



Early Estimates of SEER Cancer Incidence for 2012

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Recent Publication



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Original Article

Early Estimates of SEER Cancer Incidence for 2012: Approaches, Opportunities, and Cautions for Obtaining Preliminary Estimates of Cancer Incidence

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BACKGROUND: The National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program collects and publishes population-based cancer incidence data from registries covering approximately 28% (seer.cancer.gov/registries/data.html) of the US population. SEER incidence rates are released annually in April from data submitted the prior November. The time needed to identify, consolidate, clean, and submit data requires the latest diagnosis year included to be 3 years before release. Approaches, opportunities, and cautions for an earlier release of data based on a February submission are described. **METHODS:** First cases submitted in February for the latest diagnosis year represented 92% to 98% of those in the following November submission. A reporting delay model was used to statistically adjust counts in recent diagnosis years for cases projected in the future. February submissions required larger adjustment factors than November submissions. Second, trends were checked to assess the validity. **RESULTS:** Most cancer sites had similar annual percent change (APC) trends for February and November 2015. Male colon and rectum cancer and female lung and bronchus cancer showed an acceleration in declining APC trends only in February. Average annual percent change (AAPC) trends for the 2 submissions were similar for all sites. **CONCLUSIONS:** For the first time, preliminary 2012 incidence rates, based on February submissions, are provided. An accelerated decline starting in 2008 for male colon and rectum cancer rates and male lung cancer rates did not persist when 2012 data were added. An earlier release of SEER data is possible. Caution must be exercised when one is interpreting changing trends. Use of the more conservative AAPC is advised. **Cancer 2015;000:000-000.** © 2015 American Cancer Society.

KEYWORDS: annual percent change, average annual percent change, cancer incidence trends, delay adjustment, population-based registry data.

INTRODUCTION

Users of population-based cancer registry data have questioned whether it may be possible to shorten the time between the collection of the data and its release. Surveillance, Epidemiology, and End Results (SEER) incidence data are generally made available to the public in April of each year along with *Cancer Statistics Review*, which is based on the data submitted in the previous November.¹ Online information from the SEER program's fact sheets is also based on the November submission data.² The most recent diagnosis year in a November data submission is 22 months after the close of a diagnosis year. For example, the November 2014 SEER incidence data submission, to be released in April 2015, will include cases diagnosed through the 2012 calendar year (ie, released 28 months after the end of 2012). As part of a dynamic database, subsequent November submissions include cases that were previously unreported (delayed) and are added, whereas a few cases (eg, corrections) are removed. Because more cases are added than removed during this process, the observed rates will be underestimated when they are first reported. Underreporting in the most recent years is largest, and this biases the trends downward. The most recent data points are the most important; any small change is a potential harbinger of the impact of cancer control activities. To adjust for this, a statistical model has been developed to estimate reporting delay-adjusted rates.³

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This article has been contributed to by US Government employees and their work is in the public domain in the USA.

Additional Supporting Information may be found in the online version of this article.

