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Title: Disparities in survival by insurance status in follicular lymphoma

Running Title: Insurance status impacts survival in follicular lymphoma

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Key Points:

- Privately-insured patients have improved overall survival among follicular lymphoma patients of all ages.
- Expanding access to care through insurance has the potential to improve follicular lymphoma outcomes.

ABSTRACT

INTRODUCTION: Follicular lymphoma (FL) is the second most common non-Hodgkin lymphoma and most common indolent non-Hodgkin lymphoma. Lower socioeconomic status is associated with poor outcomes in FL, suggesting access to care is an important prognostic factor; however, the association between insurance status and FL survival has not been sufficiently examined.

METHODS: The National Cancer Database (NCDB), a nationwide cancer registry, was used to evaluate 43,648 patients with FL diagnosed between 2004 and 2014. All analyses were performed on two cohorts segmented at age 65 years, to account for changes in insurance status with Medicare eligibility. Cox proportional hazard models calculated hazard ratios (HRs) with confidence intervals (CI) for the association between insurance status and overall survival (OS) controlling for the available sociodemographic and prognostic factors and Kaplan-Meier curves display outcomes by insurance status for patients covered by: private insurance, no insurance, Medicaid, and Medicare.

RESULTS: When compared to patients under age 65 with private insurance, patients under 65 with no insurance (HR 1.96 [95% CI 1.69,2.28]), Medicaid (1.82 [1.57, 2.12]), and Medicare (1.96 [1.71,2.24]) had significantly worse OS, after adjusting for sociodemographic and prognostic factors. Compared to patients age 65 and over with private insurance, those with Medicare (1.28 [1.17,1.4]) only had significantly worse OS.

CONCLUSION: For adults with FL, expanding access to care through insurance has the potential to improve outcomes.

INTRODUCTION

Follicular lymphoma (FL) is the second most common non-Hodgkin lymphoma (NHL) overall and most common indolent NHL, with about 14,000 diagnosed cases estimated annually in the United States.[1] Accounting for up to 20% of NHL cases globally, FL is a slow-growing tumor that often responds well to initial therapy.[2] However, advanced-stage FL is an incurable disease characterized by frequent relapses, often with increasing aggressiveness, and the ability to transform into more aggressive lymphoid malignancies.[3] The variable disease course and lack of cure has resulted in variable treatment strategies, without a standard of care. Overall survival (OS) in FL has improved with the incorporation of the immunotherapy rituximab over the past decade.[4,5] However, heterogeneity in FL outcomes persists. Relapse occurs in up to 20% of patients within the first 24 months of first-line treatment, and confers a poor prognosis.[6-8] To date, a limited number of prognostic parameters have been identified for predicting outcomes in FL.

The selection of cancer diagnostics and treatments may depend on a patient's insurance status.[9-11] Patients with no insurance or Medicaid, when compared to those with private insurance, are more likely to be diagnosed at advanced stage for all cancers.[9] Disparities in treatment and outcomes related to insurance status have been examined for some patients with aggressive NHL,[12] but are less clear for FL and other indolent NHLs. For instance, NHL patients with Medicaid or no insurance are less likely to receive immunotherapy treatments like rituximab, a therapy known to improve FL outcomes.[13,14] In another study, older adolescents and young adults with lymphoma had a wider gap between cancer symptom onset and diagnosis if they had Medicaid or no insurance rather than if they had private insurance.[15] In other studies,

patients without private insurance have been shown to have significantly worse outcomes for two aggressive lymphomas: diffuse large B-cell lymphoma and Hodgkin lymphoma.[12,16]

For patients with FL, lower neighborhood socioeconomic status is associated with substantially poorer survival, suggesting access to care plays an important role in outcomes.[17] The social determinants of FL prognosis remain unclear and literature on the relationship between access to care and FL outcomes is scarce. We examined the relationship between insurance status and OS for FL in a national patient cohort.

METHODS

Data Source

Data were obtained from National Cancer Database (NCDB), a nationwide, hospital-based cancer registry sponsored by the American Cancer Society and American College of Surgeons. The NCDB contains 34 million historical records, captures data for approximately 70% of newly diagnosed cancer cases across the Unites States, and obtains data from more than 1,500 Commission on Cancer (CoC)-accredited facilities, beginning in 1989.[18] Patients' vital status and date of death are reported by the CoC facilities to the NCDB annually.[19]

Study Population

Patients with FL were identified using the third edition of the International Classification of Disease for Oncology (ICD-O-3) histology codes 9690, 9691, 9695, and 9698, following the International Lymphoma Epidemiology Consortium (Interlymph) hierarchy of lymphoid neoplasms and the 2008 World Health Organization classification.[20] FL patients were included in the study if they were age ≥ 18 years, were diagnosed with FL as their first primary tumor between 2004-2014, received all or part of their first course of treatment at the reporting facility, and were HIV-negative. Only HIV-negative patients were included in this study due to significant confounding by HIV status on the relationship between insurance status and survival. Patients were excluded if insurance status was missing (n=759) , or the reporting facility was not CoC-accredited in the follow-up years (n=4598), as were those who had government-sponsored insurance (Veterans Affairs and Indian/Public Health Services) (n=497), since this category combines various heterogenous populations in a small sample size (shown in Figure 1).

