

Supplemental Online Content

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eReferences

This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. Definition of CirCom Categories Based on Comorbidities Present

CirCom Score ¹	Definition
0	None of the following comorbidities: chronic obstructive pulmonary disease, acute myocardial infarction, peripheral arterial disease, epilepsy, substance use disorder other than alcohol use disorder, heart failure, cancer, or chronic kidney disease.
1+0	One of the above listed comorbidities.
1+1	More than one of the above listed comorbidities.
3+0	Active myocardial infarction, active non-metastatic or hematologic cancer, inactive metastatic cancer, or chronic kidney disease and <u>no</u> other above listed comorbidities.
3+1	Active myocardial infarction, active non-metastatic or hematologic cancer, inactive metastatic cancer, or chronic kidney disease and <u>at least one</u> of the above listed comorbidities.
5+0	Active metastatic cancer and <u>no</u> other above listed comorbidities.
5+1	Active metastatic cancer and <u>at least one</u> of the above listed comorbidities.

eTable 2. Identification of Surgical and Interventional HCC Treatment Received

Treatment	Data source	Data items
Resection	Inpatient procedure tables	CPT code 47100 (wedge resection) CPT code 4712x (hepatectomy) CPT code 47130 (hepatectomy)
Embolization Ablation	Radiology tables	Text-based Structured Query Language queries (eg, “embolization,” “ablation”)

For additional details, see Supplemental Methods published by Serper et al.²

eTable 3. Distribution of Percent of Time Up-to-Date With Screening During Eligible Follow-Up by Age at Index Date (HCV Cure)

Total sample with eradicated HCV and cirrhosis		
Age at index date	Median (IQR)	Mean (S.D.)
< 60 years (n=3,741)	43.9% (21.0% - 75.4%)	47.7% (31.9%)
60 – <65 years (n=6,114)	51.7% (24.3% - 82.3%)	52.4% (32.8%)
65 – <70 years (n=5,176)	55.1% (26.1% - 83.9%)	54.3% (32.8%)
70 – <75 years (n=1,481)	57.4% (27.9% - 85.1%)	55.5% (33.1%)
≥ 75 years (n=390)	58.0% (28.2% - 86.4%)	56.5% (33.2%)
Individuals who developed HCC		
< 60 years (n=281)	77.9% (42.7% - 100.0%)	69.1% (31.8%)
60 – <65 years (n=577)	82.5% (48.0% - 100.0%)	72.1% (32.0%)
65 – <70 years (n=480)	90.8% (56.8% - 100.0%)	75.1% (30.4%)
70 – <75 years (n=128)	96.2% (61.4% - 100.0%)	77.8% (29.7%)
≥ 75 years (n=28)	98.6% (55.2% - 100.0%)	77.8% (30.0%)

eTable 4. Overall Survival After HCC Diagnosis Among Veterans With HCV-Associated Cirrhosis Who Have Achieved HCV Cure and Develop Incident HCC (Full Results)

Predictor	N	Person-years of follow-up	Deaths	Mortality per 100 person-years	Adjusted ^a HR death (95% CI)
Percent of time up to date with screening (per 10% increase)	1622	3350.8	731	21.8	0.97 (0.95-0.99)
Age at diagnosis of HCC (per 5-year increase)	1622	3350.8	731	21.8	1.02 (0.94-1.11)
Sex					
Male	1589	3284.2	713	21.7	0.69 (0.43-1.11)
Female	33	66.7	18	27.0	Ref.
Race/ethnicity					
White	881	1794.5	420	23.4	Ref.
Black	457	967.5	191	19.7	0.77 (0.65-0.92)
Hispanic	132	272.3	61	22.4	0.85 (0.65-1.12)
Asian/Pac. Islander	22	51.1	10	19.6	0.89 (0.47-1.67)
Nat. American	20	51.2	10	19.5	0.86 (0.46-1.62)
Other	110	214.3	39	18.2	0.81 (0.58-1.14)
Etiology of cirrhosis					
HCV alone	856	1802.2	370	20.5	Ref.
HCV + alcohol	766	1548.6	361	23.3	1.05 (0.90-1.22)
Tobacco use					
Never	462	955.6	213	22.3	Ref.
Former	607	1304.9	263	20.2	1.08 (0.83-1.20)
Current	540	1062.3	252	23.7	1.00 (0.90-1.28)
Years since HCV cure					
1-2					Ref.
2-3	445	1215.4	254	20.9	0.99 (0.82-1.20)
3-4	377	901.8	203	22.5	1.06 (0.87-1.31)
4-5	310	599.0	155	25.9	0.65 (0.49-0.86)
5-6	227	378.2	66	17.5	0.81 (0.56-1.19)
6-7	135	150.0	34	22.7	0.65 (0.39-1.07)
7+	98	91.0	17	18.7	0.35 (0.09-1.40)
	30	15.5	2	12.9	
CTP class at HCC					
A	1430	3055.7	611	20.0	Ref.
B	192	295.1	120	40.7	1.93 (1.57-2.36)
CirCom at HCC diagnosis					
0	5	11.6	3	25.9	1.19 (0.37-3.81)
1+0	319	664.0	128	19.3	Ref.
1+1	372	851.9	150	17.6	0.89 (0.71-1.11)
3+0	58	129.5	25	19.3	1.05 (0.68-1.62)
3+1	502	1158.3	205	17.7	0.97 (0.79-1.20)
5+0	33	26.4	25	94.6	4.95 (3.22-7.63)
5+1	107	106.7	77	72.1	3.44 (2.58-4.59)

