necessary accounts to access the reporting application (n=45) or have not reported (n=30); and 12 (9.6%) are not yet engaged. Further outreach to additional regions will continue through 2014.
Conclusions: We will evaluate this program after year one of implementation to describe the progress (practice participation and cases ascertained), measures of staff effort necessary for implementation, and important lessons learned.

Notes

073

AUTOMATED CANCER CASE ASCERTAINMENT AND REPORTING IN AUSTRALIA

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In 2010 Cancer Council Victoria (CCV) initiated a project to assess the feasibility and effect of automating the identification and transmission of cancer pathology reports to the Victorian Cancer Registry (VCR) to replace paper and fax submissions and file transfers and to reduce the burden of reviewing and registering reports and following up missing information.

The twenty four month project was based on the implementation of E-Path, provided by Artificial Intelligence In Medicine (AIM), at two sites to ascertain the effect it would have on the registration process and to evaluate benefits and deficiencies.

The Royal Children's Hospital and the Peter MacCallum Cancer Centre were selected by the VCR as the two reporting sites. The VCR/AIM project team, with input from the reporting sites, developed the selection rules for automated processing and established the criteria for quantifying the effect of the changes. E-Path was implemented sequentially in the sites and the case finding criteria and lexicons adjusted through several iterations to optimize performance.

Performance was quantified as sensitivity and specificity, both of which were high, resulting in significant improvements in efficiency. Timeliness, completeness of reporting, the support provided to reporting sites, clerical labor, printing and postage costs and administrative expenses were also relevant factors and will be discussed. There were also discernible effects at reporting sites.

This project automated a largely manual process. In addition to an evaluation of the factors mentioned above, it also provided an opportunity to draw conclusions about the logistics and the human factors involved. Cancer case finding is based on extensive training and the process required to transfer this knowledge to an automated system will be discussed from a theoretical perspective with regard to the nature of expertise and some of the practical implications.

Notes

074

AUTOMATED DATA EXTRACTION AND CLASSIFICATION OF TEXT BASED PATHOLOGY REPORTS FOR RESEARCH AND CLINICAL TRIALS MATCHING

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Electronic pathology reporting (E-Path) has automated the identification of reportable cancers from text based pathology reports to a high degree of accuracy: 99% specificity and 98% sensitivity based on field testing. The volume of cases reported to cancer registries has increased dramatically since 2005; however, identification of eligible clinical study participants, still calls for interpretation of text reports by humans. Smart software is required to interpret the contents of these reports and then match the data to eligible studies.

The software is currently running at 9 central registries where assessments were carried out to determine the system's ability to correctly identify cases. The approach uses natural language and knowledge based processing to identify relevant tumor information. This information is converted into standardized representation for database storage. Search agents then match patient and tumor characteristics to study criteria. This system automatically analyzes incoming pathology reports and when matched, a notification (email) is activated and the reports are set aside.

We present qualitative and quantitative results of using this system. Data were collected over a 6 month window comparing the system's performance to human reviewers. Using various study sizes and different criteria, the time to identify a set of candidates as well as the accuracy were compared. The granularity of the search criteria was a governing factor between the number of reports identified vs. the manual review required after the automated search.

In conclusion, we found that using such a system significantly enhances the utility of registry data and could enable it to provide a service without incurring significant labor costs.

Notes

NOTES

SECTION A - GEOCODING & GEOSPATIAL QUALITY CONTROL

075

USING THE NAACCR GEOCODER METADATA TO ASSESS QUALITY OF GEOCODED DATA AND IMPACT ON RESULTS OF SPATIAL STUDIES

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Context: Most disease surveillance systems geocode case data. This, coupled with advances in computer capacity and technology, has led to a rise in epidemiologic studies on the distribution of disease that rely on analysis of secondary data, e.g. from cancer registries. Geocoding cases to census tract is required for US central cancer registries. This enables state registries to evaluate cancer burden from a sub-county spatial perspective, but the difficulty is often the interpretation of results for translation into meaningful public health action. One area hampering interpretation is the impact of quality of the geocoded data. The North American Association of Central Cancer Registries (NAACCR) now has a standard geocoder available for cancer registries. Output from the geocoder includes detailed information about geocode quality that goes beyond the codes currently required of US registries.
Methods/Results: We evaluated the utility of a precision measure and an accuracy measure available from the NAACCR geocoder for use by central registries. We compared these measures with the current, NAACCR required, GIS Quality and Census Tract Certainty codes. We evaluated the impact of geocoding quality on results from three different types of spatial studies: cluster detection, multilevel area-based models, and distance from services analysis. Not all analysis was equally impacted by data quality. Different levels of data quality are acceptable depending upon study design, for instance cluster detection results were more sensitive to changes in data quality than area-based regression models.
Public Health Significance: Due to the existing infrastructure for central cancer registries, registries are in a unique position to develop guidelines for evaluating and presenting geocoding quality to inform the appropriateness of registry data for specific research questions and design.

Notes

076

THE CANCER REGISTRY OF GREATER CALIFORNIA UNDERTAKES A GEOCODE IMPROVEMENT PROJECT

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Background: Accurate geocoding of cancer cases is critical for etiology studies and cancer control efforts. 1996 to 2007 the Cancer Registry of Greater California (CRGC) had about 66,000 cases, or approximately 5% of the total cases, with an address at diagnosis for either a post office box, rural route, or some other type of address that can only be geocoded to a zip code centroid, instead of census tracts. This led to the CRGC failing the SEER Data Quality Profile (DPQ) indicators for census tract coding for rural cases. These 5% of cases coded to centroids (certainty code of 2- zip+4, 3-zip+2, 4- zip only or 5-zip of PO Box) increased from 4% in 1996 to 7% in 2007. In 2013 staff at the CRGC began an improvement project to address these geocoding issues of increasing centroid coding and losing accuracy for those coded to centroids.
The goals of the project were to: Determine expected urban/rural population percent by region/county. Decrease PO Box addresses. Designate software tools for geocoding review. Investigate county assignment error patterns.
Our approach was to: Identify staff to lead and implement the project. Evaluate the census tract certainty cases coded as 4.Identify methods to routinely find cases needing further manual review.Conduct training of reviewers in methods of determining best search methods.Identify potential pre-processing address software.Identify methods for improvement.Share our approach with NAACCR cancer registries.
Our results include: Instructions for “Address Look Up”. A document on how to use the “NAACCR Geocoder”. Identification of repeating variations of addresses. Improvement of Census tract certainty to exceed SEER Data Quality Profile (DPQ) goals. In conclusion, we have identified a best practice approach and the CRGC census tract accuracy has increased and we are meeting DPQ goals. We are continuing to monitor and review vendor results and are developing methods to automate the review of cases receiving lesser accuracy rates.

Notes

SECTION A - GEOCODING & GEOSPATIAL QUALITY CONTROL

077

ASSESSING FITNESS FOR GEO-USE – INTERPRETING GEOCODE QUALITY IN THE NAACCR/TAMU GEOCODING SYSTEM

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The quality of geocoded data used in health research has a direct impact on study findings and policy decisions that may be based upon the results of these studies. The AGGIE (Automated Geospatial Geocoding Interface Environment) system available to the NAACCR community provides one means for cancer registries to geocode registry data. The output of this system contains a variety of quality metrics that can be used to assess fitness for use. These include the GIS Coordinate Quality Code and Census Tract Certainty Code NAACCR data items. Also included in the output are addition non-NAACCR standard data items that provide additional degrees of information about the quality of the returned data values. No one geocode quality metric provides a complete picture of geocode quality and each metric has both specific strengths and drawbacks. Understanding the quality of registry data overall and at the per-record level requires the integration and interpretation of multiple geocode quality metrics. This talk will begin with an overview of the strengths and weaknesses of various geocode quality metrics available within the output of the NAACCR/Texas A&M University (TAMU) Geocoding System. The talk will next cover techniques for analyzing, interpreting, and assessing geocode quality using NAACCR and non-NAACCR data items. The talk will conclude with issues that have been encountered in the NAACCR community as well as reflections and best practices that cancer registry staff could follow to ensure the highest quality data possible.

Notes

078

CASE STUDIES IN LARGE-SCALE REGISTRY RE-GEOCODING WITH THE NAACCR/TAMU GEOCODING SYSTEM – RESULTS FROM TEXAS & NEW MEXICO REGISTRIES

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Two studies were undertaken over the course of the previous year to re-geocode the majority and/or all of the case records from two Central Cancer Registries, the Texas Cancer Registry and the New Mexico Tumor Registry. The purpose of these studies was to compare previously geocoded data with data produced by the NAACCR/Texas A&M University (TAMU) Automated Geospatial Geocoding Interface Environment (AGGIE) Geocoding System. The primary focus of these efforts was to identify changes in geocode output resulting from the AGGIE system and the geocoding systems previously used by each registry in order to assess the comparative accuracy of the AGGIE system. Registry records were re-processed with the AGGIE geocoder to associate new latitude/longitude values as well as Census 2000 and 2010 indicators and quality metrics. A series of spatial analyses were performed to identify possible inconsistencies between geocoded and census data produce by the AGGIE system and the previous geocoding systems used by each registry in terms of census tract misassignment, county misassignment, and cases where geocode outputs varied by great distance. Changes in NAACCR census tract certainty and NAACCR GIS Coordinate Quality Code values were used to identify records which represented those which improved or degraded in geocode quality between the previously geocoded data and the new data produced by the AGGIE system. This talk will outline the methodology and key findings of this work to shed light on the main benefits and improvements in geocoded data quality that registries will observe when they begin using the AGGIE system. Common and systematic errors in previously-used geocoded systems will be enumerated, and guidance will be given on the potential impact of these issues and how it can be handled.

Notes

SECTION B - CANCER EPIDEMIOLOGY I

079

EXAMINATION OF RACIAL DISPARITIES IN EPITHELIAL OVARIAN CANCER SURVIVAL

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Ovarian cancer is the 8th most commonly diagnosed cancer and the 5th leading cause of cancer death among US women (Source: http://apps.nccd.cdc.gov/uscs/toptencancers.aspx). From 2006 to 2010, white women had greater age-adjusted ovarian cancer incidence and mortality rates compared to black women in TN and the US (Source: http://statecancerprofiles.cancer.gov/index.html). However, during 2003-2009, black women experienced reduced 5-year relative and 5-year period survival compared to white women in the US (Source: http://seer.cancer.gov/csr/1975_2010/browse_csr.php). Epithelial ovarian cancer (EOC) is the most common type of ovarian cancer. We examined survival disparities between black and white women diagnosed with EOC, who were Tennessee residents. In addition, the association of the observed survival disparities with various covariates, such as receipt of National Comprehensive Cancer Network (NCCN) guideline-concordant therapy, will be examined. EOC cases were extracted from the Tennessee Cancer Registry database for the diagnosis period 2004-2010. Autopsy-only and death-certificate-only cases were removed. We had 2715 EOC cases, 267 in black and 2448 in white women. Stage at diagnosis was as follows for black and white women, respectively: Stage 1, 13.9%, 20.1%; Stage 2, 6.4%, 8.2%; Stage 3, 30.0%, 30.0%; Stage 4, 33.7%, 27.6%; Unknown/Other Stage, 16.1%, 14.3%. Median overall survival time in black and white women, respectively, was 427 and 570 days. The mean overall survival time ± standard error for black and white women, respectively, was 640±38 and 760±14 days. Surgical therapy was performed in 75% of white women, but only 65.5% of black women. In conclusion, black women residing in Tennessee, despite experiencing better overall mortality rates for ovarian cancer compared to white women, are diagnosed more frequently at late stage, experience shorter survival times and less frequently receive guideline-concordant surgical therapy.

Notes

080

OVERALL PROSTATE CANCER SURVIVAL IN FLORIDA: A MULTILEVEL ANALYSIS

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Background: Few studies have looked at the independent contribution that individual level and contextual factors make to prostate cancer survival.
Purpose: To identify individual and contextual factors contributing to overall prostate cancer survival in Florida.
Methods: A random sample of 6453 cases diagnosed with prostate cancer between 10/1/2001 and 12/31/2007 in the Florida Cancer Data System. Census 2000 was linked to patient data. Comorbidity was computed following Elixhauser Index. Estimated survival probability curve was generated using the Kaplan-Meier estimator. Wei, Lin and Weissfeld survival model was adopted for the multivariate analysis. Hazard ratios, confidence intervals, and p-values were calculated.
Results: The average age at diagnosis was 66.55 years with 12.16% men being diagnosed with advanced stage. Range of observation period was 5 to 3925 days, where 1100 patients (17.05%) died. Older diagnosis age was associated with shorter time-to-death. Overall death rate for African American patients was 14.3% higher than that of Caucasian patients, although this relationship was not significant ($p = 0.2305$). Patients with no insurance had a 66.7% higher mortality rate than that of patients holding private insurance ($p = 0.0351$). Mortality rate for current smokers was 62.4% higher than that of non-current smokers ($p < 0.0001$). Higher hazard of overall mortality was also associated with being diagnosed with advanced stage compared to localized stage (HR=1.89, $p<0.0001$) and having undifferentiated or unknown tumor compared to well-moderately differentiated tumor (HR=1.36, $p=0.0172$). Having poorly differentiated tumor was related to higher death rate immediately after diagnosis, but this disadvantageous effect gradually vanished over time. Fourteen comorbidity was significantly associated with shorter time-to-death.
Conclusions: Further research is needed to understand mechanisms in which individual and contextual factors impact prostate cancer survival.

Notes

SECTION B - CANCER EPIDEMIOLOGY I

081

CAPITALIZING ON CANCER SURVEILLANCE THROUGH TWO OSTEOSARCOMA SURVEILLANCE STUDIES IN FIVE NORDIC COUNTRIES AND THE US: WHAT HAVE WE LEARNED?

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Background: The Osteosarcoma Surveillance Study, an ongoing 15-year drug safety surveillance study, was initiated in 2003 to monitor for a possible association between teriparatide treatment and osteosarcoma in adults aged 40 years or older in the United States (US). A 10-year companion study in five Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden) was initiated in 2004.
Objective: To compare descriptive findings from the Nordic and US studies given different methods of data collection.
Methods: Osteosarcoma cases diagnosed 2003 or later (US) and 2004 or later (Nordic) are identified by treating physicians at comprehensive cancer centers or by population-based cancer registries. After the consent process, patient information, including demographics, treatment history with teriparatide, and exposure to risk factors for osteosarcoma, is ascertained via telephone interview (US) or medical records (Nordic).
Results: By September 30, 2013, 737 patients in the US study diagnosed through 2011 had been interviewed and in the Nordic countries, medical records for 100 patients diagnosed through 2013 had been abstracted. None of the cases received teriparatide treatment prior to developing osteosarcoma. The age and sex distribution of patients, prior cancer, most common tumor sites, and history of prior radiation treatment were similar between the US and Nordic countries, whereas race, vital status at the time reported, distribution of morphology, and some selected medical history characteristics differed between the two studies.
Conclusions: The descriptive characteristics between patients in these two studies are similar, with a few exceptions that may explained by differences in study methodology, diagnostics, or clinical practice in the US and the five Nordic countries. To date, interim findings have not provided evidence of a pattern indicative of a causal association between teriparatide treatment and osteosarcoma in either study.

Notes

082

USING SEER*STAT MP-SIR TO INVESTIGATE CANCER INCIDENCE AMONG OCCUPATIONAL COHORTS

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Background: Investigations of cancer in occupational settings have contributed critically to our understanding of cancer risks. About one third of the factors recognized as human carcinogens were first documented via worksite studies. Furthermore, it is estimated that 4% to 10% of cancers in the US are caused by occupational exposures. Central cancer registries are sometimes asked to respond to reports of disease clustering within occupational groups or worksites.
Purpose: This project will demonstrate the use of the SEER*Stat Multiple Primary -- Standardized Incidence Ratios (MP-SIR) session to investigate cancer incidence among occupational cohorts.
Methods: Using a historical cohort study design, we will compute standardized incidence ratios (SIR) using the SEER*Stat MP-SIR session. We will compare results using reference incidence rates from several different populations and investigate the impact of latency period.
Results: We will present tables of cancer SIRs for an occupational cohort by cancer primary site category, reference population, and latency period.
Implications: It is hoped that this approach to the analysis of cancer incidence among occupational cohorts could be easily adopted by other central cancer registries and will be a useful model for addressing worksite cancer cluster concerns.

