

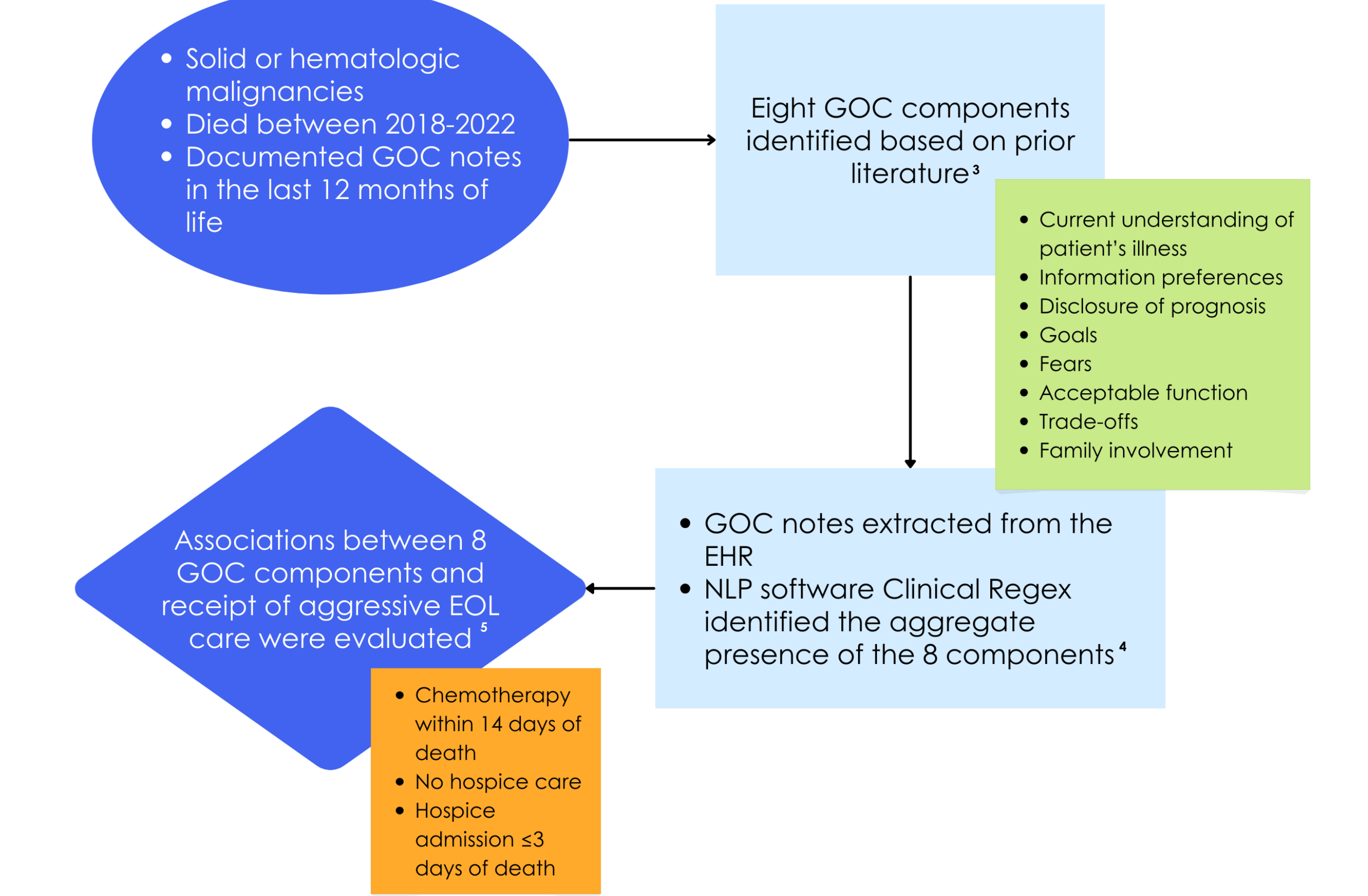
# Using Natural Language Processing to Qualitatively Assess Goals of Care Conversations for Patients with Cancer

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## Introduction

Goals of care (GOC) discussions during end-of-life (EOL) care are critical, but large-scale content assessments of these have been limited given the person-power required and the constraints of the electronic health records (EHR)<sup>1,2</sup>. We aim to use natural language processing (NLP) to qualitatively assess GOC documentation in the last year of life & associations with EOL care for patients with cancer.

## Methods



## Results

- Most common disease sites: gynecologic (22.6%), gastrointestinal (20.3%), thoracic (16.7%)
- GOC component most commonly-documented: family involvement (75.0%); least commonly-documented: fears (21.1%)
- Only 5.4% had all 8 components documented
- More comprehensive GOC notes were associated with lower rates of aggressive EOL care
- In multivariate logistic regression, GOC components documented ( $\leq 6$  vs  $\geq 7$ ), primary tumor site, & inpatient palliative care referral were independent predictors of aggressive EOL care (p-values  $< 0.0001$ )