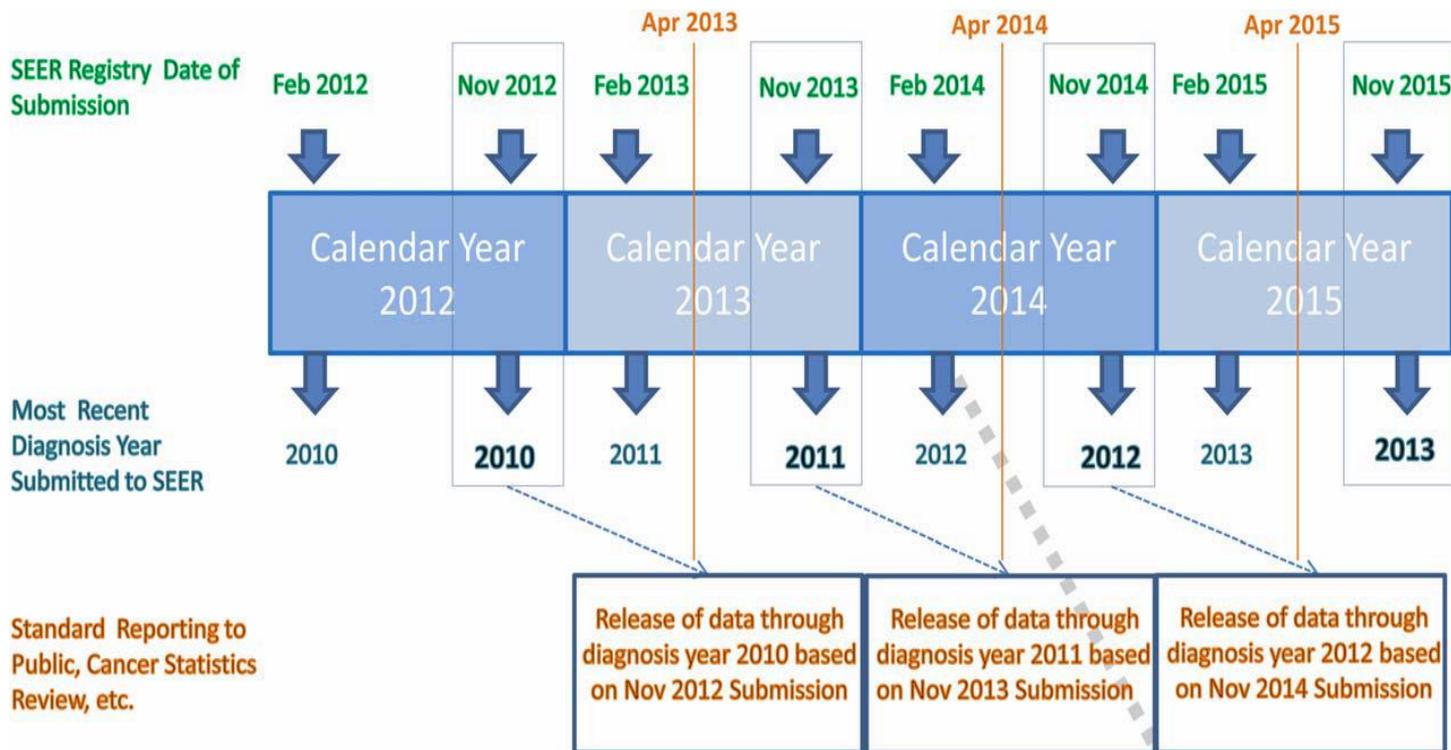
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Introduction



- SEER releases population based registry data for reporting and public use each April.
- The submission date is the previous November.
- In the released data, the most recent diagnosis year is 22 months after the close of a diagnosis year.
- The following slide provides an outline of data submission to the SEER program.

SEER Data Submission



Early Reporting

Question: Based on the Feb 2014 data submission, can we release data through diagnosis year 2012 earlier?

Objective



- Gauge the possibility of shortening the time between the collection of cancer registry data and its release for reporting and public use.

Materials & Methods



- Data sources used are the SEER17 data:
 - San Francisco-Oakland, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta
 - San Jose-Monterrey, Los Angeles, Alaska Natives, rural Georgia
 - Greater California, Kentucky, Louisiana, New Jersey

Materials & Methods



- **Year of diagnosis beginning in 2011:**
 - preliminary data files submitted in February
 - full November data submissions.
- **Data used include February and November submissions for 2011, 2012, and 2013.**

Materials & Methods



- **Cancer sites include:**
 - All sites
 - Colon and rectum
 - Lung and bronchus
 - Melanoma of the skin
 - Female breast
 - Prostate