eTable 5. Sensitivity Analysis Evaluating Percent of Time Up-to-Date With Screening During 2 Years Before HCC Diagnosis

Overall survival after HCC diagnosis among Veterans with HCV-associated cirrhosis who have achieved HCV cure and develop incident HCC

Predictor	N	Person-years of follow-up	Deaths	Mortality per 100 person-years	Unadjusted HR death (95% CI)	Adjusted ^a HR death (95% CI)
Percent of time up to date with screening during up to 2 years preceding HCC diagnosis (per 10% increase)	1622	3350.8	731	21.8	0.97 (0.95-0.99)	0.97 (0.94-0.99)
Overall survival by interaction between percent of time up to date with screening and years since HCV cure^a						
	N	Person-years of follow-up	Deaths	Mortality per 100 person-years	Adjusted ^a HR death for 10% increase in eligible time up to date with screening (95% CI)	
Years since HCV cure						
1-2	445	1215.4	254	20.9	0.97 (0.93-1.00)	
2-3	377	901.8	203	22.5	0.97 (0.92-1.01)	
3-4	310	599.0	155	25.9	0.96 (0.92-0.98)	
4-5	227	378.2	66	17.5	0.90 (0.84-0.97)	
5-6	135	150.0	34	22.7	1.10 (0.98-1.25)	
6-7	98	91.0	17	18.7	0.99 (0.87-1.14)	
7+	30	15.5	2	12.9	0.75 (0.52-1.08)	

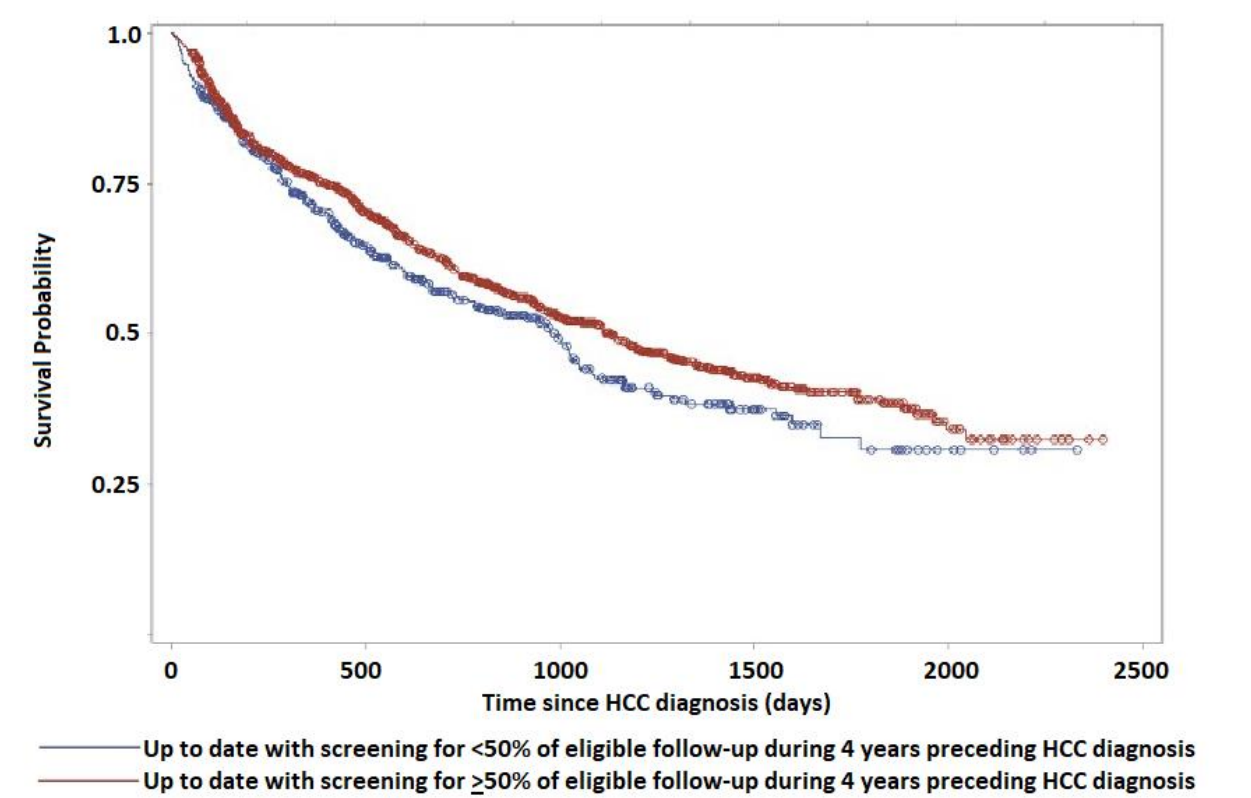
^aModel adjusted for age at HCC diagnosis, sex, race/ethnicity, etiology of cirrhosis, tobacco use, years since HCV cure, CTP class at HCC diagnosis, CirCom at HCC diagnosis.

