

# Leveraging Current SEER Data Elements to Characterize Receipt of Neoadjuvant Treatment

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## Aims

To leverage existing Surveillance Epidemiology and End Results (SEER) data elements to investigate the development of an algorithm using data items collected and transmitted through SEER to determine the likelihood that a patient received neoadjuvant treatment.

## Background

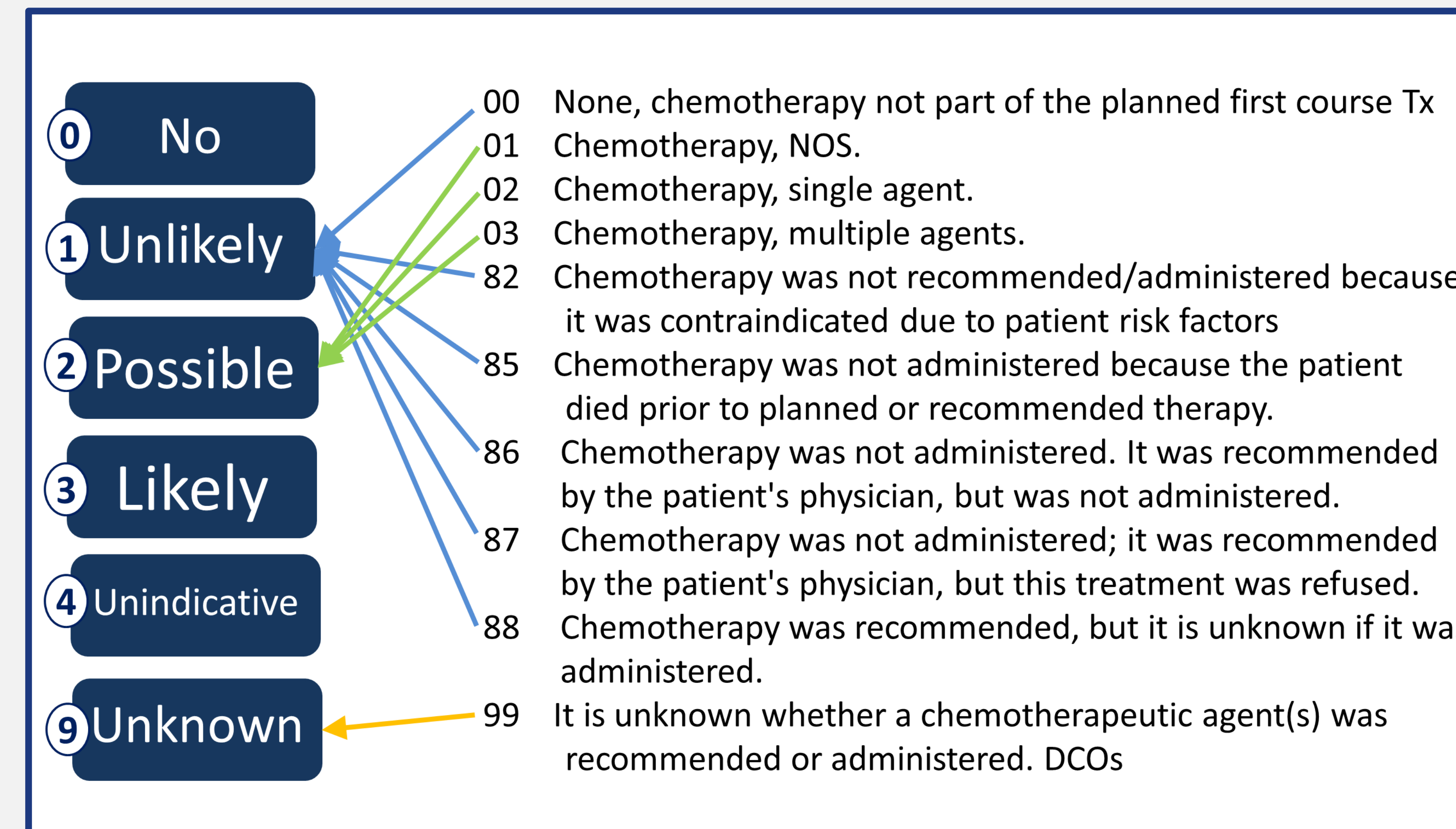
Neoadjuvant therapy, also referred to as induction therapy, is generally defined as systemic therapy given before localized cancer treatment. The use of this treatment is increasing and it remains underutilized in some populations.<sup>1-5</sup> There currently is no formal collection of this type of treatment data—largely due to the fact that a standardized definition for neoadjuvant data collection does not exist in the literature.

