Evaluating the Medicaid Subscription-based Payment Model in Hepatitis C

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Abstract

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Background

Hepatitis C virus (HCV) remains a major contributor to liver cirrhosis, hepatocellular carcinoma, and liver transplantation in the United States, imposing substantial clinical and economic burdens. Although direct-acting antivirals (DAAs) offer cure rates exceeding 95%, access remains constrained due to high drug costs, limited screening uptake, and Medicaid-specific treatment restrictions. In July 2019, Louisiana and Washington implemented subscription-based payment models (SBPMs), which decouple drug pricing from volume to promote broader treatment access through fixed-cost agreements. While theoretically promising, the real-world impact of SBPMs on HCV care delivery and their long-term societal value remains insufficiently evaluated.

Methods

This study integrated retrospective claims-based analysis with decision-analytic modeling to evaluate the clinical and economic implications of SBPMs. Aim 1 used a comparative effectiveness design using payer-complete claims data from the Komodo Health database (2018–2022), identifying Medicaid Managed Care (MMC) beneficiaries aged 18–64. Synthetic control methods were applied to construct counterfactuals for Louisiana and Washington using data from 14 comparator states, matched on pre-policy trends, state, and patient characteristics. Primary outcomes included HCV screening, RNA testing, and DAA initiation and refill rates, with subgroup and geographic stratification.

In Aim 2, a state-specific, lifetime Markov model was developed to simulate disease progression across health states representing chronic infection (F0–F4), decompensated cirrhosis, hepatocellular carcinoma, liver transplantation, background mortality, and liver-related mortality. The model was parameterized using real-world behavioral inputs from Aim 1. Outcomes were assessed from a societal perspective and included total costs, quality-adjusted life years (QALYs), and incremental net monetary benefit (INMB), using a willingness-to-pay (WTP) threshold of $150,000 per QALY.

Results

Aim 1: In Louisiana, SBPM implementation led to statistically significant and sustained increases in RNA testing (+35.2 per 100,000 population; $P<0.10$), DAA initiation (+7.8 per 1,000), and refill rates (+24.4 per 1,000), with improvements consistent across age, sex, and comorbidity subgroups. Conversely, Washington experienced a significant decline in treatment

uptake, with DAA initiations and refills decreasing by 3.9 and 12.9 per 1,000 patients, respectively ($P<0.10$), with no corresponding improvements in screening or RNA testing.

Aim 2: In Louisiana, the SBPM generated 6,377,658 QALYs at a societal cost of $56.1 billion, compared to 6,372,194 QALYs and $56.6 billion under traditional pricing. The model projected $506 million in cost savings and an INMB of $1.3 billion, indicating that the SBPM strategy was highly cost-effective. In Washington, SBPM implementation resulted in slightly fewer QALYs (2,235,301 vs. 2,235,972) and higher cost incurred ($95.2 million), yielding a negative INMB and suggesting that the strategy was not cost-effective in that context.

Conclusion

SBPMs offer a scalable approach to improving access to curative HCV treatment and can yield substantial societal benefits when implemented effectively. However, the different outcomes between Louisiana and Washington underscore the importance of state-level implementation context. DAAs financing reform alone is insufficient to achieve HCV elimination; investments in screening infrastructure, provider engagement, patient outreach, and real-time data monitoring are essential to maximize public health impact. These findings highlight the critical role of integrated policy and system-level interventions in advancing equitable and cost-effective HCV care.

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INTRODUCTION

Hepatitis C virus (HCV) poses a significant global health challenge, with an estimated 58 million individuals worldwide living with chronic infections, among which 2.8 million reside in the United States.[1,2] HCV infection can lead to severe liver-related complications, including decompensated cirrhosis and hepatocellular carcinoma, making it a leading cause of liver transplants.[3,4] While recent advancements in treatment in the form of direct-acting antivirals (DAAs) have improved cure rates [5], several obstacles hinder the United States from achieving its HCV elimination goals.[6] These hurdles include inadequate screening efforts and the prohibitively high costs of DAA treatment, which can range from $20,000 to $90,000 per patient.[7–9]

Complicating matters further, state budget constraints have prompted Medicaid programs, which covers a substantial portion of HCV patients, to impose restrictions on DAA access based on factors such as the stage of fibrosis and sobriety.[10–14] This approach has resulted in the rationing of treatment, prioritizing the sickest patients, and preventing those with substance use disorders from accessing needed therapy.

In response to these challenges, Washington (WA) and Louisiana (LA), have embraced an innovative payment model for financing HCV medications, known as the Subscription-Based Payment Model (SBPM). States directly negotiate reduced prices with a single drug manufacturer in exchange for exclusive access to the medication. Within this framework, states pay a predetermined price for a drug supply that aims to cover treatment for a specified number of patients. After reaching a spending threshold, the per-prescription price drops to zero through

additional supplemental rebates.[15–21] Both states initiated the SBPM model on 1st of July 2019 and the details of their contracts are illustrated in Table 1.[15,20–23]

Table 1: Subscription-Based Payment Model in Louisiana and Washington

	Louisiana	**Washington**
Length of contract	5 years	4 years
Drug manufacturer	Asegua Therapeutics (a subsidiary of Gilead sciences, Inc.)	AbbVie
Services provided	- Unlimited supply of the generic antiviral Epclusa® (sofosbuvir/velpatasvir) and additional services for screening and care linkage	- Unlimited supply of Mavyret (glecaprevir/pibrentasvir) and additional services to identify patients with HCV - Guaranteed best price for non-Medicaid groups
Target population	Medicaid and correctional populations	Medicaid and non-Medicaid groups
Aim	treat up to 31,000 patients	treat up to 30,000 patients
Annual payment limit	$35 million which is the same amount the state spent on treating 1,100 patients in 2018	$80.4 million which is the same amount the state spent on treating 3,300 patients in 2018
Expected average cost per treatment course	$5,645	$10,700

The SBPM model potentially offers several advantages as it reduces uncertainty to both payer and manufacturer. The model provides a degree of budget predictability for states, ensuring they can manage their healthcare expenditures effectively.[19,20] Additionally, it guarantees a stable source of revenue for drug manufacturers, which is important given the increasingly competitive landscape within the HCV treatment market. Consequently, more patients can gain increased access and benefit from DAAs.

In an effort to eradicate HCV and reduce the burden of liver cancer, the US administration has proposed a $12.3 billion budget over 5 years for a national hepatitis C elimination program,[8,24] in which implementing the subscription-based payment model nationwide is one of its main cornerstones. Nevertheless, the real-world effects of the subscription-based payment model on HCV screening and treatment uptake and the downstream societal gains relative to conventional pricing have not been rigorously evaluated.

This dissertation fills that gap by pursuing two interrelated objectives: first, it quantified the impact of SBPM implementation in Washington and Louisiana on HCV RNA testing and DAA initiation/refill rates, including an examination of how patient-level factors modified those effects; and second, it conducted a lifetime economic evaluation to compare the societal benefits of SBPM against traditional drug-pricing approaches in both states. By integrating policy impact analysis with cost–benefit modeling, this work provides critical evidence to inform policymakers and payers on the potential of subscription-based financing as a scalable strategy for national HCV elimination.

1. COMPARATIVE EVALUATION OF SUBSCRIPTION-BASED PAYMENT MODEL FOR HEPATITIS C IN MEDICAID MANAGED CARE

ABSTRACT

Background

Hepatitis C virus (HCV) remains a leading cause of cirrhosis, hepatocellular carcinoma, and liver transplantation, despite the availability of highly effective direct-acting antivirals (DAAs). High drug costs and limited screening, along with Medicaid restrictions on fibrosis and sobriety, continue to impede HCV elimination. In July 2019, Washington and Louisiana implemented subscription-based payment models (SBPM) to negotiate capped DAA pricing and eliminate per-prescription fees above a spending threshold. However, the real-world impact of SBPM on HCV screening and DAA uptake particularly among Medicaid Managed Care (MMC) beneficiaries has not been comprehensively evaluated.

Methods

We used payer-complete claims from the Komodo Health database (January 2018–December 2022) to identify adults (18–64 years) continuously enrolled in MMC without dual Medicare coverage. Employing the Synthetic Control Method, we constructed "synthetic" versions of Washington and Louisiana from 14 control states, matching pre-policy trends, patient-level, and state-level variables in overall HCV screening, RNA testing, DAA initiation/refill rates, generic Epclusa® initiation/refills in Louisiana, and Mavyret® initiation/refills in Washington. We analyzed outcomes over three intervals: July–December 2019, January 2020–December 2022, and the full post-policy period, and performed

subgroup (age, gender, SUD, diabetes, HIV) and regional (3-digit ZIP code) analyses. Statistical significance was assessed via permutation placebo tests ($\alpha = 0.10$).

Results:

After SBPM implementation, Louisiana experienced significant and sustained improvements: monthly HCV RNA testing increased by 35.2 tests per 100000 population ($P<0.10$), DAA initiation fills rose by 7.8 per 1000 patients ($P<0.10$), and refills climbed by 24.4 per 1000. These gains were consistent across age, sex, substance use disorder subgroups, as well as within all three Louisiana regions. Overall HCV screening was not statistically significantly different except for the first 6 months after SBPM implementation. In contrast, Washington showed no meaningful change in RNA testing and a significant decline in DAA uptake, with initiation fills decreasing by 3.9 per 1000 patients per month ($P<0.10$) and refills falling by 12.9 per 1000, patterns that were likewise observed across demographic and geographic subgroups.

Conclusions

The markedly different outcomes between Louisiana and Washington highlight that SBPM effectiveness depends on contextual factors beyond financing alone. For states considering SBPM as part of broader HCV elimination efforts, complementary strategies, such as provider engagement, robust screening and treatment infrastructure, patient outreach, and real-time surveillance are essential to maximize public health impact.

1.1. Background

Hepatitis C virus (HCV) remains a major public health challenge worldwide, with an estimated 50 million people chronically infected and 2.4 millions of whom reside in the United States.[1,2] Left untreated, HCV can progress to cirrhosis, hepatocellular carcinoma, and end-stage liver disease, driving a substantial fraction of liver transplantations each year.[3,4] In recognition of its global toll, the World Health Organization has set ambitious elimination targets for 2030, yet persistent gaps in case identification and treatment uptake threaten to derail progress.[25]

Although the introduction of all-oral, direct-acting antivirals (DAAs) has revolutionized therapy; achieving cure rates in excess of 95% with well-tolerated regimens, multiple systemic barriers continue to impede broad scale-up.[14,26–33] High per-patient costs ranging from US$84,000 to $90,000 when first launched,[8] uneven implementation of universal screening recommendations, and restrictive payer policies collectively limit access.[14,31,32,34–38] In particular, many state Medicaid programs impose fibrosis restrictions or sobriety restrictions that exclude vulnerable subpopulations, including people who inject drugs and those with mild liver disease.[12,33,37,39,40]

To address these challenges, Washington and Louisiana implemented a subscription-based payment model (SBPM) for DAA financing in July 2019. Under SBPM, each state negotiates a fixed annual budget with a single manufacturer for unlimited access to one DAA—generic Epclusa® in Louisiana and Mavyret® in Washington—and, once a predefined spending cap is reached, pays no further per-prescription fees.[15–21] Building on this state-level experimentation, the U.S. administration's $12.3 billion national HCV elimination plan calls for similar subscription agreements nationwide.[8,24] Yet despite its policy prominence, SBPM's real-world

effects on HCV screening, RNA testing, and DAA initiation/refill rates—particularly within Medicaid Managed Care populations, who account for nearly 79% of U.S. HCV-infected individuals—remain poorly characterized. [41]

Prior analyses have drawn on Medicaid State Drug Utilization files from January 2017 through June 2020. One study reported a significant rise in Medicaid-covered DAA prescriptions in Louisiana after SBPM implementation but found no comparable change in Washington.[18] However, it did not assess SBPM's impact on HCV screening rates, despite screening being a central objective of both state contracts, nor did it explore patient-level factors that might explain the divergent outcomes. Likewise, a recent working paper by Flynn et al. combined Medicaid drug utilization data with other state-level indicators and concluded that Louisiana achieved significantly higher rates of HCV detection and treatment under SBPM.[42] That analysis also omitted any examination of patient-level drivers and was restricted to annual, aggregated data.[42]

This dissertation therefore provides the first comprehensive, quasi-experimental comparison of SBPM's impact on HCV care in Washington and Louisiana. Leveraging closed-claims data and a synthetic control design, we evaluate changes in HCV screening, RNA testing, and both treatment initiation and refills and explore how these effects vary by demographic, clinical, and geographic subgroups to inform best practices for expanding SBPM toward national HCV elimination.

1.2. Methods

1.2.1. Data sources

We used closed-claims ("payer-complete") data from the Komodo Health database covering January 2018 through December 2022.[43] Komodo Health links over 65 billion de-identified records from more than 330 million U.S. patients, including clinical encounters, pharmacy fills, and laboratory results drawn directly from hospital systems, physician networks, claims clearinghouses, pharmacies, and insurers.[43] Approximately half of these records are payer-complete—originating straight from insurer feeds—ensuring comprehensive capture of both medical and prescription claims. The payer-complete dataset alone includes over 140 million patients enrolled in more than 150 private health plans, among them Medicaid Managed Care (MMC) and Medicare Advantage.[43]

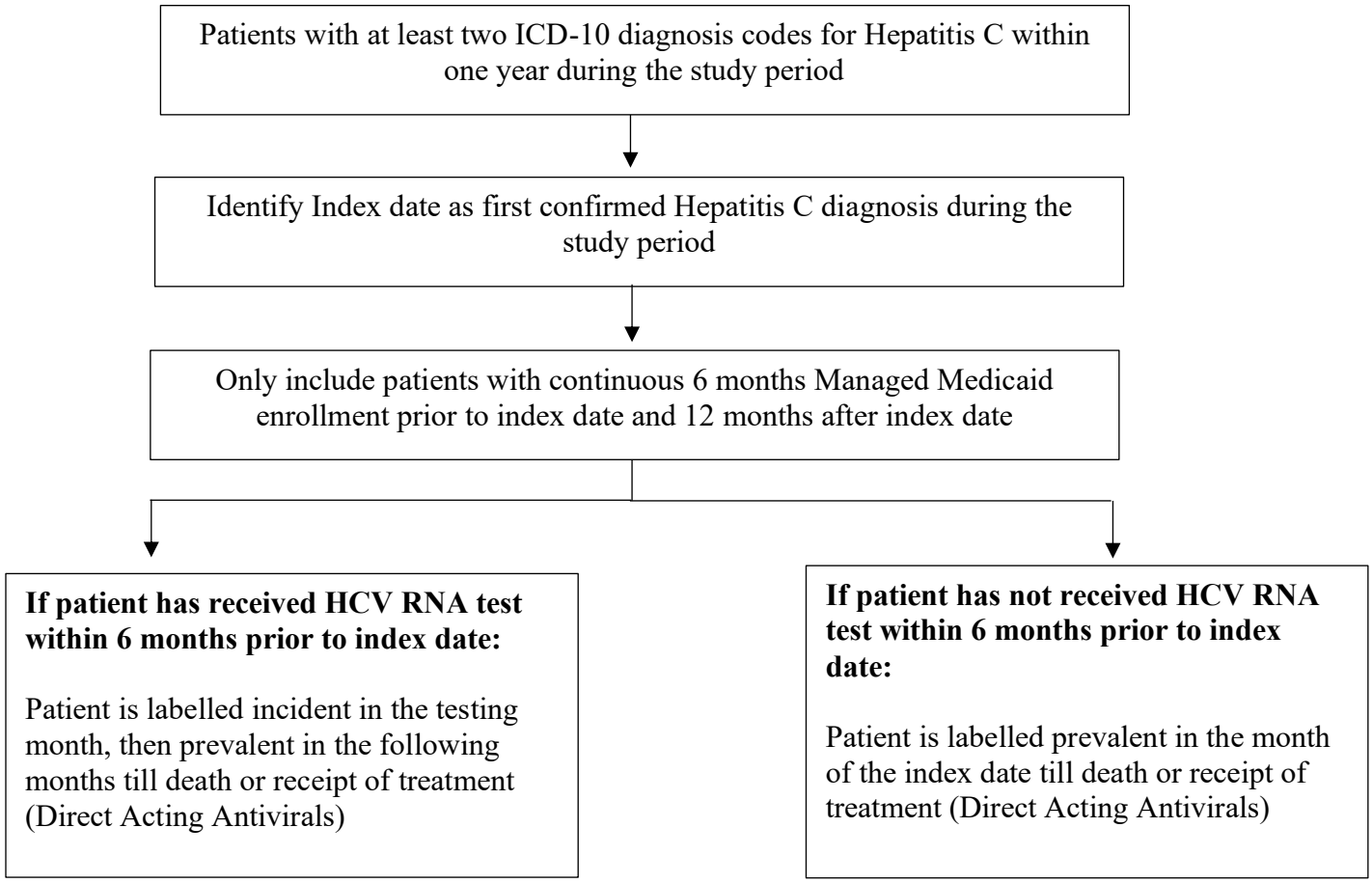
1.2.2. Study design and population

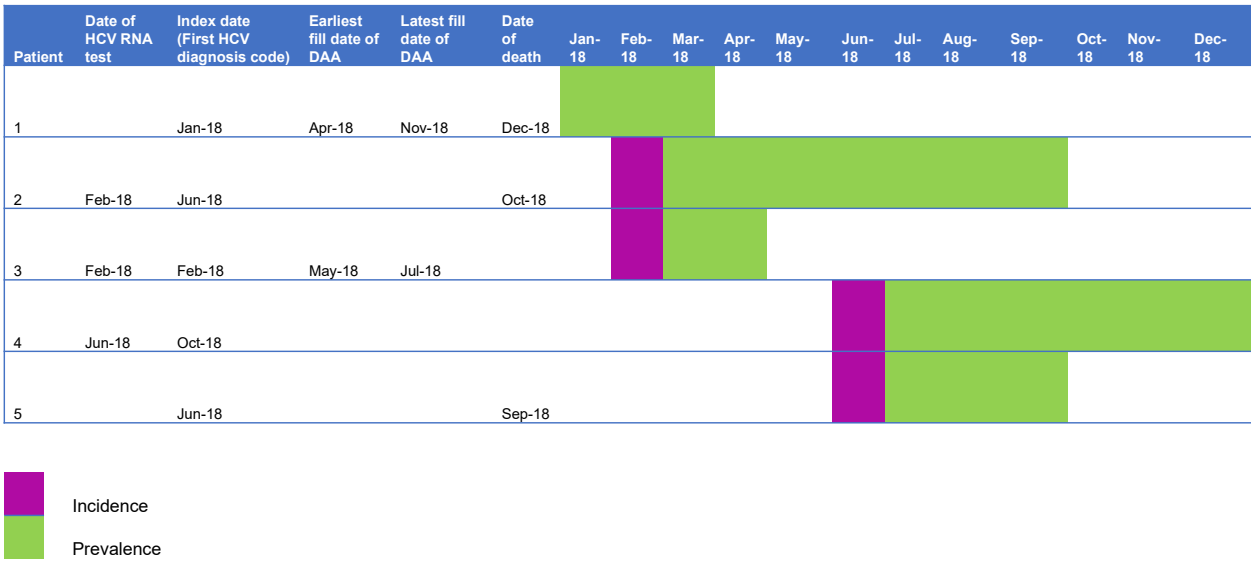
Our cohort comprised adults aged 18–64 years who maintained at least one month of continuous enrollment in Medicaid Managed Care (MMC) between January 2018 and December 2022, without any dual Medicare coverage, and for whom both closed medical and pharmacy claims were available. We excluded individuals who changed their state of residence during the study period. Each month, we identified all eligible MMC enrollees and captured HCV screening events—defined as antibody, genotype, or RNA tests using Current Procedural Terminology (CPT) codes (Table 2).