Study Variables

Insurance status, was defined as primary payer at the time of diagnosis and grouped into the following categories: private insurance, no insurance, Medicaid, and Medicare. Race/ethnicity was classified as white, Hispanic, black, and other. Because the NCDB does not capture information on individual-level socioeconomic status (SES), we used zip code-level education, measured as proportion of adults without a high school diploma according to patient's zip code of residence, as a marker of SES.[21,22] Zip code-level education level was obtained from the 2012 American Community Survey and categorized into <7%, 7 – 12.9%, 13-20.9%, and >21% of adults without a high school diploma.[23] Disease stage was defined according to the American Joint Committee on Cancer *Cancer Staging Manual* and sorted into early stage (I, II) and advanced stage (III, IV).[24] A Charlson-Deyo comorbidity score was calculated based on the patient's pre-existing medical conditions and comorbidities.[25] Type and date of initial treatment were recorded. OS was calculated, in months, as time to event from the date of diagnosis through December 31, 2014, the date of death, or the date of last contact, whichever occurred first.

Statistical Analysis

To compare the sociodemographic and clinical characteristics of the study cohort by insurance status, chi-squared analysis was used. Due to the substantial change in the insurance landscape at age 65 with Medicare eligibility, all analyses were performed on a cohort of patients age < 65 years and separately on a cohort age ≥ 65 years. Since the Medicaid and uninsured patients ≥ 65 years each consisted of less than 1% of the elderly population, they were removed from the analysis. Kaplan-Meier survival curves were drawn by insurance status and log-rank tests were performed. To assess the relationship between insurance status and advanced disease stage (III/IV vs. I/II), presence of B symptoms (yes vs. no), comorbidities (yes vs. no), initial treatment modality (systemic treatment including chemotherapy and/or immunotherapy vs no

systemic treatment) and treatment within one month (yes vs. no), multivariable log-binomial models were generated to estimate risk ratios and 95% confidence intervals, while controlling for sociodemographic factors: sex, race, and education. Univariable and multivariable Cox proportional hazards models were fitted after confirming proportional hazard assumption was met for all independent variables. To examine the effect of prognostic factors (stage, B-symptoms, comorbidity, time from diagnosis to treatment) on the survival disparity observed due to insurance status, models were fitted with variables added using forward selection and included if significance criterion of 0.10 was met. The covariates considered for inclusion were sex, race, education level, presence of B symptoms, stage, comorbidity score, type of treatment, and time from diagnosis to treatment. Additional analyses were performed to assess the impact of age on the relationship between insurance status and outcomes in the elderly cohort by generating Kaplan-Meier curves by insurance status, univariable and multivariable Cox regression models for subgroups of patients age $\geq$ 70 years and age $\geq$ 75 years, and to assess the impact of stage by generating Kaplan-Meier curves stratified by insurance status for early stage and advanced stage patients. All statistical analyses were performed using R version 3.3.2 software (R Project for Statistical Computing). The threshold for statistical significance was set at an α of 0.05.

RESULTS

We identified 43,648 patients diagnosed with FL between 2004-2014, of whom 47% had private insurance, 3% were uninsured, 4% had Medicaid, and 46% had Medicare (Table 1). Of the 22,133 FL patients age < 65 years, 80% had private insurance, 6% had no insurance, 6% had Medicaid, and 8% had Medicare. Of the 21,515 patients ≥ 65 years, 13% had private insurance and 86% had Medicare. Less than 1% of the patients age ≥ 65 years had Medicaid or had no insurance, and were not included in the analyses for this cohort.