Although treatment sequence variables are collected, the quality of these variables is under review by NCI's Data Quality Analytics and Interpretation Branch. Routine and accurate collection of this treatment sequence is essential to better understand therapeutic effectiveness and guide strategies in treatment plan for cancer care.

## Methods

- SEER 2010-2016 colon cancer cases Dataset= SEER 20 Regs, Nov 2017 Sub (1973-2016)
  - Sex= Male, Female (exclude unknown)
  - Age= All ages (exclude unknown)
  - Year of diagnosis= 2010-2016
  - Registries= All registries
  - CS Schema v0204 = colon
- 18 NAACCR vol. II variables reported and submitted to NCI
  - These variables were re-coded into neoadjuvant categories based on their indication of the likelihood of receiving neoadjuvant therapy.

## Results



**Figure 1.** Example of the re-coded NAACCR Chemotherapy variable into the neoadjuvant categorizations for use in an algorithm.

RX Summ Systemic/Surgery Sequence Variable		
	Frequency	Percent
No Neoadjuvant	0	0
Unlikely	0	0
Possible	90	0.07
Likely	328	0.26
Unindicative	127,156	99.67
Unknown	0	0

RX Summ Radiation/Surgery Sequence Variable		
	Frequency	Percent
No Neoadjuvant	125,476	98.36
Unlikely	0	0
Possible	218	0.17
Likely	1,880	1.47
Unindicative	0	0
Unknown	0	0

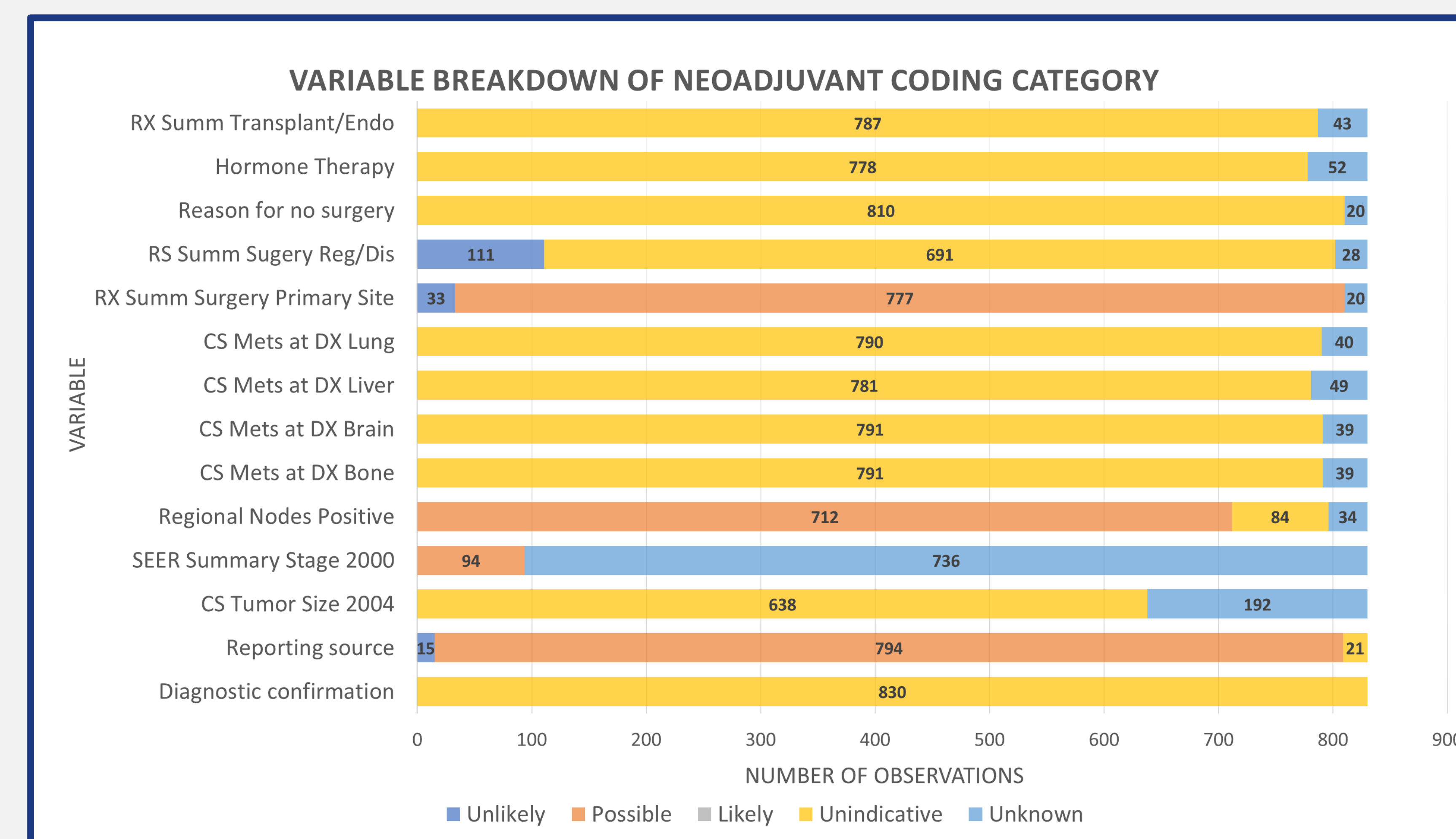
**Table 1.** Breakdown of neoadjuvant coding categories for the NAACCR treatment sequence variables.

