

## The Trends in the Costs of Hepatitis C-Related Admissions Stratified by Psychiatric and Substance Use Categories: Analysis of US Hospitals

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### Background and Aims

Given the clinical overlap between hepatitis C (HCV) and psychiatric/substance use comorbidities, it is important to investigate the burdens of cost and the trends observed in HCV-related admissions as stratified by psychiatric and substance use conditions, in order to identify the future trajectory of HCV-related expenses and to isolate sections of HCV-related strata that experience high expenditures.

### Methods

Patients with HCV were compiled from the National Inpatient Sample from years 2016-2019 and stratified into populations by psychiatric or substance use comorbidities. For each stratum, the respective total and mean cost data were derived from hospitalization charges using the inflation-adjusted cost-to-charge ratios. For the annualized costs between 2016-2019, best-fit lines were drawn and R<sup>2</sup> with p-values were extracted.

### Results

The number of US HCV-related hospitalizations for 2016-2019 were 1773.15, 1747.32, 1677.83, 1565.16 per 100,000 admissions, respectively. Total annual cost estimates were determined in millions of dollars for 2016-2019 with R<sup>2</sup> and p-values noted in parentheses for the following psychiatric comorbidities; bipolar disorder (BD): 358.99, 355.97, 348.27, 322.31 (0.83, 0.088); depression: 840.83, 802.95, 727.57, 682.80 (0.98, 0.008); anxiety disorder: 641.11, 668.89, 678.11, 652.38 (0.11, 0.660); acute stress disorder (ASD): 107.34, 113.75, 105.33, 118.96 (0.30, 0.450); schizophrenia: 166.04, 169.88, 143.96, 136.93 (0.81, 0.099); >2 comorbidities: 1058.81, 1120.22, 1135.38, 1160.36 (0.91, 0.045). As for substance use categories; cocaine use: 246.28, 245.03, 244.09, 237.81 (0.81, 0.098); marijuana use: 251.10, 249.39, 230.51, 198.83 (0.87, 0.066); opioid use: 1086.52, 1143.46, 1126.07, 1122.02 (0.23, 0.520); stimulant use: 229.25, 257.67, 295.76, 340.52 (0.99, 0.005). The strata-dependent mean values in dollars were calculated similarly. For the psychiatric comorbidities; BD: 11271.21, 11400.10, 11801.76, 12266.77 (0.95, 0.026); depression: 13149.24, 13144.73, 13232.23, 14049.38 (0.67, 0.180); anxiety disorder: 13860.37, 14110.17, 14603.36, 14862.35 (0.98, 0.009); ASD: 14795.48, 15496.82, 14166.47, 16196.31 (0.18, 0.580); schizophrenia: 16326.36, 16761.49, 15529.23, 16378.77 (0.07, 0.730); >2 comorbidities: 11499.43, 11695.81, 11662.81, 12424.18 (0.74, 0.140). As for the substance use categories; cocaine use: 12385.20, 11958.29, 11982.86, 12693.21 (0.12, 0.650); marijuana use: 12545.66, 12321.51, 12585.66, 12101.44 (0.38, 0.380); opioid use: 12929.35, 13664.67, 14066.17, 15109.37 (0.97, 0.014); stimulant use: 13781.17, 13479.92, 12811.97, 13175.51 (0.60, 0.230).

### Conclusion

The current analysis shows a promising decline in the mean and total costs of HCV-related admissions in various psychiatric and substance use strata with exception of patients with HCV and >2 psychiatric comorbidities and concomitant stimulant use (total costs) and use of >2 substances, bipolar disorder, anxiety disorder and opioid use disorder (mean costs).