For the treatment analyses, patients needed a minimum of six months of continuous MMC enrollment prior to, and 12 months following, their first confirmed HCV diagnosis (the index

date). We defined an HCV diagnosis as the presence of at least two distinct International Classification of Diseases (ICD-10) HCV codes on separate service dates (Appendix 1). Individuals were classified as incident cases if they received an HCV RNA test in a given month, were subsequently assigned two or more HCV ICD-10 codes within the next 12 months (including the test month) and had no HCV codes in the six months before the RNA test. These patients were labeled as incident in the month of testing and reclassified as prevalent starting the month after their RNA test. Patients with no RNA test in the six months prior to their first HCV code were categorized as prevalent from the date of that initial code onward. They remained in the prevalent pool until either death or initiation of DAA therapy, which was determined by the date of the first DAA prescription fill. We also evaluated possible reinfection by identifying two HCV diagnostic codes within 12 months after the final DAA fill (Figure 1). All DAA treatments were identified via National Drug Codes (NDC) (Appendix 1).

Figure 1: Schematic diagram of the study design





1.2.3. Primary exposure

Our primary exposure was a binary indicator denoting whether a state had implemented a subscription-based payment model (SBPM) for DAA medications within its Medicaid Managed Care program. As of July 2019, only Washington and Louisiana adopted SBPM and were therefore classified as treatment states; all remaining states served as controls.

1.2.4. Primary outcome

We assessed outcomes monthly over three distinct intervals: (1) the first six months post-SBPM (July–December 2019), (2) the longer-term period (January 2020–December 2022), and (3) the full post-policy window (July 2019–December 2022). Screening outcomes included the number of HCV antibody, genotype, or RNA tests per 100,000 population. We also separately looked into the number of HCV RNA tests per 100,000 population.

Treatment outcomes comprised the rate of DAA initiations (new prescriptions among patients without DAA use in the preceding six months) and the rate of DAA refills, both expressed per 1,000 patients. Because Louisiana's SBPM contract centered on generic Epclusa (sofosbuvir/velpatasvir) and Washington's on Mavyret (glecaprevir/pibrentasvir) (Table 1), we also calculated drug-specific initiation and refill rates for each regimen. Drug-specific initiation was defined as any first fill of the specified DAA, regardless of prior exposure, and refills were counted as subsequent fills for that same DAA following the initial prescription.

1.2.5. Covariates

To assess whether SBPM effects varied across different subgroups and contexts, we incorporated both patient-level and state-level covariates on a monthly basis.

Patient-level covariates included age (18–29, 30–39, 40–49, and 50–64 years),[41] sex, substance use disorder (SUD; encompassing opioid, other drug, or alcohol use), diabetes mellitus, and HIV infection (HCV screening analyses only). Race and ethnicity were not captured in the Komodo database. We selected SUD and HIV because they are well-established risk factors for HCV acquisition and progression, and diabetes given its strong link to liver disease in HCV-infected individuals.[44–46] Age categories were updated annually to reflect patients' aging, and all comorbidities were coded as binary indicators before (pre-July 2019) and after (post-July 2019) SBPM implementation. We then performed subgroup analyses defined by each characteristic.

State-level covariates were drawn from the American Community Survey and U.S. Census and included annual estimates of racial composition (percent White only, Black only), Hispanic ethnicity, poverty rate (percent below the federal poverty line), and educational attainment (less than high school, high school diploma, some college/associate degree, bachelor's degree or higher).[47,48] To capture healthcare infrastructure, we obtained from the National Neighborhood Data Archive the yearly counts of physician offices, outpatient clinics, and mental health/SUD treatment facilities—and their total employees—for each state.[49] These counts were normalized by land area (facilities per square mile). For 2022, we imputed values using the 2021 estimates.

1.2.6. Statistical analysis

To assess the effect of the subscription-based payment model on HCV screening and DAA treatment rates in Washington and Louisiana, we used the Synthetic Control Method (SCM). SCM is a macro-level quasi-experimental technique developed by Abadie et al,[50–52]. It constructs a tailored "synthetic" version of each treated unit (in our case, LA and WA states) by optimally combining outcomes from a group of control units that did not receive the intervention. In practice, the algorithm assigns nonnegative weights (summing to one) to each control state so that, before the policy date, the synthetic control closely reproduces both the outcome trajectory and key predictor values of the treated state. This pre-intervention alignment ensures that any divergence observed after July 1, 2019, can be more credibly attributed to the policy itself, rather than to pre-existing differences in trends. By comparing post-implementation outcomes in the actual policy state with those in its synthetic counterpart, SCM offers a transparent, data-driven alternative to traditional Difference-in-Differences that assumes pre-intervention parallel trends.

We generated separate synthetic controls for Washington and Louisiana for each outcome, incorporating patient-level and state-level variables and using pre-policy data from January–June 2019. We conducted the analyses in R 4.3.1 using the Tidysynth package. In keeping with Abadie et al.'s framework, we treated each policy state (Washington or Louisiana) as unit 1 in a panel of $J+1$ states observed over T months. The remaining J states comprised our donor pool. For each state i and time t, we denoted the observed (treated) outcome by Y_{it}^{I} and the unobserved counterfactual by Y_{it}^{N}. The monthly treatment effect in the policy state was then $\tau_{1t}=Y_{1t}^{I}-Y_{1t}^{N}$, where the weight vector was chosen to minimize the pre-intervention discrepancy between the treated state's predictor values and a weighted average of the donor states' predictors.

To assess statistical uncertainty, we conducted permutation placebo tests by iteratively reassigning the "treatment" to each control state, recalculating its synthetic control, and calculating the root-mean-squared prediction error (RMSPE) over the post-policy period. We formed the ratio of post- to pre-intervention RMSPE for every state (actual and placebo), ranked these ratios in descending order, and assigned a *p*-value to the treated state by dividing its rank by the total number of states. An unusually large post/pre RMSPE ratio indicated that the observed treatment effect was extreme relative to the distribution of placebo effects, thereby lending credibility to our inference.

To reduce bias in our comparisons, we removed from the donor pool any states that introduced potentially confounding changes between July 2019 and December 2022—specifically, those that (1) expanded Medicaid during that period, (2) lacked a Medicaid Managed Care program, or (3) maintained different DAA eligibility restrictions based on fibrosis stage or sobriety as of July 2019, or (4) displayed different enrollment trends in Managed Medicaid compared to Kaiser Family Foundation Statistics (see Table 3, Appendix 1). Consequently, we ended up having 14 control states and therefore the significance level was set at $\alpha = 0.1$. To validate our approach, we built synthetic controls using data through December 2018, projected their counterfactual outcomes for January–June 2019, and then compared those projections with the actual observed trends. For an additional robust check, we carried out an additional analyses for Washington state where we further restricted the donor pool to states that had applied strict COVID-19 restrictions.

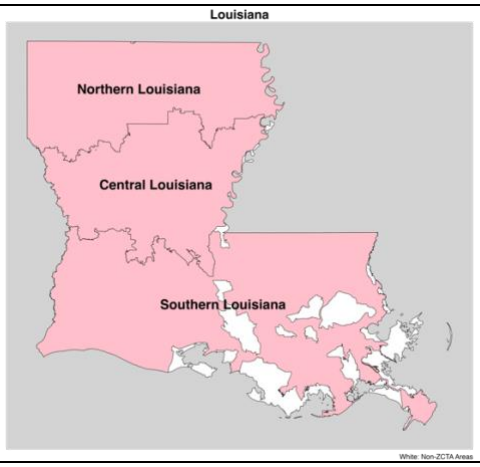
Table 2: States excluded from the control donor pool for the synthetic control analyses by reason for exclusion

Exclusion reason	**States**
Did not expand Medicaid prior to 2019	Utah, South Dakota, Nebraska, Oklahoma, Missouri, Virginia, and Maine, Idaho
Did not contract with Managed Medicaid Care or started contracting after 2019	Alabama, Alaska, Connecticut, Idaho, Maine, Montana, Oklahoma, South Dakota, Vermont, Wyoming, North Carolina
Different fibrosis restriction policy as of July 2019	Maryland, Michigan, Alabama, Indiana, Iowa, Nebraska, West Virginia, Arkansas, Montana, South Dakota, Texas
Different sobriety restriction policy as of July 2019	Florida, Wyoming, Arizona, Iowa, Kansas, North Dakota, Texas, West Virginia, Alabama, Arkansas, Idaho, Minnesota, Mississippi, Montana, Nebraska, Ohio, South Dakota, and Tennessee
Displayed different enrollment trends in Managed Medicaid compared to Kaiser Family Foundation Statistics	Oregon, Colorado, Rhode island, Hawaii, DC

We then extended our evaluation to examine heterogeneity both across patient subgroups and within-state geographies. First, we repeated the SCM analysis for each of the pre-specified demographic and clinical subgroups. We then examined geographic variation, by dividing Louisiana and Washington into 3-digit ZIP-code regions (mapped to ZCTAs; see Table 4) Northern, Central, and Southern Louisiana, and Eastern and Western Washington. We

constructed a separate synthetic control for each region to capture any localized differences in the SBPM's effects.

Table 3: Characteristics of Louisiana and Washington regions

State	Region	Population density (person/ sqm)	Black only/ 1000 person	Hispanic only/1000 person	Below poverty/ 1000 person	Number of physicians/ sqm	Number of outpatient clinics / sqm	Number of mental health clinics / sqm
	Northern	110.34	416.14	27.88	221.12	0.18	0.05	0.01
	Central	49.03	49.03	49.03	49.03	49.03	49.03	49.03
	Southern	293.22	293.22	293.22	293.22	293.22	293.22	293.22
	Eastern	55.17	55.17	55.17	55.17	55.17	55.17	55.17
	Western	14.82	14.82	14.82	14.82	14.82	14.82	14.82

Abbreviations: sqm; square mile.

1.3. Results

1.3.1. HCV Screening and RNA Testing Outcomes

Neither Louisiana nor Washington exhibited a statistically significant change in overall HCV screening rates when comparing the full post-policy period (July 2019–December 2022) to their synthetic controls (Table 4, Figure 2). However, Louisiana experienced a significant short-term rise in screening during the first six months following SBPM implementation (July–December 2019; +12.3 tests per 100,000 population per month, $p < 0.10$). More pronounced were the changes in RNA testing: Louisiana's rate increased by 63.8 tests per 100,000 per month in the initial post-implementation interval ($p < 0.10$) and by 29.7 tests per 100,000 per month from January 2020 through December 2022 ($p < 0.10$). In contrast, Washington's RNA testing trajectory post-SBPM did not differ significantly from its synthetic control, with monthly deviations ranging from +2.2 to –15.0 tests per 100,000 (Table 4, Figure 3).

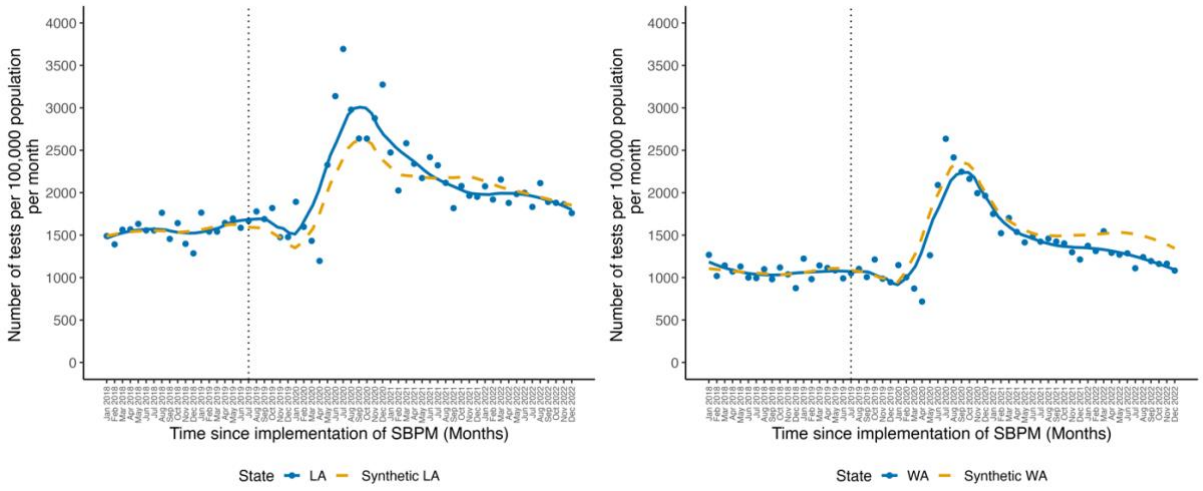
Table 4: Average treatment effect on the treated states when implementing the subscription-based payment model for HCV screening and RNA testing outcomes

	Overall HCV screening [a]		RNA testing [a]	
Time period	LA	WA	LA	WA
Jan 2019 – Dec 2019	121.9*	23.3	63.8*	2.2
Jan 2020 – Dec 2022	115.5	-276.6	29.7*	-15.0
Jan 2019 – Dec 2022	116.4	-233.8	35.2*	-11.9

[a] Rate is number of tests per 100,000 population per month

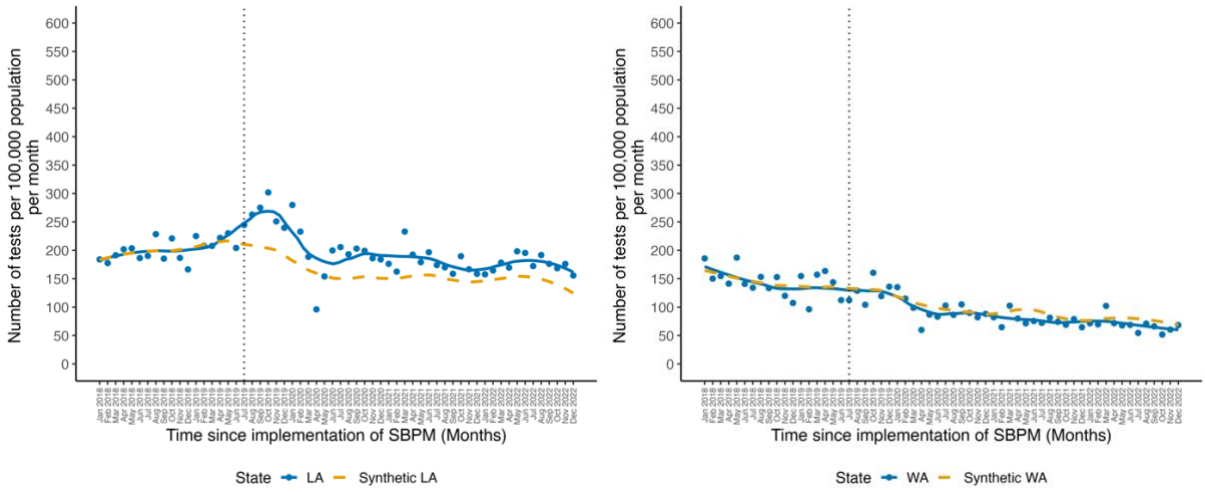
* Significant at $\alpha = 0.1$

Figure 2: Observed vs Synthetic Trends in Overall HCV Screening



Monthly rates of HCV screening tests per 100,000 population for Louisiana (left panel) and Washington (right panel), plotted relative to the start of the subscription-based payment model (SBPM) in July 2019 (time 0). The solid blue line represents observed data, while the dashed orange line represents the synthetic control, illustrating what would be expected in the absence of SBPM.

Figure 3: Observed vs Synthetic Trends in RNA testing



Monthly rates of RNA tests per 100 000 population for Louisiana (left panel) and Washington (right panel), plotted relative to the start of the subscription-based payment model (SBPM) in July 2019 (time 0). The solid blue line represents observed data, while the dashed orange line represents the synthetic control, illustrating what would be expected in the absence of SBPM.

1.3.1.1. Subgroup Analyses

Across patient subgroups, Louisiana's overall HCV screening improved most significantly among individuals with SUD—rising by 276.7 tests per 100,000 in the first six months post-SBPM—and among persons living with HIV, who saw an aggregate increase of 1,195.5 tests per 100,000 over the full post-policy period (Figure 4). RNA-specific testing likewise increased in nearly every demographic and clinical category, with the largest gains observed among patients with SUD and among men (Figure 5). In contrast, Washington's subgroup estimates were uniformly null or negative, with no subgroup demonstrating a statistically significant uptick in either overall screening or RNA testing.