Materials & Methods



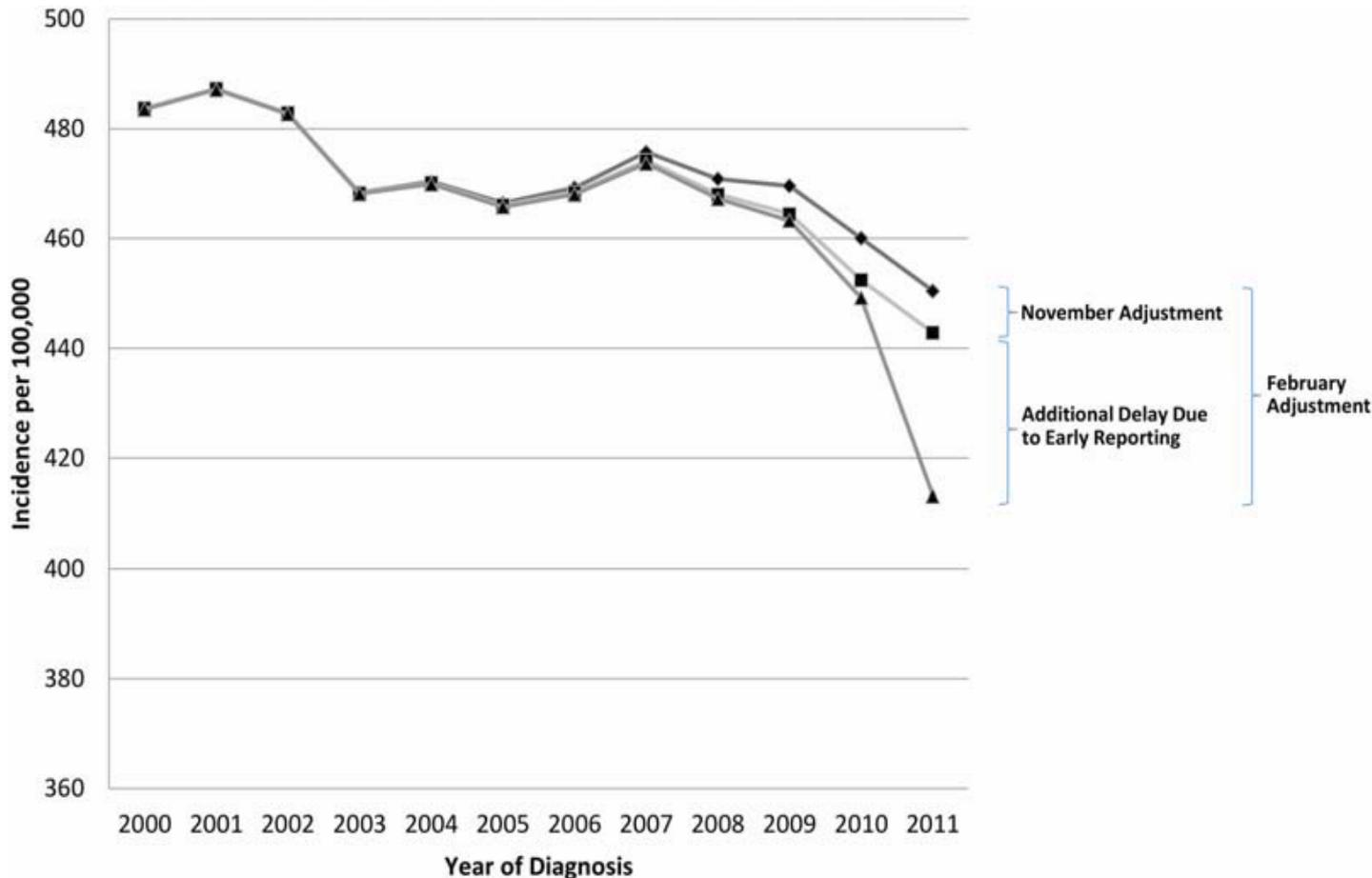
- **Joinpoint regression used to assess trends:**
 - **APC:** slope of the linear trend between 2 adjacent joinpoints.
 - **AAPC:** compare incidence trends for different cancer sites or different populations, 5 or 10 year intervals. More stable.

Materials & Methods



- Case completeness, assessed comparing February and November submissions.
- February submission reporting delay, considered for modelling completeness.
- Model considers reclassifications and data corrections.
- Without the modelled adjustments, trends will be biased downwards.

Observed and Delay Adjusted Incidence Rates for All Sites Selected, SEER17 Submissions



