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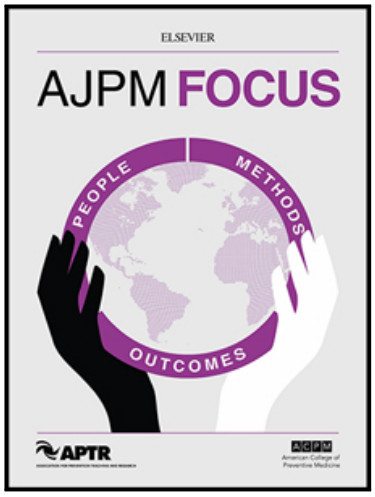

Screening for Hepatitis C Among Community Health Center Patients by Ethnicity and Language Preference

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Screening for Hepatitis C Among Community Health Center Patients by Ethnicity and Language Preference

Short: Hepatitis C Screening Disparities in Latino Populations Served by Community Health Centers

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Highlights

- Hepatitis C virus related liver disease is a leading cause of death among Latinos.
- Community health centers serve high proportion of Latinos and an important setting.
- Latino-English preferred patients had lower HCV screening rates versus other groups.
- Understanding of how language preference impacts screening disparities is needed.

ABSTRACT:

Introduction: Hepatitis C Virus (HCV) is associated with high morbidity and mortality—chronic liver disease is a leading cause of death among Latinos in the United States. Screening for HCV in community health center (CHC) settings, who serve disproportionate percentage of Latinos, is essential to eradication. We assessed HCV screening disparities in adults served by CHCs by ethnicity and language preference.

Methods: This was an observational cohort study spanning 2013-2017 of adults born 1945-1965 in the ADVANCE EHR dataset. Our exposure of interest was race/ethnicity and language preference (non-Hispanic white, Latino-English preferred, Latino-Spanish preferred). Our

primary outcome was the relative hazard of HCV screening, estimated using multivariate Cox proportional hazards regression.

Results: A total of 182,002 patients met study criteria and included 60% non-Hispanic whites, 29% Latino-Spanish preferred, and 11% Latino-English preferred. In total, 9% received HCV screening and 2.4% were diagnosed with HCV. Latino-English preferred patients had lower rates of screening compared to both non-Hispanic whites and Latino-Spanish preferred (5.5% vs 9.4% vs 9.6%). Compared to non-Hispanic whites, Latino-English preferred had lower hazards of HCV screening (aHR=0.56, 95% CI 0.44-0.72) and Latino-Spanish preferred had similar hazards of HCV screening (aHR=1.11, 95% CI 0.88-1.41).

Conclusions: We found that in a large CHC network, adult Latinos who preferred English had lower hazards of HCV screening compared to non-Hispanic whites, while Latinos who preferred Spanish had similar hazards of screening as non-Hispanic whites. Overall prevalence of HCV screening was low. Further work on the role of language preference in HCV screening is needed to better equip primary care providers to provide this recommended preventive service in culturally relevant ways.

Keywords:
Hepatitis C virus; Risk screening; Disparities; Minority health; Electronic health record, community health centers

Abbreviations and acronyms:
aHR, adjusted hazard ratio; ADVANCE, Accelerating data value across a National Community Health Center Network; CHC, Community health center; EHR, Electronic health record; HCV, hepatitis C virus; OCHIN, Not an abbreviation; PCORnet, Patient Centered Outcomes Research Network.

INTRODUCTION:

Hepatitis C virus (HCV) affects 2.4 million people in the United States and new HCV infections have tripled in recent years, [1] conjointly with the opioid crisis and rise of injection drug related infections. HCV is associated with high morbidity and mortality[2, 3] impacting Latino populations disproportionately. [4-6] Chronic liver disease is a leading cause of death among Latinos in the United States (US), and Latinos experience a higher rate of HCV related deaths than non-Hispanic whites (6.8 vs 4.5 per 100,000). [7] Published studies report screening in Latino populations remains low, and multiple barriers exist for HCV screening. [6,8,9] The role of Spanish-language preference on health care utilization and outcomes compared to English preference

varies by setting and service. [10-13] Community health center (CHC) settings are key to HCV screening efforts as many older, low-income Latino patients receive care in CHCs. [14]

