

Missing and Discordant Staging Information in Cancer Registry Data: Implications for Research in Bladder Cancer

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Outline

- Introduction
- Missing Staging Information
 - 1st example of bladder study on complications of cystectomy patients
- Discordant Staging Information
 - 2nd example of bladder study on treatment options for T2 bladder cancer patients.
- Conclusion and Discussion

Footnote: Examples are from NC research study supported by PI Dr. Angie Smith

Why looking at missing and discordance of TNM?

- CCR Intent = Surveillance
- Clinical Research = Diagnosis, Treatment, Outcomes
 - Micro-data is crucial
 - T, N, M are how physicians decide to treat patients not summary stage
 - Potential confounding



Introduction

- CCR-administrative claims linked data (Medicare, Medicaid, private insurer)
 - Diagnosis and procedure codes
 - Can be used to understand services received, costs, comorbidities, basic demographics, providers visited
 - Provides passive and longitudinal follow-up of research participants



Missing Staging Information

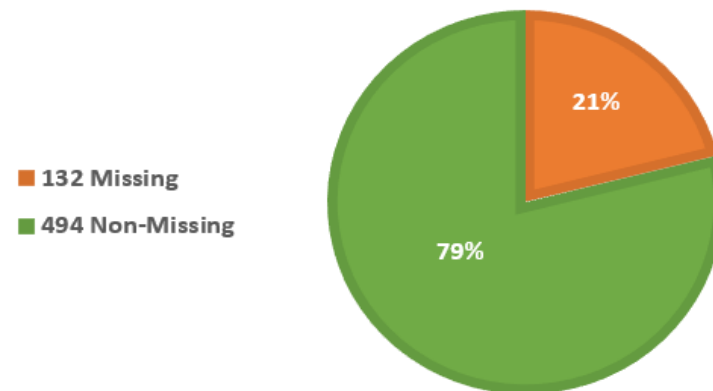
Example 1 Study Description:

Aim: Investigating post-cystectomy complications of bladder cancer patients

According to claims data, all 626 patients underwent cystectomy during 2004-2009, but not all had path staging information.

MISSING PATTERN OF PATH STAGE FOR
CYSTECTOMY PATIENTS (N=626)

Why missing?



Missing Staging Information



Path_T after Cystectomy T2

Admission Record

CCR Consolidated cases



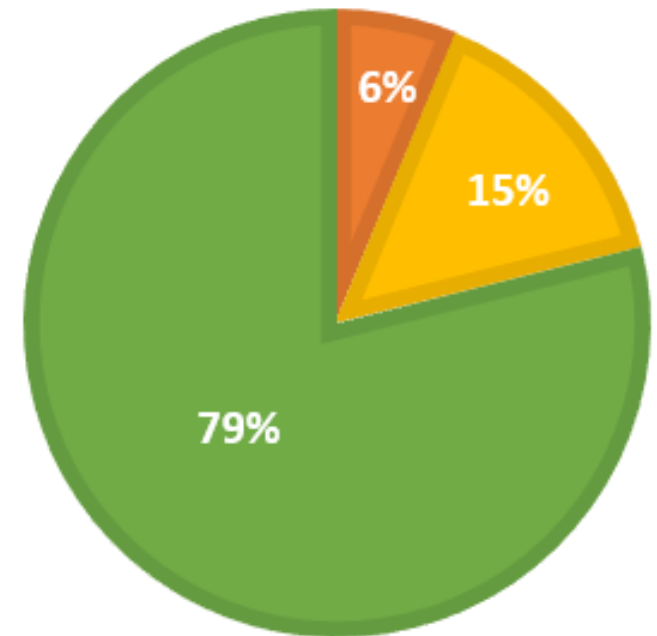
Missing Staging Information

MISSING PATTERN OF PATH STAGE FOR CYSTECTOMY PATIENTS (N=626)

Who are in the still missing 15%:

1. Cystectomy in Non-COC facility
2. Surgery NOS

- 39 Non-Missing from Admission Record
- 93 Still Missing
- 494 Non-Missing



Discordant staging information: Agreement between Pathological and Clinical (N=11,273 2004-2009 CCR)

		Clinical Staging (Row Percent)						
Pathological Staging		NA/Missing	T0	T1	T2	T3	T4	Ta-Tis-Tx
	NA/Missing	81%	-	-	-	-	-	-
	T0	-	0%	-	-	-	-	-
	T1	-	-	22%	-	-	-	-
	T2	-	-	-	25%	-	-	-
	T3	-	-	-	-	26%	-	-
	T4	-	-	-	-	-	20%	-
	Ta-Tis-Tx	-	-	-	-	-	-	75%



Discordant staging information: Agreement between Clinical and AJCC (N=11,273 2004-2009 CCR)

	AJCC Staging (Row Percent)							
		NA/Missing	T0	T1	T2	T3	T4	Ta-Tis-Tx
Clinical Staging	NA/Missing	10%	-	-	-	-	-	-
	T0	-	20%	-	-	-	-	-
	T1	-	-	88%	-	-	-	-
	T2	-	-	-	80%	-	-	-
	T3	-	-	-	-	60%	-	-
	T4	-	-	-	-	-	89%	-
	Ta-Tis-Tx	-	-	-	-	-	-	81%