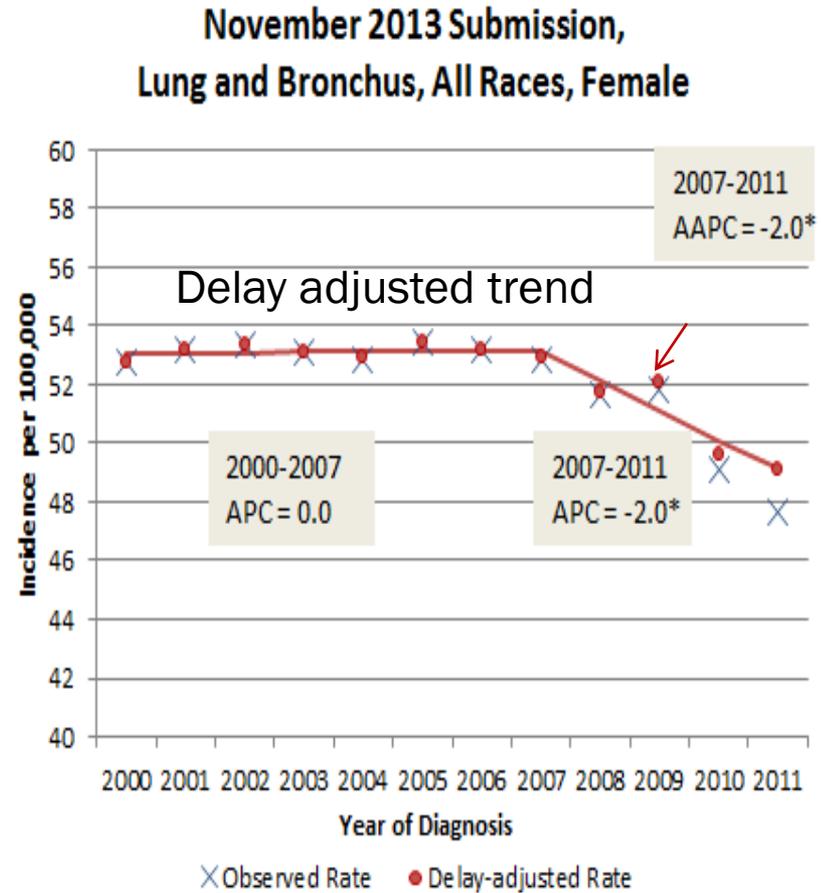
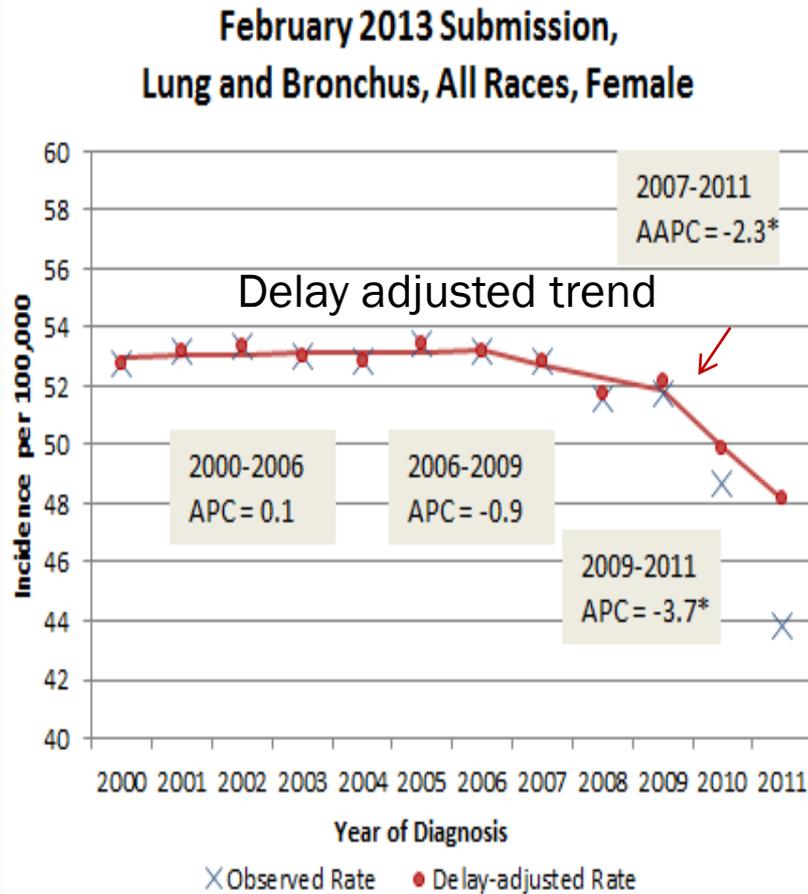
◆ February 2013 Delay-adjusted Rate ■ November 2013 Observed Rate ▲ February 2013 Observed Rate

Results



- Applied delay model to obtain delay adjusted rates.
- Fit Joinpoint model to the delay adjusted rates.
- Average annual percent change (AAPC) and annual percent change (APC) are used to evaluate small changes in rates.