Prior studies have identified disparities in HCV screening rates through surveys[15,16] or registry data which may be subject to underreporting. Electronic health records (EHR) may provide additional details of screening disparities and opportunities to target interventions along the HCV treatment cascade; however, most studies using EHR data are limited to local settings, and few examine language preference. [8,9,17] Using a multi-state EHR dataset of CHCs, we evaluated whether there were differences in HCV screening rates between non-Hispanic white, Latino-English language-preferring, and Latino-Spanish language-preferring adults.

METHODS:

Study Population:

We performed a retrospective cohort study of Latino and non-Hispanic white adults who were seen at CHCs between 2013-2017 in the ADVANCE (Accelerating Data Value Across a National Community Health Center Network) clinical data research network in 21 states. [18] Queries and data tables for analyses were standardized in the PCORnet common data model version 3.1 from the ADVANCE data warehouse, which includes specific deduplication protocols. We defined the eligible population as patients born between 1945-1965 (thus meeting the USPSTF 2013 guideline) whose first encounter in the CHC network occurred during the observation period beginning 2013, when the HCV screening policy was updated. Observation spanned from first visit until screening or censoring (death or end of study period). We excluded

patients with an existing HCV diagnosis (diagnosis codes: ICD 070.41, 070.44, 070.51, 070.54, 070.70, 070.71, B17.10, B17.11, B18.2, B19.20, B19.21) at observation start.

Measures

Outcome: We defined our primary outcome as relative hazard of HCV screening test during the study period. We also determined the prevalence of a new HCV diagnosis during the study period by noting whether the individual had a new HCV diagnosis code after observation start.

Independent variable: Our primary independent variable was a composite of three mutually exclusive ethnicity and language preference groups: non-Hispanic white, Latino-Spanish language preferred, Latino-English language preferred. Ethnicity and language were based on patient self-reported clinic registration data.

Covariates: We adjusted for the following potential confounders: age, sex, insurance status at visits during the study period (all public; all private; public and private; no insurance), substance use disorder from encounters and diagnosis ICD9/10 codes excluding tobacco and nicotine, type I or II diabetes diagnosis (to indicate obtaining periodic bloodwork), and number of primary care visits during the study period (proxy for general healthcare utilization).

Statistical Analysis

We conducted descriptive analyses of patient characteristics overall and by ethnicity/language groups including prevalence of HCV screening and HCV diagnosis. For our outcome, we used Cox proportional hazards models to estimate covariate-adjusted hazard ratios (aHR) of receipt of

HCV screening between ethnic-language groups. We used a proportional hazards approach because we were interested in whether there were differences in time to screening in addition to hazards of screening. Of the 180,053 observations used in the final model, 165,540 were censored at recorded death, end of study period, or date of disenrollment; 1,662 had a recorded death date before receipt of screening. Non-Hispanic white patients were considered referent group and robust standard errors were estimated to account for clustering of patients within clinics. Analyses were conducted using Stata version 15 and R version 4.1.3 with two-sided testing and type I error set at 5%. This study was approved by the Institutional Review Board of Oregon Health & Science University.

RESULTS:

There were 182,002 eligible patients across 21 states. The average age was 61.9 years (SD 3.89), with 54% female sex. Patients were predominantly non-Hispanic white (60.2%), with 28.8% Latino-Spanish preferred and 11.0% Latino-English preferred (**see Table 1**).

In total, 9% had an HCV screening test, and 2.4% were diagnosed with HCV during the study period. In the unadjusted analysis, Latino-English preferred patients had lower rates of HCV screening than non-Hispanic whites and Latino-Spanish preferred (5.5% vs 9.4% vs 9.6%, $p<0.001$). After adjustment, Latino-English language preferred patients had lower hazards of HCV screening than non-Hispanic whites (aHR=0.56, 95% CI=0.44-0.72), while Latino-Spanish language preferred patients had similar hazards of HCV screening (aHR=1.11, 95% CI=0.88-1.40) (**Table 2, Figure 1**).