### Cost Analyses Tables

Year	2016	2017	2018	2019	R <sup>2</sup>	p-value
<b>HCV-Related Hospitalization Incidence</b>	1773.15	1747.32	1677.83	1565.16	0.92	0.041 *
<b>Total Cost (95% CI)</b>						
<b>Psychiatric Comorbidities</b>						
Bipolar Disorder	358.99 (337.96 - 380.01)	355.97 (333.06 - 378.87)	348.27 (325.62 - 370.92)	322.31 (302.36 - 342.26)	0.83	0.088
Depression	840.83 (791.10 - 890.55)	802.95 (755.01 - 850.88)	727.57 (684.71 - 770.44)	682.80 (639.75 - 725.85)	0.98	0.008 **
Anxiety Disorder	641.11 (606.96 - 675.26)	668.89 (633.08 - 704.70)	678.11 (639.02 - 717.19)	652.38 (616.40 - 688.36)	0.11	0.660
Acute Stress Disorder	107.34 (95.50 - 119.19)	113.75 (98.45 - 129.04)	105.33 (95.25 - 115.41)	118.96 (106.93 - 130.99)	0.30	0.450
Schizophrenia	166.04 (136.57 - 195.51)	169.88 (145.56 - 194.19)	143.96 (123.86 - 164.05)	136.93 (117.55 - 156.30)	0.81	0.099
≥ 2 Comorbidities	1058.81 (1003.11 - 1114.51)	1120.22 (1055.10 - 1185.35)	1135.38 (1069.21 - 1201.54)	1160.36 (1094.37 - 1226.34)	0.91	0.045 *
None	5790.64 (5506.99 - 6074.30)	5615.93 (5334.12 - 5897.74)	5271.12 (5014.02 - 5528.22)	5139.65 (4876.01 - 5403.29)	0.97	0.014 *
<b>Substance Use Comorbidities</b>						
Cocaine	246.28 (225.81 - 266.75)	245.03 (224.97 - 265.08)	244.09 (224.60 - 263.59)	237.81 (218.45 - 257.16)	0.81	0.098
Marijuana	251.10 (232.68 - 269.52)	249.39 (230.77 - 268.01)	230.51 (213.23 - 247.78)	198.83 (185.45 - 212.20)	0.87	0.066
Opioid	1086.52 (1013.81 - 1159.22)	1143.46 (1063.39 - 1223.53)	1126.07 (1046.75 - 1205.39)	1122.02 (1037.00 - 1207.04)	0.23	0.520
Stimulant	229.25 (205.84 - 252.66)	257.67 (228.77 - 286.57)	295.76 (267.13 - 324.40)	340.52 (311.01 - 370.04)	0.99	0.005 **
≥ 2 Comorbidities	708.61 (654.61 - 762.60)	822.97 (759.70 - 886.25)	914.20 (840.11 - 988.28)	945.22 (860.63 - 1029.80)	0.95	0.027 *
None	6442.00 (6147.84 - 6736.17)	6129.07 (5841.41 - 6416.74)	5599.10 (5354.41 - 5843.79)	5369.00 (5128.01 - 5609.99)	0.98	0.011 *

Year	2016	2017	2018	2019	R <sup>2</sup>	p-value
<b>Mean Cost (95% CI)</b>						
<b>Psychiatric Comorbidities</b>						
Bipolar Disorder	11271.21 (10785.93 - 11756.49)	11400.10 (10837.97 - 11962.23)	11801.76 (11197.35 - 12406.17)	12266.77 (11703.96 - 12829.59)	0.95	0.026 *
Depression	13149.24 (12602.81 - 13695.67)	13144.73 (12626.13 - 13663.32)	13232.23 (12713.05 - 13751.42)	14049.38 (13444.08 - 14654.68)	0.67	0.180
Anxiety Disorder	13860.37 (13384.09 - 14336.65)	14110.17 (13612.52 - 14607.82)	14603.36 (14054.78 - 15151.94)	14862.35 (14324.29 - 15400.42)	0.98	0.009 **
Acute Stress Disorder	14795.48 (13337.16 - 16253.81)	15496.82 (13604.02 - 17389.63)	14166.47 (13063.15 - 15269.79)	16196.31 (14818.26 - 17574.36)	0.18	0.580
Schizophrenia	16326.36 (13593.05 - 19059.66)	16761.49 (14754.26 - 18768.71)	15529.23 (13631.26 - 17427.20)	16378.77 (14365.17 - 18392.37)	0.07	0.730
≥ 2 Comorbidities	11499.43 (11133.01 - 11865.85)	11695.81 (11293.22 - 12098.41)	11662.81 (11269.91 - 12055.72)	12424.18 (11991.21 - 12857.15)	0.74	0.140
None	15197.34 (14770.24 - 15624.45)	15074.51 (14646.07 - 15502.96)	15012.94 (14615.30 - 15410.58)	15741.91 (15263.82 - 16219.99)	0.37	0.390
<b>Substance Use Comorbidities</b>						
Cocaine	12385.20 (11732.82 - 13037.58)	11958.29 (11313.17 - 12603.40)	11982.86 (11348.69 - 12617.03)	12693.21 (11989.13 - 13397.28)	0.12	0.650
Marijuana	12545.66 (11828.94 - 13262.39)	12321.51 (11656.95 - 12986.06)	12585.66 (11852.82 - 13318.50)	12101.44 (11455.39 - 12747.49)	0.38	0.380
Opioid	12929.35 (12407.31 - 13451.38)	13664.67 (13064.79 - 14264.55)	14066.17 (13474.24 - 14658.10)	15109.37 (14450.68 - 15768.05)	0.97	0.014 *
Stimulant	13781.17 (12929.55 - 14632.79)	13479.92 (12425.47 - 14534.36)	12811.97 (12019.53 - 13604.42)	13175.51 (12434.71 - 13916.32)	0.60	0.230
≥ 2 Comorbidities	11488.44 (10903.49 - 12073.39)	11606.70 (11027.44 - 12185.96)	11847.30 (11270.86 - 12423.74)	12943.72 (12189.85 - 13697.60)	0.80	0.110
None	14969.92 (14565.88 - 15373.96)	14909.51 (14509.53 - 15309.49)	14847.79 (14483.22 - 15212.36)	15514.20 (15092.43 - 15935.97)	0.44	0.340