Notes

SECTION C - CANCER IN SPECIAL POPULATIONS II

083

AN UPDATE ON CANCER INCIDENCE IN APPALACHIA

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Background: In 2007, Wingo published the first evaluation of cancer incidence rates across the eastern US classified as Appalachia. Data for the time period 2001-2003, covering 88% of the population for that region, were analyzed and presented. The present study expands the time period and regional population coverage to update the rates described previously.
Purpose: This evaluation examines cancer incidence and trends in Appalachia and compares these rates to those found in Non-Appalachia regions.
Methods: Counties in 13 states were identified either as Appalachian or Non-Appalachian. SEER*Stat was used to calculate age-adjusted cancer incidence rates, SE, and CI using the most recent data from CDC's NPCR-CSS. Comparisons were made between Appalachia and Non-Appalachia by state, sex, and race, ARC designated economic status, and with rates published by Wingo. Trends over time were analyzed.
Results: Preliminary results show that for all Appalachian counties and cancer sites combined, incidence rates were lower than for the Non-Appalachian counties in these states. Rates varied among the states with no consistent patterns by diagnosis year. Northern Appalachia had the highest rate with the lowest rate in Southern Appalachia. In Appalachia, males have higher rates than females and the rates for males vary between Appalachia and Non-Appalachia. There were no consistent patterns by race. In most states, those counties with an ARC economic status designation of Transitional had the highest rates. Compared to the rest of the US, the Appalachian overall cancer rate is higher.
Conclusions: While the Appalachian overall cancer rates continue to be higher than the rest of the US, as shown in the rates published by Wingo, the gap has narrowed. Within the Appalachian states, combined and individually, there is no consistency in the difference between the Appalachian and Non-Appalachian counties.

Notes

084

CANCER SURVIVAL IN APPALACHIA

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Background: The Appalachian region has higher rates of poverty and lower levels of education than the rest of the U.S. Incidence and mortality from lung, colorectal, cervical and several other cancers are higher in the Appalachian region, but cancer survival in the Appalachian region as a whole has never been examined.
Aims: Quantify survival and avoidable premature deaths from cancers of the lung, colorectum, female breast, prostate, ovary and cervix in the 13 states in Appalachia, and the differences between Appalachian and non-Appalachian areas of those states, by socioeconomic status.
Methods: Data on invasive cancers diagnosed from 2001-2009 were provided by the thirteen state registries in Appalachia. The data were linked with the National Death Index to identify the vital status of all patients as of December 31, 2010. One-, two- and five-year relative survival were estimated using the cohort approach for patients diagnosed 2001-04 and the period approach for those diagnosed 2005-09. Life tables of all-cause mortality rates by age, sex, race, region and socioeconomic status were constructed to estimate expected survival. Sensitivity analyses were performed to assess the robustness of the results.
Results/Discussion: Overall survival was worse for patients in Appalachian than in non-Appalachian regions of the 13 states. Relative survival estimates will be available in early 2014. Results will showcase how cancer survival data can be used to inform cancer control and to help explain geographic patterns and trends in survival in a socially and economically disadvantaged region of the country. The results can be used to target evidenced-based cancer control activities and to monitor the impact of these intervention programs.

Notes

SECTION C - CANCER IN SPECIAL POPULATIONS II

085

CANCER INCIDENCE IN THE HISTORIC SOUTHERN BLACK BELT

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Background: The Historic Southern Black Belt describes a primarily rural area of the southern U.S. characterized by a higher proportion of Blacks in the population, unemployment, and poverty. Limited information has been published about cancer incidence in this region.
Purpose: This evaluation examines cancer incidence and trends in the Southern Black Belt by state, sex, and race and compares these rates to those found in populations in other regions.
Methods: Counties in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia were identified either as Black Belt or non-Black Belt counties. SEER*Stat 8.1.2. was used to calculate age-adjusted cancer incidence rates, standard errors, and confidence intervals using the most recent data from CDC's National Program of Cancer Registries Cancer Surveillance System for states that met high data quality criteria. Comparisons were made between Black Belt and non-Black Belt counties by state, sex, and race. Trends over time were analyzed.
Results: For most states, the age-adjusted incidence rate for the Black Belt counties is significantly higher than the rates for the non-Black Belt counties. For males, the Black Belt county incidence rates are higher than the non-Black Belt counties in all, but two, states. Rates are higher in approximately half of the Black Belt counties for Whites and Blacks with fewer increased rates in American Indians/Alaskan Natives and Asian Pacific Islanders. The rates generally increased over the time with variation for some states and/or diagnosis years.
Conclusions: Cancer incidence rates are higher in the Southern Black Belt counties compared to non-Black Belt counties. The results of this evaluation may assist in identifying areas where intervention efforts could be focused.

Notes

086

REDUCING INEQUALITIES IN CANCER SURVIVAL FOR ONTARIO FIRST NATIONS: A JOURNEY FROM SURVEILLANCE TO ACTION

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Background: First Nations people suffer from many health and socioeconomic inequalities, including in cancer: while incidence was historically low, it is more recently rising to approach that in the non-Aboriginal population. There is, however, little data about cancer survival disparities.
Objectives: To describe work estimating survival disparities between First Nations (FN) and all Ontarians, exploring reasons and developing action strategies.
Methods: Breast cancer diagnoses in Ontario FN for 1992-2001 were identified through linkage of the Indian Registry System and the Ontario Cancer Registry, and followed up through 2006. Survival in FN and all Ontario was compared using Cox proportional hazards modelling. Potential prognostic factors were abstracted from charts for a frequency matched sample of FN and non-FN women diagnosed with breast cancer in 1995-2004. Odds ratios (OR) and hazard ratios (HR) were estimated using logistic regression and Cox modelling, respectively, adjusted for age and other relevant factors.
Results: Age-adjusted breast cancer survival was significantly poorer in FN women (HR=1.6, 95%CI: 1.24-1.99). FN women were significantly more likely to be diagnosed at stages II+ (OR=1.55, 95%CI: 1.16-2.08), to live >100 km from a cancer centre, to be obese, to have ever smoked and to have at least one comorbidity (OR=2.48, 95%CI: 1.60-3.86). FN status was significantly associated with stage I survival (HR=3.1, 95%CI: 1.39-6.88) but not higher stage survival. Comorbidity was the other significant predictor of stage I survival.
Conclusions/Implications: We have demonstrated how surveillance data can lead to research and ultimately to identification of initiatives to drive change towards improved equity, such as those included in Cancer Care Ontario's second Aboriginal Cancer Strategy (ACSII), released in 2012. Ongoing surveillance is needed to monitor progress towards equity in cancer survival.

Notes

SECTION D - FUNDAMENTALS OF REGISTRY OPERATIONS

087

DATA ITEM CONSOLIDATION

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As the volume of cancer incidence records from various reporting sources continues increase it is critical that central registries begin to develop automated processes to consolidate the incoming data.

The purpose of the NAACCR Data Item Consolidation Work Group (DIWG) is to document consensus best practices for consolidating discrepant values from different reporting sources into a single best value for analysis purposes in the central cancer registry. Where consensus is not possible, the DIWG will document different practices that are used.

During this session we will help central registry staff understand the questions that need to be answered as they develop their system for data consolidation. We will also discuss consolidation guidelines for coding demographic, tumor, stage, and treatment data items.

Notes

088

HIRING CENTRAL CANCER REGISTRY STAFF – GETTING THE RIGHT PERSON IN THE RIGHT JOB

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Background: In 2003, the Illinois State Cancer Registry (ISCR) began exploring the possibility of creating a job title and career track or special option on an existing state job title for positions in the registry that require a certified tumor registrar designation. At the time, positions were filled based on seniority and no titles represented the specific job knowledge required by the central cancer registry. This situation lead to difficulty in hiring qualified personnel.
Purpose: The creation of a certified tumor registrar job title series which would ensure the ability to hire and retain certified tumor registrars (CTR).
Approach: Central Management Services (CMS) governs the hiring and management of positions for most state agencies and uses generic job titles across multiple agencies. ISCR met with CMS staff to create a specific job series that would do two things: 1) ensure that only CTR or CTR-eligible applicants qualify for registry positions and 2) provide a career path for cancer registry staff. The process required that CMS be educated about CTR eligibility rules and about the operation of central cancer registries. New job titles and corresponding position descriptions were developed and approved by CMS and the state Labor Relations Board.
Results: In the spring of 2013, ISCR received approval for a new job title series within the Illinois Central Management Services hiring system designed specifically to reflect the specialized and professional work of cancer registrars. Existing registry staffs were grandfathered into the new job titles. Vacant positions can now be filled from a pool of qualified CTR or CTR-eligible staff and existing registry staff can be promoted as new opportunities develop.
Conclusions: ISCR now has the ability to reach qualified candidates and anticipates fewer hiring issues when positions become vacant. This approach may be valuable to other state cancer registries that operate under a state government situation.

Notes

089

SEER*EDUCATE — LEARN BY DOING

M Potts[1], J Hafterson[1]
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SEER*Educate is a web-based training, assessment, and intervention program, which evolved from the Seattle SEER registry's earlier training programs that promoted greater understanding of coding guidelines and consistency of applying those guidelines by the entire Seattle staff. The goal of the Seattle registry was to produce a training program that simulated the extensive on-the-job training that most, if not all, registries can no longer afford.

In May 2013, NCI-SEER became the financial sponsor such that the Seattle training program could be upgraded for national release as SEER*Educate. Enhancements were made to the software to facilitate ease of use. The training content was reviewed to ensure that rationales all reflected national guidelines with no Seattle-specific interpretations.

SEER*Educate went live on October 1st, 2013 with 295 case scenarios for coding the tumor characteristics, CSv02.04, and first course treatment. A rationale was written for every data item on every case, resulting in 19,950 rationales. Since then, the additional content of 160 cases scenarios for training on CSv02.05 and 35 case scenarios for training on the Hematopoietic rules have been added.

In additional to the practical application coding exercises, tests covering medical terminology, CoC Cancer Program standards, computers, and statistics were also released to address the needs of people preparing for the CTR exam and for new hires to central and hospital registries.

Notes

090

STANDARDIZING VISUAL EDITING IN A DECENTRALIZED CANCER REGISTRY: MUTING 50 SHADES OF VISUAL EDITING

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The Cancer Registry of Greater California (CRGC) service area is expansive including 48 of California's 58 counties and about 93% of the land area in California. Annually, about 99,500 new cancer cases are diagnosed. The California Cancer Registry Visual Editing Standards were adopted in 2000 and requiring visual editing of 13 core data items. These core data items represent the essential data items necessary for standard epidemiological studies. Currently, 20% or approximately 22,500 of 112,000 case reports are visually edited.

The structure of the CRGC includes four regional registry offices whose responsibility includes visual editing. Standardizing visual editing practices among fourteen individuals that perform visual editing as part of their job responsibilities in four regional registries represents a challenge and an opportunity.The CRGC Quality Control and Visual Editing Committee meets once a month to discuss pertinent topics and issues. This committee formed a work group that was tasked with creating a standard reference tool for the thirteen core data items to be used by the visual editing staff throughout the CRGC. Each member was tasked with specific data items to define and reference according to the national standard setters.The work group also designed an easy to read user friendly table format for the guidelines that allows users to personalize and add notations and citations for individual use.

The result was a comprehensive Visual Editing Guidelines tool that was adopted by the CRGC Quality Control and Visual Editing Committee. These guide were distributed among the CRGC visual editors and posted on the CRGC web site as a reference for registrars and to assure registrars that visual editing is performed in standard practices. Additionally, this tool provides registrars with the visual editor's perspective when data it reviewed. The guidelines can also be used as an education and training tool for new visual editing staff and registrars.

Notes

091

DYNAMICALLY GENERATING STATISTICAL CANCER REPORTS EFFICIENTLY: GETTING THE BEST BANG FOR YOUR BUCK

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Background: Monitoring regional cancer rates is critical for strategic local and state planning and can provide a "report card" on the health of a community and insight into how well cancer prevention programs are working. However, with increasingly scarce monetary resources, producing local cancer reports on a regular basis can be challenging.
Purpose and Approach: As a small registry with restricted resources, we evaluated our process for producing cancer reports. We identified the barriers to creating reports regularly, examined available software tools, and documented methods to simplify and improve the process. Our goal was to develop best practices for creating effective and easily updateable cancer reports in a timely manner using limited resources.
Results: The National Cancer Institute has developed an abundant array of freely available software tools for analyzing cancer statistics. Utilizing these tools in conjunction with integrated Microsoft Office products resulted in significant long-term time savings. To demonstrate the streamlined process, we will highlight the most recent Cancer in Utah publication with a focus on geographic and trend data. SEER*Stat statistical software with SEER and CINA+ data was utilized. However, other analytic software could be used. Ultimately, the key to refining and streamlining the process was planning. With planning, fewer analytic sessions can be run to feed a central integrated data table. Creating the infrastructure required the largest investment of time. After the procedures and infrastructure are in place, updating annual cancer reports becomes a fast process.
Conclusion: With planning, cancer registries can reduce the resources required to generate cancer reports. Utilizing freely available tools and integrated software can result in significant time savings. Lessons learned from this experience may help other registries with limited resources improve their process of generating cancer reports.

Notes

092

EARLY AGE AND LATE STAGE DIAGNOSIS OF COLORECTAL CANCER AMONG AMERICAN INDIAN RESIDENTS OF MONTANA, 2001-2010

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Background: Montana (MT) is a frontier state with American Indians (MT AI) being the single largest non-white racial group in the state, accounting for 7% of the population. Colorectal cancer (CRC) is the third most frequently diagnosed cancer among AI and Whites in MT. CRC mortality can be reduced through universal CRC screening. In 2010, participation in CRC screening among MT adults was significantly lower among AI compared to Whites (41% and 57%; $P < 0.05$).
Purpose: This study describes CRC incidence among MT AI residents compared to MT White residents and U.S. American Indians and Alaska Natives (AI/AN).
Methods: Invasive colorectal cancers diagnosed from 2001 through 2010 in the MT Central Tumor Registry (MCTR) were analyzed by race (White or AI), age group (< 50, 50-64, ≥65), and stage at diagnosis (early [local] or late [regional and distant]). MT AI data were compared to the U.S. AI/AN with data from the National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) Program from 2000 through 2010.
Results: MT AI have significantly higher CRC age-adjusted incidence rates than MT Whites and SEER AI/AN (77.8/100,000, 44.8/100,000, 42.0/100,000, respectively). Late stage diagnosis was significantly greater among MT AI compared to MT Whites (65% compared to 56%; $P \leq 0.01$). The majority of MT AI cases were less than 65 years at diagnosis (57%) compared to MT White (34%). Late stage diagnosis in the 50-64 age group was significantly higher among MT AI compared to MT White and SEER AI/AN.
Conclusion: MT AI experienced CRC in younger age groups and at later stages of diagnosis compared to their MT White and SEER AI/AN counterparts. These data highlight the need for culturally appropriate population-based approaches to increase CRC screening in this population.

Notes

093

COLORECTAL CANCER INCIDENCE IN ABORIGINAL ONTARIANS: A CAUTIONARY ECOLOGIC TALE

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Past studies suggest that colorectal cancer incidence is increasing disproportionately in Ontario's Aboriginal populations. However, this disparity cannot be routinely monitored because the Ontario Cancer Registry does not collect information on race or ethnicity. This study aimed to use an ecologic approach to examine colorectal cancer incidence in Aboriginal Ontarians diagnosed in 1998-2009. Cases were assigned to census geographic areas with high (33% or greater) or low proportions of Aboriginal residents based on their postal code at diagnosis using the Postal Code Conversion File Plus (PCCF+). To account for potential misclassification by PCCF+'s population-weighted random assignment, cases assigned to Indian reserves for which confidence in the accuracy of assignment through postal codes is high were also identified. Compared with low-Aboriginal areas, colorectal cancer incidence was 43% higher for residents of high-Aboriginal areas (Rate Ratio [RR]=1.43, 95% Confidence Interval [CI]=1.30-1.56) and 14% higher for residents of confidently-assigned reserves (RR=1.14, 95% CI=0.98-1.31). When examined by age group (<60, 60-69, and 70+ years), significantly higher incidence rates were observed in high- compared with low-Aboriginal areas for all three age groups. However, only the youngest age group demonstrated significantly higher rates among residents of confidently-assigned reserves compared with residents of low-Aboriginal areas. These findings indicate that while there appears to be a disparity in colorectal cancer burden among Aboriginal Ontarians, some of the difference observed between high- and low-Aboriginal areas is due to differential misclassification by PCCF+. Care must be taken to ensure accurate geographic assignment of residence when area-level analyses are used to address the data gaps in Aboriginal health.