DISCUSSION:

In a large multi-state cohort of established CHC patients, we found low HCV screening prevalence (9%), but slightly higher than national average HCV diagnosis rates (2.4% vs 1%).[16] We also found significant HCV screening disparities by ethnicity and language preference. Our population's HCV screening prevalence is lower than national estimates based on the National Health Interview Survey (17.3% in 2017), [9] and consistent with prior estimates of CHC screening prevalence amongst a smaller network (8.3% of 61,000 eligible). [19] Other studies reveal variability in HCV screening rates in CHCs, [8,9,20] which warrants further investigation.

We also found that Latinos who preferred Spanish had similar rates and hazards of screening compared to non-Hispanic white, but Latinos who preferred English had lower rates and hazards of HCV screening. This was surprising as we hypothesized that Spanish-preferring Latino patients would have lower screening rates than English-preferring patients, as prior studies have shown with regards to access to health services and utilization, [2,10] HIV prophylaxis awareness, [21] and use of physician services. [22] However, we now have increasing evidence that in our practice-based research network, Spanish-preferring patients often utilize preventive services more than non-Hispanic whites and English-preferring Latinos. [11,12,23] One explanation may be that heightened attention to Spanish preferred patients in CHCs, which have additional community, cultural and language engagement resources, facilitate trust between CHC providers and Spanish speaking patients, leading to increased adherence to screening recommendations, as other screening evaluations in our network suggest. [24,25] Organizational differences in care settings (e.g., variability in support staff such as bilingual navigators) have been shown to explain differences in receipt and understanding screening mammography results across ethnic groups. [26]

It's also important to note that these were patients seeking care at CHCs, as opposed to general populations, which might also explain our findings. Further exploration into why English preferring Latinos had lower rates of screening is required.

Limitations

There are several limitations of the analyses. Screening as opposed to diagnostic testing for HCV is difficult to ascertain in our dataset. Our definition of screening is subject to misclassification bias if patients received the test outside the EHR network or received the test prior to cohort inception, which we mitigated by limiting the sample to patients whose first visit in the network occurred during the observation period. We also have evidence that the majority of patients seen in our network tend to receive all their care within the network. [27,28] Second, this is an observational study that may be subject to unmeasured confounding. This analysis did not adjust for social determinants of health such as education level, or provider level factors that might explain differences we observed. We also recognize that the USPSTF guidelines have since been updated to include universal screening for all adults[29]—our findings remind us that expanding screening initiatives without addressing underlying inequities in access to screening and subsequent treatment may worsen disparities in care. [8]

CONCLUSIONS:

In a nationally representative cohort of CHC patients, we found low rates of HCV screening overall, and significant disparities in the hazards of HCV screening by language preference amongst Latinos. Further work examining language preference is needed to better equip primary care providers to implement HCV screening in culturally relevant ways.

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Credit Statement: Brian Chan MD MPH: conceptualization, methodology, formal analysis, investigation, writing – original draft, project administration; David Ezekiel-Herrera MS: conceptualization, methodology, software, data curation, formal analysis, investigation, writing-review & editing, visualization; Steffani R. Bailey PhD: conceptualization, methodology, investigation, writing- review & editing; Miguel Marino PhD: conceptualization, methodology,

software, formal analysis, investigation, writing- review & editing, supervision, resources, funding acquisition, project administration; Jennifer A. Lucas PhD, MPH: methodology, formal analysis, data curation, investigation, writing -review & editing, resources, project administration; Sophia Giebultowicz MS: methodology, software, validation, data curation writing-review & editing; Erika Cottrell PhD, MPP: conceptualization, resources, writing-review and editing, supervision, project administration; Joe Carroll MD: conceptualization, methodology, investigation, writing-review & editing; John Heintzman MD MPH: conceptualization, methodology, investigation, writing- review & editing, project administration, resources, supervision, funding acquisition.

Preliminary results of this work were presented virtually at the California, Hawaii, Northwest Society of General Internal Medicine (SGIM) regional meeting January 2022.

