

Circumferential Resection Margin Quality Audit

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Background

- Circumferential Resection Margin (CRM): Distance between deepest point of tumor invasion and surgically resected nonperitonealized surface of the colon/rectum
- Positive CRM (<1mm distance of tumor from the resected margin) associated with disease recurrence, distant metastasis, and worse survival
- Since 2010, The SEER Program has collected Collaborative Stage Site-Specific Factor 6 (SSF 6) data item (CRM measurement) and Surgery Primary Site Code (SEER Program Coding and Staging Manual 2018) for colon and rectal cancers
- Due to ambiguous guidance and a lack of understanding on the reporting and coding of these variables, a review of the data quality is warranted

Methods

- Colon and rectal cancer cases diagnosed between 2010-2015 identified using SEER*Stat; Malignant and in situ included in the analysis
- SSF 6 codes and surgery primary site codes categorized according to CRM measurement if surgical resection was performed
- Outlier detection performed to analyze six problem areas by registry
- Trends (2010-2015) in six problem areas observed
- Seven volunteer registries completed a manual review of 100 randomly selected colon and/or rectal cancer cases with the help of Information Management Systems (IMS)

A total of six problem areas identified in the cross tabulations:

Issue 1. Resection not performed per surgery primary site code (00-28), CRM should also indicate no resection (998)

Issue 2. Cases with higher likelihood of miscoding because of decimal point conversion errors or cm to mm conversion errors; likely to benefit from visual editing

Issue 3. Surgery primary site code indicates resection (30-80), CRM code indicates no resection (998)

Issue 4. Cases with higher likelihood of miscoding as unknown CRM; likely to benefit from review of pathology reports and NAACCR Abstract text

Issue 5. CRM indicates resection performed; Surgery primary site should be coded accordingly to resection codes (i.e. 80)

Issue 6. Large Margins: CRM value \geq 20.0mm

While the results are presented solely on rectal cancer cases, the same methodology was applied to colon cancer cases, and a similar distribution of issues was found.

Results

Table 1. Surgery Primary Site Code and CRM Cross Tabulation for Rectal Cancer

Cases	RX Summ--Surg Prim Site				Total:
	00-28 (No surgical resection)	30-80 (Surgical Resection)	90 (Surgery NOS)	99 (Unknown)	
CRM (SSF 6)					
000 (CRM Positive)	203 ¹	2,694	15 ⁵	0	2,912
001-010 (0.1mm-1.0mm)	92 ¹	2,121 ²	4 ⁵	0	2,217
011-019, 992 (1.1mm-1.9mm)	21 ¹	817	2 ⁵	0	840
020-199, 993-995 (2.0mm-19.9mm)	85 ¹	4,656	2	0	4,743
996 (>5.0mm)	5 ¹	323	0	0	328
200-981 (20.0mm-98.1mm)	6 ^{1,6}	1,996 ⁶	0	0	2,002
990 (No residual tumor identified on specimen)	838 ¹	6,291	40 ⁵	0	7,169
991 (Margins clear; CRM negative; NOS)	679 ¹	9,475	30	0	10,184
998 (No resection)	19,715	1,244 ³	89	0	21,048
999 (Unknown)	3,292 ¹	6,910 ⁴	160 ⁴	343	10,705
Total:	24,936	36,527	342	343	62,148

Figure 1. Issue 1 By Year – Rectal Cancer
Proportion of cases with no resection (surgery primary site 00-28) which are *not* coded to CRM 998 (no resection)