Notes

094

PREDICTORS OF DELAYS IN SEEKING MEDICAL HELP FOR RECTAL BLEEDING

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Objective: Although cancers are now detected earlier through screening and survival rates have improved, some people still delay going to the doctor. This study explores the predictors of anticipated delays in seeking medical help for rectal bleeding
Methods: The data presented here were collected as part of the International Cancer Benchmarking Partnership which examined the relationship between patterns of cancer awareness, beliefs and barriers to seeking help and differences in survival across 5 countries. 3926 Canadians aged 50+ responded to a telephone survey using the Awareness and Beliefs about Cancer measure Respondents were coded as "delaying seeking help" if they answered that they would seek help > 1 week after rectal bleeding appeared. Respondent characteristics (sex, age, education, experience with cancer), beliefs about cancer and barriers to seeking help were examined as possible predictors of delays in seeking help using log-binomial regression.
Results: Fifteen % of respondents indicated they would delay seeking help (DSH) for rectal bleeding. In a multi-variable model risk of DSH was related to the characteristics, age (younger more likely to delay, RR=2.0,p<0.001) and education (higher education less likely to delay, p<0.001). Positive beliefs "seeking help quickly increase survival" and "cancer patients can continue normal activities" were strongly related to decreased risk of DSH (RR=0.6,p<0.001 and RR=0.7,p=0.003 respectively), while barriers "too embarrassed" ("Sometimes", RR=1.5; "Often", RR=2.0,p<0.001) and "too busy to go to the doctor" ("Sometimes", RR=1.1; "Often", RR=1.4,p=0.02) were related to increased risk.
Conclusions: Age and education are strong predictors of DSH but are not modifiable. In contrast, perceiving that you are too busy to go to the doctor, having negative and erroneous beliefs about cancer, or being too embarrassed by a symptom to seek care are factors that can be addressed to potentially decrease DSH.

Notes

095

MULTIPLE CANCERS IN PROSTATE CANCER MEN: SEER DATA REVIEW

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Background: Men with conventional prostate cancer have a relative long term survival, resulting in a higher chance to develop other cancers. There is a need to analyze the epidemiologic features of these non-prostate malignancies and their impact on prostate and non-prostate cancer survival.
Materials and Methods: A total of 1,194,178 cancer records on 1,001,631 men with prostate cancer diagnosed since 1973 were retrieved from SEER 18 Research database (2012 November submission). After limiting men with conventional prostate cancer only (ICD-O-3 codes: 8140/3, 8147/3, 8260/3, 8290/3, 8480/3 and 8572/3) and excluding melanoma records, the final cohort contained 1,126,227 records on 944,304 men. Demographics and clinicopathological features were analyzed using Chi-test, and the non-prostate malignancies' impact on survival was analyzed using Cox regression.
Results: The overall ratio of prostate cancer over all cancers was 83.84% (944,304 prostate cancer men with 1,126,227 cancers). Among these men, the ratio of men with zero (prostate cancer only), one, two and more than two non-prostate malignancies is 83.5% (788,560 men), 14.2% (133,787), 2.0% (18,645) and 0.4% (3,312). Among all non-prostate malignancies, the common coexisting ones are bladder cancer (20.3%), lung cancer (13.9%), kidney cancer and colon cancer (sigmoid, 4.8%). During the past decade, coexisting lung cancer increased 1.6 fold and kidney cancer 1.2 fold. The number of non-prostate malignancies, grade, race, and tumor stage are independent variables impacting patient survival.
Conclusions: Men with prostate cancer have a high chance to develop other cancers. The number of cancer significantly impacts patient survival, indicating the need to include coexisting cancers when conducting prostate cancer survival analysis. The result also implicates a need to evaluate whether an intrinsic association of prostate cancer management with the development of other malignancies exists.

Notes

NOTES

SECTION A - COSTS OF OPERATING A CENTRAL CANCER REGISTRY

096

COSTS OF OPERATING A CENTRAL CANCER REGISTRY AND FACTORS AFFECTING COST: FINDINGS FROM AN ECONOMIC EVALUATION OF CDC'S NATIONAL PROGRAM OF CANCER REGISTRIES

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Background: The Centers for Disease Control and Prevention (CDC) initiated an economic evaluation of the National Program of Cancer Registries (NPCR) to assess the cost associated with registry operations and identify factors that impact cost of collecting and reporting data. A comprehensive economic assessment of the registry operations provides both CDC and the registries with better tools to improve efficiency and make resource allocation decisions to meet Program priorities.
Purpose: 1) To estimate the cost of operating cancer registries and 2) to assess the factors affecting the cost per case reported by NPCR-funded central cancer registries.
Methods: We collected three years (FY09-FY11) of data from each NPCR-funded registry on all actual expenditures on registry activities and factors affecting registry operations. After pilot testing, a web-based cost assessment tool was deployed to collect data from Central Cancer Registries (CCR) in 45 states, the District of Columbia, Puerto Rico, and the U.S. Pacific Island Jurisdictions. We adjusted cost per case for regional cost of living using the Employment Cost Index prior to estimating the model. We estimate a random effects model to analyze the impact of various factors on cost per cancer case reported.
Results: The average cost of operating a NPCR-funded CCR and of reporting a cancer case varied substantially across the programs. Registries that receive high quality data (as measured by the percentage of records passing automatic edits) and those who have large volumes have significantly lower cost per case. The volume of cases reported by far has the largest impact indicating that the cost per case significantly decreases as the number of cancer cases reported increases.
Conclusion: The study findings on cost of operating CCR and factors that impact cost will allow CDC and the registries to better understand the potential opportunities for cost savings and efficiency improvements.

Notes

097

COST PER EPISODE OF CARE OF NON-MELANOMA SKIN CANCER IN SASKATCHEWAN: A DESCRIPTIVE ANALYSIS

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Background: The most common type of cancer in North America is Non-melanoma skin cancer, a preventable condition due to its association to ultraviolet exposure. The main NMSC forms are Basal-cell carcinoma (BCC) and Squamous-cell carcinoma (SCC) which account for half of all diagnosed cancer cases in Canada. With a projected incidence of 130,000 cases by 2030, it becomes increasingly important to estimate the economic burden of NMSC. Cancer registries do not routinely track NMSC cases, which limits the assessment of its treatment cost. As the Saskatchewan Cancer registry (SCR) has a high degree of NMSC case ascertainment, there is an opportunity to estimate its economic burden in the province using billing data from the Ministry of Health held at the Health Quality Council (HQC).
Purpose: To describe service utilization and calculate direct costs per episode of care for BCC and SCC cases diagnosed in SCR between 2004 and 2008.
Methods: Patients with NMSC diagnosis between 2004 and 2008 were identified within the Saskatchewan Cancer Registry, retrieving a total of 13,506 cases. Information related to cancer type (BCC and SCC) and demographic characteristics were used for descriptive analysis. Related costs were obtained by linking the SCR file with the physician fee-for-service information data file from HQC. Direct cost per episode of care will be calculated separately for BCC and SCC cases, along with total costs per treatment within the five year period. Billing claims will be tracked one year after diagnosis.
Implications: This is the first study describing the cost per episode of care for NMSC in Canada using retrospective data, providing valuable insight about service utilization. This information will serve as a benchmark for evaluating the effectiveness of provincial skin cancer prevention initiatives and contribute for a better understanding about the economic burden of NMSC.

Notes

NOTES

A3

CANCER REGISTRATION IN LOW- AND MIDDLE-INCOME COUNTRIES: A COST STUDY IN KENYA

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Background: With an estimated 14.1 million new cancer cases and 8.2 million deaths from cancer worldwide in 2012, cancer is a leading cause of illnesses and early death globally with about 6% of cases and 7% of global deaths occurring in Africa. Successful national cancer control plans are grounded on high-quality cancer registry data. Building upon the African Cancer Registry Network efforts, we engaged global stakeholders to identify and quantify the resources needed to strengthen and expand existing registries or establish new registries where none exist to support the successful collection of high-quality cancer data.
Methods: Working with an in-country consultant, we conducted site visits to understand the data collection infrastructure and types of activities performed by cancer registries in Kenya. A cost data collection tool developed for use in the U.S. was adapted and pilot-tested with registries in Nairobi and Eldoret. Using data reported by the registries, we analyzed the resources needed to operate a cancer registry in Kenya.
Results: Preliminary analyses find that the majority of resources (62% in Nairobi) devoted to cancer registration are provided in-kind. Cost per case reported in Nairobi is $7.68 ($20.39 with in-kind). More than 80% of registry resources are expended on core activities, with more than half on data collection activities, including data entry and case finding.
Conclusions: As part of a global effort, the findings from this economic assessment will define a framework for systematically collecting activity-based resource and cost data from cancer registries. This will allow for the estimation of the costs of establishing and maintaining cancer registries in varying circumstances, so that high-quality data can continually be included in the components of national cancer plans.

Notes

A4

ECONOMIC EVALUATION OF CANCER REGISTRATION IN EUROPE

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Background: Costs of cancer registration has been little investigated, and no standard indicators have been identified yet. In our knowledge, the only study on this matter published in literature has been conducted by the US Registry. Our work aims to analyse costs and outcomes of a sample of 18 European registries, covering a population of 58.9 million inhabitants.
Methods: Data on real costs of a cancer registry (concerning personnel, IT, infrastructure…) have been collected through a questionnaire. We grouped staff costs by professional position and by activity performed. Publications in peer-reviewed journals (last five-years impact factor), and characteristics of the registries' websites have been considered as outcomes.
Results: In our sample, the average cost per inhabitant due to cancer registration was 0.27€ at Purchasing Power Standard PPS (range 0.03€ PPS-0.97€ PPS), while the mean cost per case registered was 50.71€ PPS (range 6€ PPS-213€ PPS). Costs appeared strongly associated to the type of organization (regional or national) and the Gross Domestic Product (GDP) per capita of the country, whilst registry length of operation seemed not to affect costs. Cost for personnel took on average 79% of total resources. Resources spent in routine activities (on average 51%, range 28% - 87%) were predominant on those allocated to research, with few exceptions. Last five year impact factor seemed associated with expenditure in research, while quality of websites appeared independent from total budget of registries.
Conclusions: The type of registry, the size of population covered, and the national economic profile of the country are the principal factors affecting costs in cancer registration in Europe. Two indicators are proposed: the cost per case (directly comparable with the costs for diagnosing and treating a case) and the cost per inhabitants (as a proxy of the amount the taxpayers spend for this service).

Notes

B1

BREAST AND CERVICAL CANCER INCIDENCE AND MORTALITY IN MONGOLIA

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Background: The aim of this study was to determine ASR and ASMRs of breast and cervical cancers in Mongolia from 2006 to 2010 for comparing the results to data from other countries.
Methods: Data on new breast and cervical cancer cases diagnosed in 2006-2010 in permanent residents of Mongolia, collected by cancer registry of the National Cancer Center, were used for the analysis. Incidence and mortality rates were calculated as mean annual numbers per 100,000 female residents. ASRs and ASMRs were calculated by the direct method from age-specific incidence and mortality rates, weighted to the World Population standard.
Results: 464 breast cancer (BC) cases and 1,617 cervical cancer (CC) cases were included. Mean annual age-specific incidence rates of BCs were increased with age ascending from 25 years old (0.6 per 100,000 population) up to 55 years old (27.2), and decreased further with older ages. Mean annual crude rates was 6.8, and ASR was 7.7 per 100,000. Mean annual age-specific incidence rates of CCs increased with age, ascending from 25 years old (6.8 per 100,000) up to 55 years old, (81.5), and decreased further with older ages. Mean annual crude rate was 23.8, and ASR was 26.6 per 100,000. 540 women died from CC, and 182 died from BC.
Conclusions: ASR of breast and cervical cancers are increased, whereas ASMR and ASR ratio and the ASMRs are decreased compared with the previous data of Mongolia, published in Globocan 2002. Particularly, ASR of breast cancer is significantly low, whereas ASR of cervical cancer is definitely high compared with average of South-Eastern Asian countries (breast cancers ASR 31.0, cervical cancers ASR 15.8) data described in Globocan 2008. The study results strengthen the reliability of cancer registry, enable the evaluation of cancer control and offer international benchmarking opportunities.

Notes

B2

FACTORS INFLUENCING TIME BETWEEN BREAST CANCER SURGERY AND RADIOTHERAPY: A POPULATION-BASED STUDY

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Background: The quality of breast cancer care in the Netherlands is assessed through the NABON-breast-cancer-audit. The interval between surgery and start of radiotherapy (RT) is defined as one of the quality indicators with a norm of 42 days. This study aims to describe the variation in this interval and to assess influencing factors on patient, hospital and radiotherapy center (RTC) level.
Methods: All female breast cancer patients diagnosed between 2009 and 2011, who underwent breast conserving surgery or mastectomy directly followed by RT were selected from the population-based Netherlands Cancer Registry. Time interval was defined as the number of days between the last therapeutic surgery and start of RT and was dichotomized at 42 days. Multilevel logistic regression was performed to analyze the influence of various factors on patient, hospital and RTC level on the interval between surgery and RT.
Results: In total, 15,961 patients from 79 hospitals and 19 RTCs were included in the study. The median time between surgery and RT was 38 days. 66% of the patients received RT within 42 days and 95% within 63 days. The percentage of patients starting RT within 42 days varied between hospitals from 14% to 94%. Besides influencing factors on patient level (higher age, co-morbidity, advanced stage, mastectomy), the lack of on-site RT facilities for hospitals was significantly related to receiving RT >42 days after surgery (OR 0.64, p=0.024). Adding these factors into the full model, significant differences due to unmeasured factors remained between RTCs (11.1%) and hospitals (6.4%).
Conclusions: The differences of hospital and RTC level show the potential for improvement on these levels. The positive influence of on-site RT facilities and the variation between referring hospitals within one RTC indicate the importance of a good relationship between hospitals and RTCs.

Notes

B3

EXPLANATORY FACTORS FOR VARIATION IN THE TYPE OF SURGERY IN EARLY STAGE BREAST CANCER

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Background: Mastectomy and breast conserving surgery (BCS) with radiotherapy are both considered safe treatment options for early-stage breast cancer, and BCS rates have increased over the years. However, improved diagnostic and treatment options might have influenced the type of surgery. We explored trends in time in the use of BCS and mastectomy among women diagnosed with early-stage breast cancer and to determine which patient and tumour characteristics influenced the decision for BCS or mastectomy.
Methods: Patients diagnosed with first primary cT1-2,anyN,M0 breast cancer between 1993-2012 were selected from the population-based Netherlands Cancer Registry. Trends in the use of BCS were analysed by age group (<40, 40-49, 50-69, 70+). Multivariable logistic regression analysis was used to study factors that were associated with the use of BCS as compared to mastectomy.
Results: In total 157,416 patients were included; 59% underwent BCS. The estimated annual percentage change (EAPC) of BCS was minus1.8% for women <40 years of age. The EAPC was plus 0.8%, 1.8% and 4.9% for women aged 40-49, 50-69, 70+, respectively. In multivariable analyses BCS was significantly associated with the following factors: age 40-69, clinically small tumours (≤2cm), no clinically involved lymph nodes, well differentiated tumours, ductal subtype, HER2 negative tumours, unifocality, neo-adjuvant treatment, high socio-economic status, more recent time of diagnosis, treatment in a teaching or academic hospital or an intermediate volume hospital. Large differences were seen between regions.
Conclusions: The use of BCS increased over time for most age groups, a decrease in the use of BCS was seen for women <40. Favourable tumour characteristics were associated with BCS, but conflicting combinations of characteristics do exist. As BCS and mastectomy are both considered safe treatment options, shared decision making is necessary to decide on the best option per patient, taking tumour characteristics into account.

Notes

B4

EVALUATION OF CLINICALLY-SIGNIFICANT FACTORS IN COLLABORATIVE STAGE FOR FEMALE BREAST CANCER, SEER 2010 DIAGNOSES

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Background: The National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) Program collects extent of disease (EOD) information under a joint project called the Collaborative Stage Data Collection System (CS) since 2004 (www.cancerstaging.org/cstage). In 2010, the system was expanded to collect other prognostic and clinically significant factors (SSF), which were suggested by AJCC 7th edition.
Methods: 2010 cases from 18 SEER population-based cancer registries were analyzed by the Data Release Working Group and others; DCO, autopsy, and some unstaged histology cases were excluded (<1% cases). Completeness and quality of detailed stage and site-specific factors (SSF) were examined for over 72,000 female breast cancers of which over 57,000 were invasive. Lab values were compared to test interpretation.
Results: Some of the SSFs evaluated for breast were nodes [IHC, MOL, number positive axillary]; HER2 [8 data items], ER, and PR. Calculation of the percentage known was based on honing in on the criteria where the test is applicable. For nodes, the number of positive level I/II axillary nodes was known but the IHC and especially MOL studies were performed infrequently, <50% and 8%, respectively. ER and PR status were reported 95%. HER2 lab values were compared to their interpretation with varying agreements.
Conclusions: For breast, discrepancies between HER2 lab values and interpretation of the test were possibly caused by the combination of data from different labs which used different test standards/assays. Changing definitions for borderline FISH test was also a problem. Additional sites besides breast cancer were analyzed to make informed decisions regarding future collection of SSFs. Analyses of SEER required SSFs for many cancers will appear in a 2014 journal supplement.

Notes

C1

THE RISE OF CERVICAL CANCER IN PUERTO RICO; ARE POLICIES EFFECTIVE?