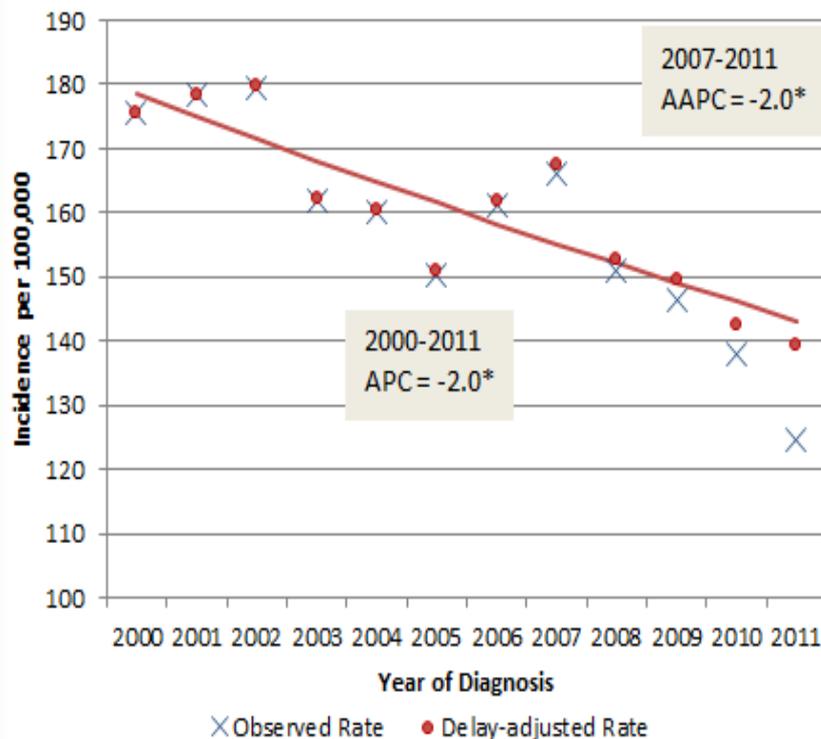
Observed and Delay Adjusted Incidence Rates – February and November 2013 SEER Submissions



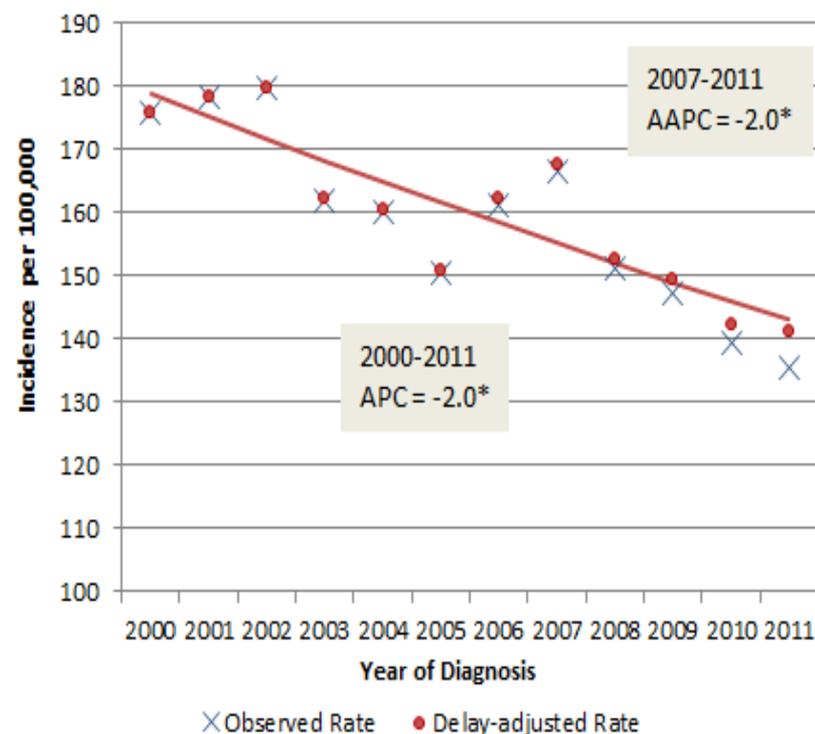
Observed and Delay Adjusted Incidence Rates- February and November 2013 SEER Submissions



February 2013 Submission,
Prostate, All Races, Males



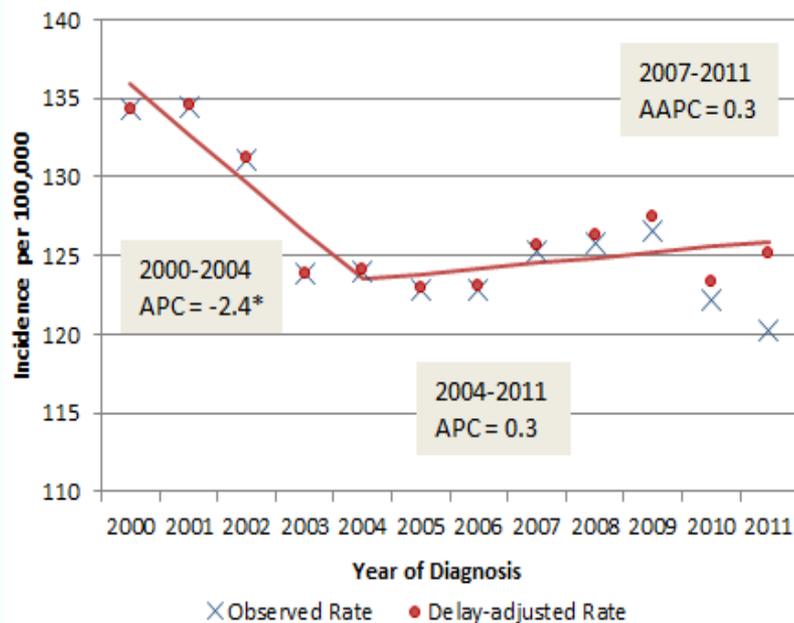
November 2013 Submission,
Prostate, All Races, Males