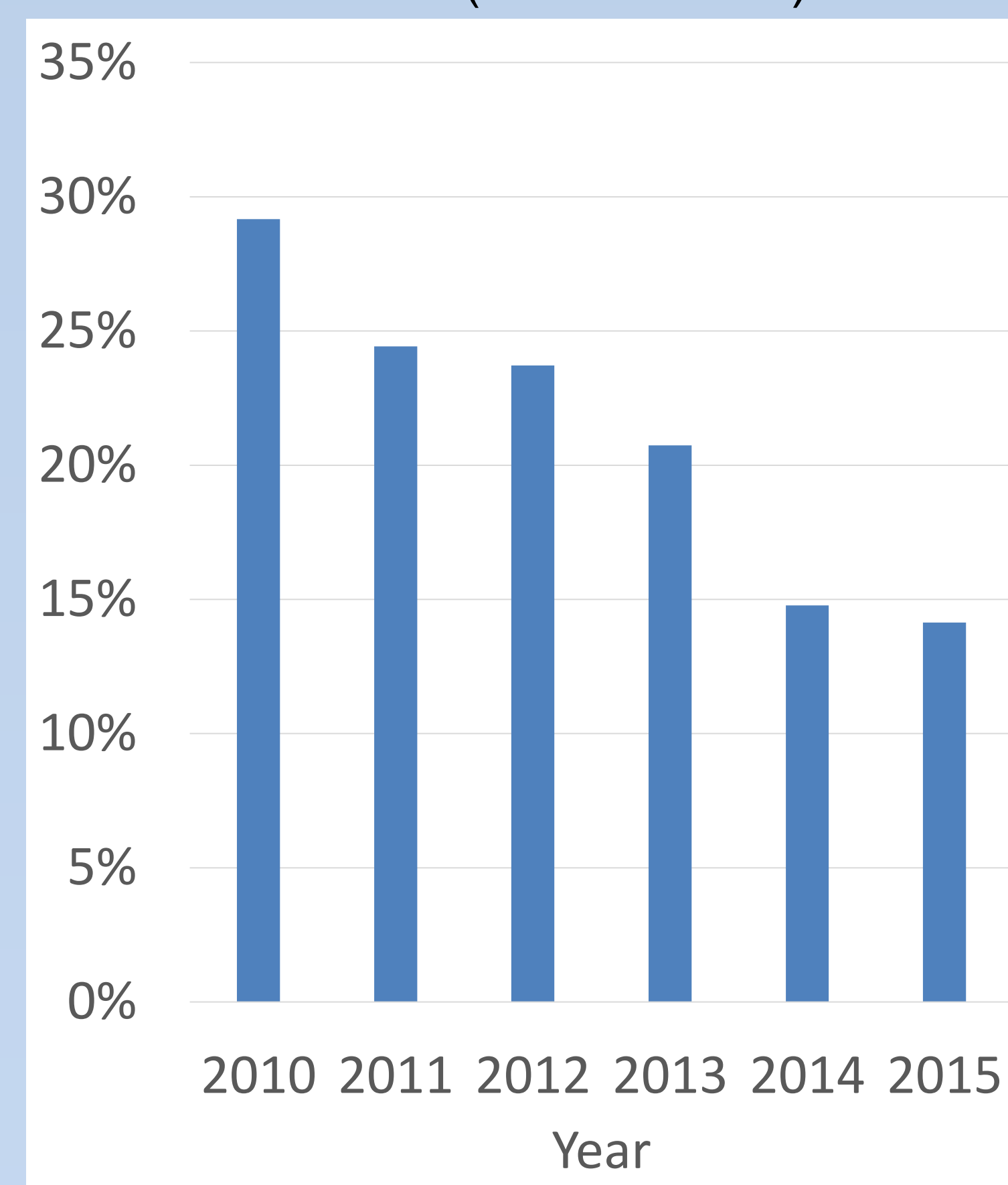


Figure 2. Issue 2 By Year – Rectal Cancer
Proportion of resection cases (surgery primary site 30-80) which are also CRM positive (CRM 001-010)