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Background: The Puerto Rico Central Cancer Registry (PRCCR) has an important role in monitoring the burden of cancer and evaluating the impact of cancer control intervention. Cervical cancer remains one of the most common cancers worldwide, including Puerto Rico (PR). The purpose of this study is to analyze the incidence trends for invasive cervical cancer in PR by histology and age.
Methods: Cervical cancer data from 1987-2011 were obtained from the PRCCR database. Data was analyzed by histology (Squamous cell carcinoma (SCC) and adenocarcinomas) and age. A Joinpoint regression model was used to determine changes in trends.
Results: The Jjoinpoint model identified a significant change in the incidence trend of cervical cancer, showing a decrease on the incidence from 1987 to 2004 (APC of -2.11%, $p \leq 0.05$) and an increase on the incidence from 2004 to 2011 (APC of 4.47%, $p \leq 0.05$). SCC accounts for the 73.7% of all cases, while adenocarcinoma accounts for 16.5%. Similar to cervical cancers combined, the incidence trend of SCC showed a significant decrease from 1987 to 2004 (APC of -3.17%, $p \leq 0.05$) and a significant increase from 2004 to 2011 (APC of 6.05%, $p \leq 0.05$); whereas, the incidence of adenocarcinoma significantly increased (APC of 1.70%, $p \leq 0.05$) between 1987 and 2011. For SCC the increase observed since 2004 was greatest in women aged 15-29 years (APC= 18.79%, $p \leq 0.05$), and 30-44 years (APC=10.81%, $p \leq 0.05$). For adenocarcinomas, the major increase was among women 30-44 years (APC=2.89%, $p \leq 0.05$). Incidence continues to decrease among women aged $^{3}60$.
Conclusions: Despite current prevention and control strategies in PR, cervical cancer incidence has been increasing since 2004. Results must be interpreted with caution due the possible impact of the improvement of the PRCCR case-finding. Also, additional studies evaluating the causes of these changes in trends are warranted. Findings from this study should inform cancer control planners.

C2

INCIDENCE AND MIGRATION FOR TUMOURS IN CHILDREN UNDER 15 YEARS: NEUQUÉN PROVINCE 2003-2008

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Background: A solid health care public system is presented in Neuquén. An extensive network of health care facilities working under a regional, interrelated and hierarchical framework. The private health sector is mainly distributed in the provincial Capital. Cancer patients (including pediatric) are assisted by specialized teams in a Dr. Eduardo Castro Rendón Hospital and in two private centers. Neuquén Cancer Registry is population based and covers the whole province (551,266 inhab.). Representing 1.4% of Argentina's population, those under 15 years represents 26.6% (9.4% between 15-19 years).
Methods: A descriptive study about children under 15 years between 2003-2008. Population data were supplied by the National Institute of Statistics and Census and mortality was provided by Vital Statistics of the Secretariat of Health of the province.
Results: In the period 2003-2008, the Neuquén Cancer Registry reported 124 children under 15 years. This means an annual incidence of about 135.7 cases per 1,000,000 in this age group. In Neuquén, the treatment of pediatric cancer patients is centralized in the metropolitan area. Given the complexity of treatment 27% of children migrate to CABA by referral to more complex services.
Conclusions: The migration depends on the complexity of the disease and/or treatment. It is expected that the proportion of children who migrate are for transplant bone marrow, or even with advanced disease and that they be referred to other more complex centers to improve their chances of survival and/or minimize damages. Factors such as health coverage, the socio-cultural level and clinical status also influence the possibility of families' migration. The analysis is an approach to the reality of the province and helps identify determinant factors to join efforts and teamwork to improve the care quality for Neuquén children.

Notes

C3

"RISING BURDEN OF TOBACCO-RELATED CANCERS": A CAUSE OF CONCERN IN THE CITY OF BHOPAL, INDIA

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Background: The National Cancer Registry Programme (NCRP) of India has a network of 29 Population-Based Cancer Registries located across the country. There is a significant difference in the proportion of tobacco-related cancers (TRC) as reported by these registries. Sites of cancer that have a strong association with the use of tobacco are cancer of lip, tongue, mouth, oropharynx, hypopharynx, oesophagus, larynx, lung and urinary bladder. The incidence and relative proportion of specific sites of cancer associated with the use of tobacco varies according to the manner in which the tobacco is consumed in the population. Bhopal registry also functions under the umbrella of NCRP. The proportion of TRC as reported by the registry in the year 2011 accounts for more than 50% of the total cancers among males and 17% among females. The registry also records the highest incidence of tongue cancer among males in the world.
Methods: An attempt was made to evaluate the changes in the incidence of TRC in the population of Bhopal over the period 1992 to 2011.
Results: In the year 2011 the leading sites of TRCs among males were mouth (12.5%), lung (10.5%), tongue (9.3%) and larynx (5.8%), and among females mouth (5.6%), oesophagus (5.1%) and lung (3.8%). A significant rising trend was observed in cancers of the mouth and larynx among males, and cancers of the mouth and oesophagus among females. High prevalence of tobacco chewing in the population underlines the rising trend of these cancers with a shift towards younger ages.
Conclusions: The rising trend of tobacco-related cancers is a cause of concern. As demonstrated by the developed countries, restriction on tobacco usage can be an effective step for cancer prevention in the region. Thus a government ban on tobacco chewingis a significant move towards a cancer control programme.

Notes

Notes

D1

SPATIAL PATTERNS IN THE CHANGE OF CANCER INCIDENCE IN BELGIUM

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Background: Changes over time can be visualised by creating cancer maps for subsequent incidence years. However, such visualisations do not show differences in the rate of change. Therefore, the Belgian Cancer Registry created maps representing the estimated annual percentage change (EAPC).
Methods: The smoothing methodology developed by the Finnish Cancer Registry was adjusted to the Belgian situation. The small areas (municipalities) may have years with zero incidence, for which EAPC cannot be calculated. Our algorithm calculates EAPC from smoothed annual WSR values instead of using municipality specific EAPC-values. EAPC-maps for the period 2004-2011 were created for several cancer sites with marked change in incidence rates.
Results: Incidence of prostate cancer in the coastal region remained stable while the rates decreased in the remaining part of Belgium. Incidence of thyroid cancer is twofold higher in the south, but the difference is diminishing because of two to three times more rapid increase in the north of Belgium. Cervical cancer incidence decreased strongly in most of the cities while it is increasing in the most affluent part of the capital (Brussels). That part of Brussels also showed the strongest increase in head and neck cancer, but a decrease in female lung cancer (in contrast to a steep increase in the other areas in Belgium).
Conclusions: EAPC-maps are an interesting addition to common cancer incidence and mortality maps. They can be used, e.g. in the context of primary prevention to increase awareness for the public, authorities and health care professionals in specific subpopulations.

Notes

D2

CANCER PREVALENCE IN JAPAN FROM 2008 TO 2029

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Background: The objectives of this study were to update the cancer prevalence by using the latest incidence and survival in Japan, and to make a prediction to the year 2029 to find the impact on the health care and cancer control in the country.
Methods: For 25 cancer sites, 5-year cancer prevalence was observed, based on the incidence (2008) and survival (2003-5) from the MCIJ project. Prediction of cancer incidence was done according to Poisson regression model, by age, period and cohort.
Results: In 2008, 5-year prevalence for all cancers was 1,220,000, corresponding to 1.96 % of the population in men and 958,300 (1.46%) in women. Prevalence of stomach cancer was highest (21.8% of all cancer sites) in men, followed by colo-rectum (18.6%) and prostate (16.0%). Breast was the leading site in women (25.2%) followed by colo-rectum (16.8%) and stomach (12.5%). According to the estimation of future incidence, the prevalence in men increased steadily till the period 2020-2024, then it was expected to take a downward turn. The prevalence in women continued to increase through the estimation period; however the increase slowed after the period 2015-2019. This is mostly due to a decrease of stomach and colo-rectum cancer patients in men, and liver and gallbladder cancer patients for both sexes. An increase was evident for specific cancers, e.g. prostate, in men and corpus uteri in women. For all cancers combined, the proportions of elderly cancer patients (75 yrs and over) were 31.2% in men and 29.2% in women in 2008, and exceeded 40% for both sexes in 2029.
Conclusions: Cancer prevalence in Japan increases rapidly for a decade in proportion as the population ages. The high proportion of elderly patients suggests the urgent need of securing health-care resources in the country, especially because additional cares for the co-morbidity are required.

Notes

D3

PREDICTING CANCER INCIDENCE IN THE NORTH OF PORTUGAL FOR THE YEARS 2013, 2015 AND 2020

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Background: Predicting cancer incidence is of paramount importance in defining priorities for cancer prevention, management and treatment. This study aimed to estimate the number of incident cases in Northern Portugal for 2013, 2015 and 2020, for all cancers except non-melanoma skin and the 15 most frequent tumors.
Methods: Cancer cases diagnosed in 1994-2008 were collected by the North Region Cancer Registry of Portugal (RORENO). Population figures for the same period were obtained from Statistics Portugal. JoinPoint regression analyses were used to detect significant changes in incidence trends. Population projections until 2020 were derived by RORENO. Cancer incidence predictions were performed using Poisson regression models proposed by Dyba and Hakulinen.
Results: For all cancers except non-melanoma skin, the number of cases is expected to increase by 19% in 2013 and by 27% in 2015, as compared to 2008, with lower increments among men than women. For most cancers considered (cervix was the only exception), the number of cases will keep rising up to 2020, although decreasing trends of standardized rates are expected for some tumors. No changes are foreseen in ranking the 5 most frequent tumors until 2015. However, in 2020 male gastric cancer will become less frequent than bladder and rectum and, among women, corpus uteri will replace rectum as the 5th most common cancer.
Conclusions: For most cancer sites, predicting cancer incidence up to 2020 yielded reasonable results. However, since Poisson regression models are mainly recommended for short-term projections, results obtained for 2020 should be interpreted with caution. Furthermore, cancer incidence trends may be affected by numerous factors (e.g., demographic changes, variations in exposure to risk factors), which should be taken into consideration. This is the first study in Portugal on cancer incidence predictions and it contributes to a broader understanding of cancer burden in the north region.

Notes

D4

STATISTICAL CURE OF COLORECTAL CANCER PATIENTS IN URBAN VS RURAL AREAS IN THE NORTH REGION OF PORTUGAL

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Background: Cure models allow the simultaneous estimation of the cure proportion and the survival distribution of the uncured, providing a better understanding of differences in cancer survival by socioeconomic group compared with standard relative survival models. The aim of this study was to estimate cure proportions and median survival time of the uncured for colorectal cancer patients diagnosed in the North Region of Portugal.
Methods: All malignant colorectal cancer patients, registered by the North Region Cancer Registry of Portugal (RORENO), with residence at diagnosis in its area of influence, diagnosed in the period 2000 to 2002, aged 15 years or older, were considered for analysis (n=4368). Patients' residence was classified in rural or urban according to the definition of the Statistics Portugal. The proportion of statistically cured patients and the median survival time among the uncured patients was estimated using flexible parametric survival models.
Results: The proportion of cured patients aged less than 75 years was similar in rural and urban patients (53.2% and 55.8%; p=0.450). In older patients (75 years), the proportion cured was significantly higher in urban patients (47.0%) when compared to rural ones (35.5%; p=0.016). Within each age group, the median survival time of the uncured was similar in both types of areas (rural/urban <75: 18.8/19.2 months; rural/urban <75: 7.9/9.2 months).
Conclusions: The proportion of cure in patients living in rural areas was significantly lower than in patients living in urban areas, but only for patients aged 75 years or older. These results suggest that a lower access to diagnosis and treatment in rural areas is limited to older patients.

Notes

SECTION E - IMPROVING DATA QUALITY

E1

AUTOMATED DATA CAPTURING FOR EARLY FINALIZATION OF DATA AN EXPERIENCE OF CANCER REGISTRY: BHOPAL, INDIA

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Background: Bhopal Cancer Registry operates under the National Cancer Registry Programme (NCRP) of India. Registration of cancer cases is done by an active follow-up method. Cancer registrars visit the sources of registration to collect information from the medical records and by interviewing the patients or relatives. Captured information is scrutinized to ascertain the quality and completeness of data, which is then transferred to NCRP using standardized software developed by NCRP. With a growing population and an increasing number of cancer care centers, manual data collection has become time consuming, requiring a lot of manpower.
Methods: To achieve timeliness in data collection and reduction in manpower, the registry started pursuing utilization of the electronic health information of hospitals and cancer care centers to explore an automated data collection process. The electronic data sets were examined to make sure the availability of the information required by the registry. Training on cancer registration and the importance of data completeness was imparted to the persons handling the electronic data sets. Data was transferred periodically from these sources to the registry. Using a computer algorithm the data received was checked for completeness of information, screened for range and consistency errors and was then transferred to the NCRP software. The changes brought timeliness to data collection, but at the same time raised questions about the quality of the data.
Results: Comparison of the two processes revealed that by using the automated system for capturing the data, completeness of records and the quality of data improved significantly with reduction in time taken for finalization of data from 24 to 12 months.
Conclusions: Ensuring totality in electronic data sets, training of medical record personnel and rule-based processing of electronic data have resulted in timeliness of data finalization, and a reduction in manpower requirements with significant improvement in data quality.

Notes

E2

IMPROVING THE COMPARABILITY AND QUALITY OF DATA OF CANCER REGISTRIES IN IARC REGIONAL HUB - MUMBAI REGION

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Background: The IARC Regional Hub at Mumbai was established in 2011 as a part of the Global Initiative for Cancer Registry Development in Low and Middle Income Countries. One of the aims of IARC regional hubs is to develop methodology to improve the quality and comparability of data in the Hub regions.
Methods: The IARC Regional Hub at Mumbai developed a questionnaire to compare the variables collected by cancer registries and to understand the similarities and differences in cancer registry operation in different regions. This is the first step to assess the extent of problems and preparing guidelines and recommendations for registry operation in developing countries. The next step is to quantify the impact of differences on incidence and mortality rates. The hub is designing the study to assess the completeness of registration.
Results: The results of questionnaires distributed in India and Thailand indicate that registries do collect information on minimum variables required to assess cancer burden. There are, however, differences of methodology in collection of these variables.
The main differences include case-finding procedures, number and type of data sources, practices in handling missing/uncertain information on residential status, date of diagnosis of malignancy and search for duplicate procedures.
Conclusions: The hub aims to interact with registries in the region to prepare guidelines, streamlining data entry and quality checks procedures using CANREG-5 and by preparing common formats for cancer registry report preparation.

Notes

SECTION E - IMPROVING DATA QUALITY

E3

GUIDELINES FOR A CANCER REGISTRY PROCEDURE MANUAL: A CONTRIBUTION FROM REDEPICAN TO GICR

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[1]REDEPICAN; [2]IARC

Background: REDEPICAN (Red Iberoamericana de Epidemiología y Sistemas de Información en Cáncer) and the Global Initiative for Cancer Registry Development (GICR) are collaborating to improve the organization and data quality of cancer registries. REDEPICAN was launched in 2007 within the CYTED Programme for Science, Technology and Development. It is a network of 12 working groups focusing on Epidemiology and Cancer Information Systems in Latin America and Spain, which has among its main objectives the development of methodologies to support cancer registries.
Methods: The Procedure Manual is one of the most important technical documents for cancer registries; however it is not uncommon for some registries to operate without written standardized procedures and defined activities. Based on the experience of REDEPICAN working group members and published literature by international and national organizations, we designed guidelines to assist cancer registries draft their own Cancer Registry Procedure Manual (CRPM). The CRPM is also used by REDEPICAN as standard criteria in the evaluation of cancer registries.
Results: The CRPM covers a registry's most important organizational and operational aspects such as: general characteristics of a registry, geographic coverage, definition of variables, data collection and processing procedures, coding, quality control and indicators, confidentiality, reporting, and legislation. The Guidelines were pilot tested in Panama and Uruguay and are adapted to Latin America cancer registries.
Conclusions: A Regional Network Hub started operating in January 2014 to implement the GICR strategy in Latin America. REDEPICAN is putting the CRPM guidelines at the disposal of GICR to promote a standardized approach to the development of cancer registries in the region. The CRPM will be presented at the IACR conference.

Notes

E4

CAN INPATIENT DATA BE USED TO IMPROVE MELANOMA CASE COMPLETENESS?