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Figure Legends:

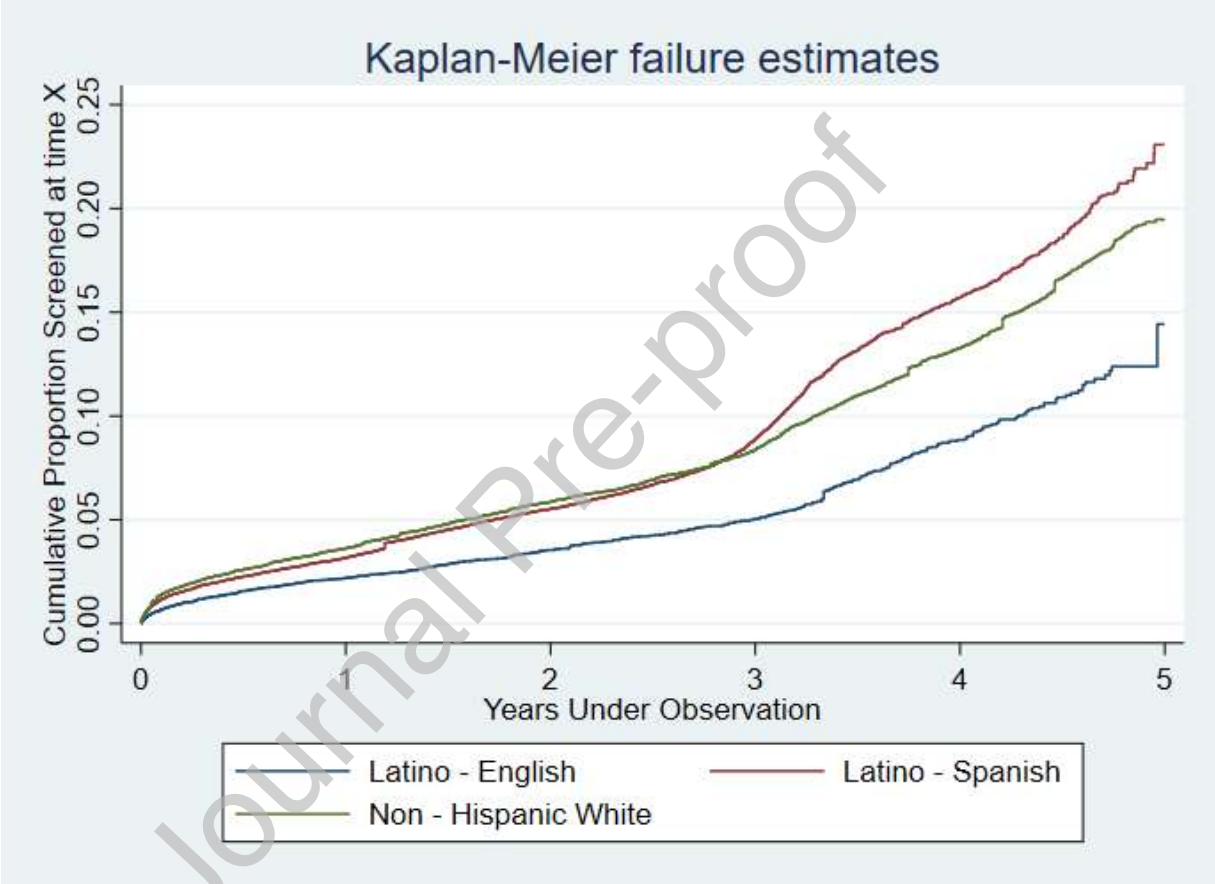

Figure 1: Kaplan-Meier plots for HCV screening completion by Race/Ethnicity-Language (Non-Hispanic White, Latino-English language preferred, Latino-Spanish language preferred)

Figure note: The proportion screened at each timepoint is among patients who have not yet been screened or censored.

