UC DAVIS
INSTITUTE FOR POPULATION HEALTH IMPROVEMENT

A CENTRAL REGISTRY RELIABILITY STUDY

Visual Editor TNM & Summary Stage Staging Skill Assessment

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Searching for Causes & Cures
CCR EuYeka
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CALIFORNIA CANCER REGISTRY
CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
California's Cancer Data Shaping the Future of Cancer Outcomes

NAACCR June 16, 2016

Outline

- California Cancer Registry
- Study Rationale & Goals
- Study Design
- Reports & Dissemination of Results
- Study Results
- Analyses of Results
- Education
- Conclusions
- Next Steps

California Cancer Registry (CCR) & Our Regional Registries

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CalCARES

California Cancer Registry

Cancer Prevention Institute of California	Cancer Registry of Greater California	Cancer Surveillance Program
Region 1/8	Regions	Los Angeles
SEER	2,3,4,5,6,7,10	Region 9
	SEER	SEER

CalCARES partners with California Department of Public Health (CDPH) to manage the operations of the state mandated California Cancer Registry (CCR)

Study Rationale

- Visual Editors (VE) on the front line
  - Provide feedback to state registrars on TNM coding
  - Some VE without any prior TNM experience
  - Others, experience long ago
  - Instructions for registry coding of AJCC TNM stage changing
  - VE's expressed confidence in skills -not high

Study Goal

- Assess TNM knowledge
  - Regional Registry Visual Editors
    - Identify knowledge gaps
    - Provide focused TNM Education
    - Improve skills and boost confidence
  - Visual Editors statewide were requested to participate
  - Assess Summary Stage 2000 for same TNM cases

Pre-Study Requirements

- Each participant to complete AJCC Training materials:
  - Registrar's Guide to Chapter One
  - Explaining Blanks and X, Ambiguous Terminology and Support for AJCC Staging
  - Completion of AJCC Curriculum Modules I-IV

Study Design- Eureka DMS

Study designed to utilize ***Eureka*** DMS

- **California Cancer Registry Data Management System**

Design included ability to:

- **Populate Study Cases with Text Information**
- **Assign Cases to Individual Participants**
- **Receive Completed Cases**
- **Generate Reports for Analysis**

Timeline Module Development

- Collaboration – CTR & Programmer Team Aug/Sept 2015
- Testing in October 2015
- Module went live November 2015

Study Design- Cases Scenarios

12 Case scenario's specially selected:

- **Maximized TNM assessment and teaching value**
  - **Understanding of AJCC rules**
  - **Understanding on use of blanks, 88s and 99**
  - **Assess Summary Stage coding**

Eureka –Reliability Study Screen

- Populates Study Answers
- Study Coordinator populates case scenario text

System | File | Search | Merge/Relink | Casefinding | Administration | Reports | Help | Developer

Reliability Study Case Admin

SEER Summary Stage 2000: 0 - IN SITU

TNM:	T	N	M	S	Descriptor
Clinical					No information available
Path					No information available

Save Close

Case Name:
Case ID:
Site:
Date Created:
Created By:
Date Last Modified:
Last Modified By:

Diagnostic Text

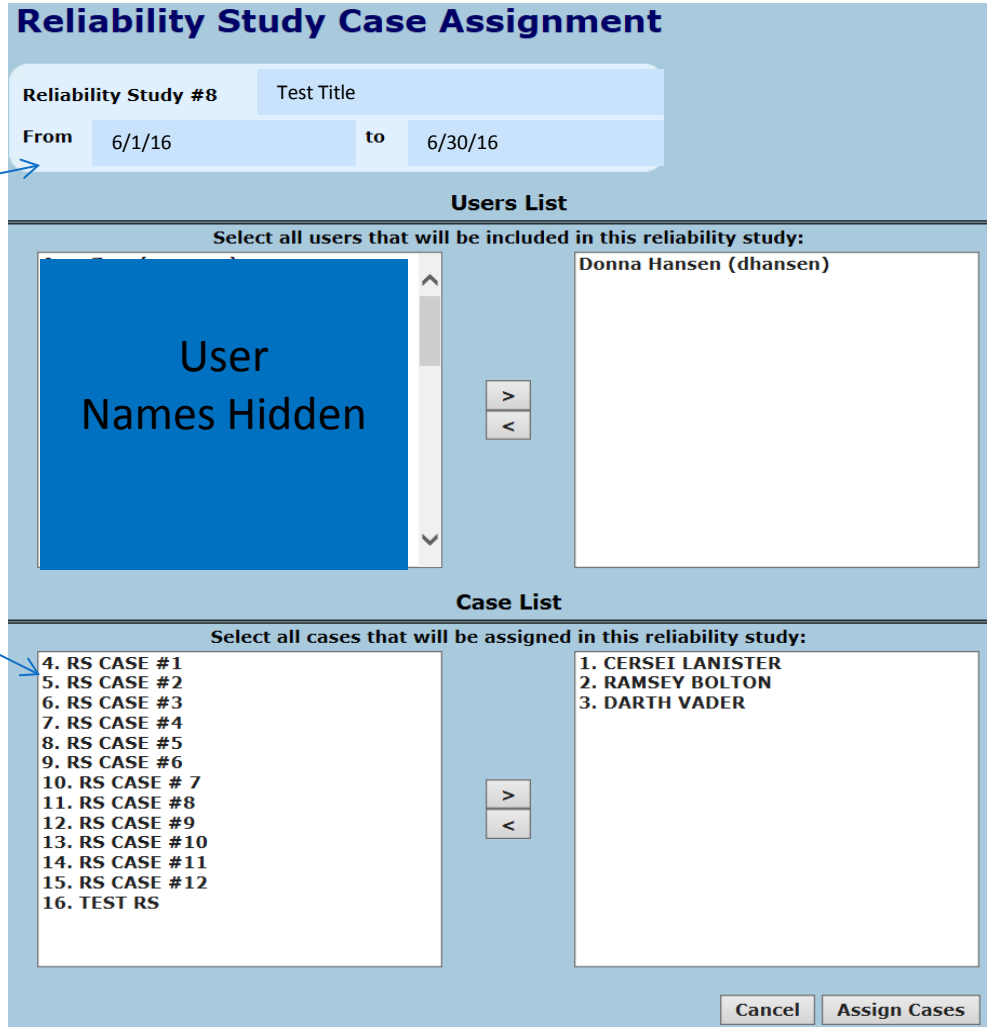
Physical Exam	Laboratory Tests	Path/Autopsy
X-Rays/Scans	Operative Findings	Final Diagnosis
Scopes	Staging	Remarks