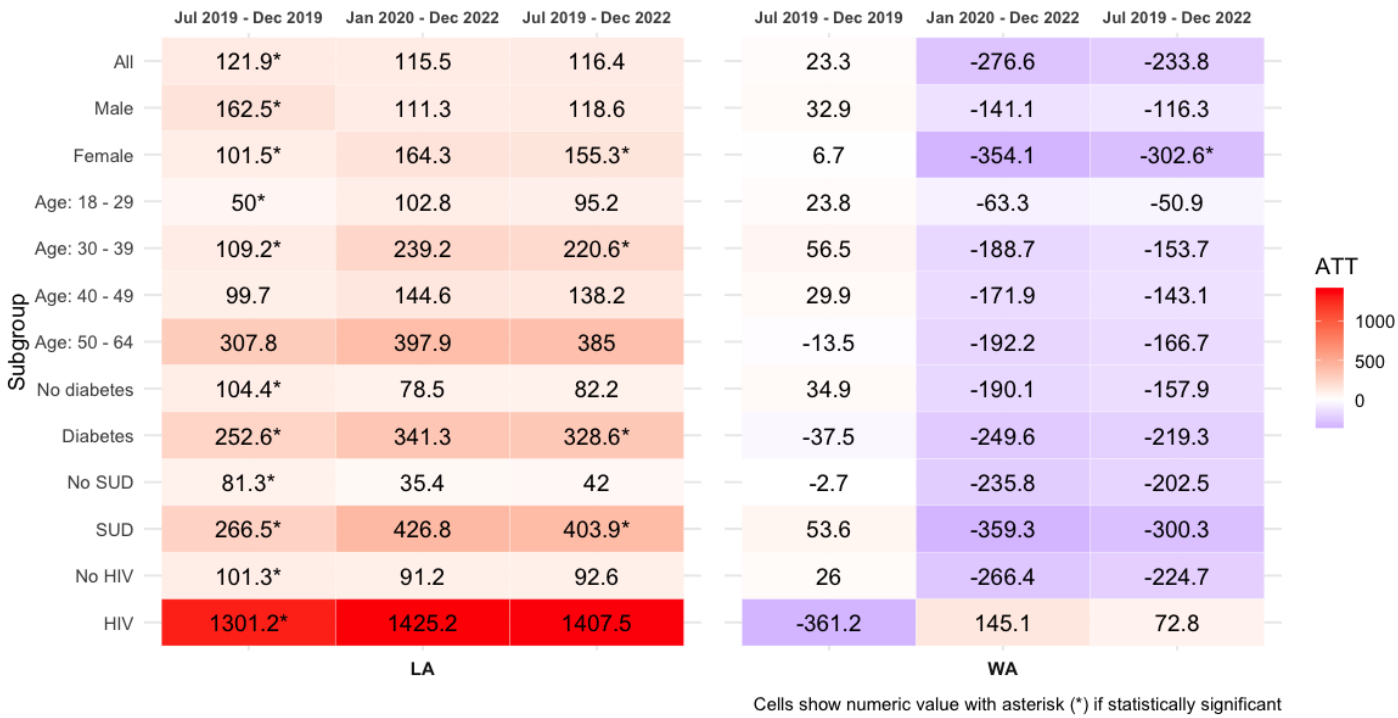
1.3.1.2. Geographic heterogeneity

In the initial six months following SBPM implementation, significant increases in overall HCV screening rates were observed in both Northern (+146.8 per 100,000) and Southern (+122.2 per 100,000) Louisiana (Figure 6). Central Louisiana also experienced an increase in screening, although this change was not statistically significant. During the subsequent period (January 2020–December 2022), positive trends in screening persisted across all Louisiana regions, with the exception of Central Louisiana; however, these improvements were no longer statistically significant. For HCV RNA testing, Northern and Southern Louisiana maintained statistically significant improvements throughout the entire post-policy period, whereas Central Louisiana exhibited nonsignificant positive changes (Figure 7). Conversely, Eastern and Western Washington did not show any statistically significant changes in overall HCV screening or RNA testing at any time during the analysis period (Figures 8, 9)

1.3.1.3. Robustness check

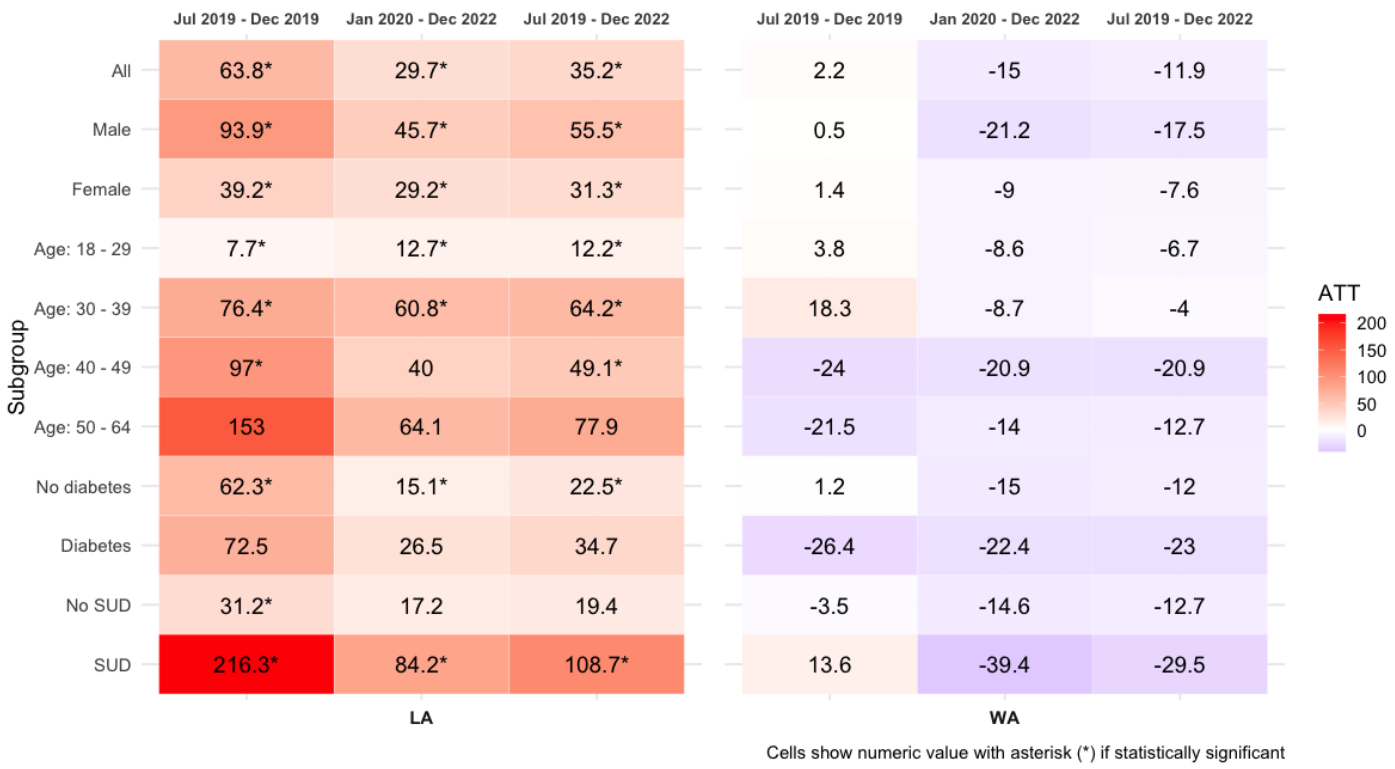
As mentioned previously, we conducted several robustness checks to ensure that our findings were rigorous. This included checking covariate balance, unit weights (Appendix 1), as well as running the synthetic control models excluding January 2019 – June 2019 (Appendix 1). We have also re-ran the synthetic control for Washington state with smaller donor pool which only included states that have applied restrictive COVID-19 policies and we obtained similar results (i.e. any HCV screening or RNA screening rates were not statistically significantly different than synthetic Washington).

Figure 4: The effect of the Subscription-based Payment Model (SBPM) on overall HCV screening – subgroup analysis



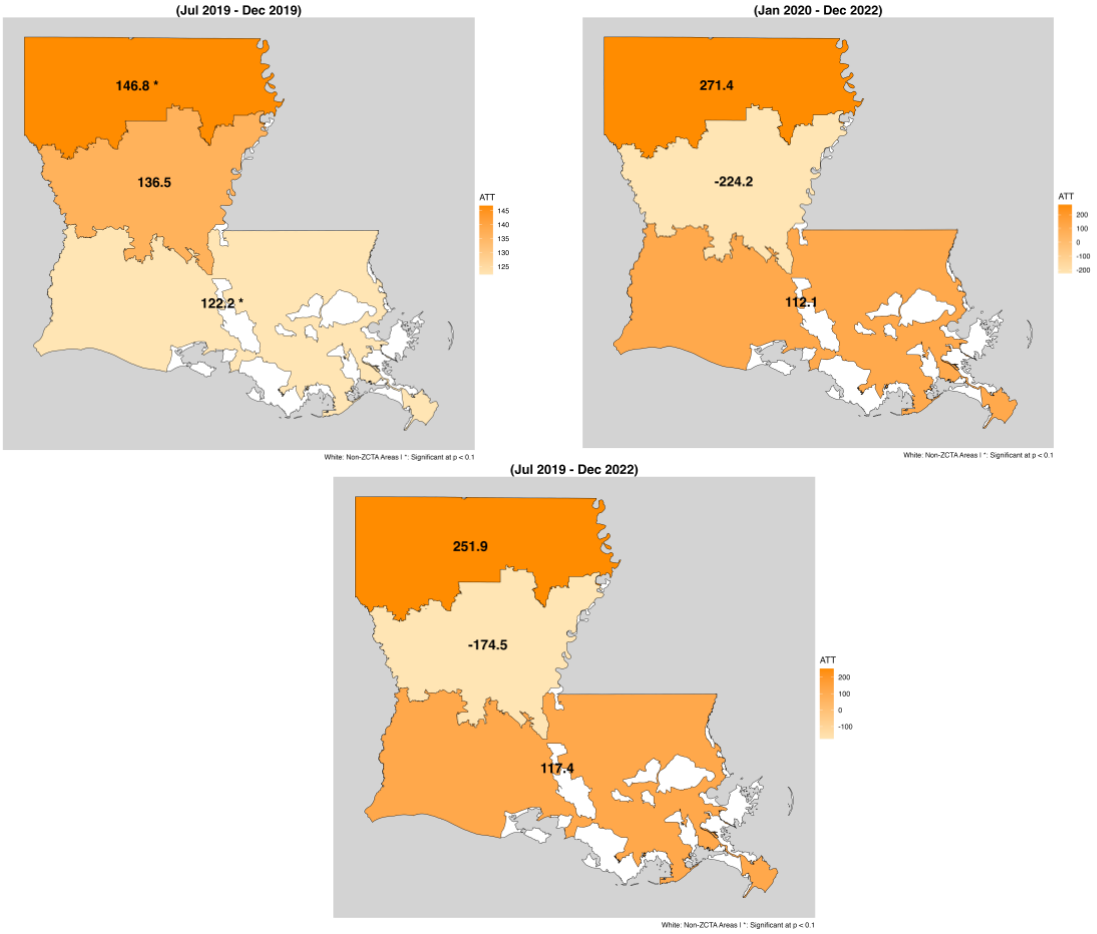
Abbreviations: SUD; Substance Use Disorder, ATT; Average treatment effect on the Treated

Figure 5: The effect of the Subscription-based Payment Model (SBPM) on RNA screening – subgroup analysis



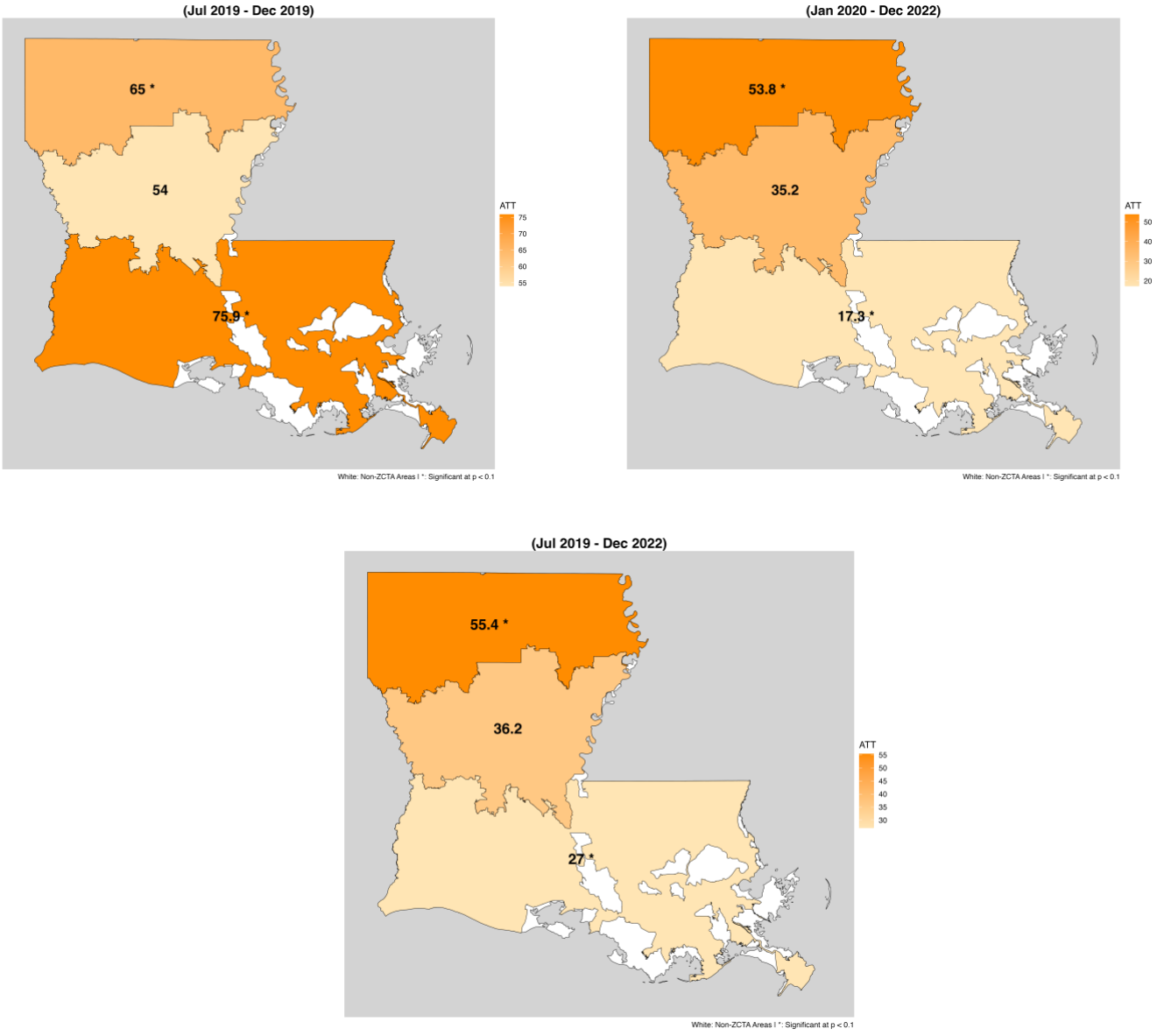
Abbreviations: SUD; Substance Use Disorder, ATT; Average treatment effect on the Treated

Figure 6: The effect of the Subscription-based Payment Model (SBPM) on Overall HCV screening in Louisiana – Regional heterogeneity analysis



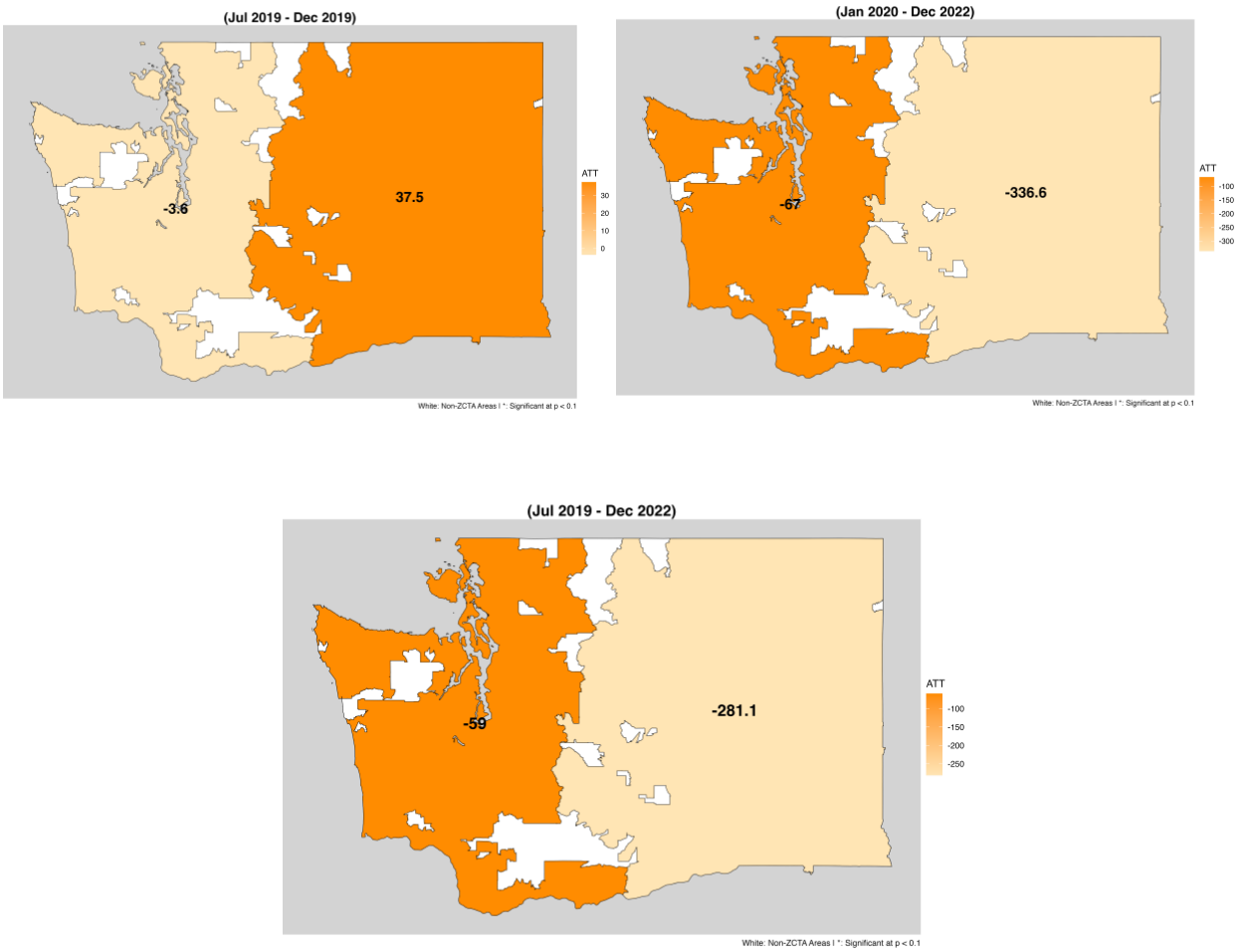
* denotes statistical significance at P < 0.10