Through 2014, 11547 (26%) patients with FL had died. The median follow-up was 57.9 months in the cohort age < 65 years and 42.8 months in the cohort age ≥ 65 years. For the cohort age < 65 years, the median ages at diagnosis were 54, 52, 52, and 59 for private insurance, no insurance, Medicaid, and Medicare respectively, and was 54 (IQR 47-60) across all insurance types. For the cohort age ≥ 65 years, the median ages at diagnosis were 71 and 75 for private insurance and Medicare respectively, and 74 (IQR 69-80) across both insurance types. Patients with no insurance or Medicaid were more likely to be black or Hispanic, live in a poorly-educated area, have B-symptoms, and be diagnosed at an advanced stage when compared to those with private insurance or Medicare (Table 1). Patients age < 65 years who were uninsured or Medicaid-insured were more likely to present at an advanced stage, present with B-symptoms, and have comorbidities after adjusting for sociodemographic factors (Supplementary Table 1). Patients with Medicare age < 65 years were more likely to have B-symptoms and comorbidities (Supplementary Table 1). Meanwhile, patients with Medicare age ≥ 65 years were significantly more likely to have comorbidities and receive treatment with systemic therapy than those privately insured (Supplemental Table 2).

For FL patients age < 65, OS was 92% at 3 years, 88% at 5 years, and 84% at 7 years. The OS rates for privately insured, uninsured, Medicaid-insured, and Medicare-insured patients age < 65 were 90%, 78%, 80% and 78%, respectively, at 5 years (Kaplan-Meier curves shown in Figure 2). OS was significantly worse for uninsured, Medicaid-insured, and Medicare-insured patients age < 65 years compared to those privately insured with HRs of 2.34 (95% CI 2.06, 2.65), 2.22 (1.96, 2.51), and 2.45 (2.22, 2.71) respectively. When adding sociodemographic, prognostic and treatment factors to the model, the HRs remained significant for uninsured, Medicaid-insured, and Medicare-insured at 1.96 (1.69, 2.28), 1.83 (1.57, 2.12), and 1.96 (1.71, 2.24) respectively (Table 2). Disease stage, presence of B-symptoms, and comorbidities were significant predictors of FL survival in patients, contributing to the survival disparities seen with insurance status.

For FL patients age ≥ 65 years, OS was 73% at 3 years, 63% at 5 years, and 52% at 7 years. The OS rates for privately insured and Medicare-insured age ≥ 65 years were 69% and 62% respectively, at 5 years (Kaplan-Meier curves shown in Figure 3). Medicare-insured patients aged ≥ 65 had significantly worse OS compared to those with private insurance with a HR of 1.33 (95% CI 1.24, 1.43). After controlling for sociodemographic and clinical factors, Medicare insurance remained significantly associated with worse OS with a HR of 1.28 (1.17, 1.4) (Table 3).

DISCUSSION

To our knowledge, this is the first US nationwide investigation into the relationship between the insurance status and OS for patients with FL as well as the first to examine this relationship in an indolent lymphoma. We found that adults age < 65 years who are uninsured, have Medicaid, or have Medicare had inferior survival in comparison to those with private insurance. Similarly, among patients ≥ 65 years with FL, those with Medicare had significantly worse OS compared to privately-insured patients. Patients who were uninsured or had Medicaid more commonly had: poorer socioeconomic status, advanced stage, B-symptoms, and multiple comorbidities, likely contributing to the observed survival difference. These associations persisted when controlling for the known and available sociodemographic and prognostic factors. The findings of the study indicate that improving access to affordable, quality healthcare may reduce disparities in survival for those currently lacking coverage.

In our additional analyses, private insurance remained a significant predictor of improved OS relative to no insurance, Medicaid, and Medicare when stratified by early and advanced stage for patients age < 65 years (Supplemental Figure 2) and for patients age ≥ 65 (Supplemental Figure 3). These results suggest that although stage is an important factor in how insurance status relates to FL survival, stage does not fully explain the disparate outcomes and lead-time bias is unlikely to be the sole source for this difference. Meanwhile, insurance status remained a significant predictor of worse OS for Medicare patients in the cohort age ≥ 70 years by log-rank test and univariable and multivariable Cox regression models, and in the elderly cohort age ≥ 75 years by log-rank test and univariable Cox regression model. It is possible that the multivariable Cox regression model did not meet significance criteria in the cohort age ≥ 75 years due to a reduced sample size. These results suggest that although age is an important factor influencing

outcomes within the elderly cohort, insurance status is an independent predictor of outcomes for elderly patients.

For FL patients age < 65 years, Medicare survival mirrors that of uninsured and Medicaid-insured patients. Medicare patients age < 65 years, were much more likely have comorbidities that contribute to the observed worse outcomes. This arises because young patients can receive Medicare if they qualify for Social Security Disability Insurance, or have end stage renal disease and are receiving dialysis or had a kidney transplant. Thus, patients insured by Medicare age ≥ 65 years had a less pronounced risk of having comorbidities, though continued to have poorer prognosis compared to elderly who are insured privately.