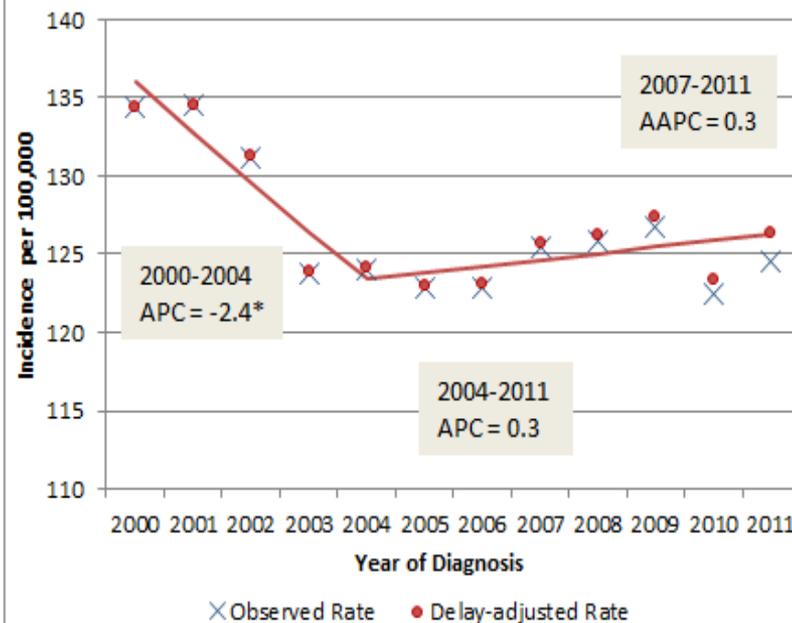
Observed and Delay Adjusted Incidence Rates – February and November 2013 SEER Submissions



**February 2013 Submission,
Breast, All Races, Females**



**November 2013 Submission,
Breast, All Races, Females**



Results – February & November 2013 Submissions



- The joinpoint fits show general consistency between trends reported.
- In general, one joinpoint was eliminated in the November data as compared with the February data for all sites (females), lung and bronchus cancer (females), colon and rectum cancer (males).
- 5- and 10-year AAPCs were consistent between the two submissions, even with changes in the number of joinpoints.

Results – Validation of 2013 Submissions for YOD 2011



Cancer Site	February 2013		November 2013	
	Observed	Delay Adjusted	Observed	Delay Adjusted
Colon & Rectum	37.9	40.3	40.1	41.0
Lung & Bronchus	50.1	55.1	54.7	56.4
Melanoma	19.4	21.3	21.0	21.5
Female Breast	120.2	125.2	124.6	126.3
Prostate	124.6	139.2	135.4	141.2

Conclusion – February & November 2013 Submissions

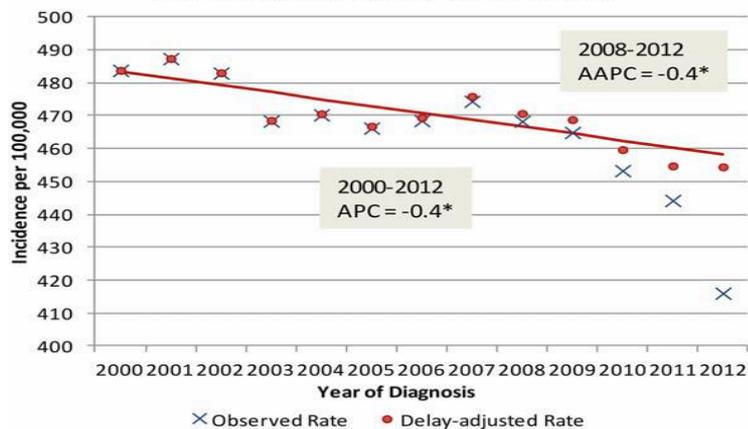


- These findings indicate that February submission data can be used to calculate valid estimates of incidence trends, especially when the more stable AAPC measure is being used.
- February submission requires larger adjustment, however, February and November submission rates are similar.