Figure 7: The effect of the Subscription-based Payment Model (SBPM) on RNA screening in Louisiana – Regional heterogeneity analysis



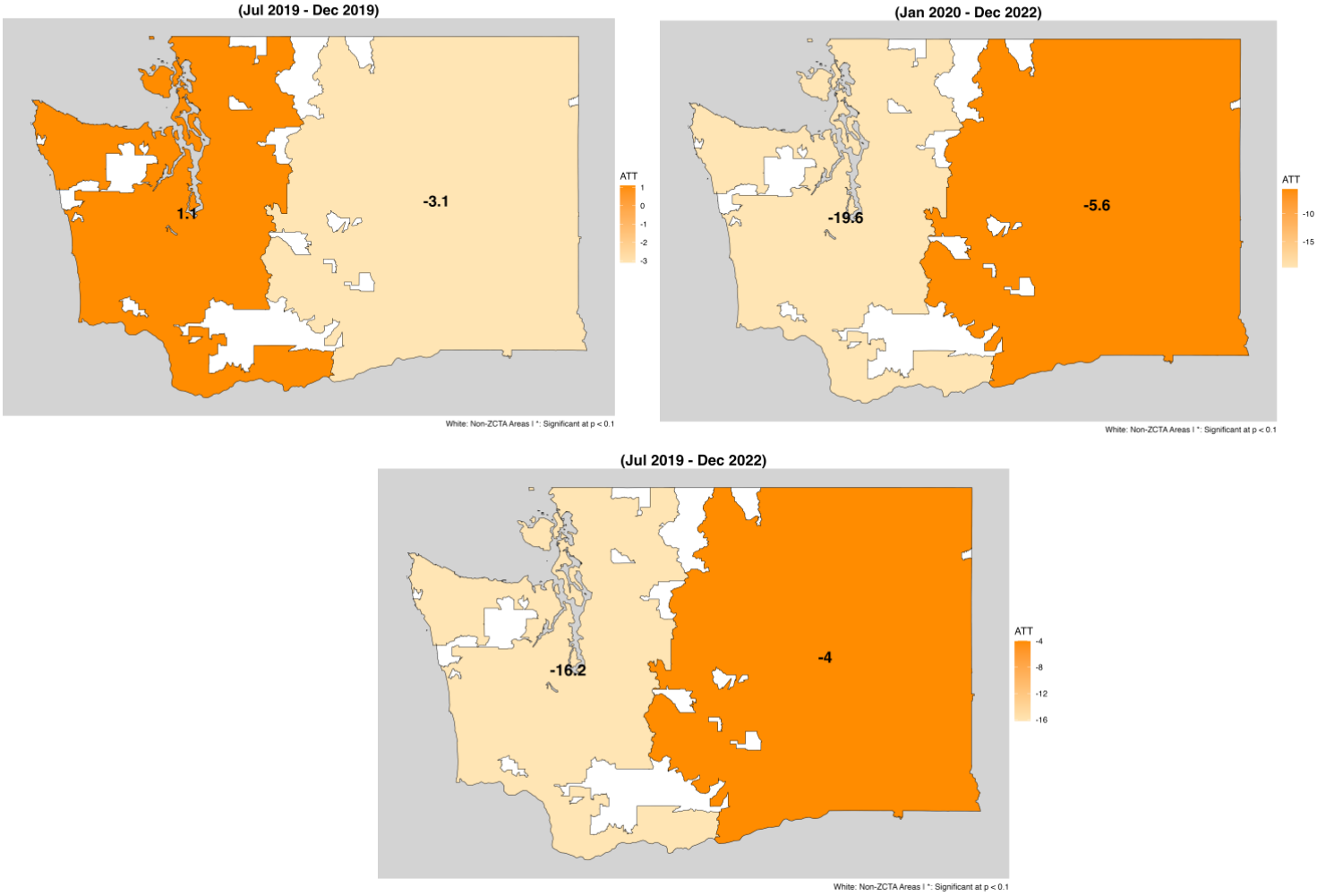
* denotes statistical significance at P < 0.10

Figure 8: The effect of the Subscription-based Payment Model (SBPM) on Overall HCV screening in Washington – Regional heterogeneity analysis



* denotes statistical significance at P < 0.10

Figure 9: The effect of the Subscription-based Payment Model (SBPM) on RNA screening in Washington – Regional heterogeneity analysis



* denotes statistical significance at P < 0.10

1.3.2. DAA treatment outcomes

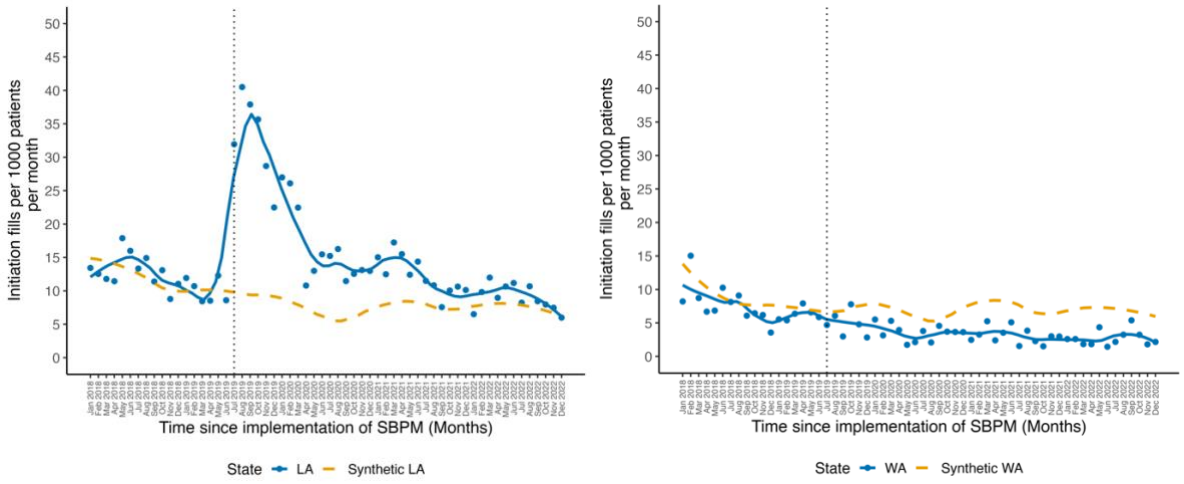
Following the adoption of SBPM, Louisiana exhibited significant increases in direct-acting antiviral (DAA) treatment initiation and refills (Table 5). Specifically, the monthly rate of DAA initiation increased by 23.0 per 1,000 patients during the initial six-month period, followed by an increase of 5.2 per 1,000 patients per month thereafter, culminating in an overall rise of 7.8 per 1,000 patients per month (Figure 10). Similarly, DAA refill rates in Louisiana increased significantly, with gains of 66.3 per 1,000 patients per month during the first six months, 16.2 per 1,000 patients per month subsequently, and 24.4 per 1,000 patients per month overall (Figure 11). These treatment improvements were primarily attributable to heightened usage of generic Epclusa (Figures 12, 13). In contrast, Washington's DAA initiation rates showed no significant change during the first six-month period post-SBPM and experienced a significant decline thereafter (−3.9 per 1,000 patients per month; Figure 10). Likewise, Washington consistently displayed declining refill rates, with reductions of −4.5, −14.1, and −12.9 per 1,000 patients per month for the initial, subsequent, and overall post-policy periods, respectively (Figure 11). Washington's Mavyret initiation and refill patterns mirrored this downward trend, exhibiting either declines or no meaningful improvements over the analysis period (Figures 12, 13).

Table 5: Average treatment effect on the treated (ATT) associated with the implementation of the Subscription Based-Payment Model (SBPM) for DAA treatment outcomes

	DAA initiation fills [b]		DAA refills [c]		Generic Epclusa initiation fills [b]	Mavyret initiation fills [b]	Generic Epclusa refills [c]	Mavyret refills [c]
Time period	LA	WA	LA	WA	LA	WA	LA	WA
Jan 2019 – Dec 2019	23.0*	-1.9	66.3*	-4.5*	30.7*	-0.3	81.3*	2.3
Jan 2020 – Dec 2022	5.2*	-3.9*	16.2*	-14.1*	9.8*	-1.6*	25.5*	-1.3

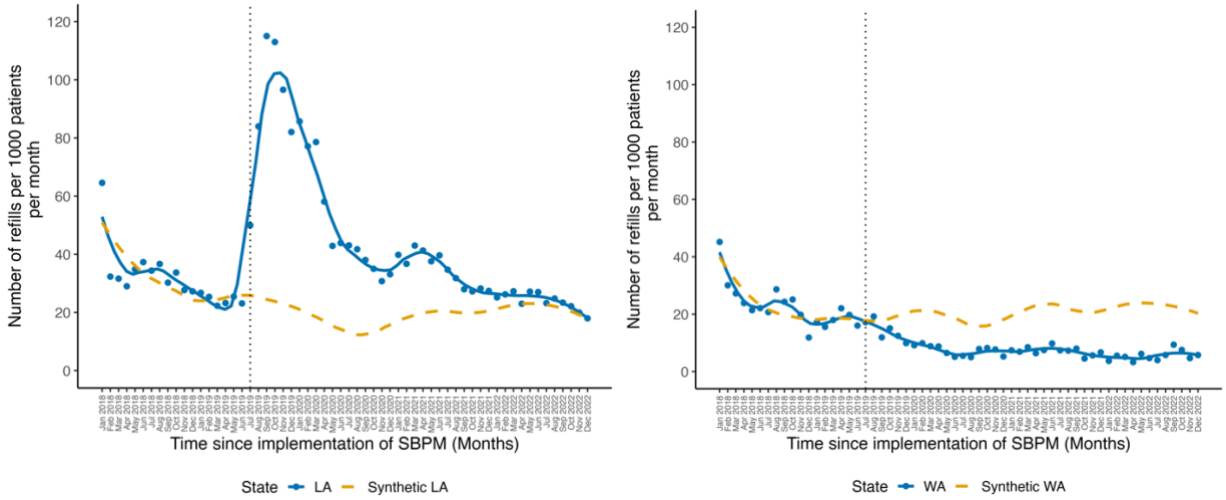
Jan 2019 – Dec 2022	7.8*	-3.6*	24.4*	-12.9*	12.8*	-1.5*	34.7*	-0.8

Figure 10: Observed vs Synthetic Trends in DAA initiation fills



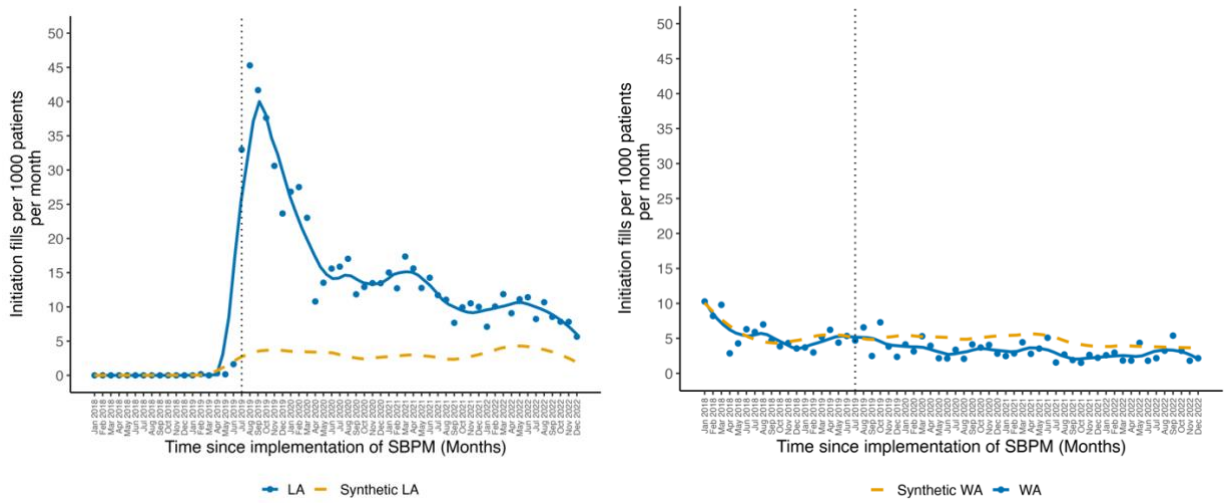
Monthly rates of DAA initiation fills per 1000 patients for Louisiana (left panel) and Washington (right panel), plotted relative to the start of the subscription-based payment model (SBPM) in July 2019 (time 0). The solid blue line represents observed data, while the dashed orange line represents the synthetic control, illustrating what would be expected in the absence of SBPM.

Figure 11: Observed vs Synthetic Trends in DAA refills



Monthly rates of DAA refills per 1000 patients for Louisiana (left panel) and Washington (right panel), plotted relative to the start of the subscription-based payment model (SBPM) in July 2019 (time 0). The solid blue line represents observed data, while the dashed orange line represents the synthetic control, illustrating what would be expected in the absence of SBPM.

Figure 12: Observed vs Synthetic Trends in Epclusa and Mavyret initiation fills



The left panel illustrates monthly Epclusa initiation fills per 1000 patients for Louisiana, plotted against its synthetic control, while the right panel depicts Mavyret initiation fills for Washington compared with its synthetic control. Both plots are aligned to the start of the subscription-based payment model (SBPM) in July 2019 (time 0).

1.3.2.1. Subgroup Analyses

Subgroup analyses in Louisiana demonstrated that every demographic category saw gains in DAA initiation and refill rates (Figures 13, 14). During the first six months after SBPM implementation (July–December 2019), initiation rates increased by 17.0–24.3 per 1,000 across age groups and by 21.6–22.9 per 1,000 among men, women, and individuals with SUD. Although these increases tapered, they remained positive from January 2020 through December 2022 (+4.1 to +6.4 per 1,000). Refill rates rose by 52.0–70.1 per 1,000 in the early phase and stayed significantly elevated thereafter ($p < 0.10$). In contrast, Washington's subgroups generally experienced declines or no change. In the first six months, men, patients aged 30–39, and those without SUD saw significant drops in initiation rates, despite a non-significant overall effect, and from January 2020 onward, all Washington subgroups

exhibited statistically significant decreases in initiation ($p < 0.10$). Refill rates likewise fell initially among individuals with and without SUD and patients aged 40–49, and then continued to decline across all subgroups in the later period.

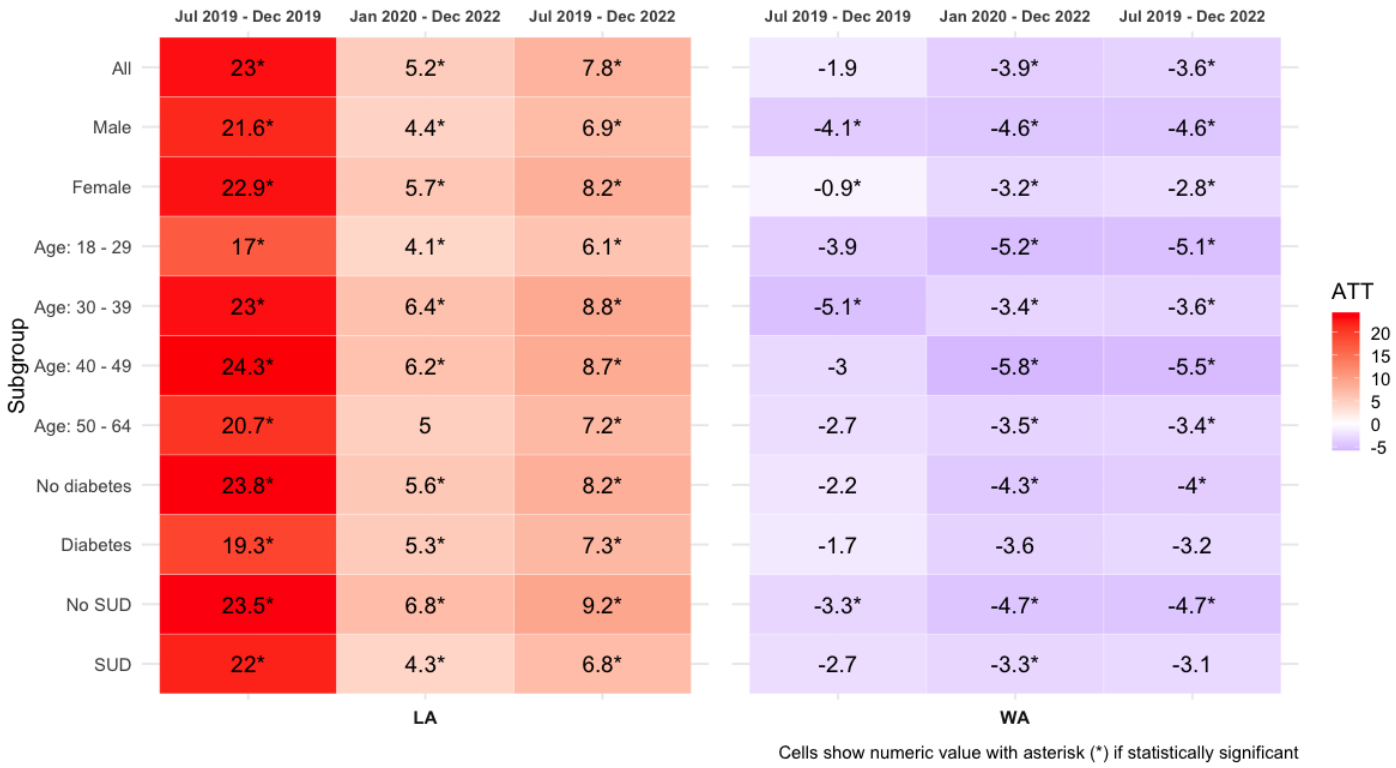
1.3.2.2. Geographic heterogeneity

Subregional analyses revealed that all Louisiana regions experienced improvements in DAA initiation and refill rates, although the magnitude of these effects varied (Figures 15, 16). In the first six months post-SBPM, both Northern and Central Louisiana saw increases exceeding 20 additional initiation fills per 1,000 patients per month, with refill rates rising by 80 or more per 1,000. These gains generally persisted from January 2020 through December 2022, with the Central region exhibiting the largest average treatment effects compared to the Northern and Southern regions. By contrast, Washington's Eastern and Western subregions showed no significant changes in initiation rates and displayed declining refill trends consistent with state-level results (Figures 17, 18). Notably, the Western subregion experienced a significant monthly decline of 15.5 refills per 1,000 patients during the later post-policy period.