Our results showed that patients with Medicaid, Medicare or no insurance age < 65 years were more likely to have a delay in treatment and were more likely to receive systemic therapy than their privately insured counterparts; however, these associations were not found in the elderly cohort. For both cohorts, a delay in treatment and treatment other than systemic therapy were associated with improved survival. This observed improved outcome is likely due to those patients having less severe disease at diagnosis. Unlike many other malignancies, systemic therapy and prompt treatment are not required or recommended for many patients with FL who are asymptomatic at diagnosis and do not have evidence of any of the Groupe d'Etude des Lymphomes Folliculaires (GELF) criteria.[26] These factors include: any nodal or extranodal tumor mass with a diameter ≥7cm, involvement of ≥3 nodal sites each with a diameter ≥3 cm, B symptoms, splenomegaly, pleural effusions or ascites, , ECOG performance status >1, or LDH or β2-microglobulin above normal levels. Unfortunately, complete assessment of GELF criteria for initiation of therapy is not possible in this dataset. Large clinical datasets that include these

criteria are needed to understand the interactions between clinical and social determinants on cancer outcomes.

Given the heterogeneity of outcomes and treatment options for FL, establishing factors that affect prognosis has been a central research focus. The most widely adopted FL risk stratification model has been FL International Prognostic Index (FLIPI), which includes age, stage, hemoglobin level, number of nodal areas, and serum LDH levels.[27] Lack of biological information in our registry data set prevented us from incorporating some of these data into our study. However, our results confirmed the importance of advanced stage, and B symptoms as predictors of worse OS.[27,28] Our study also contributes new information on prognostic factors with comorbidity score ≥ 1 as a significant, independent predictor of worse OS. In addition to the factors currently used in the FLIPI, insurance status and comorbidity score should be evaluated for inclusion in future FL prognostic models.

Significant heterogeneity exists in the frontline management of FL. Commonly used options include watchful waiting, radiotherapy, single-agent chemotherapy, immunotherapy, and chemoimmunotherapy. Initial treatment decisions often rely upon patient age, performance status, stage and goals of care.[29] Several studies have shown improved clinical course for FL in the rituximab era; however, watchful waiting remains a viable option for many.[30-35] Those who opted for watchful waiting in our analysis showed improved outcomes compared to those who received systemic treatment, suggesting watchful waiting can be useful for the appropriately-selected FL patient. Future randomized trials are essential to better identify the ideal patients for watchful waiting. Meanwhile, prior studies using the NCDB showed that patients without private insurance, as well as those with low SES and black race, are less likely to be the recipients of treatment with chemoimmunotherapy.[13] This could be an important driver of the observed

disparities in outcomes relative to insurance status, and one that is only likely to grow as expensive therapies such as idelelasib, ibrutinib, and obinutuzumab, continue to grow in use.[36-39]

Several limitations exist for this study. First, as the study utilizes a retrospective database, we were unable to control for all possible confounders. Some potential confounders, such as individual-level socioeconomic status, health literacy or adherence to follow-up, were not collected in the NCDB. State of residence was not provided in the NCDB Participant User Files, and as such, we were unable to examine how the variability in state-run Medicaid programs impacted outcomes in FL. Further, we were unable to assess the impact of immunotherapy treatment over the time period, as rituximab, an immunotherapy shown to have significant survival benefit in FL, was collected as chemotherapy rather than immunotherapy until 2013. Second, since insurance status was only recorded as primary payer at the time of diagnosis, it was not possible to account for dual insurance coverage or changes in insurance status over time. For instance, patients over 65 recorded as private insurance are likely to have private coverage supplementing insurance with Medicare. Third, it is possible that the facilities available to patients with low SES or no insurance may not provide detailed diagnoses using the World Health Organization classification, confounding the results. Finally, the results may not be fully generalizable to the US population as all data comes from CoC-accredited hospitals, which may underrepresent the most disadvantaged patients.

Despite these limitations, the study has several strengths, including the large sample size, consistent vital status reporting and inclusion of crucial factors that affect FL survival. Such factors include B-symptoms, comorbidities, time to treatment, and HIV status.

Patients without health insurance, or with inadequate health insurance, may experience substantial barriers to quality care in the form of access, cost or administration, contributing to

further health inequality.[40] The Affordable Care Act (ACA), passed in 2010 has improved patient access to care with more adults connecting to the health care system, obtaining a regular source of care, and being able to afford the care they required. [41,42] Coverage expansion has been associated with earlier oncologic diagnosis and timelier oncologic care. [43,44] The expansion of Medicaid has been successful in improving mortality, with the largest improvement in healthcare-amenable conditions like cancer.[45] Although insurance through Medicaid can be associated with improved outcomes compared with no insurance; the benefits of Medicaid may be falsely lowered due to uninsured patients waiting until they qualified for Medicaid to see a physician about their cancer symptoms.[46] This is suggested by the significantly increased likelihood of Medicaid patients presenting in an advanced stage. It is also worth noting that Medicaid insurance still confers a worse OS for FL than private insurance, though this effect may be somewhat exaggerated. Healthcare policy should be based on evidence, and, for patients with FL, improving access to care for those who are unable to afford private insurance has the potential to substantially improve outcomes.[47]