Therapy Text

Radiation Therapy	Hormone Therapy	Other Therapy
Chemo Therapy	Immuno Therapy	

Assigning Cases

- Define Testing Date Range
- Assign Users for study
- Assign cases to participants



Participant Case List

- Example: Participant Case List Screen

Reliability Study Case List

Participant Name

#	Assignment	Case	Date Assigned	Start Date	End Date	Date Last Modified	Action
331	7: TNM Reliability Study Phase 2 Test	4: RS CASE #1	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
332	7: TNM Reliability Study Phase 2 Test	5: RS CASE #2	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
333	7: TNM Reliability Study Phase 2 Test	6: RS CASE #3	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
334	7: TNM Reliability Study Phase 2 Test	7: RS CASE #4	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
335	7: TNM Reliability Study Phase 2 Test	8: RS CASE #5	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
336	7: TNM Reliability Study Phase 2 Test	9: RS CASE #6	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
337	7: TNM Reliability Study Phase 2 Test	10: RS CASE # 7	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
338	7: TNM Reliability Study Phase 2 Test	11: RS CASE #8	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
339	7: TNM Reliability Study Phase 2 Test	12: RS CASE #9	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
340	7: TNM Reliability Study Phase 2 Test	13: RS CASE #10	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
341	7: TNM Reliability Study Phase 2 Test	14: RS CASE #11	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code
342	7: TNM Reliability Study Phase 2 Test	15: RS CASE #12	05/31/2016	05/31/2016	11/30/2016	05/31/2016	code

Populated Case Scenario Screen

- **Case scenario's visually mimic view normally seen in VE process**
- Participant Reviews text
- Directly Enters TNM and Summary Stage
- Saves case as complete

SEER Summary Stage 2000: 0 - IN SITU

TNM:	T	N	M	S	Descriptor
Clinical					0 - None
Path					0 - None

Save Close

Case Name:	RS CASE #1
#	4 Site C504
Created By:	dhansen
Date Assigned:	05/31/2016
Date Last Modified:	05/31/2016
End Date:	11/30/2016

Physical Exam	Laboratory Tests	Path/Autopsy
3/11/15 57year old White non-Hispanic female presents post abnormal mammogram. PE: Symmetric breasts bilaterally, no masses palpated, no axillary adenopathy. H&P otherwise negative.	03/29/15 ER+ 90%, PR+ 60%. HER2N not done.	3/12/15 Stereotactic R breast core needle biopsy: Ductal carcinoma in situ high nuclear grade w/comedonecrosis and calcification, no invasive carcinoma. 3/29/15 R partial mastectomy: Ductal carcinoma in situ comedo
X-Rays/Scans	**Operative Findings**	**Final Diagnosis**
3/1/15 Mammogram: small focus microcalcifications in upper outer quadrant right breast by report.	3/29/15 Right breast lumpectomy: Generous transverse incision made in UOQ down to lateral edge of pectoralis major muscle. Radiology confirmed successful excision of biopsy clip as well as residual microcalcifications. Given the	DCIS Right Breast
Scopes	**Staging**	**Remarks**
NONE	NR	

Therapy Text

Radiation Therapy	Hormone Therapy	Other Therapy
Patient received external beam radiation NOS to tumor bed at ABC ROC. Total dose specifics not available.	Patient declines adjuvant hormonal therapy.	NONE
Chemo Therapy	**Immuno Therapy**	
NONE	NONE	

Software Reports

- Reports developed to calculate discrepancies & accuracy by:
  - **Individual data item**
  - **Individual case**
  - **Individual Participant**
  - **Each Region**
  - **Statewide overall**

Software Reports
How Results Counted/Calculated

- Total Participants = 23
- Total Cases = 12
- Total Items per case = 11
  - 10 data items for each TNM case
    - 230 errors possible per data item
    - 2300 overall X 23 participants x 12 cases
  - 1 data item for each Summary Stage case
    - 276 errors possible overall x 23 participants x 12 cases

- Total Errors ÷ (Total Cases x Total Items per Case) x 100 = Percentage of errors

Software Reports

- Example Individual Results

Pink cell indicates incorrect answer

TNM Reliability Study Results

1	ValueType	RegionID	Case Description	SumStage	ClinT	ClinN	ClinM	ClinStage	ClinDesc	PathT	PathN	PathM	PathStage	PathDesc	Total Errors Per Case	Accuracy Per Case
2	CaseValues*	#	RS CASE #1 (C504)	0 - IN SITU		0	0	0	0 - None	IS			0	0 - None		
3	UserValues**	#	Visual Editor A	0 - IN SITU		0	0	0	0 - None	IS			0	0 - None	0	100.00%
4	CaseValues	#	RS CASE #2 (C505)	1 - LOCALIZED	1C	0	0	1A	0 - None	1C	0		1A	0 - None		
5	UserValues	#	Visual Editor A	1 - LOCALIZED	1C	0	0	1A	0 - None	1C	0		1A	0 - None	0	100.00%
6	CaseValues	#	RS CASE #3 (C672)	1 - LOCALIZED	2	0	0	2	0 - None					0 - None		
7	UserValues	#	Visual Editor A	1 - LOCALIZED	2B	0	0	2	0 - None					0 - None	1	90.91%
8	CaseValues	#	RS CASE #4 (C187)	4 - REG LN & EXT	X	0	0	99	0 - None	3	1B		3B	0 - None		
9	UserValues	#	Visual Editor A	4 - REG LN & EXT		0	0		0 - None	3	1B		3B	0 - None	1	90.91%
10	CaseValues	#	RS CASE #5 (C541)	1 - LOCALIZED	1	0	0	1	0 - None	1A	X		99	0 - None		
11	UserValues	#	Visual Editor A	1 - LOCALIZED	1	0	0	1	0 - None	1A			1A	0 - None	2	81.82%
12	CaseValues	#	RS CASE #6 (C672)	1 - LOCALIZED	2	0	0	2	0 - None	2A	0		2	4 - Y (Initial		
13	UserValues	#	Visual Editor A	1 - LOCALIZED	2	0	0	2	0 - None					0 - None	4	63.64%
14	CaseValues	#	RS CASE # 7 (C619)	1 - LOCALIZED	1C	0	0	1	0 - None					0 - None		
15	UserValues	#	Visual Editor A	1 - LOCALIZED	1C	0	0	1	0 - None					0 - None	0	100.00%
16	CaseValues	#	RS CASE #8 (C649)	7 - DISTANT MET	4	1		4	0 - None			1	4	0 - None		
17	UserValues	#	Visual Editor A	7 - DISTANT MET	4	2	1	4	0 - None			1	4	0 - None	1	90.91%
18	CaseValues	#	RS CASE #9 (C619)	1 - LOCALIZED	2A	0	0	1	0 - None	2A	X		99	0 - None		
19	UserValues	#	Visual Editor A	1 - LOCALIZED	2	0	0	1	0 - None	3			3	0 - None	4	63.64%
20	CaseValues	#	RS CASE #10 (C504)	1 - LOCALIZED	2	0	0	2A	0 - None	2	0i+		2A	0 - None		
21	UserValues	#	Visual Editor A	1 - LOCALIZED	2	0	0	2A	0 - None	2	0i+		2A	0 - None	0	100.00%
22	CaseValues	#	RS CASE #11 (C343)	2 - REG DIR EXTEN	1A	0	0	1A	0 - None	2A	0		1B	0 - None		
23	UserValues	#	Visual Editor A	2 - REG DIR EXTEN	1A	0	0	1A	0 - None	2A	0		1B	0 - None	0	100.00%
24	CaseValues	#	RS CASE #12 (C711)	1 - LOCALIZED	88	88	88	88	0 - None	88	88	88	88	0 - None		
25	UserValues	#	Visual Editor A	1 - LOCALIZED				88	0 - None				88	0 - None	6	45.45%
26			Errors by data item	0	4	1	2	0	0	3	4	1	3	1	Overall	
27			Accuracy By Category	100.00%	66.67%	91.67%	83.33%	100.00%	100.00%	75.00%	66.67%	91.67%	75.00%	91.67%	85.60%	