1.3.2.3. Robustness check

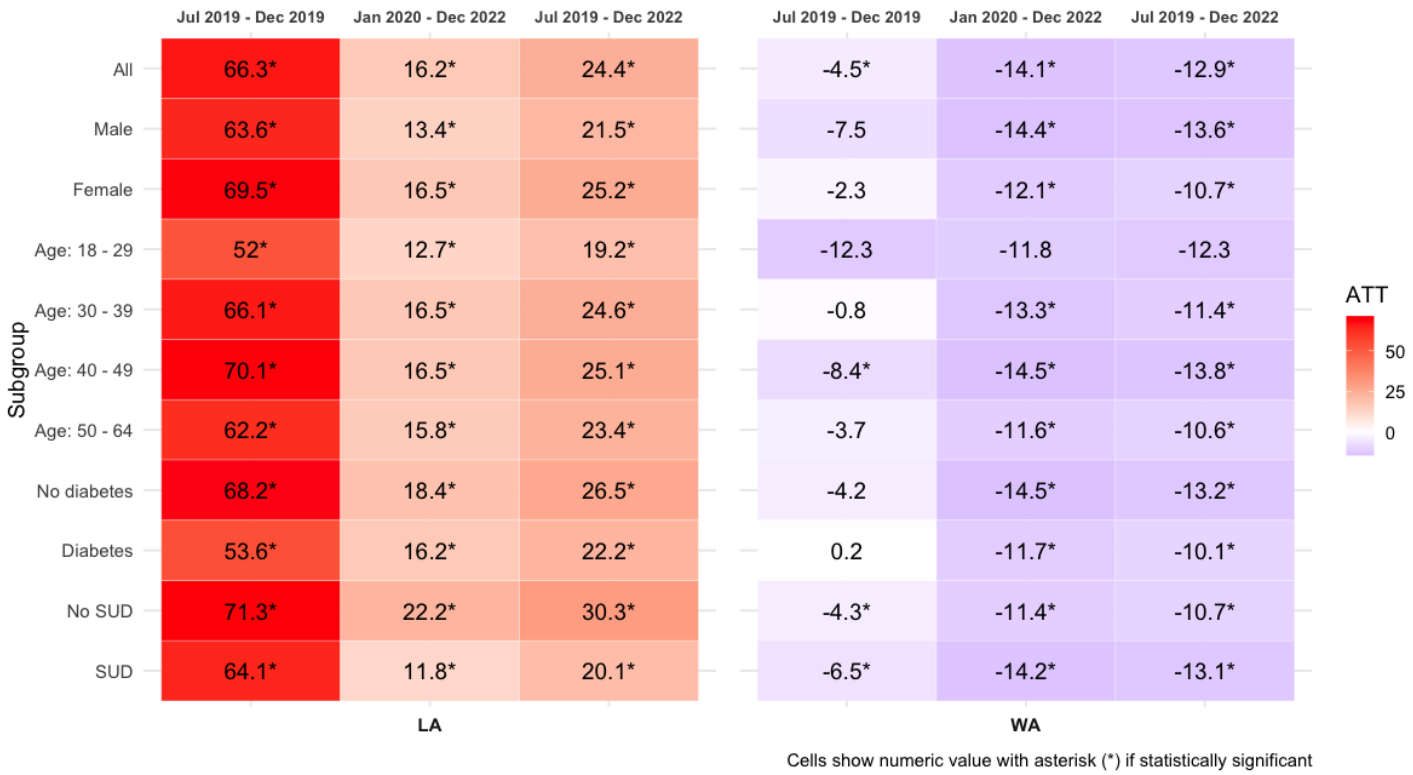
Like in the screening outcomes, we performed several robustness checks to confirm the validity of our findings. These included assessing covariate balance and unit weights (Appendix 1), re-estimating the synthetic control models while excluding the January 2019–June 2019 period (Appendix 1), and re-running the Washington state analysis with a restricted donor pool comprised solely of states that implemented stringent COVID-19 policies (i.e. DAA initiation or refill rates were not statistically significantly different than synthetic Washington).

Figure 13: The effect of the Subscription-based Payment Model (SBPM) on DAA initiation fill – subgroup analysis



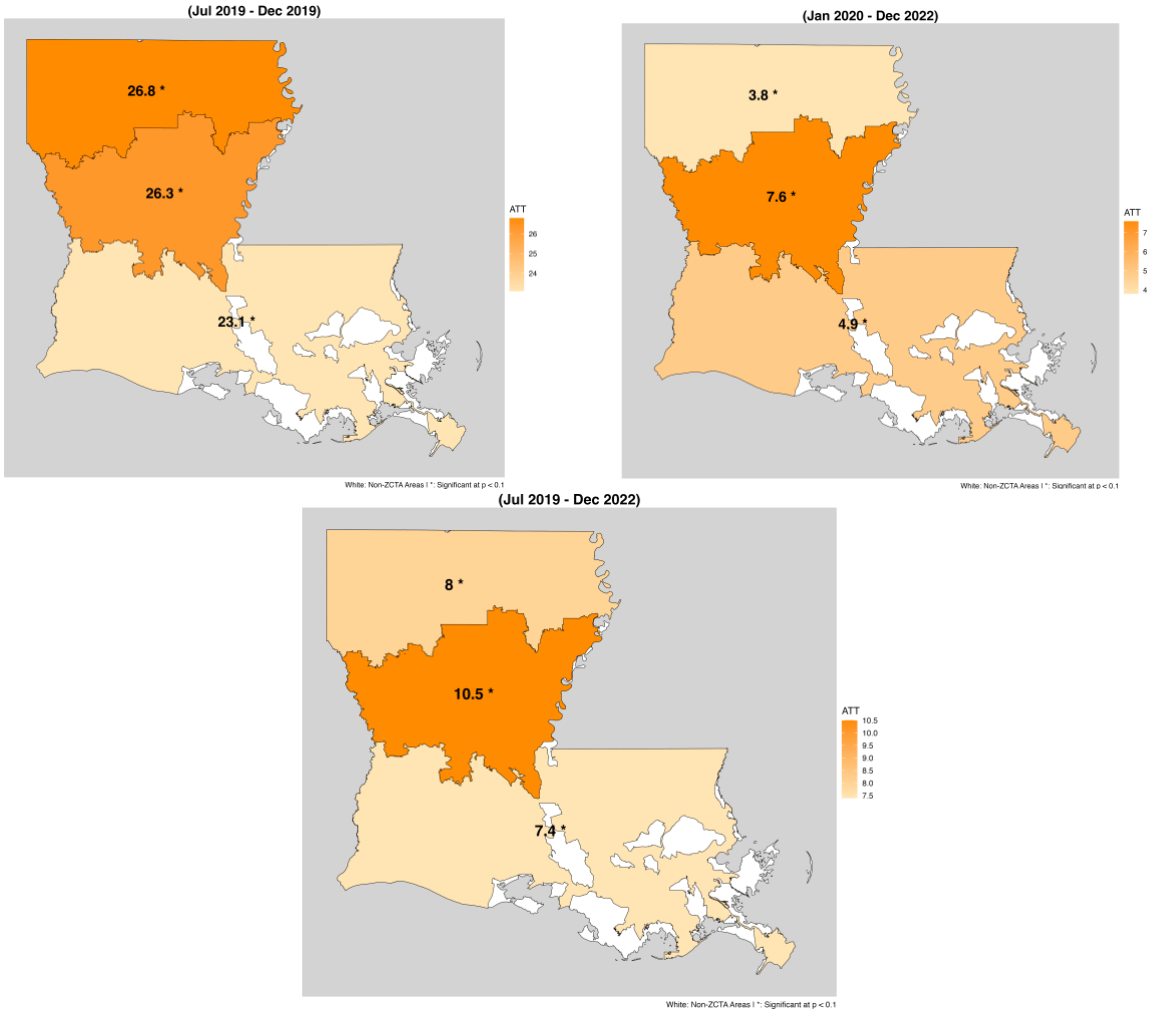
Abbreviations: SUD; Substance Use Disorder, ATT; Average treatment effect on the Treated

Figure 14: The effect of the Subscription-based Payment Model (SBPM) on DAA refills – subgroup analysis



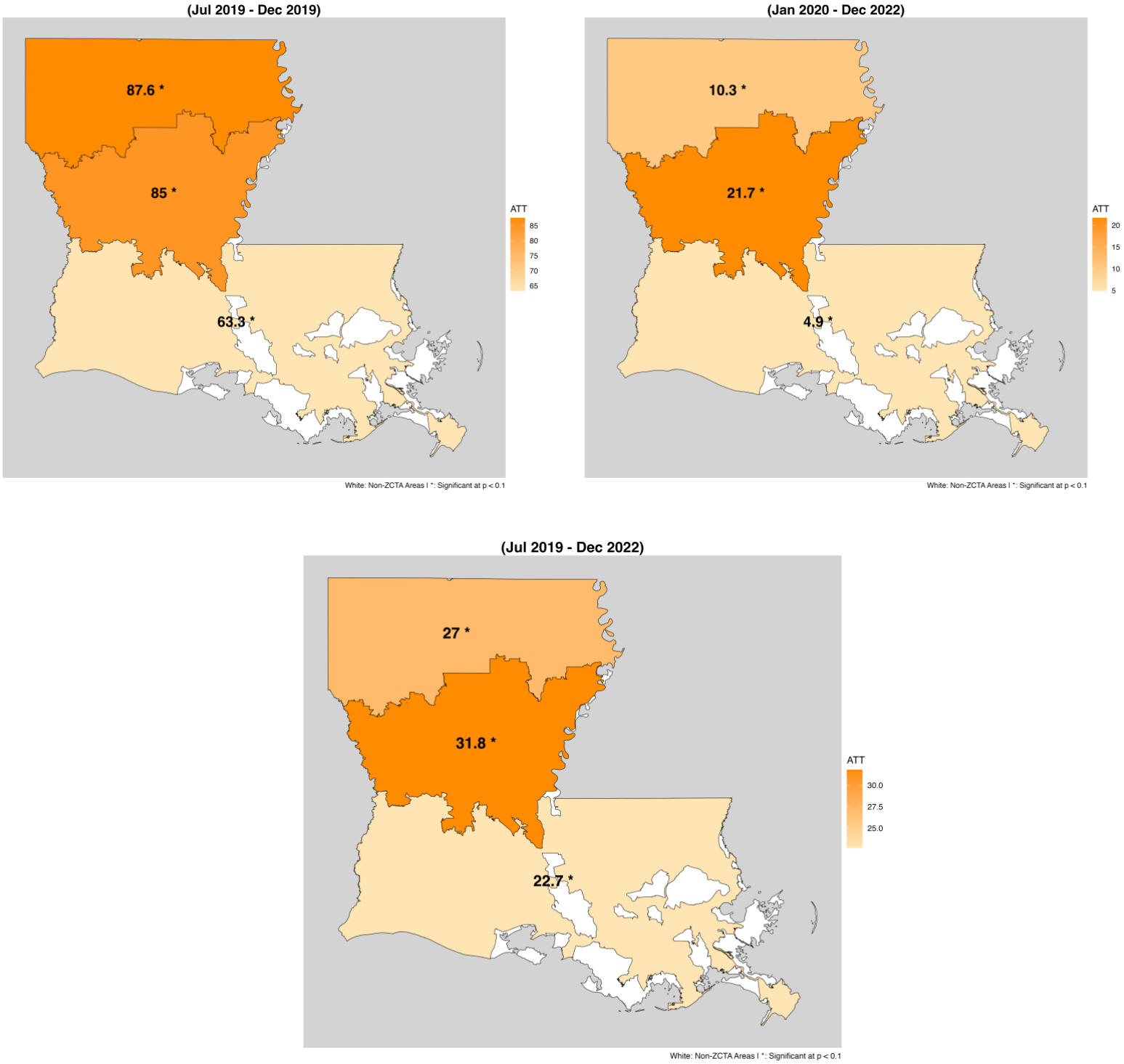
Abbreviations: SUD; Substance Use Disorder, ATT; Average treatment effect on the Treated

Figure 15: The effect of the Subscription-based Payment Model (SBPM) on DAA initiation fills in Louisiana – Regional heterogeneity analysis



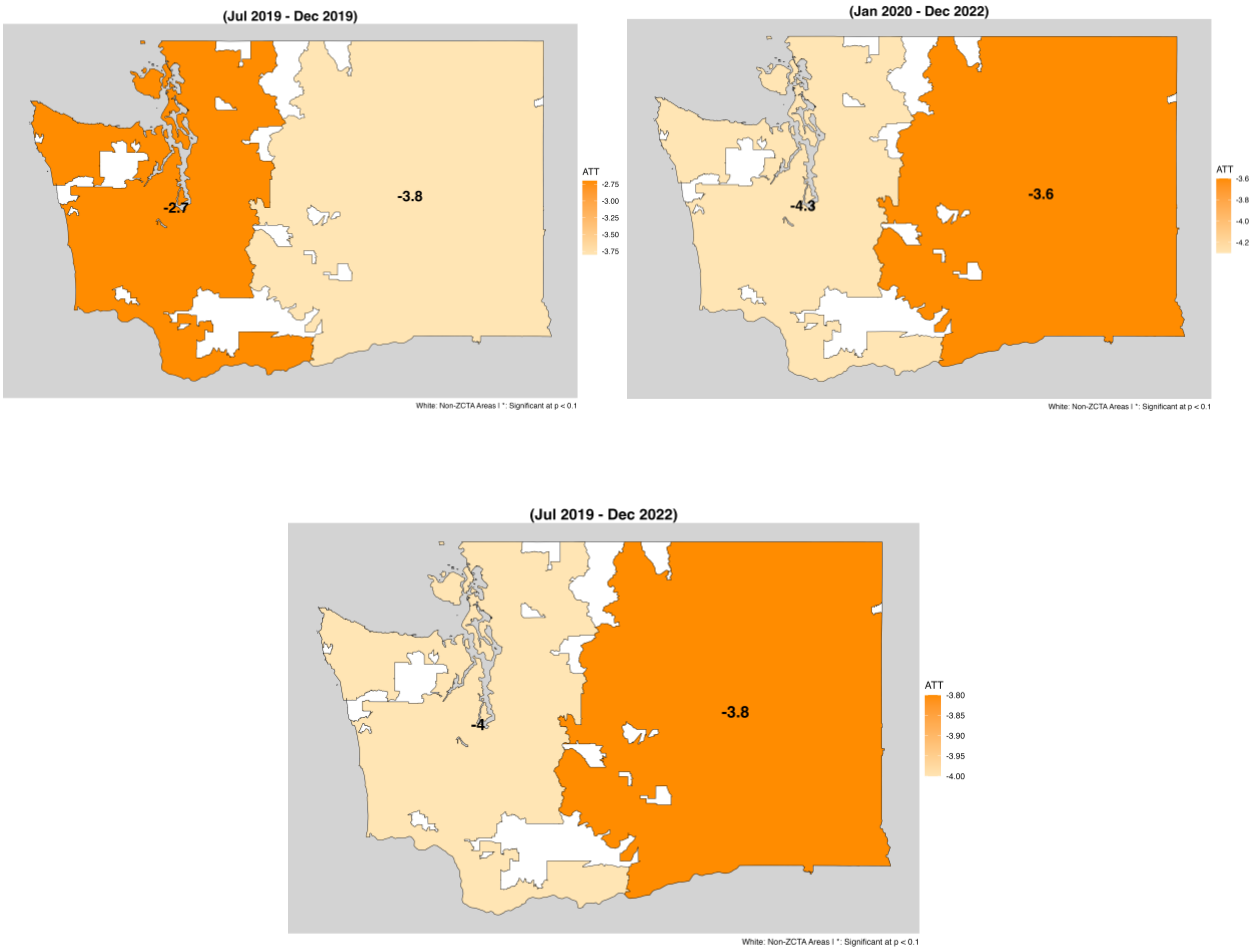
* denotes statistical significance at P < 0.10

Figure 16: The effect of the Subscription-based Payment Model (SBPM) on DAA refills in Louisiana – Regional heterogeneity analysis



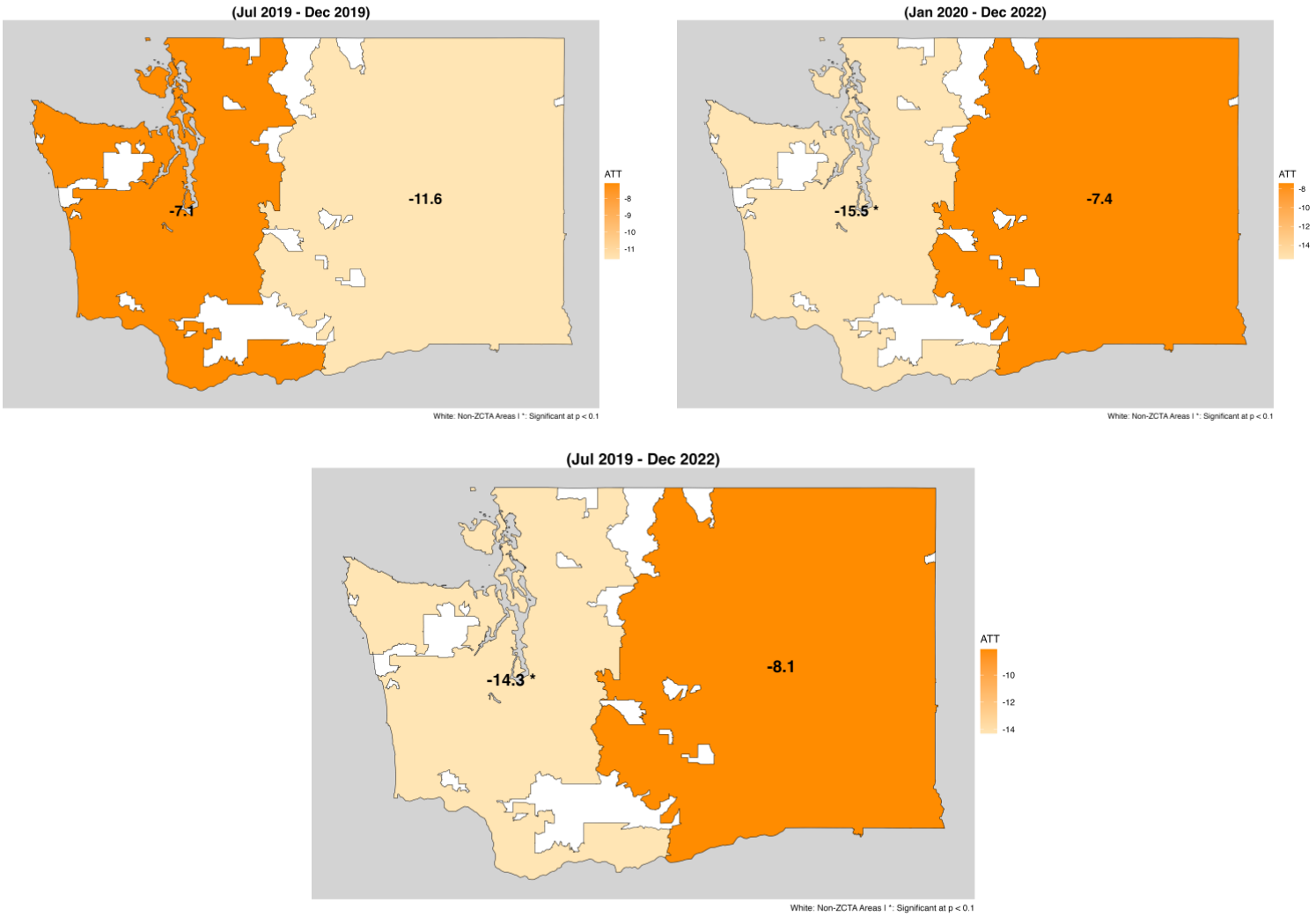
* denotes statistical significance at P < 0.10

