

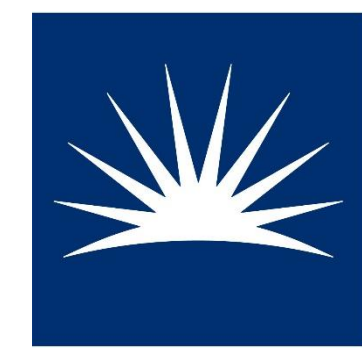
Using the National Cancer Database to Analyze Mohs Utilization for Extramammary Paget's Disease in U.S.

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Background

Extramammary Paget's Disease (EMPD) is a rare malignancy with metastatic potential and high recurrence, typically arising in apocrine-rich regions (1,2). Mohs micrographic surgery (MMS), a margin-controlled and tissue-sparing approach, offers the lowest recurrence (11.2%) compared to wide local excision (37.0%) or other methods (18.7%) (1,3). Yet, MMS remains underused (~3.9%), This practicum aimed to identify sociodemographic, institutional, and tumor factors associated with MMS receipt by selecting, accessing, and cleaning a large national database for analysis.

Population

The target population are patients diagnosed with primary EMPD that have a primary surgical treatment as standard WLE or Mohs in the US,

Learning Objectives

1. Selecting relevant variables for analysis by constructing and analyzing a conceptual model to answer the question of Mohs Receipt
2. Determining which population health database to use to answer a specific research question
3. Learn how to navigate the selected database
4. Select the appropriate study population and clean large-scale database ready for statistical analysis in RStudio

Activities

1. Completed onboarding for UH Clinical Research Group, including CITI training and background check.
2. Built a conceptual model of research question to guide methods
3. Prepared and Submitted NCDB data access proposal and obtained approval.
4. Trained in database navigation and variable definitions using NCDB PUF dictionary
5. Cleaned and harmonized NCDB dataset for EMPD surgical cases ready for analysis in RStudio
6. Performed preliminary descriptive statistics for the target population
7. Weekly/Biweekly check ins with committee members

Deliverables

1. NCDB Data Access Proposal/Application
2. Conceptual model on factors influencing surgical treatment type for EMPD patients
3. Cleaned NCDB dataset with selected EMPD sample ready for statistical analysis in R 4.5.1