In conclusion, our study finds that insurance status contributes to survival disparities in FL. Future studies on outcomes in FL should include insurance status as an important predictor. Further research on prognosis for FL should examine the impact of public policy, such as the passage of the ACA, on FL outcomes, as well as examine other factors that influence access to care, such as individual-level socioeconomic status, regular primary care visits, access to prescription medications, and care affordability.

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Authorship: All authors were involved in conception and design of the study, data interpretation, and manuscript preparation. JSG performed data analysis.

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TABLES

Table 1. Descriptive characteristics for patients with follicular lymphoma, aged < 65 years and aged ≥ 65 Years.

Variable	Patients Age < 65 Years						Patient Age ≥ 65 Years			
	Total	Private (%)	No Insurance (%)	Medicaid (%)	Medicare (%)	P-value	Total	Private (%)	Medicare (%)	P-value
Sex										
Male	11108	50.8	53.1	44.7	46	<0.0001	9727	51.6	45	<0.0001
Female	11025	49.2	46.9	55.3	54		11492	48.4	55	
Race/ethnicity										
White	17325	81	61.7	60.4	78.5	<0.0001	18121	82.3	85.9	<0.0001
Hispanic	1460	4.8	19.1	18	5.9		594	4	2.6	
Black	1349	5	11.1	13	7.8		780	4.5	3.6	
Other	1849	8.5	7.5	8	7.3		1616	8.6	7.5	
Unknown	150	0.7	0.6	0.6	0.5		108	0.7	0.5	
Percent with no HSD										
<7%	6247	31.6	15.8	11	17.8	<0.0001	5784	30.6	26.7	<0.0001
7-12.9%	7420	34.6	26.3	29.9	31.3		7450	34.6	35.2	
13-20.9%	5137	21.9	27.8	29.1	28.3		5106	21.7	24.4	
>21%	3080	10.7	29.2	29.2	21.6		2622	11.8	12.4	
Unknown	249	1.2	0.9	0.8	1		257	1.3	1.2	
B symptoms present										
Yes	4139	16.6	31.2	28.7	21.6	<0.0001	3206	14.2	15.3	0.0688
No	16309	75.5	63.1	66	70.4		15993	77.6	75	
Unknown	1685	7.9	5.7	5.4	8		2020	8.3	9.7	
Stage										
I/II	8574	40	29.5	30.7	40.1	<0.0001	9105	43.8	42.8	0.0813
III/IV	11675	51.7	61.7	61.1	49.9		9904	44.6	47	
Unknown	1884	8.4	8.8	8.2	9.9		2210	11.6	10.2	
Comorbidities										
0	19152	88.6	84.9	79.4	73.1	<0.0001	16422	80.1	77	0.0002
1	2436	9.7	12.3	15.6	19.7		3605	15.6	17.2	
≥ 2	545	1.8	2.8	5	7.2		1192	4.3	5.8	
Initial treatment										
Systemic	13838	61	71.7	71.6	62.9	<0.0001	11805	54.2	55.9	0.0959
None	7629	35.7	26.9	25.6	35.5		8890	43.3	41.7	
Days from diagnosis to treatment										
0-14	8264	37.9	35.3	36.5	34	0.0002	7439	34.2	35.2	0.0412
15-30	3342	15.1	14.6	15.2	15.7		3041	12.8	14.6	
>30	6437	28.4	34.1	32.1	30.1		5748	28.1	26.9	
Unknown	4090	18.7	16	16.2	20.2		4991	24.9	23.3	

Abbreviations: HSD (high school diploma).

Table 2. Multivariable HRs for FL patients age < 65.