Figure 17: The effect of the Subscription-based Payment Model (SBPM) on DAA initiation fills in Washington – Regional heterogeneity analysis



* denotes statistical significance at P < 0.10

Figure 18: The effect of the Subscription-based Payment Model (SBPM) on DAA refills in Washington– Regional heterogeneity analysis



* denotes statistical significance at P < 0.10

1.4. Discussion

In this direct comparison of state-specific subscription-based payment models (SBPMs) for hepatitis C virus treatment, Louisiana and Washington displayed profoundly different trajectories in screening and treatment uptake. By using a synthetic control design on a closed-claims Managed Medicaid dataset, we found that Louisiana's mid-2019 SBPM rollout coincided with large, statistically significant increase in HCV RNA screening, DAA initiation, and DAA refill rates across the state and within its Northern, Central, and Southern subregions. Meanwhile, Washington's SBPM introduction yielded few beneficial changes. Neither Eastern nor Western Washington demonstrated significant increases in RNA screening or DAA initiation during the initial post-policy period, and Washington's refill rates followed a steady downward trend in the early, late, and overall intervals, respectively. Subregional analyses mirrored these statewide results. The Western subregion in particular saw a significant monthly decline of 15.5 refills per 1,000 patients during the later post-policy period.

Several contextual factors help explain Louisiana's comparatively robust response. Louisiana expanded Medicaid in 2016—two years after Washington—and concurrently lifted advanced-fibrosis and sobriety restrictions on DAAs immediately before SBPM implementation, creating a backlog of newly eligible patients whose treatment demand was unleashed once subscription payments began.[12,37,53] The Louisiana Office of Public Health amplified this effect through a comprehensive strategy that combined extensive provider training workshops, large-scale multimedia public awareness campaigns, and direct community outreach to previously restricted Medicaid beneficiaries. Simultaneously, the state expanded harm-reduction services and incorporated methadone maintenance into Medicaid coverage, strengthening the

integration of HCV prevention and care.[15] These concerted efforts not only lowered non-cost barriers such as stigma and provider access but also ensured that pent-up demand translated into measurable improvements in both screening and treatment uptake.

In Washington, however, earlier policy changes diffused pent-up demand by the time SBPM was introduced. The state had expanded Medicaid in 2014 and removed fibrosis-based access restrictions in 2016—several years before adopting the subscription model in 2019—so fewer untreated patients remained when SBPM took effect.[12,53] Although Washington partnered with Abbvie and public health agencies to embed HCV education within substance use disorder treatment programs, these initiatives were substantially disrupted by the COVID-19 pandemic beginning in early 2020.[16,21] Moreover, by concentrating outreach efforts on individuals with substance use disorders; a population already facing significant structural and behavioral barriers to care, Washington encountered greater challenges in achieving broad-based treatment gains under SBPM.[16,30,33,38,40,54]

Beyond these state-level distinctions, national trends also influenced HCV care between 2019 and 2022. Increasing clinical familiarity with direct-acting antivirals, progressive loosening of Medicaid restrictions to DAAs, expanded treatment indications across genotypes, and dramatic price reductions from over $80,000 to approximately $20,000 per course, drove rising screening and treatment rates even in states without SBPMs.[8] The U.S. Preventive Services Task Force's 2020 recommendation for universal HCV screening further accelerated testing uptake independently of subscription financing.[55] These developments suggest that while SBPMs can

serve as powerful financing innovations, their ultimate impact depends on the broader policy and clinical environment in which they operate.

As the US administration's proposed $12 billion national HCV elimination plan centers on subscription payments, our findings highlight the imperative of pairing SBPMs with complementary interventions.[8] Prior-authorization reform, integrated service delivery for high-risk groups, anti-stigma initiatives, targeted public-awareness campaigns, and expanded treatment capacity will all be essential to overcome persistent systemic barriers and translate financing innovations into equitable, population-level reductions in HCV burden.

This study has several limitations. Komodo Health's claims dataset may not reflect the entire population of Managed Medicaid; we therefore benchmarked our sample against publicly available enrollment data from the Kaiser Family Foundation to verify representativeness. Our reliance on ICD-10, CPT, and HCPCS codes to identify screening and treatment events—in the absence of confirmatory laboratory results—may have introduced outcome misclassification. Additionally, as with all synthetic control analyses, the estimator's accuracy tends to diminish the farther one moves from the pre-intervention period, potentially reducing the precision of estimates in later post-policy intervals. Finally, the lack of granular demographic variables (e.g., race, ethnicity, income, education) and five-digit ZIP codes constrained our ability to examine within-state disparities, which is particularly salient given HCV's disproportionate impact on marginalized communities.

1.5. Conclusion

In this dissertation, we have demonstrated that subscription-based payment models (SBPMs) can meaningfully accelerate hepatitis C virus (HCV) screening and treatment uptake, but that their impact is highly contingent on the surrounding policy and programmatic context. By applying a synthetic control framework to Managed Medicaid claims data, we showed that Louisiana's SBPM rollout in mid-2019 was followed by large, sustained increases in HCV RNA testing, direct-acting antiviral (DAA) initiation, and refill rates across all demographic and geographic subgroups. In Washington, by contrast, the same financing mechanism yielded minimal gains or even declines in those same measures. These findings emphasize that financing innovation alone is insufficient: early wins in Louisiana were facilitated by a confluence of timely Medicaid expansion, elimination of fibrosis restrictions, robust public-health outreach, provider training, and harm-reduction integration, whereas Washington's earlier policy changes and pandemic-related disruptions muted its SBPM effects.

Methodologically, this work contributes to the literature by leveraging a closed-claims dataset and rigorous synthetic control methods to enable a transparent, reproducible comparison of two contemporaneous policy interventions. It extends prior case studies by embedding subgroup, subregional, and robustness analyses within a unified analytic framework, thereby illuminating both the breadth and limits of SBPM efficacy. Practically, these results offer a roadmap for policymakers: to replicate Louisiana's success, states must align SBPM implementation with comprehensive supportive measures, such as removing non-cost barriers, embedding HCV care within existing public-health infrastructures, and targeting outreach to underserved populations.

Looking forward, the US administration's proposed $12 billion national HCV elimination plan rightly positions SBPMs at its core, but our findings suggest that subscription payments will realize their full potential only when integrated into a multifaceted strategy. Prior-authorization reforms, universal screening recommendations, and expanded treatment capacity, must accompany financing reforms to dismantle systemic obstacles.

In conclusion, this dissertation provides robust evidence that SBPMs can catalyze significant improvements in HCV care but only within a carefully orchestrated policy ecosystem. By integrating financing innovation with targeted public-health interventions, states can not only accelerate progress toward HCV elimination but also ensure that these gains are equitable, sustainable, and resilient to future challenges.

2. MODELING LIFETIME SOCIETAL OUTCOMES OF SUBSCRIPTION-BASED VERSUS TRADITIONAL PRICING FOR HEPATITIS C TREATMENT IN WASHINGTON AND LOUISIANA

ABSTRACT

Background:

Hepatitis C virus (HCV) remains a major public health and economic burden in the United States, with access to curative direct-acting antivirals (DAAs) historically limited by high costs and restrictive policies, particularly in Medicaid populations. In 2019, Louisiana and Washington implemented subscription-based payment models (SBPMs) to expand access to treatment and accelerate HCV elimination. This study evaluated the long-term societal value of SBPMs using real-world data.

Methods:

A state-transition Markov model was developed to simulate the clinical and economic outcomes associated with SBPM implementation compared to traditional pricing in Louisiana and Washington. The model incorporated real-world HCV screening, incidence, and treatment rates and adopted a societal perspective. Outcomes included total costs, productivity gains, life years, quality-adjusted life years (QALYs), and incremental net monetary benefit (INMB). Sensitivity analyses were performed to evaluate parameter uncertainty.

Results:

In Louisiana, the SBPM generated an INMB of approximately $1.3 billion and yielded cost savings of $506 million, with an average gain of 0.016 QALYs per patient. When extrapolated to

the full Louisiana Managed Medicaid population, the projected societal benefit approached $5.9 billion. In contrast, the SBPM in Washington was associated with a negative INMB of –$196 million and a slight QALY loss of 0.005 per patient. One-way and probabilistic sensitivity analyses confirmed the robustness of these findings.

Conclusions:

The cost-effectiveness of SBPMs is highly context dependent. In states with high unmet treatment needs and restrictive pre-existing access policies, SBPMs can yield substantial health and economic gains. However, in settings where access had already expanded prior to implementation, the incremental benefits of subscription pricing may be limited. These findings underscore the importance of tailoring payment models to state-specific epidemiological and policy contexts to maximize their societal value.

2.1. Background

Hepatitis C virus (HCV) infection remains a major public health and economic burden in the United States, with estimated annual healthcare costs surpassing $10 billion.[56] Without treatment, approximately 20% to 30% of individuals with chronic HCV will develop cirrhosis over two to three decades, a progression associated with serious complications and increased healthcare utilization.[57] The introduction of direct-acting antivirals (DAAs) in 2013 marked a significant breakthrough in HCV management, offering sustained virologic response rates above 95%.[5] However, initial DAA prices; such as $84,000 for a 12-week course of sofosbuvir and $94,500 for ledipasvir/sofosbuvir posed serious affordability challenges, particularly for publicly funded insurance programs operating under fee-for-service reimbursement models.[8]

Despite subsequent reductions in net treatment costs to below $20,000, financial and administrative barriers have continued to restrict access especially in Medicaid, which insures nearly 79% of the HCV-infected population in the U.S., according to the Centers for Disease Control and Prevention (CDC).[41] In response, states such as Louisiana and Washington adopted subscription-based payment models (SBPMs) in 2019 to support large-scale DAA treatment as part of their HCV elimination strategies. These innovative financing arrangements aim to decouple drug pricing from volume and enable broader access through fixed-cost agreements.[15,17,21]

Earlier evaluations of subscription-based payment models (SBPMs) and similar risk-sharing mechanisms primarily relied on theoretical simulations and projected assumptions. A working paper from the National Bureau of Economic Research (NBER) estimated that a national HCV

elimination strategy, supported by widespread access to direct-acting antivirals (DAAs), could achieve considerable health and economic gains.[58] Using an updated mathematical model, the authors projected that within five years, 92.5% of individuals with HCV would be diagnosed and 89.6% cured. Over a 10-year span, such a national initiative was expected to avert 20,000 cases of hepatocellular carcinoma, 49,100 new cases of diabetes, and 25,000 cases of chronic kidney disease, while preventing 24,000 deaths and adding approximately 220,000 life-years. From a financial standpoint, the strategy was projected to reduce healthcare expenditures by $18.1 billion over a decade, $13.3 billion of which would accrue to the federal government. Over 20 years, these savings were forecasted to triple, particularly if reductions in HCV prevalence led to lower incidence rates.[58]

Complementing this work, Matthew et al. also assessed the use of SBPM using computational models to simulate treatment uptake, disease progression, and cost impacts across three high-income countries (the United States, the United Kingdom, and Italy).[59] The study demonstrated that implementing the SBPM at the launch of interferon-free DAAs would have more than doubled the number of patients treated and cured within the first three years. Liver-related deaths (LRDs) would have been reduced by approximately 40%. Economically, the SBPM was shown to reduce total payer costs by more than 25%, while simultaneously increasing pharmaceutical manufacturer revenues by 10% which suggested the model may align incentives across stakeholders. These findings held true across varying healthcare structures and remained robust under sensitivity analyses. The implications were clear: SBPMs offer a scalable, cost-effective path to expanding access to curative HCV therapies.[59] Together, these studies provide mounting evidence that reimagining drug financing structures that are grounded in population health and

value-based principles could accelerate elimination goals while supporting sustainable pricing and innovation.[58,59]

Unlike previous evaluations grounded in hypothetical uptake, the present study takes an empirically driven approach by constructing a Markov state-transition model parameterized using real-world data from SBPM implementation, specifically from Managed Medicaid claims under Aim 1. This approach enables robust estimation of long-term health and economic outcomes associated with SBPMs using directly observed screening, incidence, and treatment rates. The economic evaluation adopts a societal perspective in accordance with guidelines established by the Second Panel on Cost-Effectiveness in Health and Medicine, allowing for a more comprehensive assessment of the model's projected benefits.[60]

By integrating empirical data with rigorous modeling, this research aims to generate policy-relevant insights into the long-term societal value of subscription-based approaches to HCV treatment. These findings will support evidence-informed strategies for achieving equitable, cost-effective HCV elimination at the state level.

2.2. Methods

2.2.1. Model overview

To evaluate the long-term clinical and economic outcomes associated with subscription-based payment models (SBPMs) for hepatitis C virus (HCV) treatment, we developed a state-transition Markov model. This model was adapted from a previously validated simulation framework used in national HCV policy modeling and modified to reflect the availability of real-world evidence

data.[61] The original model structure included health states representing acute infection, spontaneous resolution, chronic infection categorized by fibrosis stages (F0–F4), sustained virologic response (SVR), decompensated cirrhosis (DC), hepatocellular carcinoma (HCC), liver transplantation (LT), and liver-related death.[61]

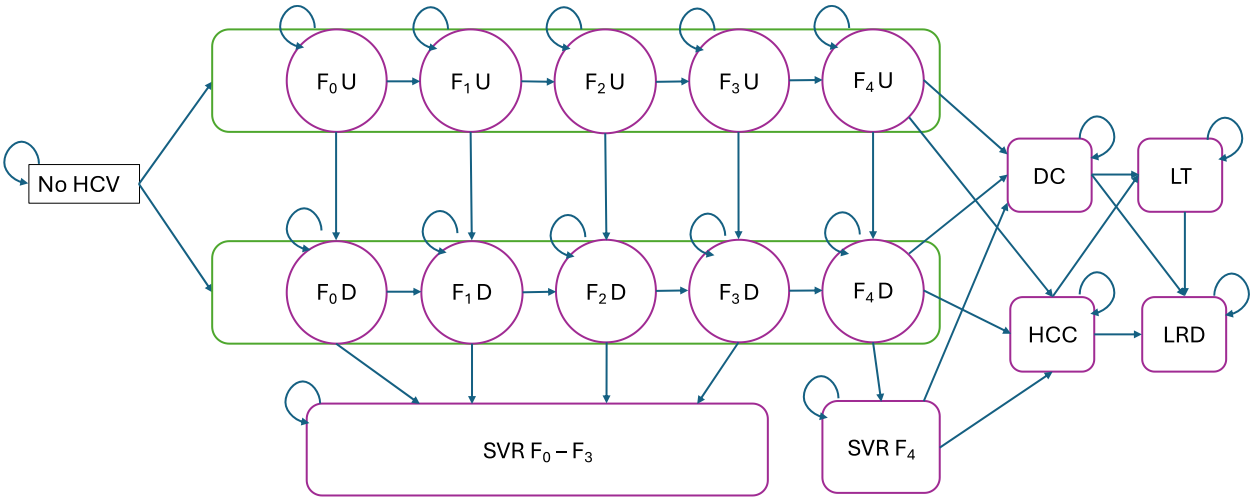
Given that Aim 1 relied on ICD-10 codes that could not reliably distinguish acute from chronic HCV infection, and because spontaneous clearance events could not be captured using claims data alone, the acute and resolved states were excluded from the revised model. The final model initiated with a No HCV state, representing uninfected individuals at risk of acquiring hepatitis C virus (HCV) infection. Upon infection, individuals transitioned directly into either the F0 undiagnosed (F0U) or F0 diagnosed (F0D) fibrosis states, depending on whether HCV was detected through screening.

The model structured disease progression along the METAVIR fibrosis stages (F0 to F4), with each stage divided into undiagnosed (U) and diagnosed (D) categories to account for the impact of screening. Transitions from undiagnosed to diagnosed states occurred upon HCV detection. Patients treated during fibrosis stages F0 to F3 who achieved cure entered an SVR (sustained virologic response) F0–F3 state. Patients diagnosed at F4 who were successfully treated transitioned to an SVR F4 state, which conveyed a reduced but persistent risk of progression to decompensated cirrhosis (DC) or hepatocellular carcinoma (HCC).

Patients who remained untreated at F4, or who progressed despite treatment, could transition to advanced liver disease states, including DC, HCC, and subsequently liver transplantation (LT) or

liver-related death (LRD). Individuals in all health states were subject to background mortality rates based on age, aligned with general population estimates. This model thus incorporated HCV infection, fibrosis progression, screening, diagnosis, treatment outcomes, and advanced liver disease pathways to capture the natural history and impact of interventions in chronic HCV infection (Figure 19).