Software Reports

- Example Regional Report

Reliability Study Results-Region K				Total Errors by category												
Number	User	Visual Editor 1=yes 2=no	Region	Summary Stage	Clin T	Clin N	Clin M	Stage Grp	Descriptor	Path T	Path N	Path M	Stage Grp2	Descriptor2	Total Errors from All Cases	Overall Accuracy Rate by participant
1	K1	1	K	1	1	0	1	1	0	1	1	1	3	0	10	92.42%
2	K2	1	K	0	2	1	0	0	0	1	0	0	0	0	4	96.97%
3	K3	1	K	1	3	0	0	1	0	1	0	0	0	1	7	94.70%
4	K4	1	K	5	9	3	1	5	0	5	5	4	4	1	42	68.18%
5	K5	1	K	2	2	0	1	0	0	0	2	0	2	0	9	93.18%
	Total Errors			9	17	4	3	7	0	8	8	5	9	2	72	
	Poss Errors x 5 participants			60	60	60	60	60	60	60	60	60	60	60	660	
	Accuracy by Category			85.00%	71.70%	93.34%	95.00%	88.34%	100%	86.67%	86.67%	91.67%	85.00%	96.67%		
																89.09%

Items per Case	11
Total Cases	12
Participants	5

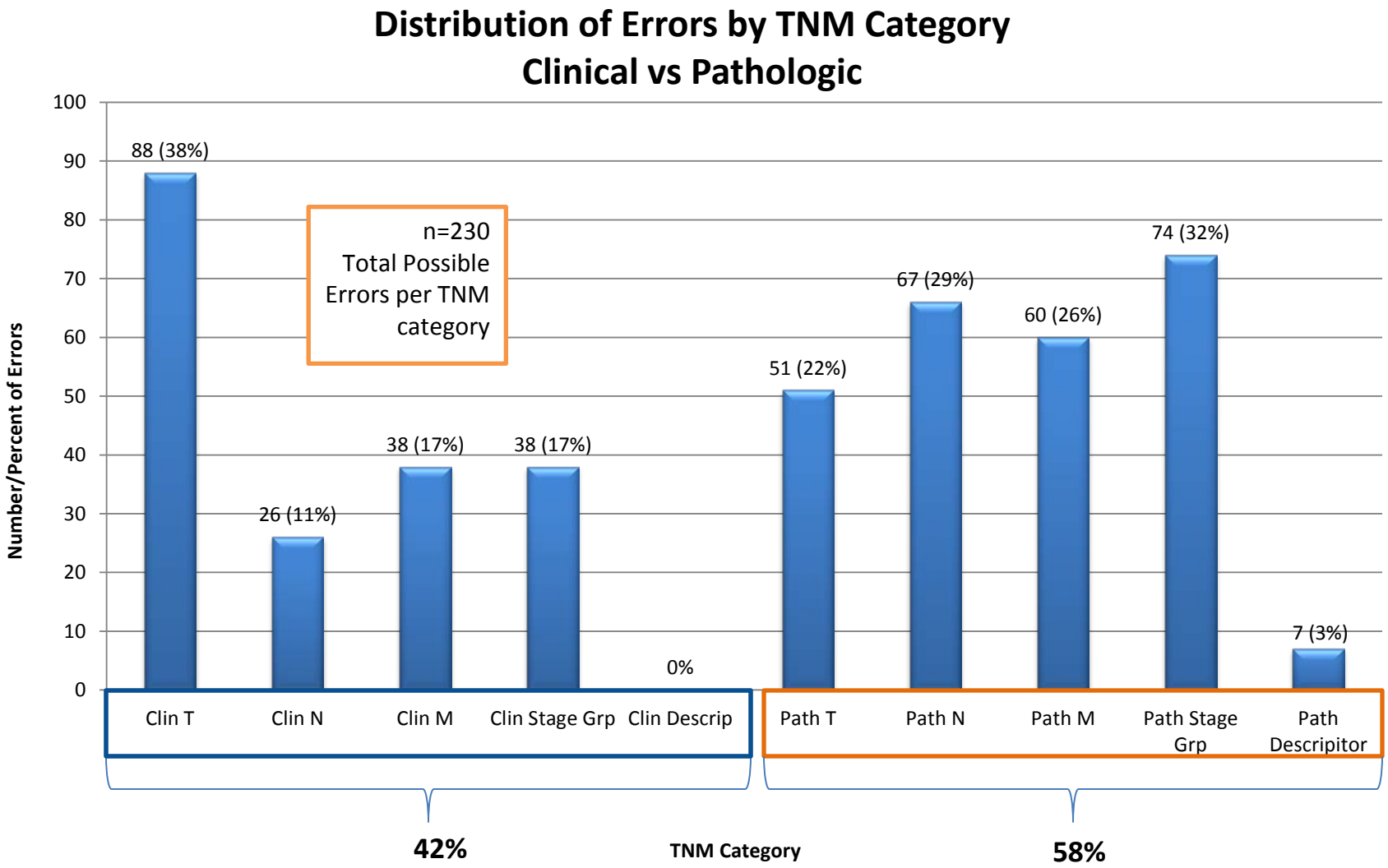
Total Errors:	
Sum Stage Total errors overall=9	Total Errors Possible = 60
TNM - Total Errors overall = 63	Total Errors Possible = 600
Combined SS & TNM Errors =72	Total Errors Possible = 660