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Background: Because cases of melanoma are usually treated in a non-hospital setting, they are under-reported to central cancer registries. We hypothesized that it is possible to create a melanoma case for the registry from state-wide outpatient encounter data.
Methods: We searched nine million 2011 encounter records in the Texas Outpatient Surgical and Radiological Procedure Data (a state-wide database) for melanoma ICD-9-CM diagnosis codes (172.xx) as the principal diagnosis. We used probabilistic linkage (LinkPlus) to link melanoma encounter records with 2,928 2011 melanoma cases in Texas Cancer Registry (TCR) data.
Results: After de-duplicating melanoma encounter records on the person level, 5,676 patients with melanoma were identified in 2011 outpatient data. 1,869 of these were present in 2011 registry data (i.e. 64% of 2011 registry cases also existed in outpatient data), but the remaining cases were not. The outpatient data contain patient demographics that are typically reported to the registry for all cancer cases (name, address, county, birthdate, social security and medical record numbers, race, ethnicity, primary payer, surgical treatment codes). However they don't contain date of diagnosis, laterality, specific histology, or stage at diagnosis. Followback to the hospital to confirm the cases and obtain these data is possible because outpatient data contain hospital name and address. We will consider using year and month of service date as a proxy for diagnosis date, and selected procedures as a proxy for diagnostic confirmation. We will describe our findings in detail, along with procedures we have developed for incorporating these cases into our data.
Conclusions: Outpatient melanoma cases not already present in TCR represent potentially missed cases. We anticipate being able to add these cases to the registry in a fashion similar to the way death-certificate-only cases are handled, including followback to the outpatient facilities.

Notes

SECTION E - IMPROVING DATA QUALITY

E5

THE GLOBAL INITIATIVE FOR CANCER REGISTRY DEVELOPMENT (GICR): IMPLEMENTATION IN LATIN AMERICA

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Background: The critical importance of cancer surveillance was recognized by the UN Political declaration on Noncommunicable diseases (2011). As part of the Global Monitoring Framework developed by the WHO in fulfilment of the "25 by 25" mortality target, countries are required to monitor cancer incidence by type. In Latin America and the Caribbean, over one million new cases and 600,000 deaths were estimated to occur in 2012. The Global Initiative for Cancer Registry Development (GICR), a multi-partner initiative led by IARC, was launched in 2011 with the aim to develop the capacity to produce reliable, high-quality information on the burden of cancer, with a special focus on less developed countries (http://gicr.iarc.fr).
Methods: The GICR strategy is implemented through Regional Hubs, IARC resource centres capable of supporting the establishment and functioning of population-based cancer registration (PBCR) within their regions. Regional Hubs provide technical, educational and advocacy support.
Results: The Regional Hub for Latin America was developed around a network concept, with a Coordinating Centre based at the Argentinean National Cancer Institute, and Contributing Centres providing specific expertise to the Hub. The Regional Hub became operational in January 2014. Initial activities include situation analyses, the development of targeted collaborations with regional stakeholders, the identification of Contributing Centres and the set up of a discussion forum to involve the cancer registration community in the identification and prioritization of activities.
Conclusions: The success of GICR will be measured by the increase in the number and quality of PBCR, and ultimately in national cancer control interventions guided by reliable data. The Latin American Regional Network Hub through its pooled expertise is well placed to facilitate this process in the region, for the benefit of cancer patients.

Notes

SECTION F - CANCER OUTCOMES

F1

CANCER IN PATIENTS PRESCRIBED ANTIPSYCHOTIC MEDICATIONS – DIFFERENCES AND OUTCOMES

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Background: Population estimates of cancer in patients with mental illness, their care pathway and outcomes are unknown in the UK. We explore cancer incidence, stage and survival in psychiatric patients compared to the general cancer population.
Methods: Data from the NI Cancer Registry (2009-2011) were linked to prescribing data and analysed by the following drug categories: 1. Anti-psychotic drugs (BNF code 4.2) 2. Hypnotics/ anxiolytic or anti-depressant drugs (BNF codes 4.1 & 4.3) but not anti-psychotic drugs. 3. None of the above. Patients aged >75 or prescribed drugs three months before diagnosis were excluded as antipsychotic medications are prescribed for palliation and dementia. Frequency distributions between different drug categories were compared using z- and Chi-square tests, while survival analysis used the Kaplan-Meier and Cox regression methods.
Results: Out of 20,426 patients, 7.6% (male: 7%, female: 9.4%) had a history of anti-psychotic drug prescriptions; 34.9% (male: 29.9%, female: 40.3%) had hypnotics or anxiolytics, 29.5% (male: 23.3%, female: 36.3%) had anti-depressants. 55.4% (male: 61.1%, female: 49.2% female) had no psychiatric drug record. Those prescribed antipsychotic medication were more likely to be from deprived areas and older. Oesophageal, stomach, liver, gallbladder, pancreas, lung, ovary and brain cancers made up a higher proportion of cancers among anti-psychotic drug patients compared to those without a history of mental health drugs, whereas melanoma, non-melanoma skin, breast, prostate, testicular, uterine cancers and leukaemias and lymphomas made up a lower proportion. Patients on anti-psychotic medication had later stage breast disease but a similar proporion diagnosed via breast screening. Breast and colorectal cancer survival was significantly lower than average for those on anti-psychotic drugs, which was partially but not completely accounted for when adjusted for stage.
Conclusions: Patients on antipsychotic medications which is a marker for psychiatric illness have more tobacco-related and brain cancer and less skin and screen detected cancers (breast and prostate). They have late stage of presentation and lower survival (breast and colorectal) despite lots of service contact. Awareness of cancer in psychiatric patients should be raised among relevant professionals
Acknowlegements: the N. Ireland Cancer Registry is funded by the Public Health Agency for N. Ireland

SECTION F - CANCER OUTCOMES

F2

ANALYSIS OF PROGNOSTIC FACTORS INFLUENCING SURVIVAL IN PATIENTS WITH GLIOBLASTOMA MULTIFORME (2000-2011)

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Background: Gliomas are a collection of tumors arising within the central nervous system divided into four grades. The most aggressive of the gliomas, grade 4 or Glioblastoma Multiforme (GBM) is also the most common. Many patients diagnosed with GBM die of the disease in less than a year and only a few have long term survival. Evaluating the prognostic factors that influence survival of GBM patients can provide insight into treatment modalities.
Purpose: To evaluate the survival of patients with GBM and analyze the prognostic factors influencing their survival.
Methods/Approach: Data on 393 GBM patients diagnosed from 2000 to 2011 was sourced retrospectively from the Saskatchewan Cancer Registry (SCR) and through chart abstraction. The SCR (est. 1932) is a repository of cancer data with excellent follow-up and completeness of case ascertainment. Cox's proportional hazards model will be used to examine the influence of age, sex and treatment modality (surgery, radiation therapy, chemotherapy) among others as prognostic factors in this analysis. The measures used in this analysis will be overall survival and progression-free survival.
Results: Median age was 67 and 63 years for female and male patients respectively. Overall median survival of patients was about fifty nine weeks. Progression free survival, overall survival and an evaluation of the factors influencing prognosis will also be presented.
Implications: This analysis will evaluate and attempt to identify the factors that influence GBM survival. Retrospective analyses rely on reliable data being collected with accurate follow-up in a cancer registry in order to identify patients and abstract further information from patient charts. In the future as the need for such analyses evolves, clinically relevant data fields may need to be integrated into cancer registries in order to conduct more effective analyses.

Notes

F3

PLANNING EXPANDED SCOPE PARAMEDICINE FOR PALLIATIVE CANCER PATIENTS USING POPULATION-BASED LINKED ADMINISTRATIVE DATA

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[1]Dalhousie University; [2]Emergency Health Services; [3]Cancer Care Nova Scotia; [4]Capital District Health Authority

Background: Emergency Health Services of Nova Scotia (NS), Canada, are developing a comprehensive Emergency Medical Service (EMS)-Palliative Care Collaboration. Paramedic practice will be expanded to provide at-home emergency care to better meet patient wishes and reduce the transport of palliative patients to the Emergency Department (ED). The objective of this analysis was to utilize linked administrative data to provide a population-based estimate of palliative cancer patients that may benefit from this innovative program.
Methods: Data from three district palliative care programs (PCP) and three provincial disease programs (cancer, cardiovascular, diabetes) were linked to study subjects retrospectively defined from death certificates.
Results: Between 1995 and 2009 there were 121,458 deaths in NS, of which 32.2% had cancer listed as a cause of death. 70% of cancer patients died in hospital, 8.9% in a nursing home, and 21.1% at home. Over 10% of all cancer deaths were nursing home residents. Average age at death was 72.1 years with males accounting for 53.6% of cancer deaths. The mean number of death causes listed on the death certificate was 2.47. Among cancer decedents, 11.6% also had a cardiovascular cause, 7.9% chronic obstructive pulmonary disease, 6.0% diabetes, 4.6% renal, and 3.4% dementia. In 2009, 21.5% of the cancer deaths were in the cardiovascular registry and 16.1% in the diabetes registry. PCP enrollment was 66.7%. Among PCP enrollees, 14.4% were enrolled within 7 days and 22.9% within 14 days of death.
Conclusions: Linked administrative data can help plan for the utilization of expanded scope paramedicine to support at-home emergency care for palliative cancer patients by providing an estimate of the size and characteristics of the population that may benefit. To provide support for comorbidities at the end of life, collaboration with non-cancer chronic disease registries is advised.

Notes

NOTES

All delegates are encouraged to take the opportunity to visit the posters to become familiar with some of the latest advances and research in the field.

Posters will be available at the following locations and times:

Confederation Ballroom on Level 4
Monday, June 23 5:30 pm to 7:00 pm
Tuesday, June 24 7:00 am to 5:00 pm
Wednesday, June 25 7:00 am to 3:30 pm

Confederation 2 & 3 on Level 4
Thursday, June 26 7:00 am to 3:45 pm

Confederation 1 & 2 on Level 4
Friday, June 27 7:00 am to 6:30 pm
Saturday, June 28 7:00 am to 1:30 pm

P-01

CHANGING HEPATOCELLULAR CARCINOMA INCIDENCE AND LIVER CANCER MORTALITY RATES IN THE UNITED STATES

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Background: United States hepatocellular carcinoma (HCC) incidence and liver cancer mortality trends have risen. Trends may vary by geography, age, race/ethnicity and gender.
Purpose: To provide detailed HCC incidence and liver cancer mortality trends within population subgroups
Methods: HCC incidence data from SEER 18 registries and United States liver cancer mortality data from the National Center for Health Statistics were analyzed. Rates and joinpoint trends were calculated by demographic subgroup. State-level liver cancer mortality rates and trends were mapped.
Results: HCC incidence rates in SEER registries did not significantly increase during 2007-2010, however U.S. liver cancer mortality rates did increase. HCC incidence and liver cancer mortality rates increased among black, Hispanic and white men aged 50+ years and decreased among 35-49 year old men in all racial/ethnic groups including Asians and Pacific Islanders. Significantly increasing incidence and mortality rates were seen among blacks, Hispanics and white women aged 50+ years. Liver cancer mortality rates decreased among Asians and Pacific Islanders with decreasing rates among women aged 50-64 years and men 35-49 years and stable rates in other groups. During 2006-2010 among person 50-64 years of age blacks and Hispanics had higher incidence and mortality rates than Asians and Pacific Islanders. Liver cancer mortality rates were highest in Gulf Coast States and Washington, DC.
Conclusions: Decreasing HCC incidence and liver cancer mortality rates among Asians and Pacific Islanders, men aged 35-49 years, and a non-significant increase in overall HCC incidence rates suggest the epidemic may have peaked. State variation in mortality rates can inform control efforts.

P-02

A NEW MODEL FOR ANNUAL INCIDENCE CANCER REPORTING

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For at least 40 years, the traditional cancer report has been based primarily on anatomic site; a few more detailed reports may include references to histology. Rapid and significant changes in our understanding of the molecular biology of tumors has rendered these historical classifications obsolete. There is clear heterogeneity among the cancers of a single anatomic site, yet tumors in different sites can share clinically tractable molecular characteristics; for example, HER2 may be over-expressed in breast, gastric, esophageal and other cancers. The use of molecular markers allows cancers to be categorized into subtypes of disease that may reflect different molecular underpinnings and etiologies, respond to different treatment strategies, and have different prognoses. Clinicians now routinely test cancers for markers to sub-classify tumors; as new tumor markers are identified, the most useful are incorporated into clinical care and collected by cancer registries. Traditional cancer incidence reports do not incorporate these rapidly changing yet important data.

To remain relevant, cancer incidence reporting needs to align itself with clinical science by focusing on all the relevant factors that define disease etiology, management, and prognosis. These data will then be highly useful to the medical community and research funding agencies, and to the surveillance community as we begin to report on prognosis and survival.

Because the traditional cancer incidence report has changed relatively little over several decades, it remains a useful tool to show some trends over time. However, there may be advantages to supplementing this format with tumor sub-classifications that recognize the evolving clinical paradigms in cancer care. The authors will solicit input from experts in oncology, pathology and epidemiology; we will present a new model for reporting cancer incidence and use New Hampshire State Cancer Registry data to illustrate the new report.

P-03

AN AUDIT OF EPATH CASE FINDING COMPLETENESS. LOS ANGELES CANCER SURVEILLANCE PROGRAM

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Background: Over the past 10 years, the Los Angeles Cancer Surveillance Program (CSP) in collaboration with Artificial Intelligence in Medicine, Inc. (AIM) has installed an ePath case finding system in 22 hospitals and 1 free-standing lab. We are conducting a 100% audit of pathology reports received electronically via ePath to assure completeness of case finding for cancer diagnoses and CIN III diagnoses. This is the first case finding audit of CSP ePath facilities.
Purpose: The purpose of this audit is to confirm the accuracy of ePath selection in Los Angeles.
Methods: We developed an audit protocol in which AIM "turned off" filtering selection criteria for a 30 day period at each facility during which all pathology reports were sent to CSP for visual review to determine reportability. CSP and AIM will review and adjudicate discrepancies between visual determination of selectability and ePath selection.
Results: Analyses are in progress. We will present results of analyses which will identify overall agreement and disagreement between ePath selection criteria and visual review classification for both cancer and CIN III pathology reports. We will evaluate false negative results and explore possible methods to improve case finding completeness through ePath. We will also evaluate false positive results to explore the possibility of reducing unnecessary review of non-reportable pathology reports.
Conclusions: The purpose of this project is to evaluate completeness of case finding at ePath facilities. ePath has proven to increase cancer reporting productivity and decrease registry dependence upon paper pathology reports from hospitals. The results of our audit will provide important information regarding the reliability of ePath case finding.

P-04

QUALITY OF CANCER CARE: THE ROLE OF THE UROLOGICAL CANCER REGISTRY

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Introduction: The Urological Cancer Registry (UCR) at the Department of Urology at the Singapore General Hospital (SGH) adopted the American College of Surgeons (ACS) Commission on Cancer (CoC) standards to collect and maintain data on all Urological cancers diagnosed and/or treated at SGH.
Methods: The UCR data has been widely used in three areas: (A) assessment of accuracy and completeness of data; (B) support of research projects; and (C) patient follow-up.
Results: The UCR not only provides the infrastructure for collecting data on the quality of cancer care, but also involves in tracking of follow-ups of brachytherapy patients.
Conclusion: The UCR data is well utilized in helping to improve the quality of care for urological cancer patients in our institution.

Notes

POSTER SESSIONS

P-05

A COMPARISON OF METHODS FOR ASSESSING COMPLETENESS OF CASE ASCERTAINMENT IN DATA FROM THE NATIONAL PROGRAM OF CANCER REGISTRIES

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Background: Completeness of incident case ascertainment is an essential component of quality and reliability of cancer surveillance data. The current method used by NAACCR to estimate case completeness assumes the ratio of age-adjusted SEER incidence to national death rates is constant across geographic areas for a given cancer site, race (white and black only), and gender group. We explored how this method compares to others used to calculated completeness in data from the NPCR.
Methods: Using data from the November, 2012 NPCR submission, we calculated completeness using the following methods: 1) the ratio of SEER incidence to national mortality [I/M (SEER)]; 2) I/M ratios using the overall NPCR incidence rate in the calculation [I/M (NPCR)]; and 3) simple linear regression to estimate the expected case count from historical reports within each NPCR registry. We also review pros and cons of each method, and discuss the potential for utilizing more complex modeling techniques such as time-series or dynamic panel models and spatial prediction models.
Results: Completeness calculations using I/M (SEER) and I/M (NPCR) ratios yield similar results; however, some registries, particularly those with large Hispanic populations, may benefit from modifications to the current methodology that make use of mortality data based on other racial and ethnic groups. Results from our simple linear regression technique yielded overall higher completeness than the I/M methodologies for earlier years, but substantially lower completeness results for more recent years suggesting the need for linear transformation in these models. Conclusions: More work needs to be done to determine the best method for estimating the expected case count in NPCR registries. We are working closely with our partners to develop a methodology with assumptions that more accurately reflect all NPCR registries, has strong predictive power, and is relatively easy to implement at the registry level.