Figure 19: Overview of the Markov state transition model for Hepatitis C



Abbreviations: HCV; Hepatitis C Virus, F0 to F4; Fibrosis stages according to METAVIR score, U; Undiagnosed, D; Diagnosed, DC; Decompensated cirrhosis, HCC; Hepatocellular carcinoma, LT; Liver transplant, LRD; Liver Related Deaths, SVR; Sustained Virologic response.

The model operated in annual cycles with half-cycle correction and projected disease progression and treatment effects over a lifetime horizon, beginning in July 2019 (the implementation date of subscription-based payment models (SBPMs) in Washington and Louisiana). Analyses were conducted from a societal perspective, consistent with the recommendations of the Second Panel on Cost-Effectiveness in Health and Medicine (Appendix 2).[60] Synthetic control groups were

developed for each state to serve as counterfactual comparators under traditional pricing models, as outlined in Aim 1.

To estimate the baseline distribution of fibrosis stages prior to SBPM implementation, the model was first simulated for Louisiana (LA) over 20 annual cycles without treatment, representing the natural history of HCV progression from F0 to hepatocellular carcinoma (HCC).[62] It was assumed that, during this period, only patients at stage F4 would be screened and diagnosed, reflecting Louisiana's historical fibrosis-stage restrictions on treatment and the greater likelihood of diagnosis among symptomatic individuals.[12]

For Washington (WA), the model was similarly run for 20 cycles; however, in the final three cycles, adjustments were made to incorporate policy changes initiated in mid-2016, when all direct-acting antiviral (DAA) access restrictions were lifted. Treatment rates for the last three years were derived from Washington's Hep C Online Dashboard,[63] and screening rates prior to 2019 were informed by data from the Komodo database.

2.2.2. Model inputs

Model inputs incorporated a comprehensive set of clinical, behavioral, economic, and demographic parameters, informed by both peer-reviewed literature and state-specific real-world data obtained from aim 1 analysis. These inputs included annual HCV transition probabilities, SVR rates by genotype and fibrosis stage, health utilities, healthcare costs, productivity costs, and uptake patterns related to screening and treatment. Transition probabilities for disease progression were obtained from the HEP-SIM calculator, including stage-to-stage fibrosis

progression (F0 to F4), transitions to decompensated cirrhosis (DC), hepatocellular carcinoma (HCC), liver transplantation (LT), and liver-related mortality (LRD).[61] The model also captured post-treatment transitions, such as the risk of progression from F4-SVR to DC or HCC, and post-LT mortality rates.[61]

Behavioral transition probabilities (i.e. transition probabilities impacted by the implementation of the SBPM policy) including HCV screening uptake, RNA testing, and DAA treatment initiation were derived from Aim 1 of this study, with state-specific estimates provided for each year from 2019 to 2021 in both Louisiana and Washington. These estimates also included annual incidence and prevalence of HCV, the total Managed Medicaid-enrolled population in Komodo dataset, and the age distribution of HCV-infected patients in Komodo dataset. Synthetic control probabilities for screening and treatment were similarly calculated using modeled counterfactual trends based on aim one results.

National estimates were used to inform HCV genotype and fibrosis stage distributions at baseline, as well as SVR rates for Mavyret and Epclusa by genotype and fibrosis stage, using data from HEP-SIM.[58,61] Health utility values for each health state (F0–F4, DC, HCC, LT, LRD), as well as SVR states, were sourced from previously published cost-utility studies.[64,65]

Healthcare cost inputs reflected direct medical costs of managing each HCV-related health state, as well as the costs associated with HCV screening and diagnostic services. Disease management costs by fibrosis stage, DC, HCC, LT (first year and subsequent years), and post-SVR states were drawn from Younessi et al. and Goldman et al.[66,67] Screening costs for HCV RNA,

antibody testing, confirmatory testing, and specialty panels were derived from the Clinical Laboratory Fee Schedule (2025–2029).[68] In addition, costs related to diabetes and chronic kidney disease (CKD) management were incorporated based on estimates from Chhatwal et al.[58] Future unrelated healthcare costs for the general population were also considered, applied as age-specific estimates of annual spending for both survivors and decedents at each age, based on established methods for incorporating unrelated medical costs in lifetime cost-effectiveness models.[69] All costs were inflated to January 2025.

Productivity costs were included in the model from both loss and gain perspectives. Annual productivity losses due to untreated HCV were derived from estimates by Su et al.,[70] while productivity gains associated with curative treatment were informed by Sulkowski et al.[71]

The integration of both empirical and literature-based parameters ensured that the model was robust, policy-relevant, and grounded in real-world SBPM implementation contexts in Washington and Louisiana. Full parameter values, definitions, and sources are detailed in Appendix 2.

2.2.3. Model assumptions

Several assumptions were made to support the structure and validity of the model. First, behavioral transition probabilities including annual HCV incidence, screening rates, and DAA initiation probabilities were assumed to remain stable from the third simulation year onward. This assumption reflects limitations in long-term behavioral data under subscription-based

payment models (SBPMs) and allows for consistent forward projections in the lifetime horizon model.

Second, direct drug acquisition costs were excluded from the model. This decision was made to align the analysis with its central objective: estimating the societal lifetime benefits of SBPM implementation rather than conducting a conventional cost-effectiveness analysis focused on incremental cost-effectiveness ratios (ICERs). Third, both costs and health outcomes were discounted at an annual rate of 3%, consistent with standard practices recommended by the Second Panel on Cost-Effectiveness in Health and Medicine.[60]

Fourth, the model assumed a starting average age of 48 years for Louisiana and 47 years for Washington, based on Aim 1 results. These age distributions informed all mortality adjustments, cost projections, and productivity loss estimates throughout the simulation period. Finally, the model adopted a societal willingness-to-pay (WTP) threshold of $150,000 per quality-adjusted life year (QALY) gained, which was used to interpret the net monetary benefit (NMB) of the SBPM relative to the synthetic control comparator.

2.2.4. Model outputs

Model outcomes included total healthcare costs, productivity gains, life years and QALYs gained. These outcomes were used to estimate the incremental net monetary benefit (INMB), comparing the SBPM strategy to the synthetic control under traditional pricing. INMB was calculated as the difference in costs subtracted from the product of incremental QALYs and the

willingness-to-pay threshold ($150,000 per QALY); a positive INMB indicates that the SBPM strategy is cost-effective relative to the traditional pricing model.

2.2.5. Model uncertainty

To evaluate model uncertainty, we conducted several sensitivity analyses. A one-way deterministic sensitivity analysis was used to examine the effect of varying individual parameters on INMB outcomes. For the probabilistic sensitivity analysis, we applied beta distributions for probabilities, gamma distributions for cost parameters, and a normal distribution for age. A total of 10,000 Monte Carlo simulations were performed to assess the joint uncertainty across all model inputs.

2.3. Results

2.3.1. Net monetary benefits

Louisiana (LA)

In the Louisiana cohort, comprising 338,037 individuals, the subscription-based payment model (SBPM) produced a total of 6,412,983 life-years, 6,377,658 QALYs and incurred total costs of $56.1 billion. Under the traditional pricing model, QALYs were marginally lower at 6,372,194, while total costs were higher, reaching approximately $56.6 billion. Overall, the SBPM resulted in an estimated cost savings of $505 million and an incremental net monetary benefit (INMB) of $1.3 billion, indicating that the intervention is highly cost-effective. On average, the SBPM yielded an additional 0.016 QALYs per person (see Table 6).

Washington (WA)

In Washington State (n = 130,390), the SBPM scenario resulted in 2,756,189 life years, 2,235,301 QALYs and total costs of $21.9 billion. In contrast, the traditional pricing model produced slightly higher QALYs (2,235,972) alongside lower total costs of $21.8 billion. Productivity gains were higher under the traditional model ($144 million vs. $107 million). However, unlike the findings in Louisiana, the SBPM in Washington was associated with a negative INMB of -$196 million and a QALY loss of 0.005 per person, indicating that the intervention was not cost-effective in this context (Table 6).

Table 6: The incremental net monetary benefits of implementing the SBPM versus traditional pricing in Louisiana and Washington

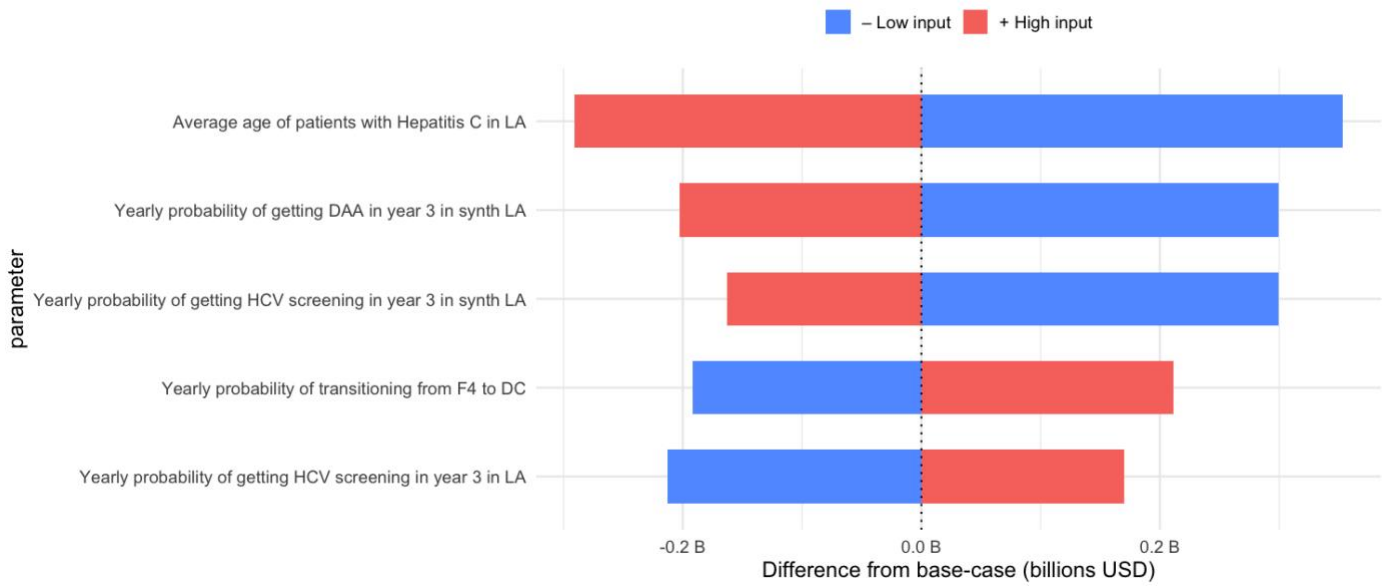
Outcome	Louisiana			Washington		
	Subscription-based pricing	Traditional pricing	Incremental	Subscription-based pricing	Traditional pricing	Incremental
Population size	338,037	338,037		130,390	130,390	
life-years	6,412,983	6,410,134		2,756,189	2,756,650	
QALYs	6,377,658	6,372,194		2,235,301	2,235,972	
Medical costs	$56.8 B	$57.1 B		$21.94 B	$21.88 B	
Productivity gains	$781 M	$587 M		$107 M	$143 M	
Total costs	$56.1 B	$56.6 B		$21.86 B	$21.76 B	
Cost savings			$506 M			-$95.2 M
INMB			$1.3 B			-$196 M
QALY gained per person			0.016			-0.005

Abbreviations: B; Billions, M; Millions, QALYs; Quality-adjusted life years, INMB; Incremental net monetary benefits

2.3.2. Sensitivity analyses

We conducted one-way sensitivity analyses to evaluate the robustness of model results to variations in key input parameters for both Louisiana (LA) and Washington (WA). In LA, the model was generally robust, with all tested parameters maintaining a positive incremental net monetary benefit. The parameters with the largest influence on INMB were the utility of achieving cure (F0–F3), the average age of patients, and the probability of receiving DAAs in year 3. Importantly, across all tested ranges, implementation of the subscription-based payment model (SBPM) in LA consistently remained cost-effective (Figure 20).

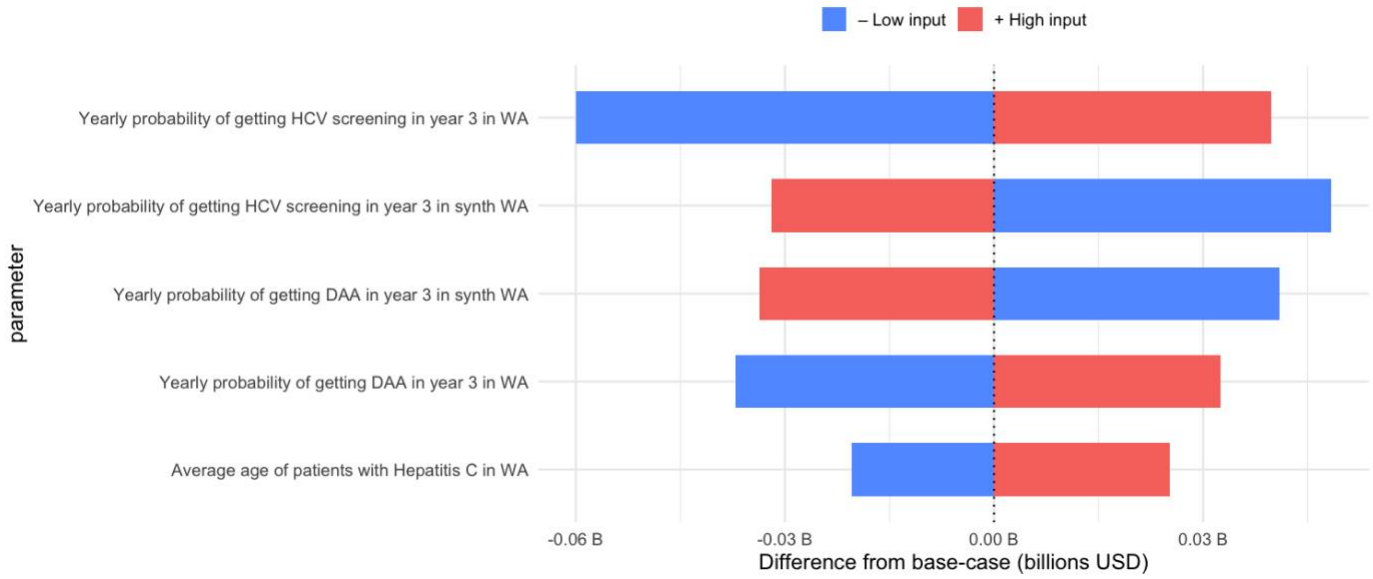
Figure 20: Tornado diagram for one-way sensitivity analysis for Louisiana



In WA, by contrast, the main analysis yielded a negative INMB, and the one-way sensitivity analysis confirmed that variations in key parameters did not reverse this result. Across all tested

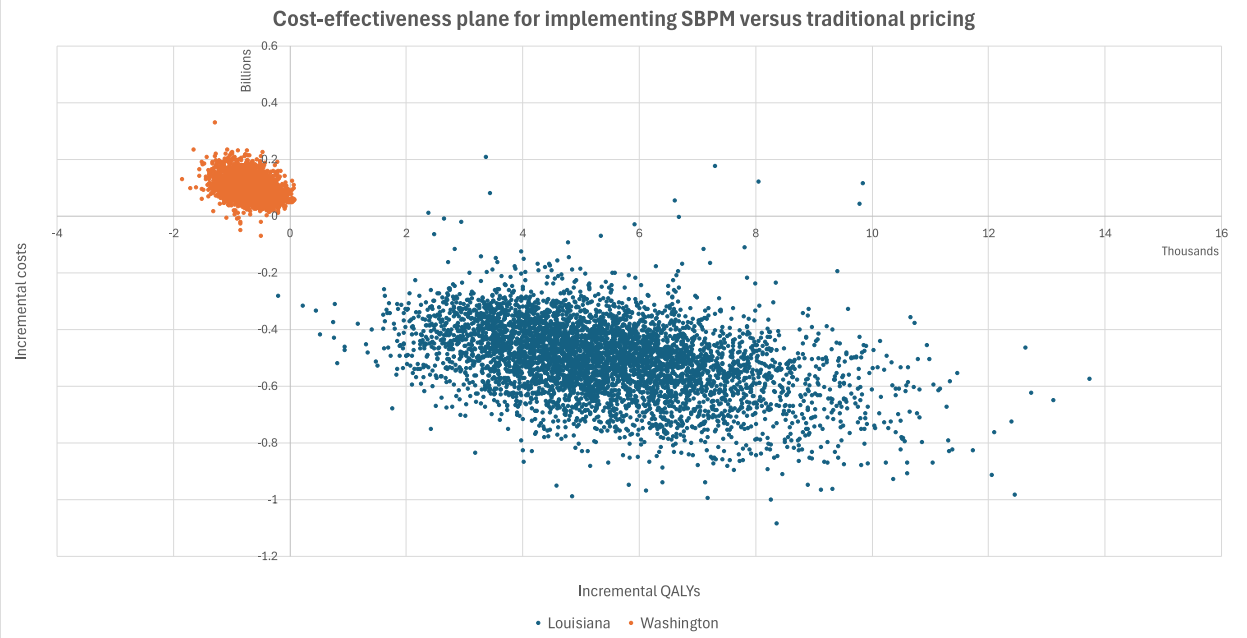
input ranges, INMB remained negative. The parameters that most influenced the magnitude of INMB in WA included the probability of HCV screening, DAA uptake rates, and utility values for early-stage fibrosis (F0–F2). However, no parameter changes were sufficient to make SBPM implementation cost-effective in WA (Figure 21).

Figure 21: Tornado diagram for one-way sensitivity analysis for Washington



Probabilistic sensitivity analysis (PSA) results are shown in the cost-effectiveness plane (Figure 22). In LA, most simulations fell within the southeast quadrant, indicating that SBPM was associated with lower costs and greater quality-adjusted life year (QALY) gains compared to traditional pricing models. In WA, simulations predominantly indicated higher costs and smaller or uncertain QALY gains, consistent with the one-way sensitivity and base-case results.

Figure 22: Cost-effectiveness plane for probabilistic sensitivity analysis results



2.4. Discussion

This study evaluated the net monetary benefit of implementing a subscription-based payment model (SBPM) for hepatitis C virus (HCV) treatment in two U.S. states, Louisiana (LA) and Washington (WA), using a Markov model using real-world evidence. The results demonstrate that while the SBPM was highly cost-effective in Louisiana, it was not cost-effective in Washington under the modeled assumptions.