	HR (95% CI)	P-value
Insurance Status		
Private Insurance	1.00 (ref)	
No Insurance	1.96(1.69, 2.28)	<0.0001
Medicaid	1.83(1.57, 2.12)	<0.0001
Medicare	1.96(1.71, 2.24)	<0.0001
Gender		
Male	1.00 (ref)	
Female	0.78 (0.71, 0.85)	<0.0001
Race/Ethnicity		
White	1.00 (ref)	
Black	0.98(0.83, 1.17)	0.8462
Hispanic	0.72(0.59, 0.88)	0.0014
Other Race	0.95(0.81, 1.12)	0.5616
Unknown Race	1.01(0.56, 1.82)	0.9828
Percent with no HSD		
<7%	1.00 (ref)	
7-12.9%	1.19(1.05, 1.34)	0.0051
13-20.9%	1.4(1.24, 1.59)	<0.0001
>21%	1.42(1.22, 1.64)	<0.0001
B symptoms		
Not present	1.00 (ref)	
Present	1.35(1.22, 1.49)	<0.0001
Stage		
I/II	1.00 (ref)	
III/IV	1.69 (1.52, 1.87)	<0.0001
Comorbidity Score		
0	1.00 (ref)	
1	1.71 (1.52, 1.93)	<0.0001
2+	3.1 (2.61, 3.69)	<0.0001
Initial Treatment		
Systemic	1.00 (ref)	
None	0.81(0.71, 0.92)	<0.0001
Days to Treatment		
0-14	1.00 (ref)	
15-30	0.82(0.73, 0.93)	0.0012
30+	0.69(0.62, 0.76)	<0.0001

Abbreviations: hazard ratio (HR); confidence interval (CI); HSD (high school diploma).

Table 3. Multivariable HRs for FL patients age ≥ 65.

	HR (95% CI)	P-value
Insurance Status		
Private Insurance	1.00 (ref)	
Medicare	1.28(1.17, 1.4)	<0.0001
Gender		
Male	1.00 (ref)	
Female	0.88(0.83, 0.93)	<0.0001
Race/Ethnicity		
White	1.00 (ref)	
Black	0.96(0.83, 1.11)	0.5958
Hispanic	0.67(0.55, 0.82)	<0.0001
Other Race	1.02(0.92, 1.12)	0.7651
Unknown Race	1.44(0.98, 2.12)	0.0627
Percent with no HSD		
<7%	1.00 (ref)	
7-12.9%	1.03(0.96, 1.11)	0.4219
13-20.9%	1.09(1.01, 1.18)	0.0279
>21%	1.19(1.09, 1.31)	0.0002
B symptoms		
Not present	1.00 (ref)	
Present	1.38(1.29, 1.48)	<0.0001
Stage		
I/II	1.00 (ref)	
III/IV	1.35(1.27, 1.43)	<0.0001
Comorbidity Score		
0	1.00 (ref)	
1	1.44(1.35, 1.55)	<0.0001
2+	2.33(2.11, 2.57)	<0.0001
Initial Treatment		
Systemic	1.00 (ref)	
None	0.97(0.9, 1.04)	0.3489
Days to Treatment		
0-14	1.00 (ref)	
15-30	0.96(0.89,1.04)	0.3173
30+	0.84(0.78, 0.89)	<0.0001

Abbreviations: hazard ratio (HR); confidence interval (CI); HSD (high school diploma).

FIGURE LEGENDS

Figure 1. CONSORT diagram depicting follicular lymphoma case selection process. The total number of FL patients who met inclusion and exclusion criteria was 49, 374. These were then stratified into a cohort of patients age < 65 years and age ≥ 65 years.

Figure 2. Overall survival by insurance status for FL patients age < 65. OS for the cohort was 92% at 3 years, 88% at 5 years, and 84% at 7 years

Figure 3. Overall survival by insurance status for FL patients age ≥ 65. OS for the cohort was 73% at 3 years, 63% at 5 years, and 52% at 7 years.