P-06

REFERRAL AND TREATMENT PATTERNS FOR RECTAL CANCER PATIENTS IN NEW BRUNSWICK

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Background: In 2010, the New Brunswick (NB) Radiation Therapy Wait Time Guarantee (RTWTG) was established. Associated with the guarantee, a provincial cancer treatment access repository (CTAR) has been developed to monitor, manage and report on radiotherapy. The objective of this paper is to examine the referral and treatment patterns and adherence to clinical guidelines for radiotherapy for rectal cancer patients using linked administrative health databases.
Method: All new malignant rectal cancer cases diagnosed between 2010 and 2011 were identified through the NB Provincial Cancer Registry, and information regarding disease characteristics, surgery and stage were extracted. The cohort was linked with CTAR to obtain radiotherapy information.
Results: According to widely published treatment guidelines, stage II and III rectal cancer patients are recommended to receive radiotherapy. In NB, a total of 383 incident rectal cancer cases were identified and 200 had stage II and III in the cohort. 71% of stage II and III cases were referred to radiation oncology. 86.6% of those referred received radiotherapy. For those who received treatment, 59.3% had pre-operative radiotherapy.
Conclusion: The newly developed CTAR fills the gap of the collection of radiotherapy treatment information in NB. Linking it with other data sources permits a detailed examination of access and practice patterns in NB relative to guidelines. Gaps can then be addressed such as why patients with stage II and III rectal cancer were not referred to radiation oncology.

Notes

P-07

THE FIRST NEW BRUNSWICK CANCER SYSTEM PERFORMANCE INDICATORS REPORT –A COLLABORATIVE EFFORT

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Background: Measuring the performance of cancer control was identified as a priority at the very inception of the New Brunswick Cancer Network. The first New Brunswick System Performance Indicators report will be released in early 2014.
Purpose: To produce a list of indicators in the areas of prevention, screening, diagnosis, treatment and end-of-life care at health region level.
Method: A list of cancer system performance indicators has been developed by Canadian Partnership Against Cancer (CPAC) in collaboration with experts at national and provincial level. NBCN adapted CPAC's list and consulted with local clinical experts and stakeholders. We also added some disease specific indicators, such as circumferential resection margin status for colorectal cancer, surgical margin status in radical prostatectomy surgery for prostate cancer, etc.
To produce these indicators, a large number of databases were used, for example New Brunswick Provincial Cancer Registry, Provincial Cancer Treatment Access Repository, New Brunswick Breast Cancer Screening Service Database, New Brunswick Cervical Cancer Prevention and Screening Data Repository, etc
Results/Conclusion: This report provides valuable information that can be used by stakeholders and health professionals to assess and improve their practices. It also enhances the information value of these databases by conducting data linkages. This is a collaborative effort with multiple partners in the regional health authorities.

P-08

TUMOR LINKAGE EXACT MATCH AUTOMATION RULE

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Background Statement: Most of the manual work performed by Eureka DMS users is related to enforcing California Cancer Registry abstracting and coding rules, linkage/matching rules, tumor consolidation rules, and rules for applying updates from source documents to ensure good data quality. These are all good candidates to become automated rules integrated into the Eureka DMS. We will develop and document processes and implementation plans in support of leveraging Eureka DMS technology to create and program the business rule sets so that they can be applied in all areas of cancer data processing and quality control.
Purpose of Project: Implementing an automation solution for manual new tumor linkage to patient processes in lieu of the current method of manual processing will free up regional staff time and allow regions to reallocate staff resources appropriately.
Methods/Approach: We first obtained baseline numbers in order to evaluate the impact of the automation effort. The rule was written by Business Analysts/CTRs with extensive input from programmers to ensure all aspects were evaluated that would affect the database. The rule was then programmed and implemented in a test database. Extensive testing was performed by Business Analysts.
Results: Business rules that result in an automatic action eliminate a manual decision. Thus, as each new business rule is implemented, less manual work will be required, and the California Cancer Registry will incrementally move closer to straight-through-processing, continuous quality control, and exception-based processing.
Conclusions: Once this initial linkage rule is implemented and tested, it is our goal to implement site specific tumor linkage rules based on MP/H rules. We plan to start with colon, lung and breast as those sites will affect the most cases. It is estimated that after implementation of all of the rules, automated tumor linkage will increase to approximately 90%.

Notes

P-09

SMOOTHED LEXIS DIAGRAMS: WITH APPLICATIONS TO LUNG AND BREAST CANCER TRENDS IN TAIWAN

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Background: Cancer surveillance research often begins with a rate matrix, also called a Lexis diagram, of cancer incidence derived from cancer registry and census data. Lexis diagrams with 3 or 5-year intervals for age group and for calendar year of diagnosis are often considered. This simple smoothing approach suffers from significant limitations; important details useful in studying time trends may be lost in the averaging process involved in generating a summary rate.
Purpose: To construct a smoothed Lexis diagram and to indicate its use in cancer surveillance research. This approach is direct and intuitive and avoids the non-identifiability issues frequently discussed in age-period-cohort models. We illustrate our approach by studying lung and breast cancer incidence in Taiwan.
Method: Assuming the number of people newly diagnosed in a given year at a given age is Poisson with parameter the product of the number of people at risk and the probability of an individual to be newly diagnosed. Based on the Lexis diagrams with 1-year intervals, we propose a Bayesian model to get the posterior distribution of the probability of an individual at a given age to be newly diagnosed at a given year.
Results: Graphical and Bayesian inferential reports are used to describe age, period and cohort effects on cancer incidence. Our simulation study indicates excellent numerical performance of the method. Applying it to lung and breast cancer in Taiwan, we find that for nearly every age group, the incidence rates for lung ADC and female invasive breast cancer increased rapidly in past two decades and those for male lung squamous cell carcinoma started to decrease, consistent with the decline in male smoking rate. Since the analyses indicate strong age, period and cohort effects, it seems that both lung ADC and breast cancer will become more important public health problems in Taiwan. **Conclusion**: This method should be useful in cancer surveillance research.

P-10

OREGON'S APPROACH TO INCREASING AWARENESS OF HEREDITARY BREAST AND OVARIAN CANCER SYNDROME (HBOC) AMONG CLINICIANS AND PATIENTS

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Background: HBOC accounts for 5 to 10% of breast and about 15% of ovarian cancers.[1] Most HBOC cancers are due to mutations in the BRCA1/BRCA2 genes. Physician and patient education leading to genetic services can result in early detection of tumors or risk reduction through prophylactic measures.
Methods: In collaboration with Oregon Genetics Program (OGP) 2,596 patients diagnosed with cancers between 2009 and 2011 who met at least one criterion for referral to genetic risk evaluation[2] were selected from the Oregon Cancer Registry (OSCaR). The criteria included women aged 50 or younger diagnosed with breast cancer, women with triple negative breast cancer, women with ovarian cancer, and men with breast cancer. A total of 726 physicians treating these patients were identified using records in OSCaR. Letters containing information about risks associated with HBOC, benefits of genetic counseling and contact details of local genetic services were mailed to these selected clinicians and patients. To assess usefulness of these letters all patients and clinicians received an online link to complete a survey with an incentive of $2 bill for patients.
Results: The effectiveness of these letters will be measured through the physician & patient surveys and surveillance of the Oregon cancer genetics clinics conducted by OGP and the results are anticipated by May 2014.
Conclusions: Cancer registries can be used to promote awareness and discussions of HBOC between patients and providers, and thus increase referrals to genetic services.

Notes

P-11

CANCER INCIDENCE IN ADOLESCENTS AND YOUNG ADULTS (AYA) IN MASSACHUSETTS, 2006-2010

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Purpose: To examine cancer incidence patterns among adolescents and young adults (ages 15-39) in Massachusetts.
Methods: Cancer incidence data from the MCR for 2006-2010 were grouped using the SEER AYA Site Recode ICD-O3/WHO 2008 Definition. Percent distributions, age-specific rates and age-adjusted rates per 100,000 were calculated by cancer type, 5-year age groups and sex.
Results: There were 8,260 malignant cancers among 15-39 year olds for 2006-2010, representing 4.6% of all malignant cancers for all ages combined. The 5 most common cancers for ages 15-39, males and females combined were: thyroid, breast, melanoma of skin, germ cell, and Hodgkin lymphoma. These accounted for almost 60% of cancers among this age group. However, the distributions of cancer types vary dramatically by age and sex, reflecting the transition from pediatric to adult cancers. The pattern among the youngest age group (15-19) is quite different than that in the oldest age group (35-39). The 5 top cancers among males aged 15-19 were germ cell, leukemia, Hodgkin lymphoma, NHL, and CNS and other intracranial and intraspinal neoplasms; while for the 35-39 year olds the top 5 were germ cell, melanoma of skin, colon and rectum, NHL and thyroid. For females, the top 5 among the 15-19 age group were thyroid, Hodgkin lymphoma, melanoma of skin, CNS and other intracranial and intraspinal neoplasms, and leukemia, and for the 35-39 year old the top 5 included breast, thyroid, melanoma of skin, cervical/uterine, and colorectal. Overall, age-adjusted rates are significantly higher for females than males (98.0 vs. 57.8 per 100,000 respectively).
Implications: Identifying cancer patterns in the AYA population can inform cancer prevention and control strategies to better address specific needs in this population.

P-12

ACCESS TO CARE IN VERMONT: FACTORS LINKED WITH TIME TO CHEMOTHERAPY FOR WOMEN WITH BREAST CANCER

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Background: Vermont has a goal to increase adherence to National Comprehensive Cancer Network (NCCN) treatment standards including timeliness of care.[1] In 2011, 87% of eligible women treated at Commission on Cancer accredited centers considered or received combination chemotherapy within four months of breast cancer (BC) diagnosis.[2] A task force was convened to evaluate which factors influence time to chemotherapy (TTC) in Vermont.
Purpose: The aim of this study was to calculate TTC for BC patients and identify factors associated with delays. The data will be used in designing interventions to increase access to high quality BC care.
Methods: The Vermont Cancer Registry was used to identify eligible cases: Vermont women diagnosed with Stage I-III BC in 2006-2010 with adjuvant chemotherapy given on or up to 32 weeks after surgery.
Preliminary Results: Mean TTC was 10.1 weeks (median 9.7 weeks, range 1.2 to 26.5 weeks). This interval is similar to a recent NCCN study.[3] A regression analysis is planned to test for associations between TTC and age, year of diagnosis, primary payer, managing facility, single/multiple facilities, county of residence, rural/urban residence, and drive time to managing facility.
Implications: The use of population-based data to evaluate access to BC care is an inclusive approach because women are included regardless of residence or treating facility. We plan to use the study findings to inform decisions about how to reduce barriers to care and shorten TTC for women with BC in Vermont.

[1]Vermont Department of Health and Vermonters Taking Action Against Cancer. (2010). Vermont State Cancer Plan: A statewide plan to reduce the impact of cancer in Vermont.
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Notes

P-13

TRENDS OF BREAST AND CERVICAL CANCERS IN ALGIERS

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CAPITALIZING ON CANCER SURVEILLANCE DATA FOR IMPROVED CANCER CONTROL

TRENDS OF BREAST AND CERVICAL CANCERS IN ALGIERS

Background: Cancer of breast incidence has been increasing steadily in Algiers since the 2000s with 21.1 per 100.000; high rates have been shown for women in 2011 with incidence rate 71.4 per 100.000 women, on the other side cervical cancer is markedly decreased with incidence rate 8 per 100.000
in year 2011, while we had incidences rate 9.7, 10.1 and 10.9 in years 2010, 2009 and 2008.
Data Sourses and Methods: The Algiers Cancer Registry (ACR) logs all confirmed cancer from hospitals, pathology laboratories, to extract cancer cases out area, the registry Enlarged collection in neighboring areas and trends in breast and cervical cancer incidence were estimated by age,
Results: From 2000-2011 there were 1137,while it was at 361 case in 2000,The first cases of female breast cancer occur from the age of 20 years, with a median age of 50 years, coinciding with the peak incidence.
In the same time there were115 cases of cervical cancer in 2011, while it was at 361 in 2000
Discussion: After the introduction of the cervical smear in the national screening program against cervical cancer, it has been a clear decline in the number of cancer cases because all detected cases are treated at advanced stage.
Breast female cancer poses a great problem of health, because information alone is not enough to strive against this cancer. The high cost means of screening breast cancer makes almost hard protection .

P-14

USING THE NAACCR GEOCODER TO PERFORM IN-HOUSE GEOCODING OF YOUR REGISTRY DATABASE

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The Alaska Cancer Registry (ACR) used the NAACCR geocoder to perform in-house geocoding of all the reportable records in the registry for the first time. In preparation for this process, ACR performed a number of database modifications and DxAddress quality control steps. Geocoded address and date fields were created so that it would be possible to compare the current and geocoded addresses in the future. In this way, ACR could identify records that needed to be re-geocode even though a valid geocoded date existed. Due to the rural nature of the state, a large number of DxAddresses were found to be unknown, PO Boxes, or Rural Routes. ACR linked its registry database to the Alaska Permanent Fund Applicant database and was able to reduce the number of unknown addresses from 36.3% to 24.2%. All DxAddresses were then sorted alphabetically and those that did not start with a number were reviewed. Some were names of apartment buildings, nursing homes, and prisons. Those facilities were researched and their addresses were entered into the corresponding cases.

The ACR data were then ready for geocoding. Two export files were created: DxYears 1996-2010 to geocode to the 2000 census database and DxYears 2011 forward to geocode to the 2010 census database. The NAACCR geocoder is accessed on the NAACCR website via a personal MyNAACCR account. ACR performed batch database geocoding processes for each file. Certain small towns were not recognized as valid place names and were not geocodable. ACR researched these locations and manually assigned latitudes, longitudes, and census tracts. Many cases were geocoded to a city centroid. ACR manually researched such addresses with house numbers, corrected the addresses, and re-geocoded them. PO Boxes for the five largest towns all geocoded to the city centroid because their ZIP codes lacked a ZCTA. Their census tract information was changed to unknown. After geocoding, ACR's completeness for known census tracts went from 34.3% to 95.5%.

Notes

Notes

P-15

RECENT TRENDS IN TOBACCO-RELATED CANCER INCIDENCE, UNITED STATES 2005-2009

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Background: More than 1 in 3 cancer-related deaths are associated with tobacco use; these include cancers of the lung and bronchus, oral cavity and pharynx, larynx, esophagus, stomach, pancreas, kidney and renal pelvis, urinary bladder, and cervix, and acute myeloid leukemia. In order to characterize the current cancer burden due to tobacco use, this study provides recent trends in tobacco-related cancer incidence across the United States.
Methods: We analyzed data from CDC's National Program of Cancer Registries (NPCR) and NCI's Surveillance, Epidemiology and End Results Program (SEER), covering 100% of the U.S. population during 2005-2009. Age-adjusted incidence rates, 95% confidence intervals and annual percent change (APC) were calculated for each state, the District of Columbia, and the United States.
Results: Tobacco-related cancer incidence in the United States decreased significantly from 152.9 (per 100,000 persons) in 2005 to 145.8 in 2009. Men had higher incidence rates, but a greater decrease in tobacco-related cancers per year over the five-year time period (-1.4% in men, compared to -0.8% in women). Incidence rates decreased the most per year for larynx (-2.4%), lung and bronchus (-1.9%) and stomach (-1.5%) cancers during the study period. Tobacco-related cancer incidence rates decreased ≥2% per year in the District of Columbia, Missouri, South Carolina and Utah; and 0.7-1.9% per year in California, Florida, Maine, New Mexico, North Carolina, North Dakota, South Carolina, and South Dakota. Incidence rates were stable in all other states.
Conclusion: While tobacco-related cancer incidence in the United States decreased overall from 2005-2009, tobacco continued to account for a large cancer burden. Our findings suggest that continued efforts in tobacco prevention and control are needed to further reduce tobacco-related cancer burden in general and among targeted sub-populations in the United States.

Notes

P-16

FEMALE BREAST CANCER IN CANADA BY SOCIOECONOMIC STATUS

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Background: Unlike most cancers, the rate of female breast cancer is generally higher among women of higher socioeconomic status (SES), especially post-menopausal breast cancers. Affluent western subpopulations have rates of breast cancer as much as ten times higher than rates in Africa and Asia. Within countries, rates also vary by SES and race. The only previous national study of breast cancer risk and SES in Canada was an ecological analysis that examined average neighbourhood income associated with breast cancer risk. The authors found a 15% reduction in breast cancer risk among women in the lowest income quintile compared to the highest.
Purpose: The main objective of this analysis is to examine the relationship between various components of SES and breast cancer incidence across Canada using individual level data.
Methods: Data for this analysis comes from the 1991 Canadian Census Cohort, a linkage of the 1991 census long-form to mortality, cancer incidence, and place of residence. The complete data from the 1991 Canadian Census provide information on demographic and socio-economic status for 2.7 million eligible Canadians, aged 25 years and over at the time of the 1991 Census. These data are linked to the Canadian Cancer Database from 1969 through 2003, with information on histology, date of diagnosis, and region. Incidence rates, rate ratios and rate differences of breast cancer by socio-economic factors were calculated. Multi-variate analysis was done using Poisson regression.
Results: Results show that age-adjusted breast cancer incidence rates rise with level of educational attainment, income quintile, and professional occupational status. Rate ratios are highest for the top income quintile and for professional or management level occupations.
Conclusions: This is the first national study of risk of breast cancer associated with socio-economic status using individual level in Canada. The various contribution of each risk factor will be discussed.