Table 1: Description of the ADVANCE sample by race, language preference

	No. (%)			
		Ethnicity/Language Groups		
Characteristic	**Overall (n=182002)**	**Non-Hispanic white (n=109368)**	**Latino: Preferring English (n=19982)**	**Latino: Preferring Spanish (n=52382)**
Age at first encounter (mean(SD))	61.90 (3.89)	61.86 (3.92)	61.53 (3.84)	62.12 (3.85)
Age group, years				
50-54	1583 (0.9)	1095 (1.0)	189 (0.9)	299 (0.6)
55-59	63412 (34.8)	38546 (35.2)	7645 (38.3)	17221 (32.9)
60-64	76389 (42.0)	45219 (41.2)	8376 (41.9)	22794 (43.5)
65-69	35729 (19.6)	21998 (20.1)	3289 (16.5)	10442 (19.9)
70-73	4889 (2.7)	2780 (2.5)	483 (2.4)	1626 (3.1)
Female sex	98353 (54.0)	56546 (51.6)	10681 (53.5)	31126 (59.4)
Insurance				
Never Insured	35414 (19.5)	19087 (17.4)	3957 (19.8)	12370 (23.6)
Some Private	35764 (19.7)	24273 (22.1)	3737 (18.7)	7754 (14.8)
Some Public	101057 (55.5)	59733 (54.5)	11196 (56.0)	30128 (57.5)
Some Public and Private	9767 (5.4)	6545 (6.0)	1092 (5.5)	2130 (4.1)
Screened for HCV[a]	16462 (9.0)	10342 (9.4)	1092 (5.5)	5028 (9.6)
HCV[a] Diagnosis	4305 (2.4)	3328 (3.0)	655 (3.3)	322 (0.6)
SUD[b]	17260 (9.5)	13949 (12.7)	1966 (9.8)	1345 (2.6)
FPL[c]				
<138%	99381 (54.6)	49546 (45.2)	12447 (62.3)	37388 (71.4)
>=138%	29388 (16.1)	21710 (19.8)	2961 (14.8)	4717 (9.0)
Missing	53233 (29.2)	38382 (35.0)	4574 (22.9)	10277 (19.6)
Visits Per Year				
<1	50566 (27.8)	33391 (30.5)	5614 (28.1)	11561 (22.1)
1-3	59350 (32.6)	35696 (32.6)	6369 (31.9)	17285 (33.0)
3-5	31110 (17.1)	16825 (15.3)	3370 (16.9)	10915 (20.8)
5-10	27276 (15.0)	14645 (13.4)	3045 (15.2)	9586 (18.3)
10+	13700 (7.5)	9081 (8.3)	1584 (7.9)	3035 (5.8)

Age At HCV Diagnosis				
50-54	9 (0.0)	8 (0.0)	1 (0.0)	0 (0.0)
55-59	1284 (0.7)	939 (0.9)	281 (1.4)	64 (0.1)
60-64	2135 (1.2)	1724 (1.6)	215 (1.1)	196 (0.4)
65-69	761 (0.4)	563 (0.5)	149 (0.7)	49 (0.1)
70-73	116 (0.1)	94 (0.1)	9 (0.0)	13 (0.0)
Not Diagnosed	177697 (97.6)	106310 (97.0)	19327 (96.7)	52060 (99.4)

[a]Hepatitis C virus, [b]Substance Use Disorder, [c]Federal Poverty Level

Table 2: Adjusted Relative Hazard of Receipt of Hepatitis C Virus screening test[1]

	Patient Group	HR Estimate (95% CI)
Adjusted Hazard Ratio[2]	Latino English Speaking	0.56 (0.43, 0.72)
	Latino Spanish Speaking	1.11 (0.88, 1.40)
	Non-Hispanic white	Ref
Unadjusted Hazard Ratio	Latino English Speaking	0.61 (0.47, 0.79)
	Latino Spanish Speaking	1.08 (0.81, 1.45)
	Non-Hispanic white	Ref

[1]Patients included in the time to event analysis were required to have entered the study population during the study period and not have a screening at their first visit.

[2]Adjusted for: age category, female sex, insurance, visits per year, diabetes diagnosis, and substance use disorder