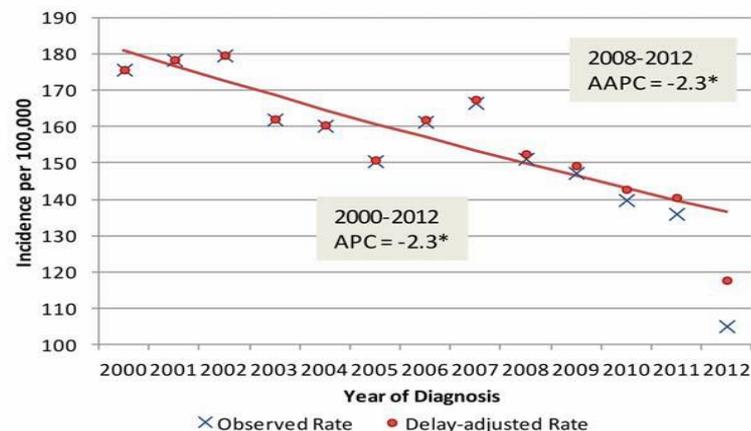
Results – Preliminary Report of 2012 Data



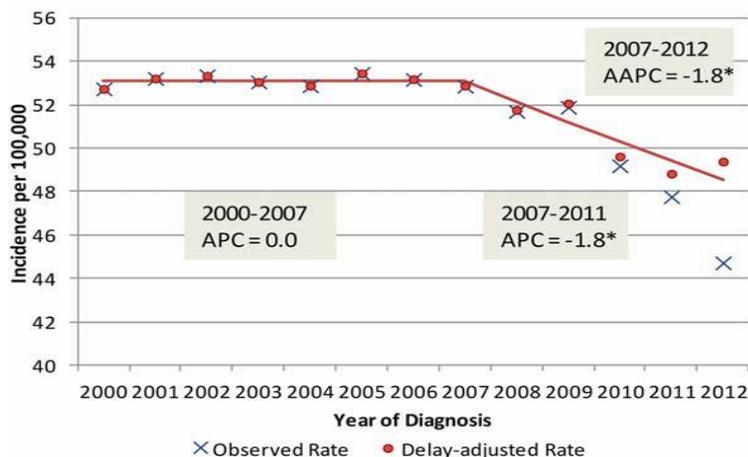
February 2014 Submission,
All Sites, All Races, Both Sexes



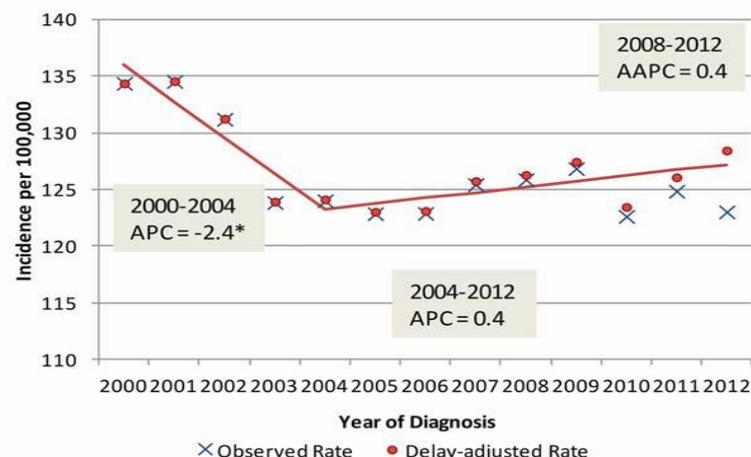
February 2014 Submission,
Prostate, All Races, Males