Figure 1

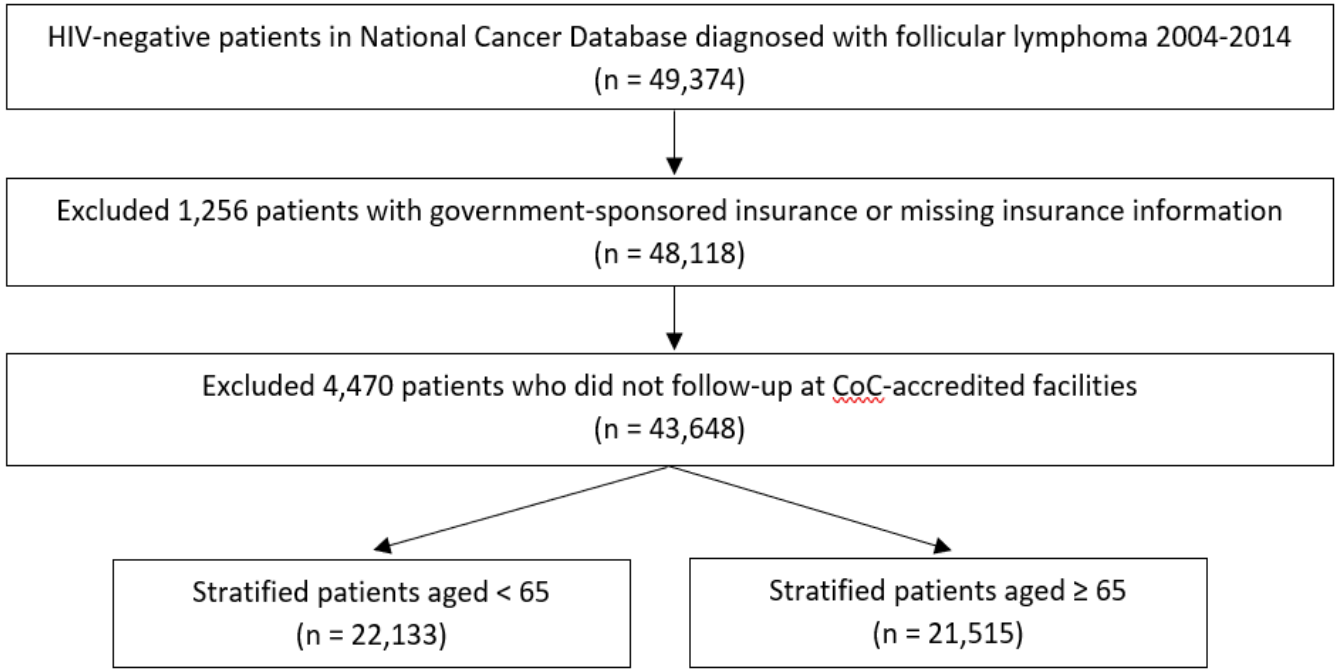

HIV-negative patients in National Cancer Database diagnosed with follicular lymphoma 2004-2014
(n = 49,374)
Excluded 1,256 patients with government-sponsored insurance or missing insurance information
(n = 48,118)
Excluded 4,470 patients who did not follow-up at CoC-accredited facilities
(n = 43,648)
Stratified patients aged < 65
(n = 22,133)
Stratified patients aged ≥ 65
(n = 21,515)