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Methods

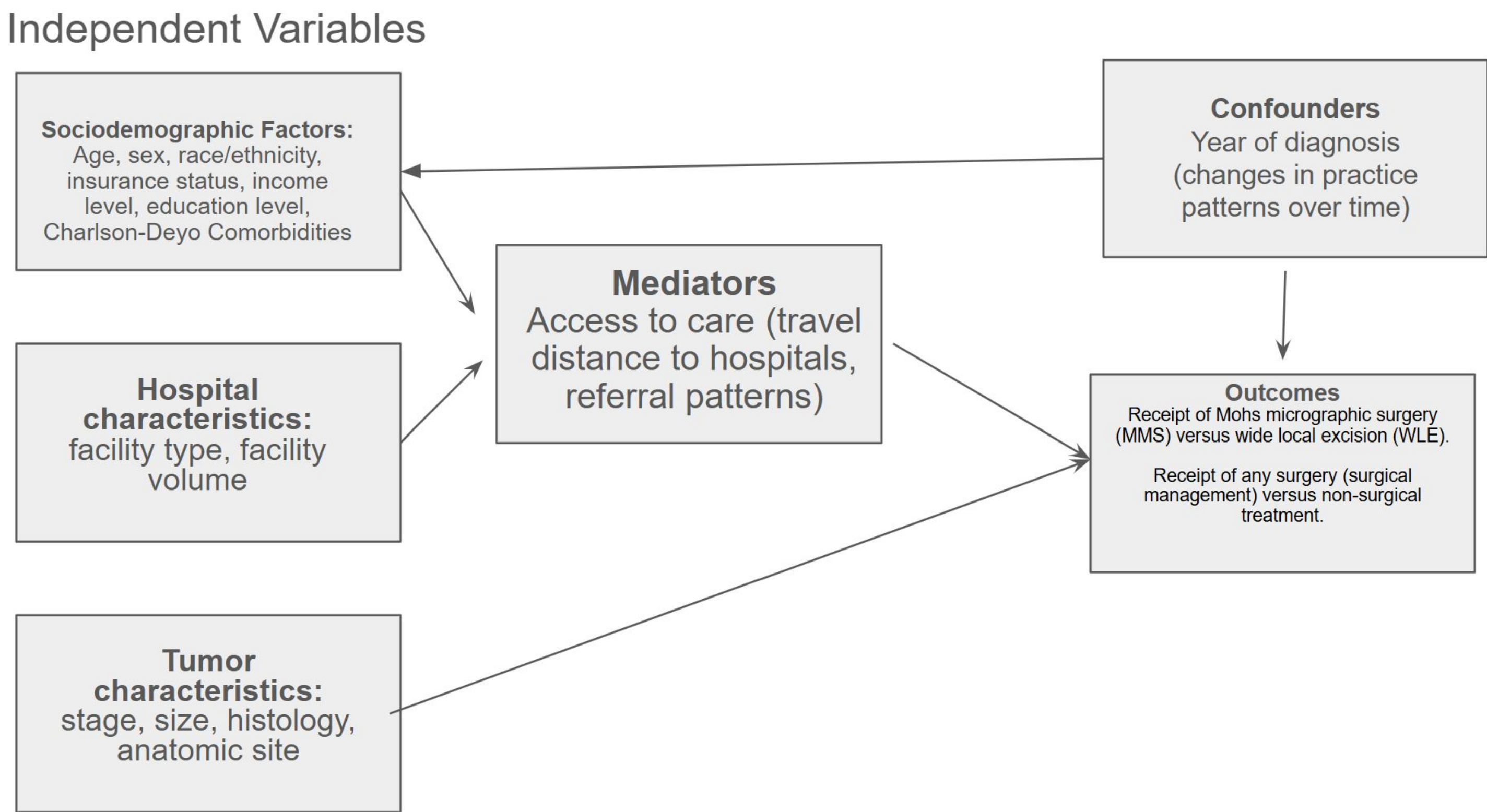


Figure 1. Conceptual Model for Variables Predicted to Impact Key Outcomes Receipt of Mohs micrographic surgery and Receipt of Surgery