Tumor Characteristics Variable Set			
	Codes 2-9	Unlikely	Total
Out (likely, possible in SEQ var)	760	12	772
No neoadjuvant	104,309	1,172	105,481
<b>Total</b>	<b>105,069</b>	<b>1,184</b>	<b>106,253</b>
Sensitivity	0.98		
Specificity	0.01		
PPV	0.01		

Tumor Characteristics + Treatment Variable Set			
	Codes 2-9	Unlikely	Total
Out (likely, possible in SEQ var)	595	146	741
No neoadjuvant	23,473	73,790	97,263
<b>Total</b>	<b>24,068</b>	<b>73,936</b>	<b>98,004</b>
Sensitivity	0.80		
Specificity	0.76		
PPV	0.02		

**Table 2.** Neoadjuvant algorithm performance compared to NAACCR sequence variables. Codes 2-9 cases cover possible, likely, unindicative, & unknown neoadjuvant categories.



**Figure 2.** Breakdown of neoadjuvant coding categories for the neoadjuvant algorithm variables.

## Conclusions & Next Steps

Following these preliminary algorithm results, the following next steps are planned for its improvement and testing:

- Adding additional elements to the algorithm calculations, for example, the collaborative stage evaluation variables.
- Testing the algorithm on other cancer sites, for example, breast.
- Validating the algorithm's performance using the SEER\*Medicare linked dataset.

## References

- Greenleaf, E. K., Hollenbeak, C. S., & Wong, J. (2016). Trends in the use and impact of neoadjuvant chemotherapy on perioperative outcomes for resected gastric cancer: Evidence from the American College of Surgeons National Cancer Database. *Surgery*, 159(4), 1099-1112. doi:10.1016/j.surg.2015.11.004
- Youngwirth, L. M., Nussbaum, D. P., Thomas, S., Adam, M. A., Blazer, D. G., Roman, S. A., & Sosa, J. A. (2017). Nationwide trends and outcomes associated with neoadjuvant therapy in pancreatic cancer: An analysis of 18 243 patients. *Journal of Surgical Oncology*, 116(2), 127-132. doi:10.1002/jso.24630
- Dimou, F., Sineshaw, H., Parmar, A., Tamirisa, N., Jupiter, D., Jemal, A., & Riall, T. S. (2015). 442 Trends in Receipt and Timing of Multimodality Therapy in Early Stage Pancreatic Cancer. *Gastroenterology*, 148(4). doi:10.1016/s0016-5085(15)33772-0
- Mirkin, K. A., Hollenbeak, C. S., Gusani, N. J., & Wong, J. (2017). Trends in utilization of neoadjuvant therapy and short-term outcomes in resected pancreatic cancer. *The American Journal of Surgery*, 214(1), 80-88. doi:10.1016/j.amj Surg.2016.08.015
- Chiba, A., Hoskin, T. L., Heins, C. N., Hunt, K. K., Habermann, E. B., & Boughey, J. C. (2016). Trends in Neoadjuvant Endocrine Therapy Use and Impact on Rates of Breast Conservation in Hormone Receptor-Positive Breast Cancer: A National Cancer Data Base Study. *Annals of Surgical Oncology*, 24(2), 418-424.