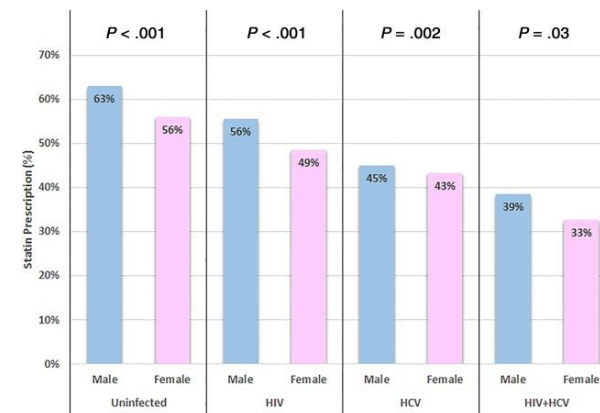


# Statin Utilization as a Function of Calculated ASCVD Risk in Patients with HCV

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# Statin utilization in HCV background

- HCV is an independent risk for coronary artery disease (CAD)
  - HR 1.25<sup>1</sup>
    - Despite lower rates of hypertension, hyperlipidemia and diabetes
    - ASCVD risk score underestimates risk in HCV patients when calculated risk  $\geq 7.5\%$
- Does the high risk lead to high statin utilization?
- Question of statin utilization mainly evaluated in the male, veteran population<sup>2</sup>
  - Only 21% despite 71% having 10-year ASCVD risk  $\geq 7.5\%$
  - 25.3% of individuals with ASCVD risk  $\geq 7.5\%$
- Any data outside of the male, veteran population?<sup>3</sup>
  - Only for patients with diabetes, LDL  $\geq 190$ , or history of CAD



# Are statins safe in chronic liver disease?

- 2 big perceived risks
  - 1 – Worsening liver function, acute liver injury
    - Considerable retrospective data and RCTs demonstrating statins do not harm liver function in compensated, chronic liver disease<sup>4</sup>
    - Including compensated cirrhosis<sup>5</sup>
      - Rates of LFT elevation lower in treatment than placebo group in 36 week trial (n=326)
    - Evidence that they improve liver outcomes
      - ↓ HCC, progression to fibrosis, decompensation<sup>6-8</sup>
      - ↑ sustained virologic response<sup>7,9</sup>
      - ↓ mortality in some studies<sup>4,7</sup>
  - 2- Rhabdomyolysis/myalgias/myopathy
    - Increase has been noted in decompensated or severe (bilirubin > 5) cirrhosis<sup>10</sup>
    - No increase in compensated, chronic liver disease<sup>11-13</sup>

High risk  
individuals



Underutilization of  
primary prevention



Potential for poor patient outcomes

- But is utilization better in the general community?
- Can we identify factors associated with underutilization?
  - Address why statins are not being prescribed

# Study design

- 3-year (2019-2021) retrospective analysis
- Inclusion criteria
  - HCV positive by antibody or RNA
  - Aged 40-75 years
  - Available data to complete 2013 AHA/ACC Pooled Cohort Equation
  - Encounter at some point 2019-2021
- Exclusion criteria
  - HBV or HIV coinfections
  - Hx of CVD – only evaluated primary prevention
- Assessed for presence of a statin on med list at any point 2019-2021
- Assessed for statin related complications

Age	<input type="text" value="Norm: 40 - 75"/>	years
<small>This calculator only applies to individuals 40-75 years of age.</small>		
Diabetes	<input checked="" type="radio"/> No	<input type="radio"/> Yes
Sex	<input type="radio"/> Female	<input type="radio"/> Male
Smoker	<input checked="" type="radio"/> No	<input type="radio"/> Yes
Total cholesterol	<input type="text" value="Norm: 150 - 200"/>	mg/dL ↔
HDL cholesterol	<input type="text"/>	mg/dL ↔
Systolic blood pressure	<input type="text" value="Norm: 100 - 120"/>	mm Hg
Treatment for hypertension	<input checked="" type="radio"/> No	<input type="radio"/> Yes
Race	<input type="text" value="White"/>	
<small>Race may/may not provide better estimates of CV risk; optional</small>		
	<input type="text" value="African American"/>	
	<input type="text" value="Other"/>	

# Results

Variable	Statin (n = 55)	No statin (n = 196)	P-value
Age (years), mean (SD)	61.6 (6.1)	59.6 (6.1)	0.037
Female sex	30.9%	26.0%	0.494
Black race	70.9%	58.2%	0.117
Total cholesterol (mg/dL), mean (SD)	201.6 (38.8)	181.1 (38.5)	< 0.001
High-density lipoprotein cholesterol (mg/dL), mean (SD)	56.1 (18.3)	51.9 (17.1)	0.113
Low-density lipoprotein cholesterol (mg/dL), mean (SD)	120.2 (31.3)	105.5 (25.6)	< 0.001
Systolic blood pressure (mmHg), mean (SD)	141.1 (16.2)	136.4 (18.0)	0.084
On anti-hypertensive therapy	72.7%	61.2%	0.153
Body mass index (kg/m <sup>2</sup> ), mean (SD)	28.4 (7.3)	28.2 (6.2)	0.826
Current smoking	54.6%	65.8%	0.154
FIB-4 > 3.5	13.5%	12.9%	1.000
Cirrhosis diagnoses	10.9%	18.9%	0.224

- Looking at individuals whose only 2019 ACC/AHA guideline indication would be ASCVD score  $\geq 7.5$ 
  - Excluded diabetes and those with LDL  $\geq 190$ 
    - 251/430 (58.4%) had 10-year ASCVD risk  $\geq 7.5\%$ 
      - 55/251 (21.9%) were prescribed a statin
      - Excluding individuals with cirrhosis, 49/208 (23.6%) were prescribed a statin