### Figures of the Trends

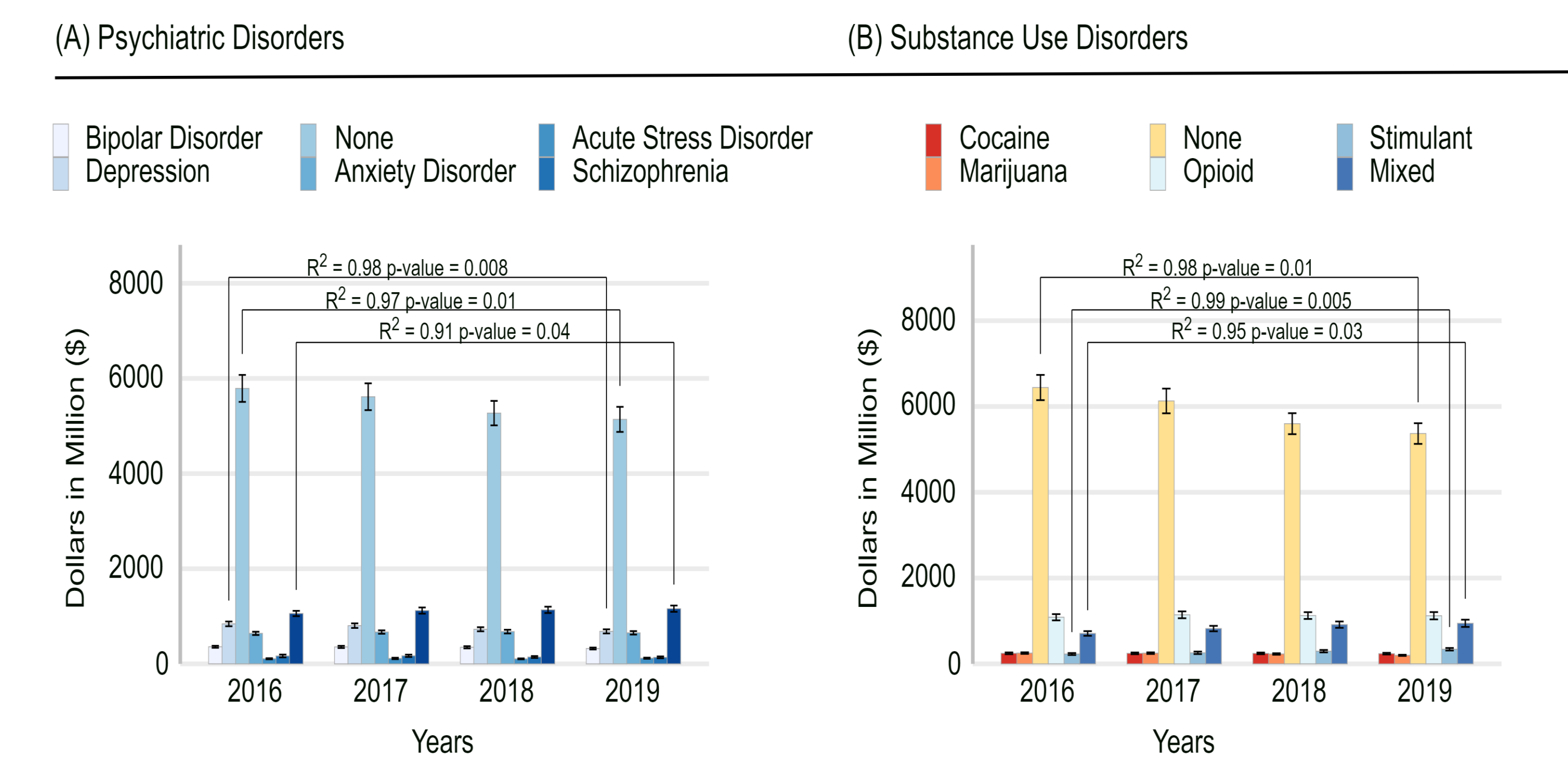
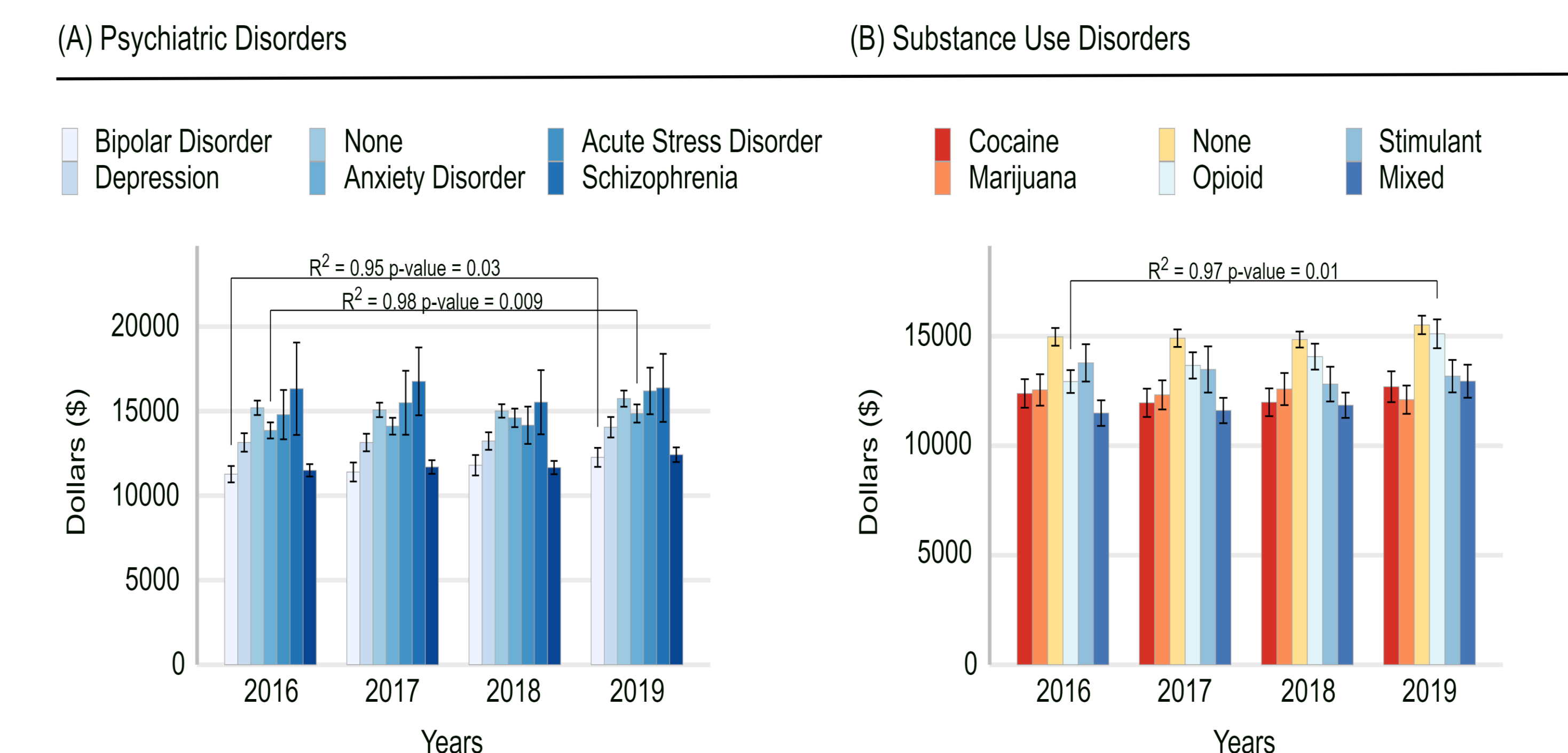


Figure 1b: Inflation-adjusted Mean Costs Stratified by Psychiatric Disorders and Substance Use Disorders in Patients With Hepatitis C



These figures represent the total (figure 1a) and mean (figure 1b) costs of Hepatitis C stratified by (A) psychiatric disorders and (B) substance use disorders.

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