Discordant staging information: Agreement between Pathological and AJCC (N=11,273 2004-2009 CCR)

		AJCC Staging (Row Percent)						
Pathological Staging		NA/Missing	T0	T1	T2	T3	T4	Ta-Tis-Tx
	NA/Missing	7%	-	-	-	-	-	-
	T0	-	0%	-	-	-	-	-
	T1	-	-	88%	-	-	-	-
	T2	-	-	-	85%	-	-	-
	T3	-	-	-	-	85%	-	-
	T4	-	-	-	-	-	89%	-
	Ta-Tis-Tx	-	-	-	-	-	-	73%



Discordant staging information: When AJCC 6 is different from Path or Clin (N=11,273 2004-2009 CCR)

	Frequency	Percent
AJCC6 different from clinical and pathological	2472	22%
AJCC6 same as either clinical or pathological	8801	78%



Discordant staging information: Top 5 patterns when AJCC 6 conflicts with both path and clin (N=2,472)

Clin	Path	AJCC	Count	Percent
NA/Missing	NA/Missing	TA-TIS-TX	952	39%
NA/Missing	NA/Missing	T1	586	24%
NA/Missing	NA/Missing	T2	205	8%
TA-TIS-TX	TA-TIS-TX	T1	187	8%
TA-TIS-TX	TA-TIS-TX	T2	63	3%



Discordant staging information: 2nd example

Example 2 Study Description:

- **Hypothesis:**

Low-SES (any Medicaid coverage) T2 bladder cancer patients are less likely to receive standard treatment

- **Outcome:**

Standard	Cystectomy / Chemo+Rad within 180 days of each other
Non-standard	TURBT /bladder biopsy or partial cystectomy/Nothing

- **Covariates:** Age, Gender, Race, Insurance Type, Comorbidity, Urothelial, SES (Census Tract Level), Year of Diagnosis

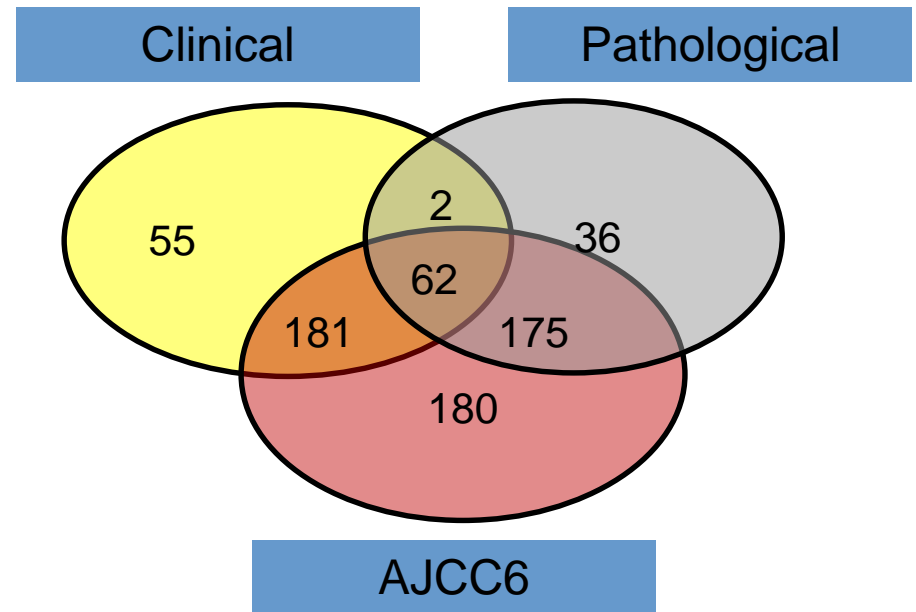
- **Methods:** Logistic regression

Discordant staging information: 2nd example

The sample size of T2 patients using different staging information

Criteria	Sample Size
Using Clin	300
Using Path	275
Using AJCC 6	598

- Only 62 patients overlapped
- More is not always better



2nd example: Logistic regression results of probability of receiving non-standard treatment

Variables		Odds Ratio (Clin)	Odds Ratio (Path)	Odds Ratio (AJCC6)
N		300	275	598
Age at Diagnosis		1.07**	1.08**	1.07**
Race (Ref=White)		2.77	2.80*	1.97*
Insurance Type (Ref=Any Private)	Any Medicaid	2.92*	0.76	1.54
	Only Medicare	0.94	0.66	0.86
Comorbidity Index (Ref=0)	1			1.27
	2+			1.70*
Controlling for Gender, Urothelial, Percent of High Census Tract, Year of Diagnosis				idential

** P<0.01, *P<0.1

3 times more likely to receive non-standard treatment



Conclusion and Discussion

- Using registry data for research purposes other than surveillance
- Choosing the appropriate staging information for different study



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