## Discussion

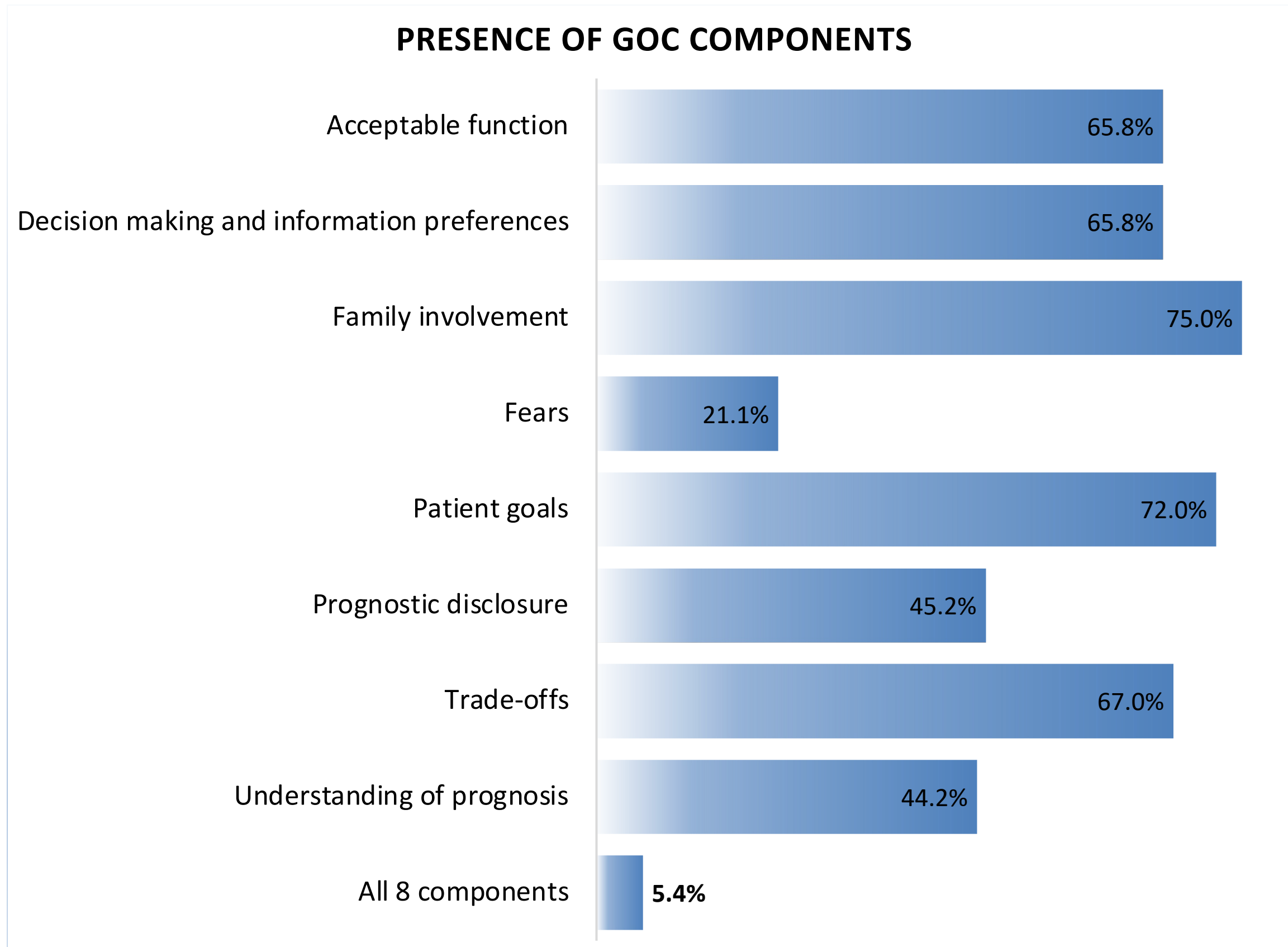
Increasing the comprehensiveness of GOC documentation impacts the EOL experience for patients with cancer. Healthcare teams should not only track whether GOC conversations occur, but also what is being said. Opportunities to improve both the quality & documentation of GOC conversations, as well as increasing outpatient palliative care referrals, may decrease the chances of patients with cancer receiving aggressive EOL care.

Despite associations with less aggressive EOL care, only 5% of patients engage in truly comprehensive GOC discussions in the last year of life.



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Figure 1. Percent of patients with notes documenting specific GOC components. Family involvement was the most commonly-documented GOC component; very few patients had all 8 components documented.



Number of GOC Components Addressed	Received Aggressive EOL Care
0	73.2%
$\geq 1$	60.7%
$\geq 2$	60.0%
$\geq 3$	60.6%
$\geq 4$	61.1%
$\geq 5$	59.0%
$\geq 6$	56.8%
$\geq 7$	50.3%
All 8	53.6%

Table 1. Number of GOC Components Discussed and Percentage that Received Aggressive EOL Care

# GOC components	Odds Ratio Estimates				p-value
	Effect	Odds Ratio	95% Wald Confidence Limits		
Primary Tumor Site	$\leq 6$ vs $\geq 7$	2.131	1.645	2.761	$< 0.0001$
	GI vs Breast	0.522	0.344	0.792	
	GU vs Breast	0.536	0.341	0.842	
	Gynecologic vs Breast	0.765	0.500	1.171	
	Leukemia vs Breast	1.093	0.649	1.839	
	Lymphoma vs Breast	2.858	1.188	6.876	
	Neurologic vs Breast	0.503	0.274	0.926	
	Other vs Breast	0.592	0.355	0.989	
	Thoracic vs Breast	0.853	0.553	1.315	
	Unknown vs Breast	0.758	0.374	1.536	
Inpatient Palliative Referral	Yes vs No	1.877	1.546	2.279	$< 0.0001$

Table 2. Multivariate logistic regression showing predictors of aggressive EOL care