Figure 2

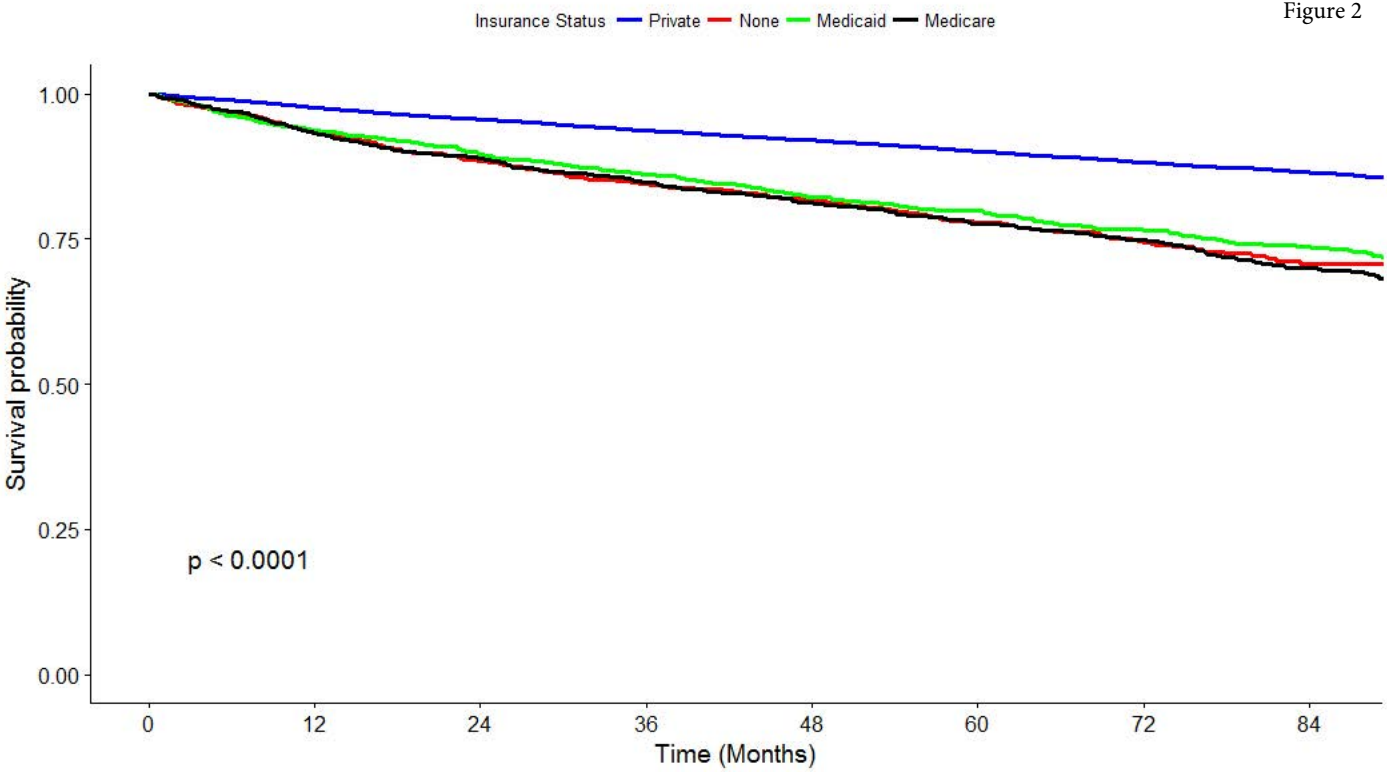
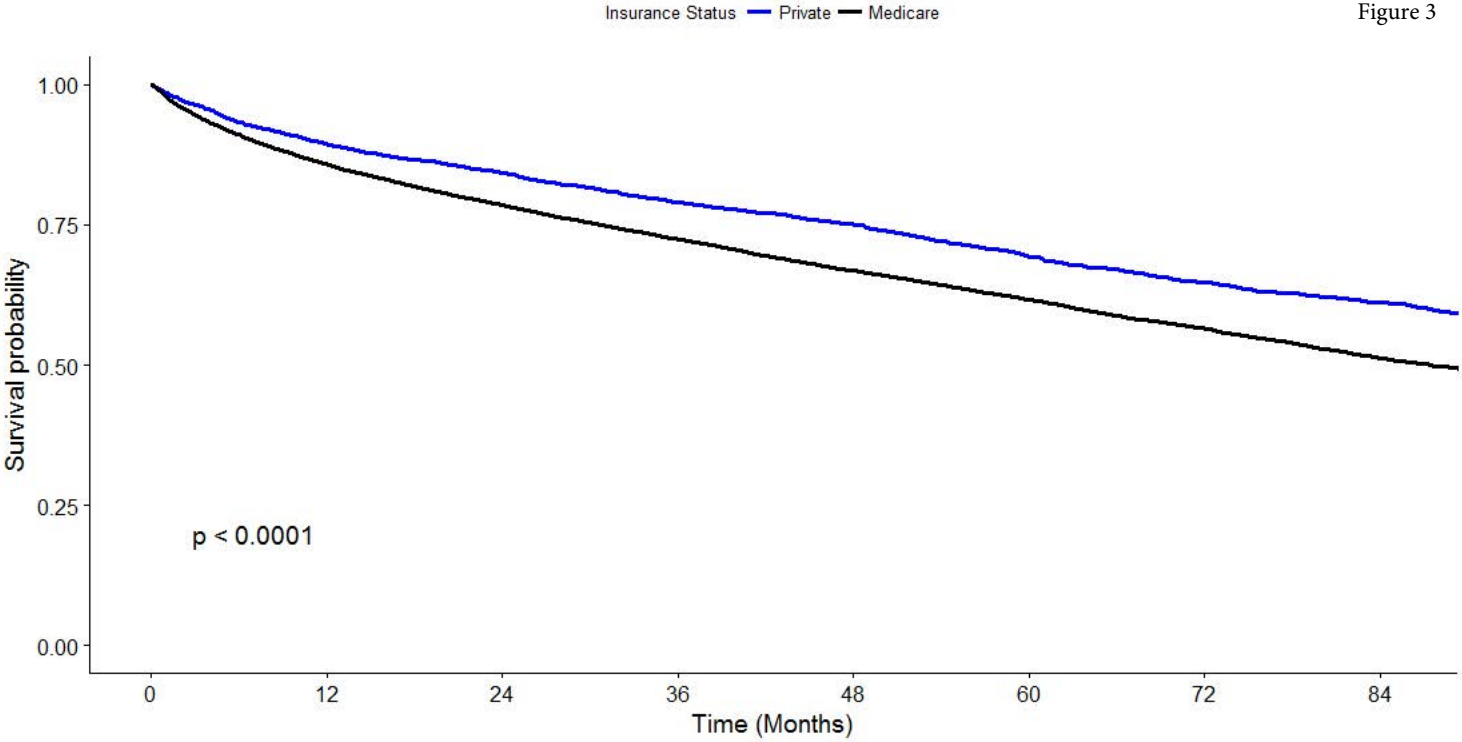

Insurance Status
Private
None
Medicaid
Medicare
1.00
0.75
0.50
0.25
0.00
Survival probability
p < 0.0001
0
12
24
36
48
60
72
84
Time (Months)

Figure 3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Disparities in survival by insurance status in follicular lymphoma

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