eTable 6. Proportional Hazard Regression Modeling Overall Survival on Percent of Eligible Follow-Up Up-to-Date With Screening During the 4 Years Preceding HCC Diagnosis Assessing for Interaction Between Age at HCC Diagnosis^a

	Age at HCC <70		Age at HCC ≥70	
	HR death	95% CI	HR death	95% CI
Percent of eligible time up to date with screening in 2 years preceding HCC diagnosis (per 10% increase)	0.98	0.96 – 1.00	0.95	0.90 – 1.00
^a p-value interaction term between percent of time up to date with screening and age = 0.26				
	Age at HCC <75		Age at HCC ≥75	
	HR death	95% CI	HR death	95% CI
Percent of eligible time up to date with screening in 2 years preceding HCC diagnosis (per 10% increase)	0.97	0.95 – 0.99	0.96	0.86 – 1.08
^a p-value interaction term between percent of time up to date with screening and age = 0.84				

Model adjusted for number of years since HCV cure, CTP class at HCC diagnosis, CirCom at HCC diagnosis, etiology of cirrhosis, sex, race and ethnicity, tobacco use.

eFigure . Kaplan-Meier Survival Curve Corrected For Median Lead-Time Estimated for Annual Screening and Stratified by Percent of Time Up-to-Date With Screening During the 4 Years Preceding HCC Diagnosis



eTable 7. Sensitivity Analysis Accounting for Median Lead-Time Estimated for Annual Screening Overall survival after HCC diagnosis among Veterans with HCV-associated cirrhosis who have achieved HCV cure and develop incident HCC

Predictor	N	Person-years of follow-up	Deaths	Mortality per 100 person-years	Adjusted ^a HR death (95% CI)
Percent of eligible time up to date with screening during up to 4 years preceding HCC diagnosis (per 10% increase)	1622	3350.8	731	21.8	0.98 (0.96 – 1.00)

^aModel adjusted for age at HCC diagnosis, sex, race/ethnicity, etiology of cirrhosis, tobacco use, years since HCV eradication, CTP class at HCC diagnosis, CirCom at HCC diagnosis.

eReferences

1. Jepsen P, Vilstrup H, Lash TL. Development and validation of a comorbidity scoring system for patients with cirrhosis. *Gastroenterology*. Jan 2014;146(1):147-56; quiz e15-6. doi:10.1053/j.gastro.2013.09.019
2. Serper M, Taddei TH, Mehta R, et al. Association of Provider Specialty and Multidisciplinary Care With Hepatocellular Carcinoma Treatment and Mortality. *Gastroenterology*. Jun 2017;152(8):1954-1964. doi:10.1053/j.gastro.2017.02.040