Accuracy Rates:	
Summary Stage Accuracy Rate	85.00%
Overall TNM Accuracy Rate	89.50%
Overall Summary Stage & TNM Accuracy-all	89.09%

Dissemination of Results

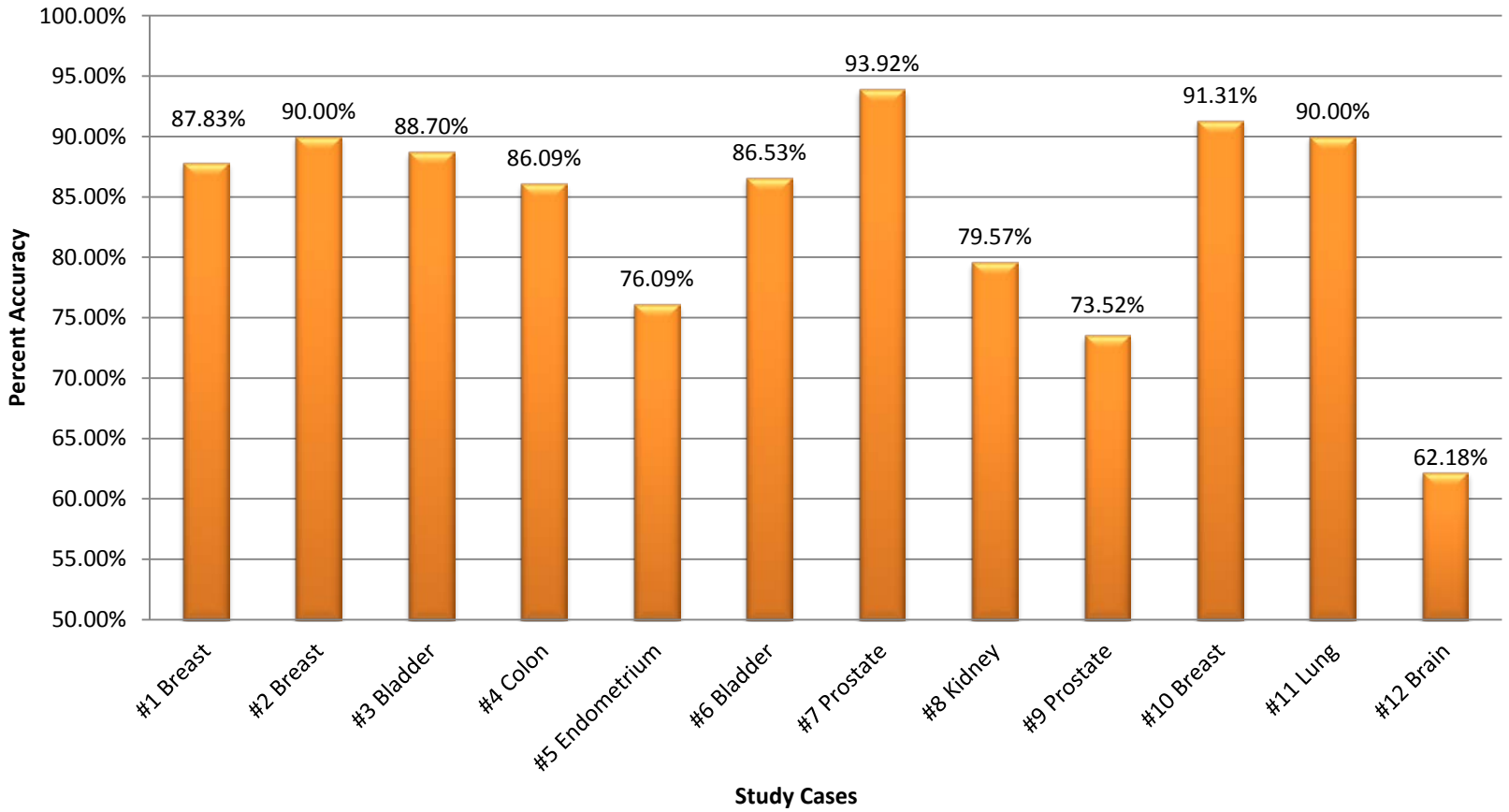
- Individual Participant
  - Personal Accuracy
    - TNM
    - Summary Stage
    - Overall
- Regional Registry Management
  - Results Specific to Region
- UCD Management
- CDPH Management
  - Statewide and Regional Results