February 2014 Submission,
Lung and Bronchus, All Races, Female



February 2014 Submission,
Breast, All Races, Females

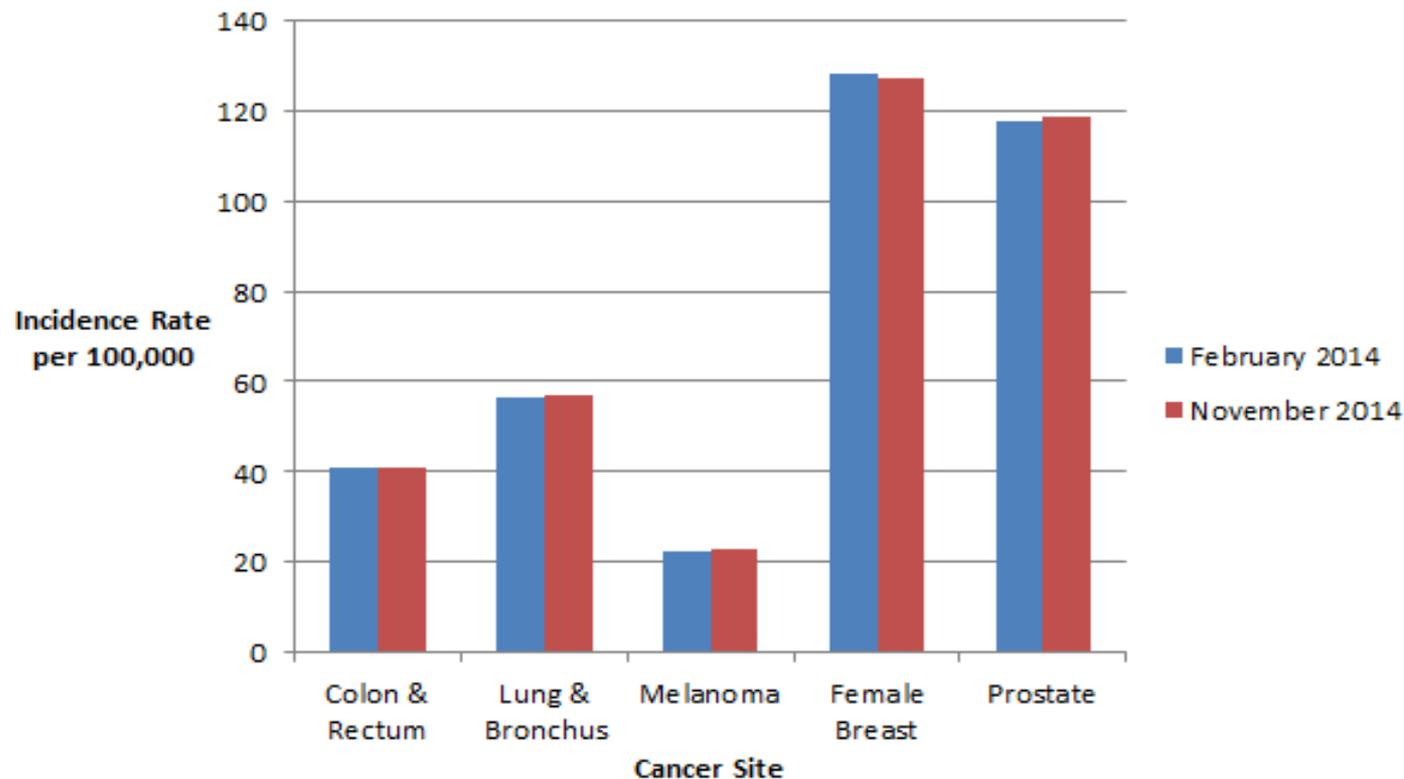


Results – Preliminary Report of 2012 Data



- For 2012 incidence rates, observed and delay-adjusted rates were compared, along with APC and AAPC trends.
- The delay adjusted model made a steady adjustment at the last data point for 2012, in keeping with the overall trend.
- The AAPCs were similar for 5 and 10 years and in the same direction.

Brief Update - 2012 Delay Adjusted Rates



Update



- Comparison of 2012 delay adjusted rates for SEER18 (with greater Georgia) for February and November 2012 show close agreement across multiple cancer sites.
- Can use delay factors to adjust February submission data and get close to November submission rates.
- Percent difference for most delay estimates were within 2 points.

Discussion



- The rates and trends presented are based on the February 2014 submission of 2012 data.
- The Cancer Statistics Review including 2012 statistics is based on the November 2014 submission and was released in April 2015.

Discussion



- A comparison of the delay adjusted rates for 2012 from the February 2014 submission and the November 2014 submission indicate good agreement in the two sets of rates.

Future Directions



- While electronic data capture methods are promising for timelier release of cancer incidence data, these methods require additional evaluation.
- November submissions do include cases diagnosed in subsequent years.
- Further refinement of the delay adjustment models could occur to explore ways to make earlier limited data release possible.

Early Estimates Citation



- <http://onlinelibrary.wiley.com/doi/10.1002/cncr.29304/epdf>
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Further Questions? Thoughts?



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