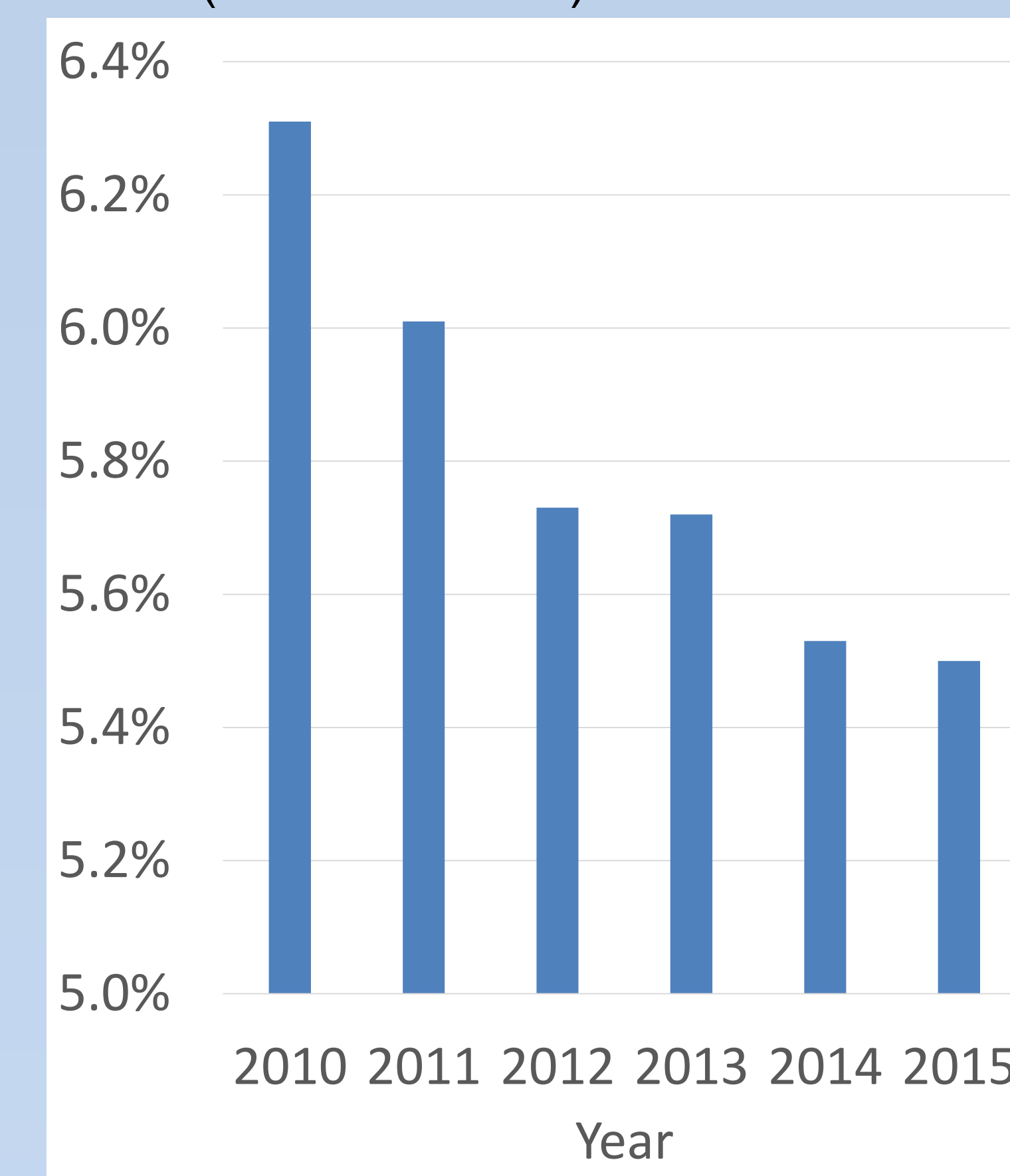


Figure 3. Issue 5 By Registry – Rectal Cancer

Outlier detection for cases coded to surgery NOS, but with a CRM code indicating resection