# Results

- 1,077 total subjects included in analysis
  - 709/1077 (65.8%) had 10-year ASCVD risk  $\geq 7.5\%$ 
    - 269/709 (37.9%) of subjects with 10-year risk  $\geq 7.5\%$  were treated with a statin
    - 37/368 (10.1%) of subjects with risk  $< 7.5\%$  were treated with a statin

Variable	ASCVD risk $< 5\%$ (n=237)	ASCVD risk 5-7.4% (n=131)	ASCVD risk 7.5-9.9% (n=98)	ASCVD risk 10-19.9% (n=361)	ASCVD risk $\geq 20\%$ (n=250)	P-value
Age (years), mean (SD)	49.5 (6.3)	54.5 (6.0)	56.1 (6.4)	59.6 (6.1)	61.7 (6.0)	$< 0.001$
Female sex	65.0%	42.0%	38.8%	30.5%	17.6%	$< 0.001$
Black race	24.1%	25.2%	44.9%	54.8%	73.6%	$< 0.001$
Total cholesterol (mg/dL), mean (SD)	166.7 (35.8)	169.4 (42.5)	172.9 (36.3)	169.8 (36.7)	168.0 (42.9)	0.704
High-density lipoprotein cholesterol (mg/dL), mean (SD)	59.1 (20.5)	56.7 (20.2)	55.9 (20.0)	52.3 (18.0)	50.6 (19.6)	$< 0.001$
Low-density lipoprotein cholesterol (mg/dL), mean (SD)	73.1 (39.6)	73.6 (40.8)	83.4 (42.4)	77.6 (41.8)	75.9 (39.8)	0.266
Diabetes	9.7%	15.3%	27.6%	25.5%	65.2%	$< 0.001$
Systolic blood pressure (mmHg), mean (SD)	122.1 (14.4)	125.6 (17.9)	126.3 (17.7)	135.4 (17.1)	145.7 (18.8)	$< 0.001$
On anti-hypertensive therapy	36.3%	48.9%	51.0%	62.9%	85.2%	$< .0001$
Body mass index (kg/m <sup>2</sup> ), mean (SD)	28.8 (7.2)	29.4 (7.0)	29.5 (7.1)	28.6 (6.7)	29.2 (6.5)	0.652
Current smoking	43.5%	59.5%	54.1%	59.8%	68.4%	$< 0.001$
FIB-4 $> 3.5$	13.7%	14.2%	9.6%	14.7%	9.3%	0.286
Diagnosis of cirrhosis	13.5%	13.7%	19.4%	16.1%	15.6%	0.689
Statin therapy	8.0%	13.7%	23.5%	31.0%	53.6%	$< 0.001$

Variable	FIB-4 < 1.45 (n=516)	FIB-4 1.45- 3.24 (n=363)	FIB-4 ≥ 3.25 (n=139)	P- value
Age (years), mean (SD)	55.1 (7.8)	58.9 (7.0)	58.5 (7.3)	< 0.001
Female sex	39.1%	36.1%	30.2%	0.143
Black race	44.1%	51.2%	50.4%	0.092
Diabetes	31.6%	29.8%	30.9%	0.845
Smoking	59.9%	59.2%	52.5%	0.282
Low-density lipoprotein cholesterol (mg/dL), mean (SD)	80.5 (41.8)	72.5 (39.0)	65.9 (37.5)	< 0.001
Direct acting antiviral use at any point 2019-2021	31.0%	38.3%	30.9%	0.615
ASCVD risk score, mean (SD)	0.132 (0.108)	0.156 (0.116)	0.141 (0.114)	0.007
Statin use	31.4%	27.5%	21.6%	0.064

Variable	Subjects with ≥ 1 adverse event* 2019- 2021 (n = 91)	Subjects with no adverse event* 2019- 2021 (n = 986)	P-value
Age (year), mean (SD)	55.1 (7.1)	57.1 (7.7)	0.017
Female sex	25.3%	38.3%	0.017
Cirrhosis	36.3%	13.5%	< 0.001
Fibrosis-4 > 3.5	37.4%	10.2%	0.675
Treatment with direct-acting antiviral at any time 2019-2021	35.2%	31.3%	0.023
ASCVD risk score	0.138 (0.107)	0.141 (0.113)	0.819
Statin use	20.9%	29.3%	0.114

\*Adverse event defined as one of the following: diagnosis of myopathy, CK > 600, ascites, hepatic encephalopathy, AST > 80, ALT > 82

# Results

- Did extent of liver disease correlate with underutilization?
- When just assessing individuals with indication for statin use based on 2019 ACC/AHA guidelines
  - FIB-4 < 1.45 = 144/347 (41.5%)
  - FIB-4 1.45-3.24 = 91/272 (33.5%)
  - FIB-4 ≥ 3.25 = 27/95 (28.4%)
  - **P = 0.024**
- Was statin use associated with increased adverse events?



# Discussion

- Utilization increases as ASCVD risk goes up
  - Yet the highest risk group still only is prescribed a statin ~50% of the time
- Results are similar to findings in the veteran population
  - More generalizable
- Liver function correlated with utilization
  - No increase in adverse events noted
    - Supports existing retrospective and more limited prospective data
- Limitations
  - Clinical difference between HCV-infected and chronic hepatitis C
  - Bias – suspect more complications in those less likely to be prescribed statins

# Next steps

- Further prospective study
  - Contribute to growing statin safety evidence in liver disease
  - Assess effectiveness of statins for CVD prevention specifically in this population
  - Continued assessment of liver specific benefits of statins in chronic liver disease
- Clinical practice changes
  - In chronic, compensated liver disease, statins appear safe
    - Empower clinicians to prescribe statins in this population

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