Notes

POSTER SESSIONS

P-17

THE EPIDEMIOLOGY OF PRIMARY BRAIN TUMORS AMONG MASSACHUSETTS RESIDENTS, 2001-2010

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Objectives: The purpose of this report is to present the epidemiology of both malignant and non-malignant primary brain tumors among Massachusetts residents from 2001-2010.
Methods: Brain tumors were divided into malignant tumors with a behavior code of 3 (invasive) and non-malignant tumors with a behavior code of either 0 (benign) or 1 (uncertain behavior). Preliminary data were run on the histological types of malignant and non-malignant brain tumors. These data were cross tabulated by site in the brain. Incidence rates of the major histologies by race/ethnicity and sex will be compared for the 10 year period. Additionally, overall incidence rates for the major histologies from 2001 to 2010 will be examined for trends. Cause specific five year survival will also be examined for cases diagnosed from 2001 to 2005.
Results: There were 12,111 brain tumors diagnosed among Massachusetts residents from 2001 to 2010, 5308 (43.8%) of which were malignant and 6803 (56.2%) of which were non-malignant. Gliomas, found mainly in the frontal and temporal lobes, accounted for 81.7% of malignant brain tumors, with glioblastomas representing 58.5% of gliomas and 47.8% of all malignant tumors. Lymphomas accounted for 3.0% of malignant tumors. Meningiomas, found exclusively in the cerebral and spinal meninges, was the most common non-malignant tumor, representing 60.4% of tumors, followed by pituitary tumors (12.3%) and nerve sheath tumors (13.4%). Neoplasm, NOS accounted for 4.0% of both malignant and non-malignant tumors.
Conclusions: Brain tumor data have not been examined in Massachusetts for over 20 years before either meningioma or pituitary tumors were reportable. Given the large number of cases diagnosed from 2001 to 2010, this report will provide robust statistics on brain tumors in Massachusetts. Further analyses will be done as described in the methods section. Additionally, Massachusetts data will be compared with national data.

Notes

P-18

IMPROVING COMPLETENESS OF BENIGN BRAIN TUMOR REPORTING BY A LINKAGE WITH HOSPITAL INPATIENT DISCHARGE DATA - LOUISIANA TUMOR REGISTRY'S EXPERIENCES

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Background: Benign brain tumors (BBT) diagnosed in 2004 and after are reportable by population-based cancer registries in the US. Many BBT cases are diagnosed by radiography and imaging; patients usually do not receive surgery until the tumors become life threatening. The majority of cancer registries do not routinely conduct case-finding in radiography centers due to resources issues; therefore underreporting of BBT has been a well-recognized challenge. Thus seeking more cost-effective way to identify BBT is a high priority of Louisiana Tumor Registry (LTR). This study linked registry data with Louisiana hospital inpatient discharge data (HIDD) to identify potential missed BBT cases and assessed the effectiveness of this linkage by following back with medical records.
Methods: Hospital inpatient discharge data for 2011, which covered 75% of the acute care hospital beds, were obtained from the Louisiana Department of Health and Hospitals. The ICD-9-CM diagnosis codes for benign brain tumor were obtained from the SEER case-finding list (http://training.seer.cancer.gov/brain/non-malignant/casefinding.html). We linked the BBT cases identified in HIDD data file with BBT cases diagnosed in 1988 and after in LTR database (SEER*DMS) using CDC Link Plus software. We investigated these potential BBT cases identified in the HIDD file by reviewing medical charts to confirm whether they were truly reportable.
Results: We identified 732 BBT cases from HIDD file. After linking these BBT cases in HIDD file with 6,027 BBT cases in SEER*DMS, we found that 382 (53%) cases were in both HIDD and SEER*DMS. The remaining 350 (47%) cases from HIDD were not in SEER*DMS, which were considered as possible missed BBT cases. After reviewing medical charts, we found that 167 (48%) cases were missed reportable BBT cases.
Conclusions: Linkage of registry data with hospital inpatient discharge data is a cost-effective way to improve the reporting of BBT.

Notes

P-19

PATIENT CHARACTERISTICS AND REGISTRY VARIATION ASSOCIATED WITH RECEIPT OF KRAS TESTING IN COLORECTAL CANCER

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Background: In 2008, the National Comprehensive Cancer Network recommended KRAS testing for all patients with Stage IV colorectal cancer (CRC) at time of diagnosis, and only those with wild-type KRAS be treated with epidermal growth factor receptor inhibitors due to toxicity and cost. KRAS was collected by SEER registries as a CS site-specific factor beginning with 2010 cases.
Purpose: To examine registry and patient-level variation in KRAS testing.
Methods: The study population included all malignant cases with positive histology for adenocarcinoma of the colon/rectum diagnosed in a SEER region in 2010 (N=30,416). Chi-square tests and logistic regression analyses were conducted to determine patient characteristics associated with KRAS testing, stratified by stage I-III vs. Stage IV.
Results: Substantial variation between registries was detected; 39% of New Mexico Stage IV cases had documented KRAS testing vs. 15% of Louisiana cases. In the logistic model, younger age, being married, living in large metropolitan areas, tumor in sigmoid or descending colon and sub-stage IVA or IVB (vs. IVNOS) were associated with receipt of KRAS testing. Among those with stage I-III CRC for whom KRAS testing is not recommended, 5% had testing; registry-specific rates ranged from 11% in Seattle to <2% in Iowa and San Francisco.
Conclusion: There appears to be wide variation in documented KRAS testing in Stage IV CRC patients by SEER registry; it is unknown if variation exists primarily due to inconsistencies in data capture or due to differences in provider practices. The fact that age remained highly significant after controlling for registry suggests providers are selecting patients for testing based on this characteristic or that younger patients tend to select providers more likely to order testing. Further research is needed to determine drivers of registry and age variations. Reasons for the relatively high rate of testing in stage I-III also warrants further investigation.

Notes

P-20

AN AUDIT OF GENDER CODES FOR GENDER SPECIFIC CANCERS – CALIFORNIA'S RESULTS

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Background: It may seem obvious that gender specific cancers (such as prostate or endometrium) are generally coded to male or female, a mini-reliability study revealed issues with coding gender appropriately. The Comparative Effectiveness Research (CER) project in California identified an issue with the sex field (gender) being incorrectly coded to "9" (unknown) for prostate cancer cases. The decision was made by the California Cancer Registry's (CCR) Production Automation and Quality Control (PAQC) Unit to perform an audit by expanding the original analysis to include all gender specific cancers from all three SEER regions in California to evaluate the extent of the issue in coding gender.
Methods: The reporting rules for coding the data item Sex established by the California Cancer Registry, Volume I; the SEER Program Coding and Staging Manual, and the North American Association of Central Cancer Registries (NAACCR), Volume II were applied to the audit sample. SQL queries were run and identified 111 cases of male genital cancers that were not coded to "1" (male) and 53 cases of female genital cancers that were not coded to "2" (female). The query results were placed into spreadsheets and a detailed analysis was performed.
Results: The results of this analysis demonstrated 77% of the cases were coded incorrectly. Most of the discrepancies had been coded to 9 (Unknown Sex). Other issues identified were the incorrect use of codes 3 (Hermaphrodite/Inter-sexed) and code 4 (Transsexual/Transgendered).

Notes

P-21

EDIT ERRORS ON FILE UPLOAD: USE OF REPORT ANALYSIS TO IMPROVE DATA QUALITY

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Background: In an effort to improve data quality, the California Cancer Registry (CCR) began a monthly analysis of edit errors identified when abstracts are uploaded into Eureka, CCR's integrated cancer database management system. The CCR Report, Edit Errors on File Upload Summary, is utilized to capture these edit errors and provide documentation for how many initial edits are received on an admission. Trends can be identified between the total number of edits firing and their relation to Region, Vendor, Site, and Admission ID. By analyzing these relationships, new opportunities can be found to not only create new automation logic and address educational needs, but to also create dialogue between the Central Registry, Regional Registries, and Facilities.
Methods/Approach: A monthly analysis of the Edit Errors on File Upload Summary is performed by Business Analysts. Prospectively, the report is analyzed targeting the top edits, which are defined as edit errors appearing on the report for the first time. Once identifying the admissions associated with the top edits, it can be determined if additional edits are also associated with the admissions. Retrospectively, edit errors that have been previously addressed in reports are monitored to ensure that a proposed solution is still accurate or if further action needs to be taken to re-address the edit errors.
Results/Conclusion: Analysis of initial errors has become a great resource for the CCR. The initial summary reports have been able to target associated interfiled edits that are related to specific software vendors, facilities, and educational needs.

Notes

P-22

CANCER CASES IN RURAL CALIFORNIA, 2006 – 2011 COMPARED TO 2001 – 2005

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Disparities between cancer cases in urban and rural environments have been hypothesized, and questions still remain. Understanding disparities in cancer occurrence by urbanization level may help direct exploration of cancer etiology and guide the development of effective cancer control strategies. Urban-rural disparities are difficult to study, however, in part because of the small population size in rural areas. California has a relatively large rural population. Geographically, approximately 65% of the state is considered to be rural, boasting a population of approximately 3 million residents (nine percent of the State's total population) (2000). With this robust sample, we propose to present a profile of cancer occurrence in rural California, looking at the most common types of cancer, and potentially meaningful variation with respect to stage, incidence, treatment, and mortality, among other relevant variables. In preliminary analyses, we found 644,238 cases of invasive cancer that could be classified by urbanization level in California between 2001 and 2005, roughly seven percent of which occurred in rural areas. This analysis will assess possible changes in the relationship between cancer cases and level of urbanization over time, as well as provide a straight-forward portrait of recent cancer cases in rural California (2006-2011).

Notes

P-23

PROCESSING CORRECTIONS/UPDATES IN CALIFORNIA: HOW DO WE GET THE MOST IMPORTANT INFORMATION IN THE MOST EFFICIENT WAY POSSIBLE?

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Annually over 775,000 correction records are created every year to update cases already in our database management system, of these around half of these require manual processing in order to determine if and/or how this data is to be incorporated into the existing information. If each correction takes one minute to complete this equates to over three full time employees per year.

This study will analyze the business process of corrections/updates to determine the distribution of the types of data (demographic, follow-up, staging, treatment, etc.) in the updates and attempt to determine the level importance of each type of update. This study will also analyze the records that do not apply automatically to determine what manual work needs to be done in order to complete the process.

This study will look at current and historical data to determine the most common updates and make use of subject matter experts to determine what decisions need to be made to incorporate updates with minimal manual interaction. The findings should help improve all parts of the process from the business practices concerning the updates, to the system process that will allow for a more efficient application of the updates with minimal manual interaction.

Notes

P-24

A MISSOURI MODEL FOR BATCH AUDIT QUALITY ASSESSMENT

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Background: Case-finding and re-abstracting audits are labor-intensive and expensive. Budget constraints are forcing central cancer registries (CCRs) to rethink audit processes.
Purpose: Develop and evaluate a new educational audit method.
Methods: We chose quality criteria for which CCR staff could gather data from abstract-level records submitted by hospitals for two recent years; we limited our audit to records with class of case 10-14 since facilities have most control of processes for these cases. We generated a table with 32 rows of specific data quality criteria for each facility. The goal was a minimal number of unknown, improper or non-specific codes. The table showed facility percent compliance with each criterion and compared each result to results for combined Missouri hospitals. Facilities also received a document that outlined the basis for the analysis and offered references to coding manuals and process improvement ideas.
Results: Registrars took seriously the opportunity to improve quality processes. Many wanted to identify and fix specific cases; we encouraged them to run and analyze their own extracts to uncover poorly coded cases beyond those in our audit. Administrators missed having a final statement of pass/fail but were encouraged to dialogue with their registrars on process improvement (e.g., availability of patient ethnicity data). Even facilities with no significant deviation from the norm could see areas where they, along with their peers statewide, could improve (e.g., unknown ethnicity at 17% statewide). Missouri Cancer Registry staff could see areas of need for continued training and subsequently developed/presented a Live Meeting on melanoma surgery codes.
Conclusion: Batch quality assessment is a novel and successful method for auditing registry data using specific quality criteria that can complement or replace traditional audit tools. Facilities can expand results in a self-directed assessment to improve their data quality.

Notes

P-25

USE OF LIVE MEETING TO CONDUCT INTERACTIVE QUALITY REVIEW OF DATA FROM A MULTI-CAMPUS HEALTHCARE SYSTEM

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Background: Visual review of incoming abstracts is needed to identify non-edit coding errors. Returning written feedback to individual abstractors before a large facility submits its next data file can be challenging in the face of central cancer registry staffing cuts.
Purpose: Streamline the feedback process to a multi-abstractor facility by addressing non-edit quality issues via an interactive group forum.
Methods: A large reporting institution acquired several free-standing facilities and began reporting their eligible cancer cases under the auspices of the parent institution; this added significantly to the Missouri Cancer Registry (MCR) QA workload. MCR's quality review of the initial data submission was very detailed and identified issues needing educational input. Explaining the error in writing, corrections needed, supporting references, etc., was labor-intensive and needed to be streamlined. The institution's registry supervisor invited MCR to participate in its staff meeting. Using Live Meeting to provide a "batch" feedback report seemed a natural fit. The first hour-long session focused on specific quality matters found during non-edit review of the incoming data file. Later, a demonstration of MCR's non-edit review techniques showed abstractors ways to identify and correct errors proactively prior to submitting their case files.
Results: Sessions were well-received. Effectiveness is being assessed as subsequent data files are reviewed. There was consensus that sessions were very helpful and should be held regularly. Abstractors would also like to reverse the process and review difficult cases that they select ahead of time.
Conclusions: Live Meeting software provided by CDC allowed MCR staff to attend virtually a multi-campus reporting institution staff meeting and present training specific to problems with their submission. The interactive format allowed questions specific to the registrars' needs with discussion until understanding was achieved.

Notes

P-26

CANCER DISPARITIES IN ALASKA NATIVE PEOPLE

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Background: Cancer incidence rates have dramatically increased during the last 40 years. A disparity in overall cancer incidence exists between AN people and US whites.
Purpose: To report cancer incidence patterns and disparities among AN people compared to US whites so that medical providers, health care planners and community members may identify needs to develop cancer prevention and early detection programs, and detect changes that may reflect intervention successes.
Methods: Data are from the Surveillance, Epidemiology and End Results (SEER) Alaska Native Tumor Registry, a population-based registry which includes AN people living in Alaska at the time of cancer diagnosis from 1969 to 2011. US white cancer incidence rates are from SEER*Stat. Statistical significance between AN and US white rates was determined through comparison of 95% confidence intervals (Tiwari modification).
Results: Over the 43 year period, the age-adjusted incidence rate for all sites combined increased 32 percent. Incidence rates in AN men are similar to US white men (rate ratio = 1.0); however, AN women show rates that are 30% higher than US women for all cancers combined. Declines in cancer incidence rates that began in earlier years among US whites are now occurring in AN people during the most recent five-year period 2007-2011: all sites combined (AN men), colorectal (AN men and women), and lung (AN men). Declines in US rates of breast and lung cancer are not seen in incidence rates of AN women. Incidence rates in AN people which exceed US white rates for the period 2007-2011 are: all sites combined (AN:US rate ratio = 1.2), nasopharynx (11.3), gastric (3.3), colorectal (2.1), pancreas (1.4), lung (1.5) and kidney (1.6). Cancer incidence rates are lower in AN people than US whites for: melanoma (AN:US rate ratio =0.1), uterine (0.6), prostate (0.5) and thyroid cancer (0.7), and lymphoma (0.6).
Conclusions: Declines in lung cancer among AN men may indicate progress made through tobacco prevention and control program interventions established for tribal health organizations. Increases in colorectal screening may explain recent declines in colorectal cancer seen in recent years among AN people.

Notes

P-27

CHANGING PATTERN IN CANCER PREVALENCE IN SOUTH WEST NIGERIA

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The cancer prevalence in South West Nigeria where the Ife Ijesha cancer registry is based has shown a gradual change in the pattern and types of cancer seen. In the early 1950s when cancer registration started in Nigeria, cancer of the liver and cancer of the cervix where the commonest cancers in men and women respectively. Cancer of the lung and cancer of the colon were rare in Nigeria. However with improvement in data collection and registration and the advent of rapid urbanization with lifestyle modification and change in dietary habits, these rare cancers are increasingly being documented in Nigeria. The prevalence of cancers in developing countries and limited resource country like Nigeria is now approaching the pattern seen in the developed world. This presentation aims to highlight and document the changing pattern and the similarities of cancers documented in south west Nigeria.