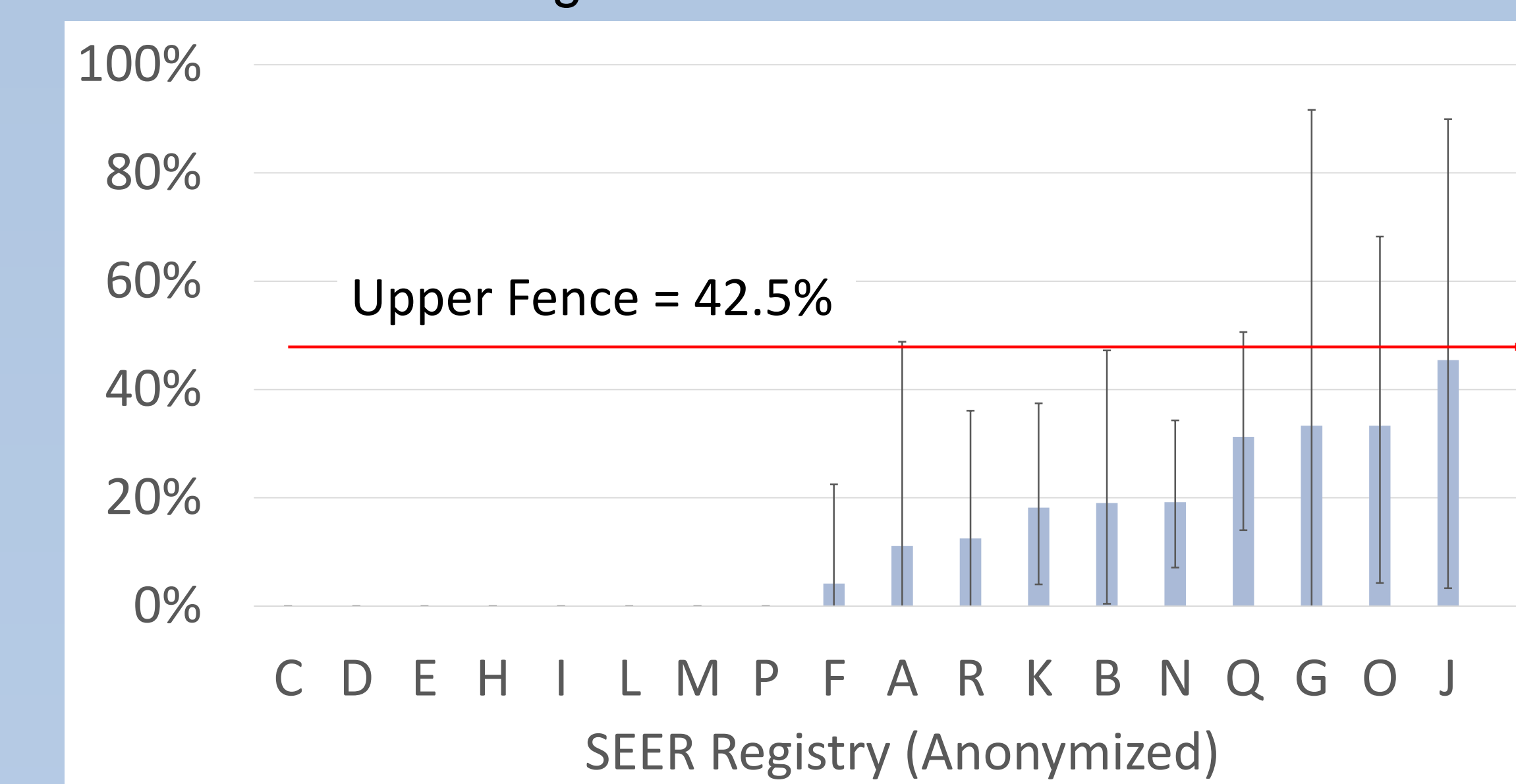
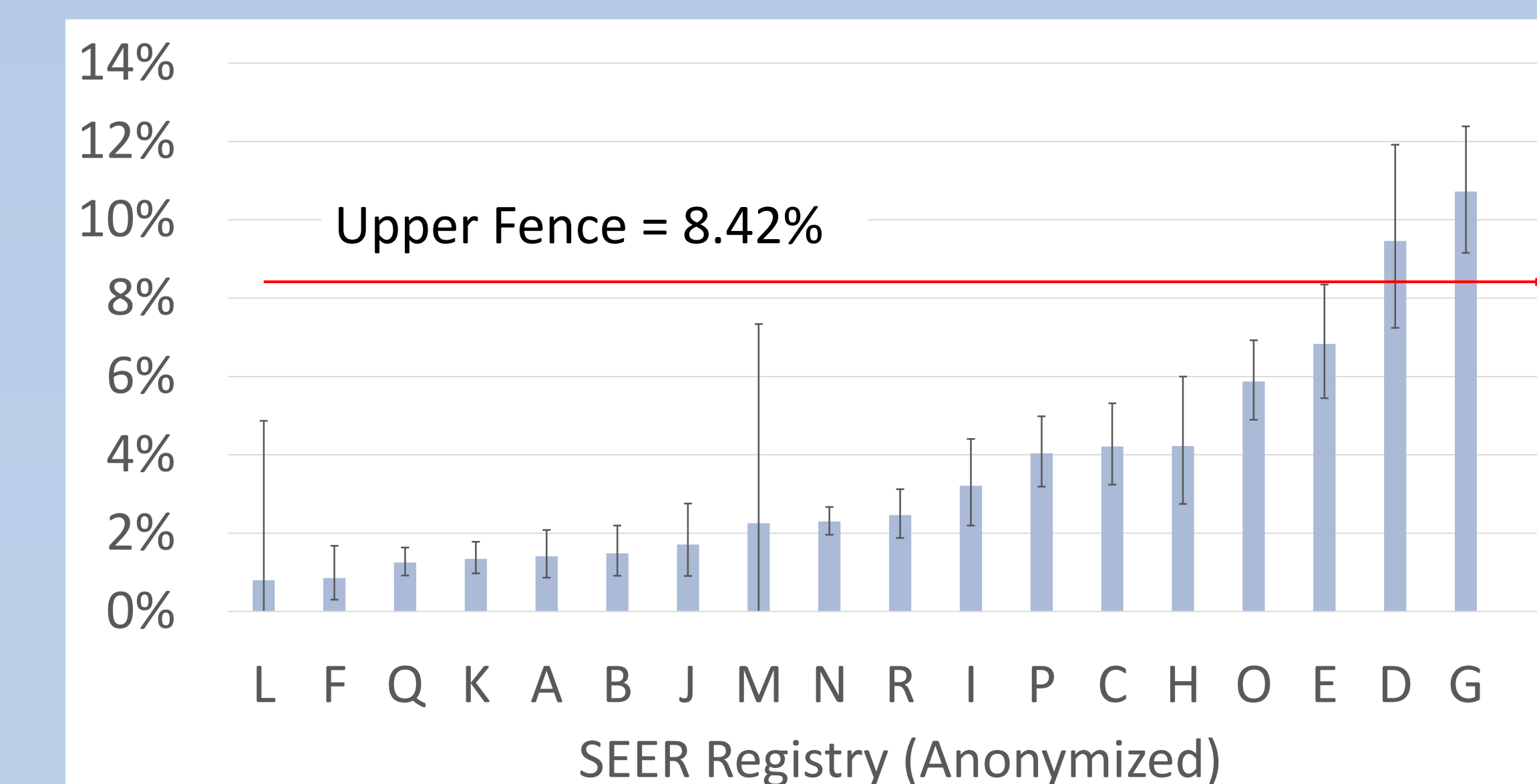


Figure 4. Issue 6 By Registry – Rectal Cancer

Outlier detection for cases with CRM measurement \geq 20.0mm



Figures 3 & 4 use Outlier Detection methods: Interquartile ranges calculated to create upper and lower fences. Lower fence in both graphs = 0% and therefore omitted. An outlier is established if entire confidence interval falls outside the indicated fences

Discussion

The following corrective-action plan is proposed:

1. Remove the CRM data item from existing datasets (completed April 2019); do not re-release the data item until correct
2. Edit Checks
 - If surgery primary site is <30, CRM should only be 998
 - If surgery primary site = 90 (surgery NOS) and CRM indicates resection was performed, can code to surgery primary site 80 (resection NOS)
 - Large margins: Should not have CRM values greater than 200 (20.0mm; 2.0cm)
3. Full Audit: Re-consolidate the values based on verification of pathology report and NAACCR Abstract text