Selection of NCDB: >70% incident cancer cases in the US, 120+ CoC Hospitals

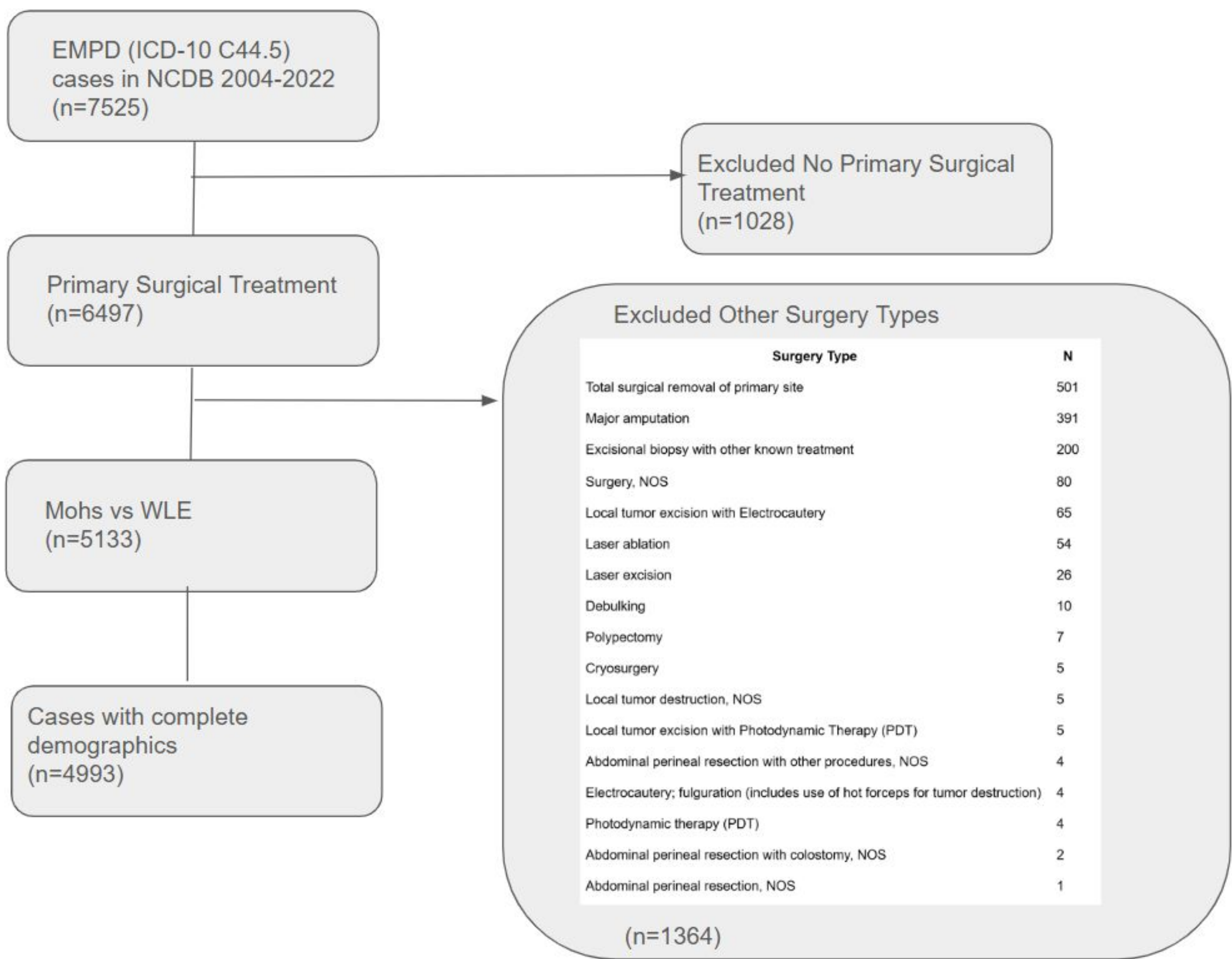


Figure 2. Exclusion Flow Chart from NCDB 2004-2022 for included EMPD cases.

Statistical Analyses

Univariate analyses were conducted using Chi-square tests for categorical variables, Wilcoxon rank-sum tests for continuous variables, and Fisher's exact tests when appropriate. After practicum: Multivariable logistic regression with Firth correction for rare events was performed in R version 4.5.1.

EMPD Study Population Characteristics

Table 1: Sociodemographic Characteristics for EMPD Cases: NCDB 2004-2022				
Variable	Total (N=4993)	WLE (N=4846)	Mohs (N=147)	P
Age Mean (sd)	71.11 (10.38)	71.09 (10.42)	71.80 (8.87)	0.4869
Sex				< 0.001
Male	1192 (23.9%)	1074 (22.2%)	118 (80.3%)	
Female	3801 (76.1%)	3772 (77.8%)	29 (19.7%)	
Race				0.350
Nonwhite	467 (9.4%)	457 (9.4%)	10 (6.8%)	
White	4526 (90.6%)	4389 (90.6%)	137 (93.2%)	
Insurance				0.030
Medicare	3367 (67.4%)	3275 (67.6%)	92 (62.6%)	
Other	224 (4.5%)	211 (4.4%)	13 (8.8%)	
Private (ref)	1402 (28.1%)	1360 (28.1%)	42 (28.6%)	
Comorbidity Score (CD ≥1)				0.150
CD ≥1	998 (20%)	976 (20.1%)	22 (15%)	
CD = 0	3995 (80%)	3870 (79.9%)	125 (85%)	
Stage				0.422
Regional/Distant	126 (2.5%)	121 (2.5%)	5 (3.4%)	
Localized	4867 (97.5%)	4725 (97.5%)	142 (96.6%)	
Facility Type				< 0.001
Non-Academic	2490 (49.9%)	2458 (50.7%)	32 (21.8%)	
Academic	2503 (50.1%)	2388 (49.3%)	115 (78.2%)	
Primary Site				< 0.001
Head & Neck	28 (0.6%)	14 (0.3%)	14 (9.5%)	
Anogenital	4063 (81.4%)	4053 (83.7%)	10 (6.8%)	
Trunk/Extremities	902 (18.1%)	779 (16.1%)	123 (83.7%)	
Facility Region				< 0.001
Northeast	1120 (22.4%)	1091 (22.5%)	29 (19.7%)	
South	1604 (32.1%)	1576 (32.5%)	28 (19%)	
West	925 (18.5%)	882 (18.2%)	43 (29.3%)	
Midwest	1344 (26.9%)	1297 (26.8%)	47 (32%)	
Year Diagnosed				0.045
2004-2013	2152 (43.1%)	2101 (43.4%)	51 (34.7%)	
2014-2022	2841 (56.9%)	2745 (56.6%)	96 (65.3%)	

Multivariable Regression Results Summary:

After controlling for all variables above, strongest predictors of MMS were **head and neck tumors** (OR 6.96; 95% CI: 2.99-16) **academic centers vs non academic** (OR 3.41; 95% CI: 2.22-5.39) , and Male sex (OR 3.51; 95 CI: 2.26-5.61)

- New factor: **Nonwhite race**, with lower odds of MMS (OR 0.50; 0.30-0.98)

Lessons Learned

1) Using a conceptual model was helpful in thinking about the most important variables to include in the univariate comparisons and multivariable modeling
2) Data cleaning is a lengthy but critical process to ensure analytic validity and accuracy of results. 3) Documenting each step in defining and selecting the study population improved clarity and reproducibility. 4) Collaboration with mentors enhanced methodological rigor, refined analyses, and helped identify areas needing further attention.

Public Health Implications

- Low MMS utilization (2.9%), consistent with prior reports under 5% (1,4), indicates underuse of best practices. Overuse of invasive excision among women (4) suggests potential implicit bias or training gaps.
- Higher MMS rates at academic centers highlight inequitable access to specialized surgical care (6).
- Improving equity requires expanding surgeon training, reimbursement incentives, and referral access in community and underserved settings (6).
- Limitations: Mohs cases may be undercounted since the NCDB excludes procedures performed in private clinics.