Study Results

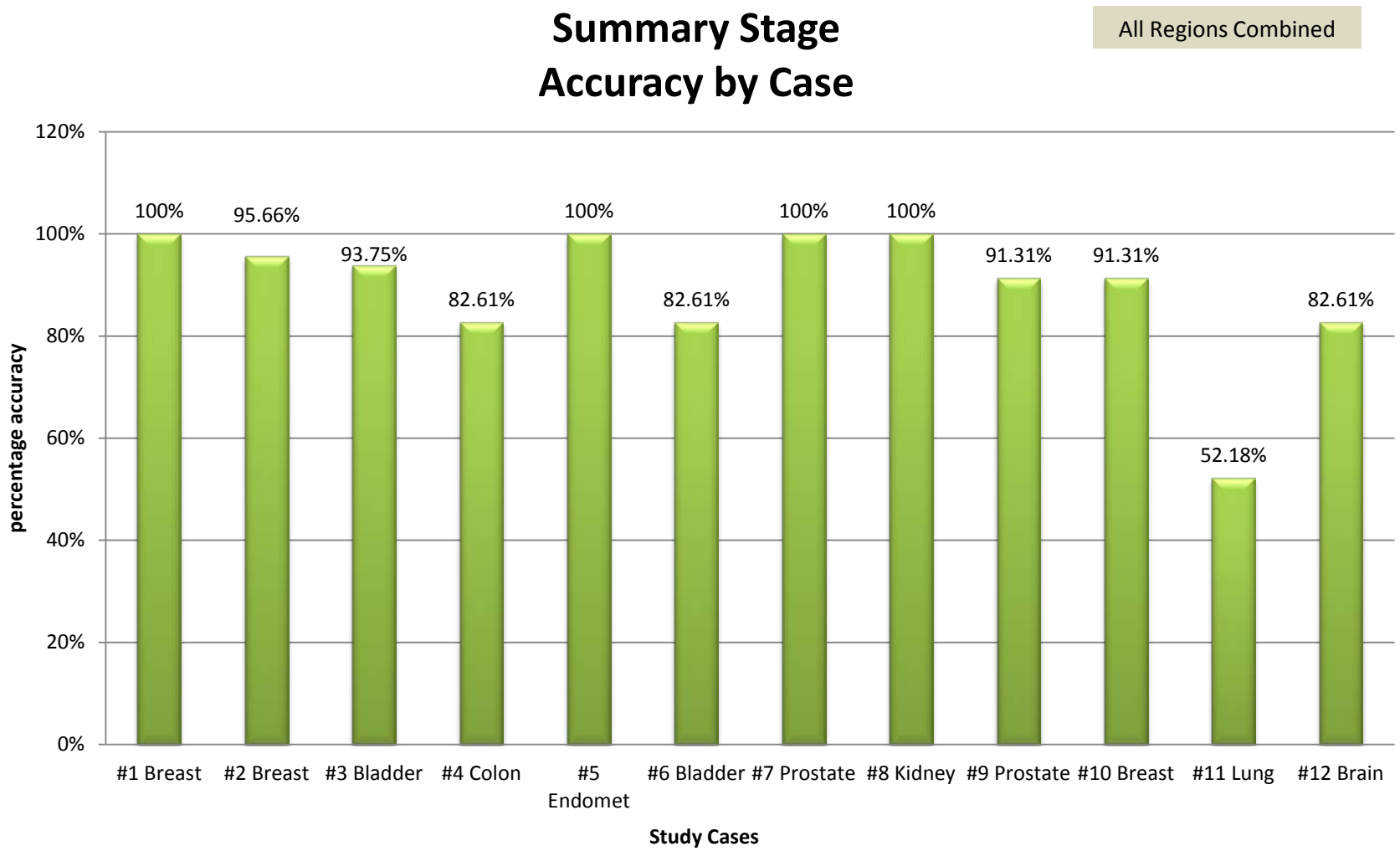


Study Results

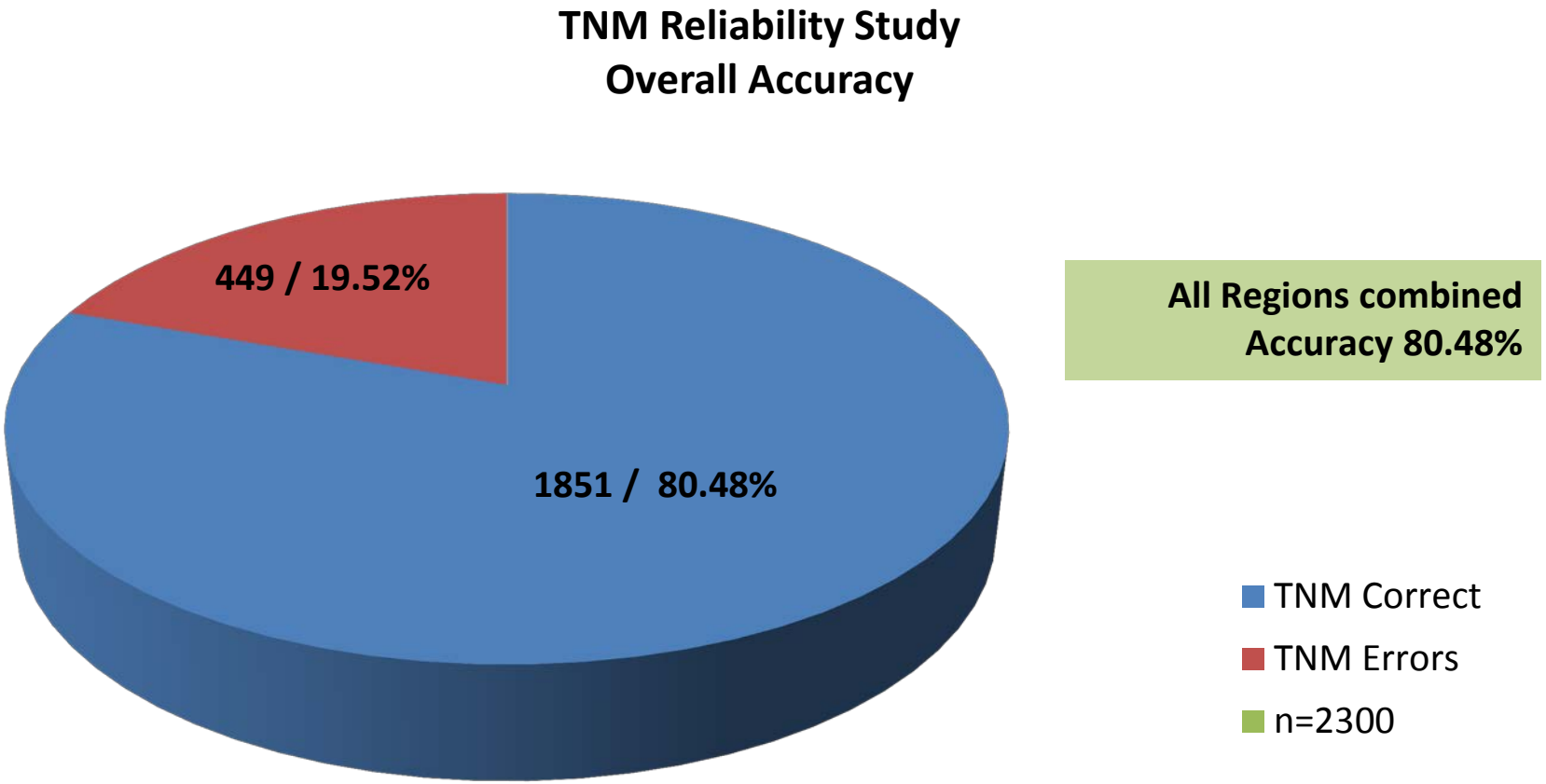
All Regions Combined



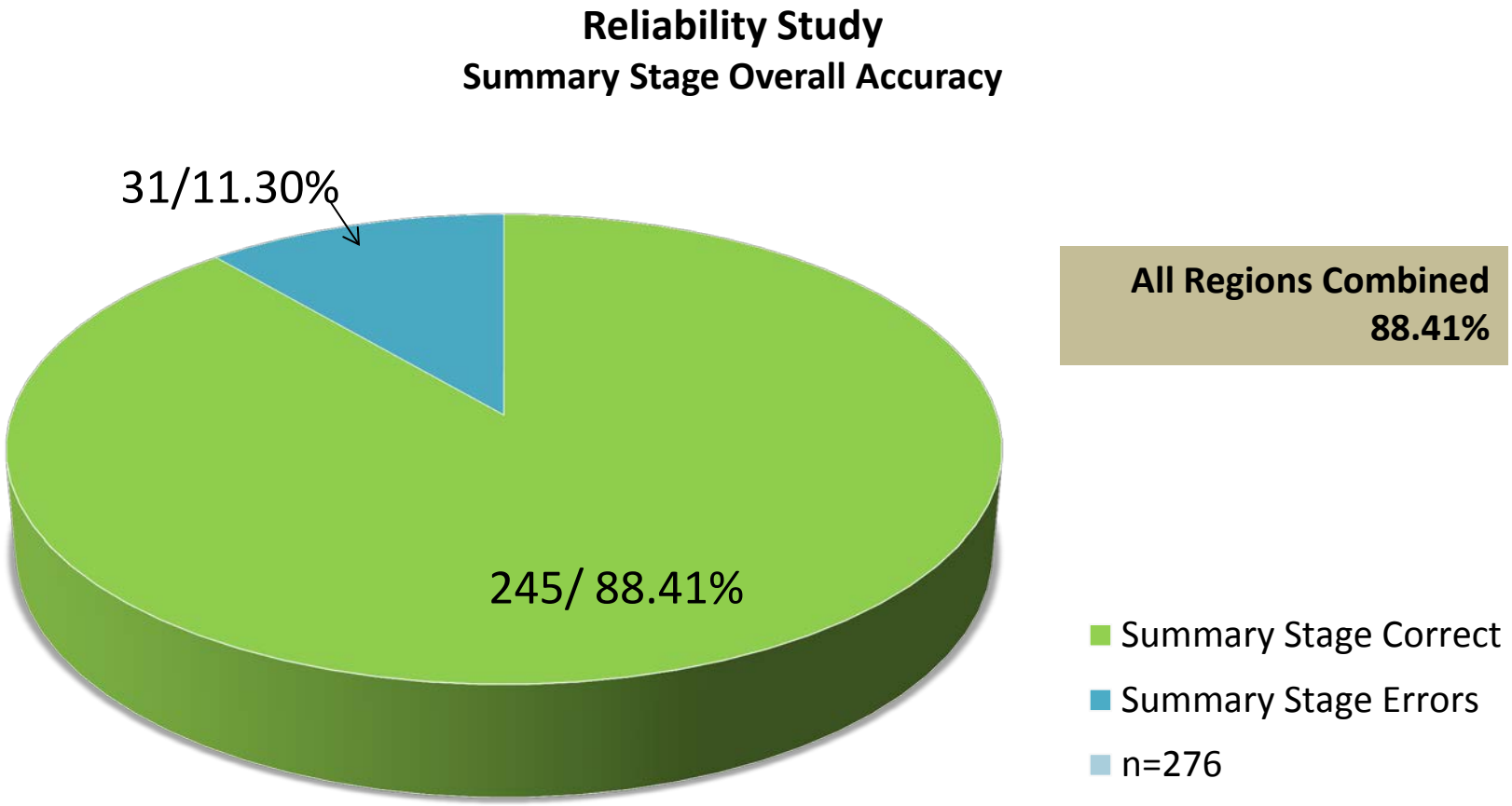
Study Results



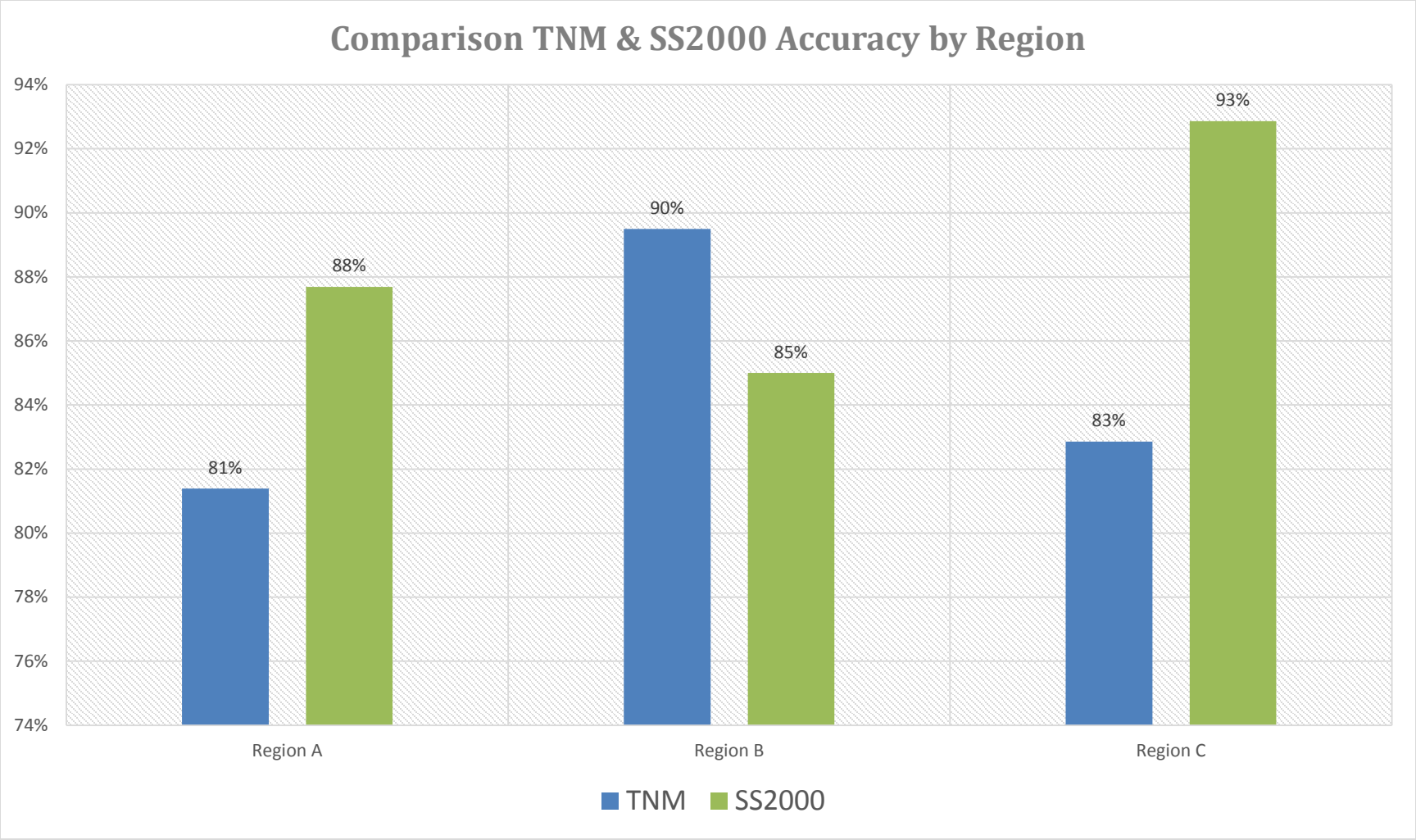
Study Results



Study Results



Study Results

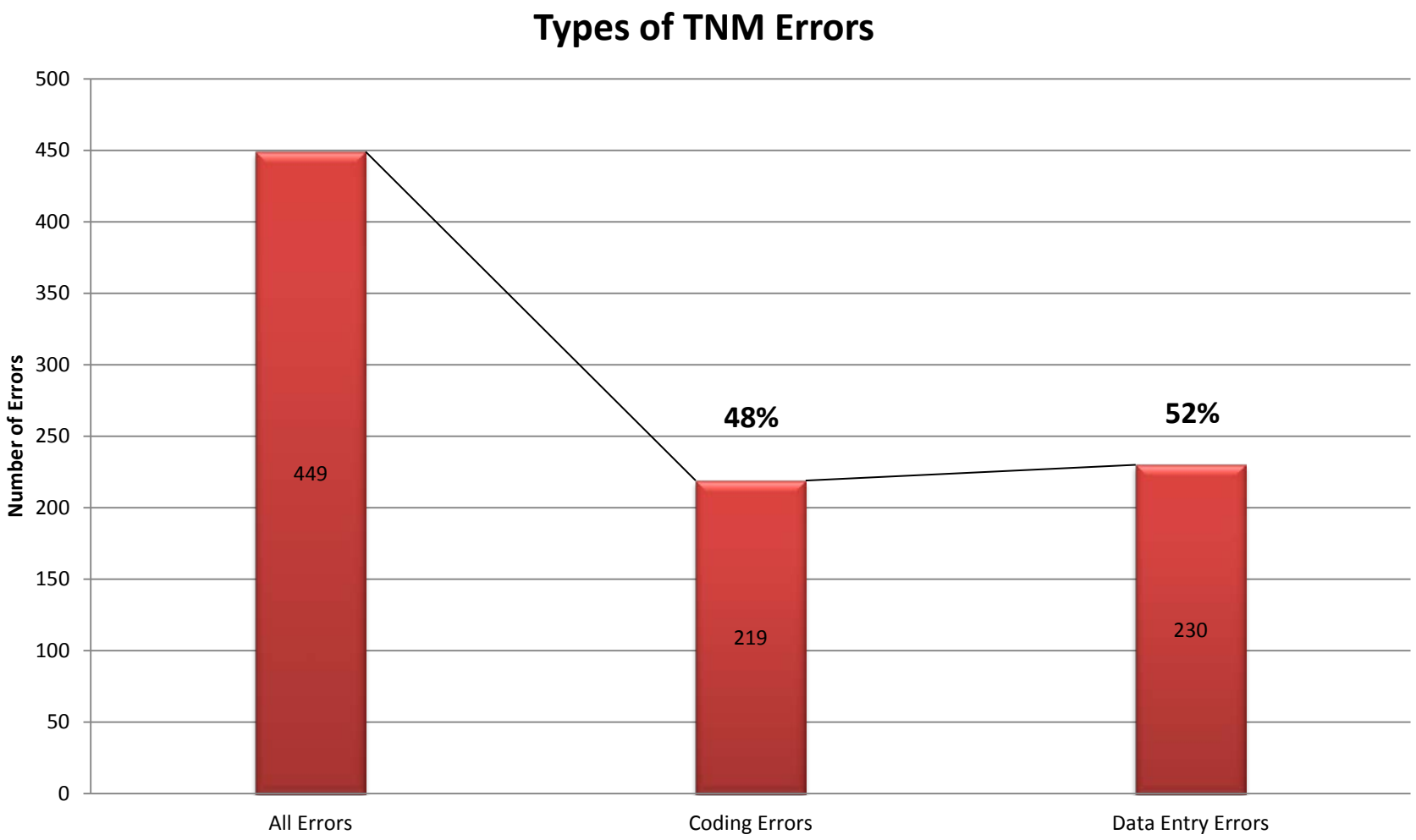


Analyses of Results

Two Types of Errors:

- **Coding Errors**
  - Selection of incorrect AJCC TNM category (value)
  - Assigned X when a valid TNM category available
  - Descriptor error
  - Incorrect assignment of M
- **Data Entry Errors**
  - Non-use/incorrect use of blanks, 88, 99 to reflect stage in registry data fields

Analyses of Results



Analyses of Results

Coding Errors = 48%

- Result of:
  - Incorrect understanding of some AJCC principals
    - Rules for classification
    - Use of clinical info in path stage
    - Assessment/timeframe rules for M assignment
  - Tumor size errors-converting cm to mm
  - Incorrect use of X
  - AJCC T, N & M tables –some layout differences between chapters
    - TNM Subcategories not used when applicable
    - Used incorrect TNM Subcategory
  - Special AJCC rules for some circumstances
    - Differ from general rules