It is apparent that as lifestyle modification and urbanization in Nigeria and elsewhere continues especially in developing nations, the pattern of cancer will tend to assume similarities to the pattern seen in the developed nations. However some region specific cancers which are related to environmental or genic influence like Burkitt's Lymphoma and Kaposi Sarcoma will still be common in some geographical locations like Nigeria.

Notes

P-28

CERVICAL CANCER IN THE GEOGRAPHICALLY DISPERSED, RESOURCE-LIMITED US AFFILIATED PACIFIC ISLANDS (USAPI): PROGRAM CAPACITY IMPACT ON SURVEILLANCE AND REPORTING

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Background: In 2002, sparse and unreliable cancer surveillance and risk factor data existed for a combined population of 460,000 dispersed over 2 million square miles of Pacific Ocean. In 2005, capacity building in cancer surveillance and control of preventable cancers started. Concurrent analyses of health system capacity was needed. Comprehensive cancer control efforts, capacity building and cancer surveillance systems development have occurred in the USAPI in a tightly coordinated fashion since 2007.
Purpose: Several projects were undertaken to describe current status and challenges in detecting cervical cancer, and the impact on incidence of invasive cervical cancer and precancers.
Approach: New invasive cancers, as well as HPV-associated pre-cancers have been collected since 2007. Assessments of health system capacity were undertaken in 2002, 2008 and 2011, with focus on cervical cancer screening in 2008 and 2011. Based on the responses from the program assessments, a numerical score of cervical cancer program capacity was assigned, using the 2011 UNFPA Cervical Cancer Program Management Guidelines as a standard. Descriptive statistics were calculated for cancer data. Poisson regression of incidence of cervical cancer, overall and by stage at diagnosis, will be used to determine the relationship with program capacity.
Results: Invasive cervical cancer incidence, as well as precancer rates will be presented along with a snapshot of current program capacity for screening.Geographic and resource impacts on cancer diagnosis and stage will be presented.
Conclusions: Cervical cancer screening programs with high human and technology resource requirements may not be appropriate for geographically dispersed, resource-limited small populations. Program challenges can adversely impact cancer reporting and should be considered when analyzing cancer data. Central registries can play a direct role in program planning and evaluation in small populations.

Notes

P-29

EVALUATION OF LEXIS NEXIS BATCH SOLUTIONS FOR CANCER REGISTRIES IN NEW YORK STATE

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Background: Despite the best efforts of registry staff, a small share of the demographic information for cancer patients can never be determined with certainty. While this share has decreased over time because of improved information technology, some of the gains have been offset by increasing reports from non-traditional sources such as laboratories and private physicians.
Purpose: To assess Lexis Nexis Batch Solutions as a resource for determining the date of birth, address at diagnosis, and/or social security number of a sample of patients reported to the New York State Cancer Registry (NYSCR)
Methods: We generated the following files: (1) partial birthdates and ambiguous birthdates (2 or more sources with birthdates differing by >1 year) reported to NYSCR from 1990-2011 (n=3376, 0.15% of all patients) (2) addresses missing census tract for cases diagnosed in 2010 (n=416, 0.33% of all tumors) (3) Patients with social security numbers shared by others on the registry (n=194 pairs, 0.01% of all patients). Most of these had previously been clerically reviewed without success.
Results: For the date of birth searches, 2,288 (67.8%) were found. Of these, 83.3% were returned with complete birthdates, 12.5% with year and month information and 4.3% with year information alone. The success rate improved from 76.2% in the early 1990s to 92.9% in the 2010s. For the address searches, 289 (69.5%) had address information meeting the date criteria. 134 (46.4%) of these were geocodable addresses (containing a house number and street). A majority of social security searches yielded positive results, with the best results for 2010s cases.
Conclusions: Lexis Nexis Batch Solutions was able to resolve the demographic information for a significant share of cases nearly instantly and at a very reasonable cost. Researching these cases one at a time would have taken clerical staff many months. The NYSCR anticipates being a regular user of this service in the years ahead.

Notes

P-30

CANCER SCREENING AMONG MANITOBA'S FIRST NATIONS POPULATION

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Background: Screening can reduce mortality from breast, cervical, and colorectal cancer (CRC). However, screening rates are often low among vulnerable populations such as minorities, low-income and rural populations. Few studies in Canada have examined the utilization of cancer screening among First Nations (FNs) individuals.
Purpose: To describe breast, cervical, and colorectal cancer screening utilization among FNs and all other Manitobans (AOMs).
Methods: A client registry extract from the federal Aboriginal Affairs and Northern Development Canada Indian Registry System database was linked to the Manitoba Population Health Registry (1984-2008), the Manitoba Health Medical Claims database, and the provincial screening registries (breast, colorectal, and cervical) to compare cancer screening among FNs and AOMs. Variables included in the analyses were age, time period, gender (for CRC screening) and region of residence.
Results: Breast and CRC screening rates have increased for FNs and AOMs. However, FNs women were less likely to be screened compared to AOMs; the difference was lower in the north than in the rural south or urban areas. FNs were less likely to have a FOBT in the previous two years than other Winnipeg residents; there was no difference in colonoscopy or flexible sigmoidoscopy rates among residents of the north although in the rural south and urban areas, FNs were less likely than AOMs to have a scope. The rate of cervical screening was similar for FNs and AOMs who lived in the North or an urban area, but FNs women who lived in the rural south were less likely to have had a Pap test. The rate of high-grade dysplasia was higher among FNs women than AOMs.
Conclusions: The findings from this project will provide baseline data for the screening programs, policy makers, and community leaders to develop and refine culturally relevant strategies to improve screening access and reduce cancer morbidity and mortality among Manitoba's FNs.

Notes

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A Critical Review of the Data Quality Report for the Canadian Cancer Registry

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Background: The Canadian Cancer Registry (CCR) is a national dynamic administrative survey established in 1992, which contains person-oriented information on cancer incidence, mortality and stage from the thirteen provincial/territorial cancer registries (PTCRs). The CCR has implemented a variety of measures to optimize data quality including the annual production of a high level data quality indicator report which allows for comparisons of key indicators across PTCRs.
Purpose: To critically review all available data quality indicators to ensure indicators included in the CCR data quality report are the most relevant and adequately represent a cross section of data quality domains (relevance, accuracy, timeliness, accessibility, interpretability, and coherence).
Method: A template was developed to ensure a standardized, non bias comprehensive review process, including adequate consultation with stakeholders. Key evaluation criteria included clarity of calculation and interpretation, availability of established optimal targets, validity, relevancy and actionability. Reviewers considered each indicator's overall score when making a recommendation to retain, modify or remove.
Results: The revised data quality report includes a total of nine indicators, several with modifications to existing indicators and the addition of one new indicator. Several current as well as new indicators were suggested for an operational provincial/territorial-level feedback report.
Conclusions: The new Canadian Council of Cancer Registries Data Quality Report provides a comprehensive high level national measurement of data quality in the Canadian Cancer Registry. The data quality indicators will be reviewed annually to ensure the most current information regarding key indicators, optimal cut-points and appropriate interpretation are incorporated.

Notes

P-32

"I KNOW YOU OWE ME!": RECOVERING STAGE INFORMATION FROM UROLOGISTS IN PUERTO RICO

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Background: Physician reporting has been a challenge in most registries, and Puerto Rico is not the exception. Over the years the Puerto Rico Central Cancer Registry (PRCCR) worked on the improvement of its completeness and last year this effort was paid off. Now we are focusing on improving: the timeliness of reporting and the quality of the information reported, both worked in conjunction. We are focusing our efforts to describe the recovery of physician's data, especially from the urologists, since most of them diagnose and treat patients at their own office.
Objective: To recover essential diagnosis information from the urologists in order to improve the quality of data and to decrease the percentage of unknown stage, among other clinical data.
Methods: Physicians were contacted directly using different approaches; by visiting their offices and doing their cases using a partial prefilled template in NAACCR format or by sending them a single page document to recover sociodemographic and cancer identification variables. A formal letter was sent to the physicians to explain the purpose of the recovery project. This letter also explained that the PRCCR was going to send them an exclusive encrypted list of patients they diagnosed with cancer on the year 2011 that were not reported to the PRCCR and that were identified by pathologies, along with the reporting form document. Information of the physician cases was received at the PRCCR by encrypted email or fax.
Results/Conclusions: From a total of 49 urologists contacted, 39 fully responded, 4 partially responded and 5 did not reply. Information about stage of prostate cases for 2011 improved approximately 5.0% in two months. This project helped the PRCCR to see that different approaches are needed in order to increase reporting by physicians. Also, education or training should be offered to physicians in order to increase their knowledge about the reporting process and about the different venues to report a case.

Notes

POSTER SESSIONS

P-33

A COMPARATIVE ANALYSIS OF CANCER RATES FOR INDIANA'S 10 PUBLIC HEALTH DISTRICTS

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To tackle incidence and mortality rates of the state's highest burden cancers in Indiana's Public Health Districts (PHD), organized district level cancer coalitions met and continue to meet to discuss ways to improve these cancer rates in their communities. While district level data are readily available via the Indiana State Cancer Registry's Data Generator, a geographic comparative analysis is not. In addition, inclusion of county level data in the online data generator cannot occur as many have numbers too small for reporting or producing stable rates. With growing interest in the establishment of local-level coalitions, the need arose for a report containing district-level cancer incidence and mortality data for the top four cancer sites (lung, female breast, colorectal and prostate cancer) for Indiana's 10 PHD's and counties. The project considered each PHD individually and comparatively with the other nine districts as well as to Indiana as a whole. Use of an internally available graphical user interface called *CanStat* facilitated the process, allowing the cancer epidemiologist to extract cancer registry data and place it in Excel spreadsheets. Confidence interval comparisons determined significant differences between rates. Our presentation will show how *CanStat*, the spreadsheet layout and subsequent findings led to the final report. The results provided a backdrop to guide the cancer control planning efforts of not only governmental entities and district coalitions but also non-profit health agencies that serve the communities within each district. Other benefits include using the results to support cancer risk factor modifications at a local level. In addition, it opens up the possibility of providing to the state legislature, targeted information in regards to cancer rates among their constituents. This enhances their ability to have a full understanding of Indiana's cancer incidence and mortality rates.

Notes

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ENHANCING RADIOTHERAPY TREATMENT DATA AMONG PROSTATE CANCER CASES DIAGNOSED FROM 2008 TO 2011 IN PUERTO RICO

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Background: For many years the Puerto Rico Central Cancer Registry (PRCCR) has experienced difficulties with collecting cancer treatment data since most are administered in non-hospital facilities. One measure that the PRCCR use to improve data quality was the *Claims Project*, which was designed to identify potentially missing cases and recover missing data. Most of prostate cancer diagnosis and treatments, such as hormone and radiotherapy, are not performed at a specialized cancer center or hospital. With the Claims database some of the possible missing radiotherapy treatment data of prostate cancer cases could be identified.
Objective: To evaluate the effectiveness of Claims database for the recovery of radiotherapy treatment data in prostate cancer cases diagnosed from 2008 to 2011 in Puerto Rico (PR)
Methods: The Claims database was used to generate lists filtered by CPT codes for radiotherapy treatment delivery, primary site and diagnostic year. Each case was compared with PRCCR database using online probabilistic match to identify if the case was already in the database. If it was, we verified if the radiotherapy treatment's date and modality was coded correctly. If not, we verified if it was a first course treatment or not, so the data could be updated. Finally, the PRCCR registrars could contact the specialist and/or hospital where the patient was diagnosed or treated to acquire the information that was supposed to be reported and evaluate why the case was lost.
Results/Conclusion: The Claims database was an effective source to recover and improve prostate cancer cases and radiotherapy treatment that were performed at non-hospital facilities. Almost20% of new radiotherapy treatment data in cases diagnosed from 2008 to 2011 was identified. Among a 65% of radiotherapy treatment data was confirmed to have correct date, modality and reporting source, where we can see that a significant percentage of institutions are reporting correctly.

Notes

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EPIDEMIOLOGICAL TRENDS OF HPV-RELATED CANCERS IN MINNESOTA

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There are more than 40 types of human papilloma virus (HPV) that can infect the genital, mouth & throat areas of males and females. HPV is a vaccine-preventable infection. The overall incidence rate of HPV-related cancers has declined in Minnesota, from 10.1/100,000 in 1988 to 9.2/100,000 in 2009. While rates of penile, cervical, vaginal & vulvar cancers have decreased, the incidence rates of selected oropharyngeal (back of the throat, including base of tongue & tonsils), and anal cancers have increased in Minnesota. The total number of anal, cervical, penile, selected oropharyngeal, vaginal & vulvar cancers diagnosed in Minnesota from 1998-2009 was 9,220 (MCSS, 2013).
There are more than 21,000 HPV-associated cancers per year among women in the US, with cervical being the most common. Of the more than 12,000 HPV-associated cancers diagnosed per year among men in the US, oropharyngeal is currently the most common (CDC, 2013). Health care providers in Minnesota are encouraged to pay closer attention to current recommendations for HPV vaccination of girls & boys, prior to their sexual debut. Eligible females with past exposure to HPV, and HPV-negative, should still be vaccinated. Surveys of health care providers in the US indicate that nearly half are not following the current CDC guidelines for HPV vaccinations. Efforts are underway to encourage more providers to follow current recommendations regarding HPV vaccines.

Notes

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CANCER STAGING AND TREATMENT FOR FIRST NATIONS IN MANITOBA

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Background: The Manitoba Cancer Registry (MCR) is legally mandated to collect and classify all cancer diagnoses in the province including information on patient demographics, tumour characteristics, treatment types and dates as well as stage at diagnosis. Data related to ethnicity is not part of the MCR. Through collaboration with First Nations (FNs) and governmental agencies the MCR has been able to identify FNs diagnosed with cancer. Our team used this information to analyze data on cancer incidence, mortality, screening, stage at diagnosis, and treatment rates among FNs and all other Manitobans (AOMs).
Objective: To identify FNs in the MCR diagnosed between 2004 and 2008, to describe stage and treatment patterns following a cancer diagnosis among FNs compared to AOMs, and to determine if such patterns were consistent by region of residence.
Methods: The FN population was identified through linking the federal Indian Registry System to the Manitoba Health Population Registry. A file using an anonymized identifier was created and used for linkage to the MCR. Standard statistical tests were run to examine the differences in treatment between FNs and AOMs by stage. Stratification and modeling were used to understand the interaction between ethnicity and geography.
Results: Our analysis shows that there are some differences in stage at diagnosis and treatment rates for FNs compared to AOMs. Although the analysis was limited by the small sample size, there is evidence that stage and treatment may vary by region of residence, and any association between FNs and AOMs may be masked if a geographic-specific analysis is not done. Further investigation is planned to look at whether geography and ethnicity might explain this relationship.
Conclusions: Understanding the relative roles of ethnicity and geography in stage at diagnosis and treatment will play a key role in improving cancer services for FNs living in Manitoba.

Notes

POSTER SESSIONS

P-37

TRENDS IN INITIAL MANAGEMENT OF PROSTATE CANCER IN NEW HAMPSHIRE – REASONS FOR OPTIMISM?

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Background: Management of prostate cancer is evolving in an effort to minimize over- and under-treatment. There has been emphasis on increasing the use of expectant management/ active surveillance for low risk disease and ensuring the definitive treatment of high risk cancer with surgery rather than default radiation therapy.
Purpose: We assessed trends in management of different disease risk categories to ensure appropriate management of prostate cancer patients.
Methods: From the NH State Cancer Registry, we identified clinically localized prostate cancers diagnosed 2004 to 2011 with recorded Gleason score and PSA value, and classified them according to D'Amico criteria. Initial treatment modality was recorded as surgery, radiation, expectant management (no treatment recorded) or hormones only. Temporal trends were assessed by chi square for trend.
Results: Of the 6,203 prostate cancers meeting all inclusion criteria, 34% were low risk disease, 30% intermediate risk and 28% high risk. For patients with low risk disease, there was increased use of expectant management as initial treatment (17 to 42%, $p<0.001$) and surgery (29 to 39%, $p<0.001$), and decreased use of radiation therapy (49 to 19%, $p<0.001$). For intermediate risk patients, surgery was more frequent (24 to 50%, $p<0.001$) while radiation decreased (58 to 34%, $p<0.001$). Hormonal therapy alone was rarely used in low (2%) or intermediate (4%) risk disease. For high risk patients, surgery increased (38 to 47%, $p=0.003$) and radiation decreased (41 to 38%, $p=0.026$), while hormonal therapy and expectant management remained stable at 8 and 14%, respectively.
Discussion: There are encouraging trends in the management of clinically low and high risk prostate cancer in New Hampshire, including less overtreatment of low risk cancer and rising surgical treatment of high risk disease. Continued efforts to study and refine practice patterns will enable us to optimize our approaches to this heterogeneous disease.

Notes

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