Analyses of Results

Data Entry Errors = 52%

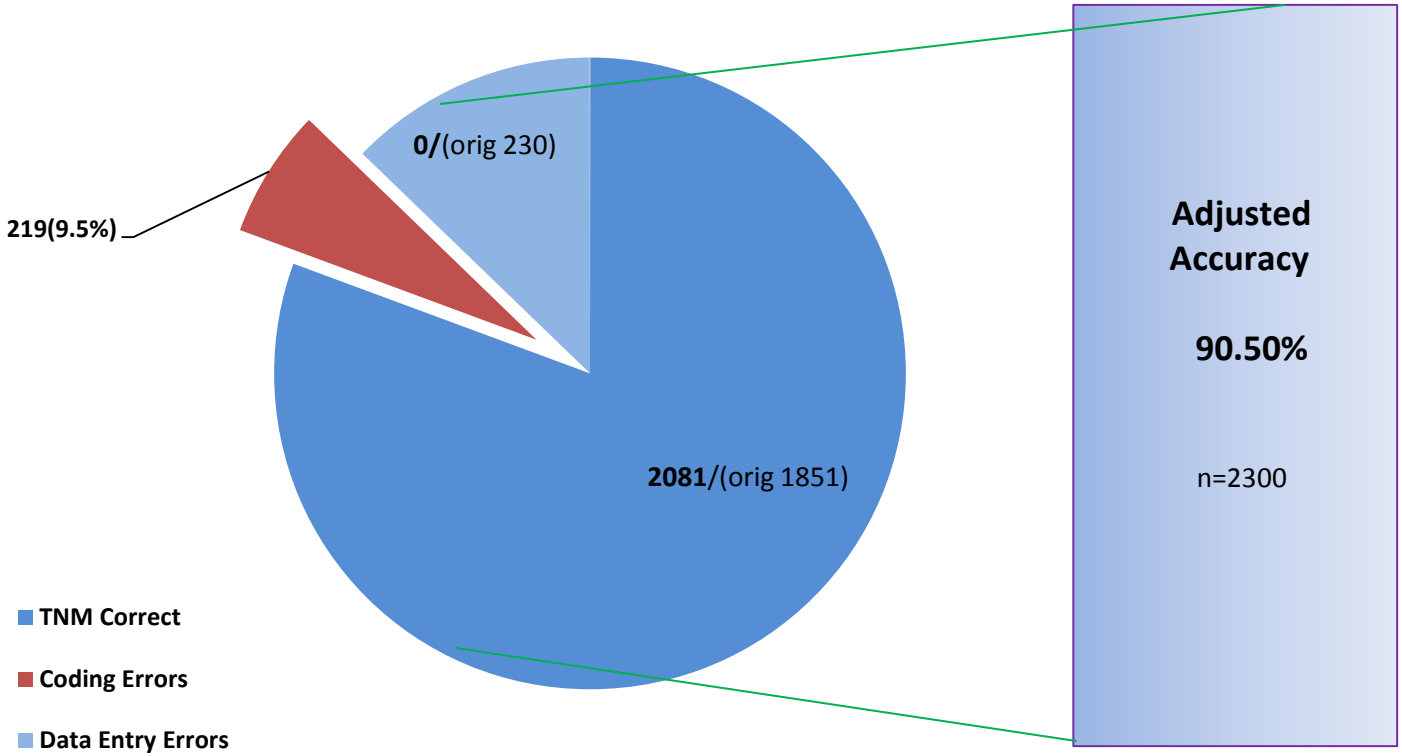
- Modifications required for stage entry in registry fields
- **Record layout does not allow AJCC stage composition entry**
  - Requires use of blanks in some scenarios
  - Errors due to unclear understanding on when/how to use blanks to represent AJCC Stage in record layout.
- Use of 88's when TNM not defined by AJCC
- Stage group 99.
  - AJCC rules and other Standard Setter rules differ

Analyses of Results

TNM Adjusted Accuracy

IF "Data Entry Errors" Non-Existent

Accuracy with "Coding Errors" Only



Identified Education Needs

Clarification and training needed on:

- How to use blanks to represent an "implied value" in data entry
- How/when to use blanks when Info unknown or rules for classification not met
- How/when to use 88's or 99
- **Correct way to use clinical information in pathologic stage**
- Review of the "M" Rules
  - Assessment method
  - Timeframe
  - How to represent AJCC stage composition in record layout
- 7th Edition Manual Review
  - Chapter specific rules
  - Rules for Classification
  - Surgical treatment and Pathologic stage
  - TNM Subcategories clinical vs pathologic
- Summary Stage vs TNM
  - Different rules
  - Can't convert

Education Provided

- Education presentation developed
  - Presented in person at regional offices or via live webinar
- Included:
  - Overall Results- all regions combined.
  - Customized regional results contrasted to overall results.

Education Provided

- Education included:
  - Detailed Answer Key for each case
    - AJCC Stage Composition
    - AJCC Staging Rationale
    - **Data entry examples and rationale**
    - AJCC Curriculum Modules-where to find supporting info
    - AJCC Manual-where to find rules/info
  - Review of TNM rules for classification
  - Special Rules situations
  - Correct use of X, Blank, 88 or 99 with examples
  - Summary Stage Answers & differences with TNM
  - TNM Tips
  - VE Tips
  - Q&A's

Education Example

Case # 2 Breast

Invasive tumor on Bx, no residual tumor on resection

AJCC Stage

	T	N	M	Stage Group
Clin	cT1c	cN0	cM0	IA
Path	pT1c	pN0	cM0	IA
Path T included clinical info				

Data Entry

	T	N	M	Stage Group
Clin	1C	0	0	1A
Path	1C	0		1A
pM left blank to indicate "implied value" of cM0 to correctly represent stage in record layout				

Tip:

- Use the clinical tumor size info in this case (cT1c) which *is assigned as* a **pT** because path rules for classification were met by the definitive *tumor resection.*
- *Case is not pT0 because we can* incorporate the clinical cT1c info per AJCC rules.
- See AJCC Module II, Lesson 8, Slides 5,6,7

Education Provided

- Further Education provided:
  - During timeframe of study, new values released by AJCC for TNM
  - Additional education was provided to VE
    - New 2016 allowable values for TNM categories reviewed
    - Rationale for “c” & “p” prefixes
    - Multiple Examples/Case scenario’s
    - Compared 2015 TNM stage/data entry to 2015 TNM stage/data entry
- Post study education continues

Education Example 2016 cases

For an *in situ* tumor: Bx DCIS & Surgery DCIS
Correct stage composition now possible

Breast/AJCC Stage
Clin: **pTis, cN0, cM0**, Stage 0
Path: **pTis, cN0, cM0**, Stage 0

indicates "implied" value

2015 vs 2016 Data Entry

2015

	T	N	M	Stage Group
Clin	pTIS	0	0	0
Path	IS	cN0	cM0	0

Must use blanks to correctly represent stage in record layout

2016

	T	N	M	Stage Group
Clin	pIS	c0	c0	0
Path	pIS	c0	c0	0

- pTis, cN0, cM0 no longer "blank"- have values to complete correct clinical & path stage composition

Special In situ rule per AJCC pg. 12, table 1.8

Conclusions

TNM Reliability Study

- Met Established Goals
  - Assessment of Regional Registry VE skills
    - TNM coding
    - TNM data entry
    - Summary Stage coding
  - Identified Areas to Focus Education
    - Increased understanding of TNM, Summary Stage principals
    - Improved understanding of Registry Data Entry
    - Boosted confidence of VE staff

Conclusions

- Eureka DMS
  - Enhancement & Customizations possible
  - Meet evolving registry needs
  - Programmer & CTR Collaboration Successful

- Reliability Study Effective Education Tool

Next Steps

Reliability Study Phase 2

- Retest with new cases
  - Using 2016 allowable values
- Timeline Goal
  - Summer/Fall 2016

- Compare results Phase I/Phase II
  - Determine additional training needs

Acknowledgement

Ghenadie Ciornii, BSIT, CPBI

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California Cancer Registry

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