In Louisiana, the SBPM produced substantial cost savings and health gains, generating an incremental net monetary benefit (INMB) of approximately $1.3 billion and increasing quality-adjusted life years (QALYs) per patient by 0.016. These favorable outcomes were driven by the high baseline disease burden, significant unmet treatment need prior to policy implementation,

and the greater marginal benefits associated with expanded treatment access under the SBPM. One-way sensitivity analyses confirmed the robustness of the findings across a wide range of plausible parameter values. Even under the most extreme input variations, the SBPM in Louisiana consistently remained cost-effective. Probabilistic sensitivity analysis (PSA) further reinforced these conclusions, with most simulations indicating both lower costs and improved health outcomes relative to traditional pricing.

When scaled to the full Louisiana Managed Medicaid population—estimated at approximately 1,533,871 individuals (based on Kaiser Family Foundation averages from 2019–2022)[72]—the projected economic impact of the SBPM could be even more substantial. Adjusting for this larger population, the total potential INMB would be approximately $5.9 billion, highlighting the broader societal value of subscription-based pricing models in high-burden populations.

In contrast, in Washington, the SBPM was not cost-effective. The model estimated a negative INMB of –$196 million, reflecting both a slight loss in QALYs and higher overall costs relative to the traditional pricing model. Several factors likely contributed to this finding. Importantly, Washington had already lifted DAA access restrictions in mid-2016, which, coupled with expanded screening efforts, resulted in broader treatment access well before SBPM implementation. As a consequence, many patients who were easier and less costly to diagnose and treat had already been reached prior to 2019, leaving a harder-to-reach population requiring more intensive and costly efforts for identification and linkage to care. This phenomenon likely increased the marginal cost per additional case detected and cured, thereby reducing the cost-effectiveness of SBPM under current conditions. One-way sensitivity analyses confirmed that no

single parameter variation was sufficient to alter this conclusion, and PSA results corroborated the finding that SBPM in Washington was associated with uncertain or negative economic and health benefits.

These findings extend prior literature on the value of expanded HCV treatment access. Chhatwal et al. (NBER Working Paper) projected that achieving national HCV elimination goals could generate approximately $18 billion in federal budgetary savings over a decade.[58] However, their estimates primarily captured direct medical cost savings and did not incorporate broader societal gains from productivity improvements or future unrelated medical costs. By contrast, the present analysis included both direct medical costs and productivity impacts, providing a more comprehensive estimate of the potential societal benefits of SBPMs in HCV management.

Overall, the findings highlight important contextual considerations when evaluating alternative payment models for curative therapies. The success of SBPMs depends not only on drug pricing mechanisms but also on the pre-existing disease burden, the history of treatment access policies, and the ability to identify and engage untreated individuals efficiently. In settings like Louisiana, where significant unmet needs existed prior to SBPM rollout, subscription models can deliver substantial public health and economic gains. Conversely, in states like Washington, where many eligible patients had already been treated, the incremental benefits of SBPMs may be limited, and the costs of further case-finding may outweigh the potential health gains.

Strengths of this study include the use of state-specific data, and a comprehensive societal perspective incorporating productivity. Limitations include reliance on administrative claims

data for model inputs, potential underestimation of undiagnosed populations, and assumptions regarding future trends in treatment uptake and costs. Nevertheless, the findings provide important guidance for policymakers considering the design and implementation of alternative payment models for high-cost, curative therapies.

2.5. Conclusion

This study assessed the societal net monetary benefit of subscription-based payment models (SBPMs) for hepatitis C virus (HCV) treatment in Louisiana and Washington. The SBPM was highly cost-effective in Louisiana, generating an incremental net monetary benefit (INMB) of approximately $1.3 billion, with potential gains approaching $5.9 billion when extrapolated to the full Medicaid population. In contrast, the SBPM was not cost-effective in Washington, likely due to earlier removal of treatment restrictions and expanded screening efforts that reduced the incremental benefit of subscription pricing. These findings highlight that the value of SBPMs is highly context-dependent, with greater benefits realized in settings with high unmet treatment needs.

CONCLUSION

This dissertation demonstrated that subscription-based payment models (SBPMs) can meaningfully accelerate hepatitis C virus (HCV) screening and treatment uptake when implemented within a supportive policy and programmatic ecosystem. Using a synthetic control framework applied to Managed Medicaid claims data, it was shown that Louisiana's SBPM was associated with large, sustained increases in HCV RNA testing, direct-acting antiviral (DAA) initiation, and refill rates across all demographic and geographic subgroups. In contrast, Washington's SBPM produced minimal improvements, likely reflecting earlier policy changes that had already expanded treatment access. These findings emphasize that financing innovation alone is insufficient; complementary reforms such as elimination of fibrosis restrictions, robust public-health outreach, and provider training are critical to maximizing the impact of subscription models.

In Aim 2, a state-transition Markov model incorporating real-world data was developed to estimate the long-term clinical and economic outcomes of SBPM implementation compared to traditional pricing models. The model found that SBPM was highly cost-effective in Louisiana, generating an incremental net monetary benefit (INMB) of approximately $1.3 billion, with projected gains approaching $5.9 billion when scaled to the full Managed Medicaid population. In Washington, however, the SBPM was not cost-effective, yielding a negative INMB of –$196 million. These contrasting results reflect differences in baseline disease burden, the timing of policy reforms, and the cost dynamics of reaching remaining untreated populations. Sensitivity analyses confirmed the robustness of these findings.

Together, these two aims provide comprehensive, empirical evidence that while SBPMs represent a promising financing innovation for expanding access to curative therapies, their success depends critically on broader system alignment. This dissertation advances the literature methodologically by applying rigorous causal inference and simulation modeling to real-world policy evaluation. Practically, it offers a roadmap for policymakers: financing reforms like SBPMs must be integrated with comprehensive public health strategies to achieve equitable, sustainable HCV elimination. As national efforts to eliminate HCV advance, this work underscores the necessity of combining bold payment innovations with the removal of systemic barriers to care.

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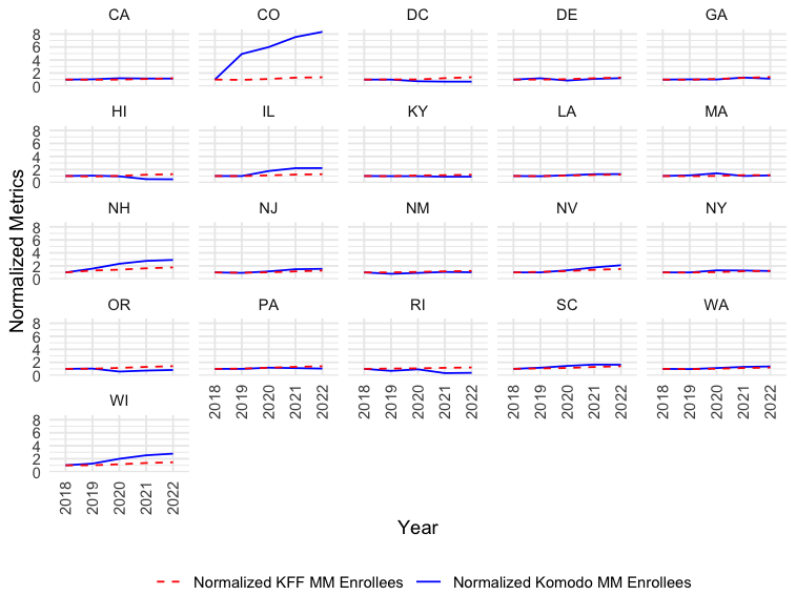
3. SUPPLEMETAL APPENDICES

3.1. APPENDIX 1

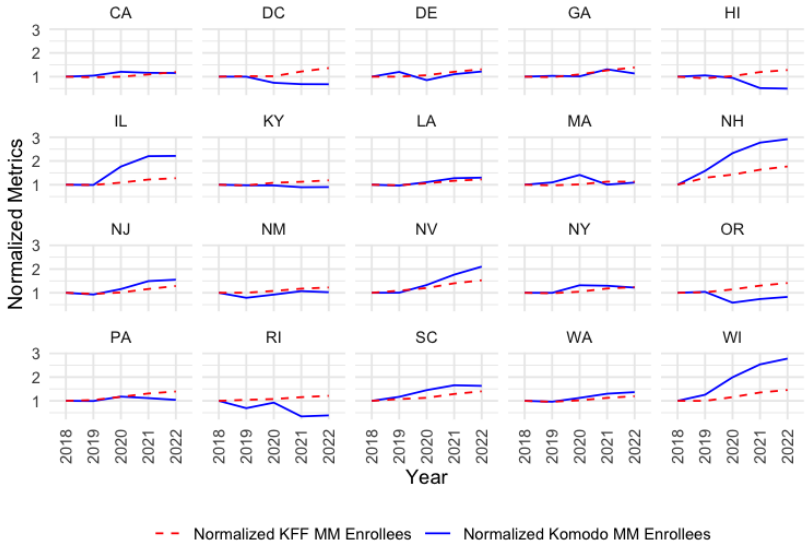
3.1.1. Current Procedural Terminology (CPT) codes used to identify patients receiving any Hepatitis C screening tests, International Classification of Diseases (ICD-10) codes used to identify patients with Hepatitis C diagnosis, and National Drug Codes (NDCs) used to identify Direct Acting Antivirals (DAAs)

Current Procedural Terminology (CPT) codes for Hepatitis C screening	
3266F	Hepatitis C, genotype test
86803	Hepatitis C antibody
86804	Hepatitis C antibody Confirmation test
G0472	Hepatitis C antibody screening, for an individual at high risk and other covered indication
87520	Hepatitis C RNA; direct probe technique
87521	Hepatitis C RNA; amplified probe technique
87522	Hepatitis C RNA; quantification
87902	Hepatitis C virus genotype analysis
80074	Hepatitis panel/ Acute Hepatitis panel
International Classification of Diseases (ICD-10) codes for Hepatitis C diagnosis	
B17.10	Acute hepatitis C without hepatic coma
B17.11	Acute hepatitis C with hepatic coma
B18.2	Chronic viral hepatitis C
B19.20	Unspecified viral hepatitis C without hepatic coma
B19.21	Unspecified viral hepatitis C with hepatic coma
National Drug Codes (NDCs) for Direct Acting Antivirals (DAAs)	
Sovaldi (Sofosbuvir)	61958150101, 61958150201, 61958150202, 61958150301, 61958150401, 61958150501
Harvoni (Ledipasvir/ sofosbuvir)	61958180501, 61958180401, 61958180301, 61958180202, 61958180101
Viekira Pak (Ombitasvir/ paritaprevir/ritonavir/dasabuvir)	00074309328, 00074309301
Technivie (Ombitasvir/ paritaprevir/ritonavir)	00074308228
Zepatier (Elbasvir/grazoprevir)	00006307402, 00006307401
Epclusa (Sofosbuvir/velpatasvir)	61958220101, 61958220201, 61958220202, 61958220203, 61958220301
Viekira XR (Dasabuvir/ ombitasvir/paritaprevir/ritonavir)	00074006328, 00074006301
Vosevi (Sofosbuvir/ velpatasvir/voxilaprevir)	61958240101
Mavyret (Glecaprevir/ pibrentasvir)	00074262528, 00074262501, 00074262556, 00074262580, 00074260028
Epclusa authorized generic (Velpatasvir/sofosbuvir)	72626270101
Harvoni authorized generic (Ledipasvir/sofosbuvir)	72626260101

3.1.2. Normalized Medicaid Managed (MM) Care Enrollment in Komodo vs Kaiser Family Foundation (KFF), 2018–2022



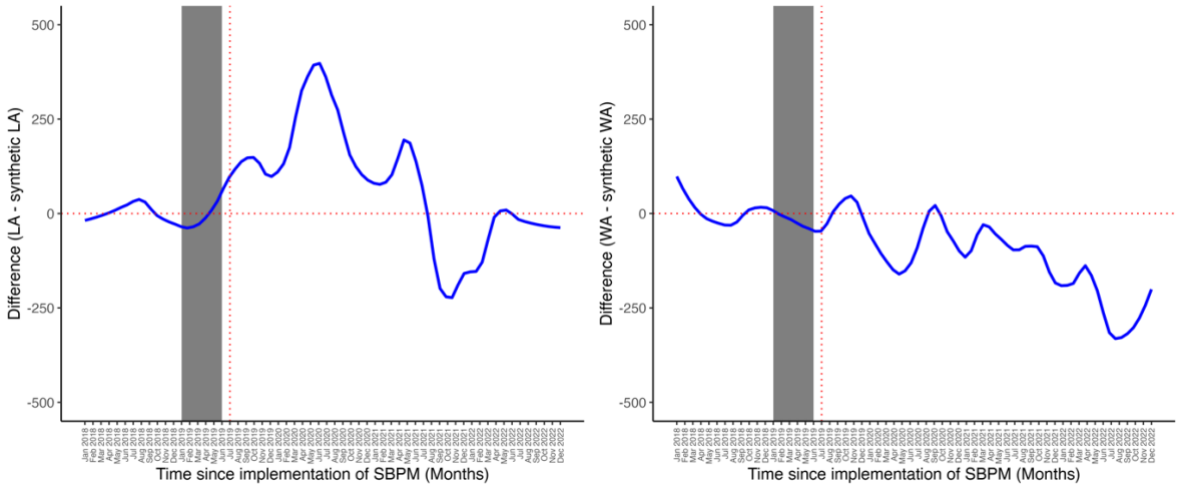
A.



B.

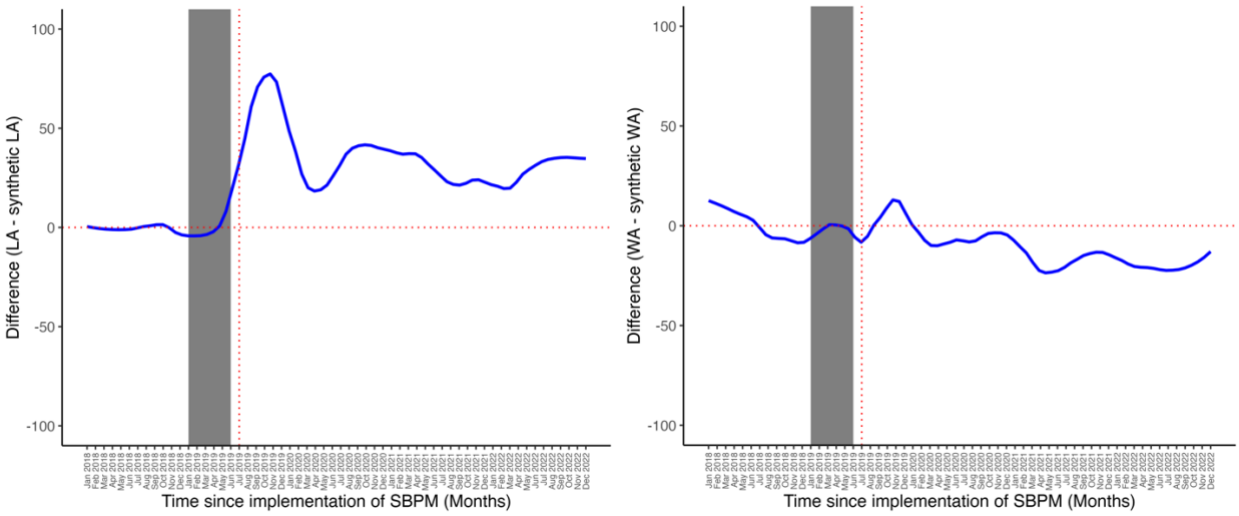
Panel A: Each subplot compares yearly enrollment trends in Komodo (blue line) with KFF data (red line), normalized to each state's 2018 enrollment. Colorado diverges substantially from the KFF trend, prompting its removal.
Panel B: After excluding Colorado, further inspection revealed that Oregon, Rhode Island, Hawaii, and the District of Columbia also exhibited opposite enrollment trajectories relative to KFF data. These states were subsequently removed. The remaining states show more parallel trends between Komodo and KFF.

3.1.3. Cross-Validation of the synthetic control model for overall HCV screening outcomes



The left panel shows the difference between observed and synthetic Louisiana outcomes after removing January–June 2019 from the pre-intervention matching period in the synthetic control model; the right panel depicts the same for Washington. The shaded region corresponds to the omitted period, during which the average placebo effect estimates were −5.2 tests per 100 000 population per month for Louisiana and −17.0 tests per 100 000 population per month for Washington, indicating minimal deviation between observed and synthetic outcomes.

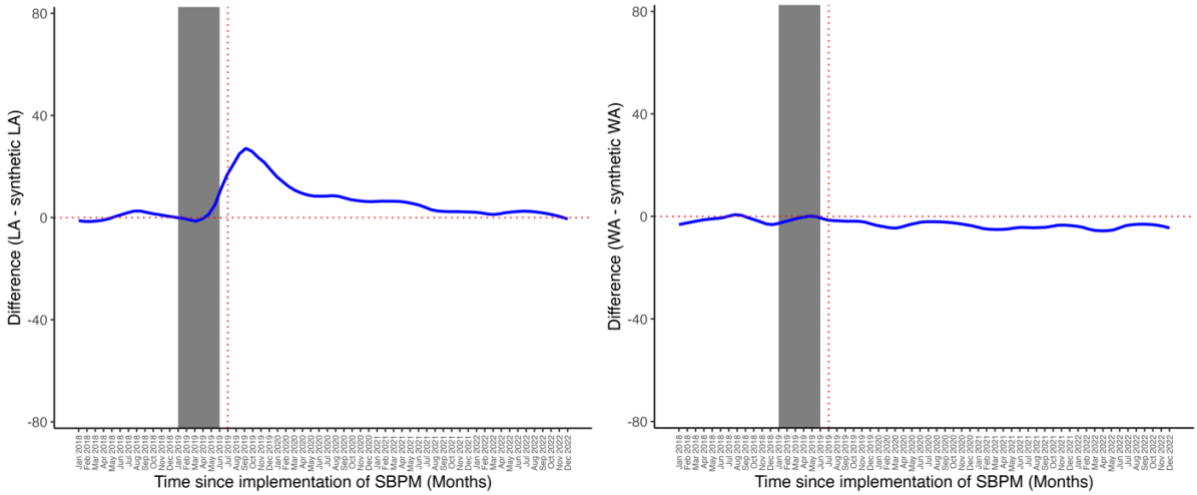
3.1.4. Cross-Validation of the synthetic control model for RNA testing outcomes



The left panel shows the difference between observed and synthetic Louisiana outcomes after removing January–June 2019 from the pre-intervention matching period in the synthetic control model; the right

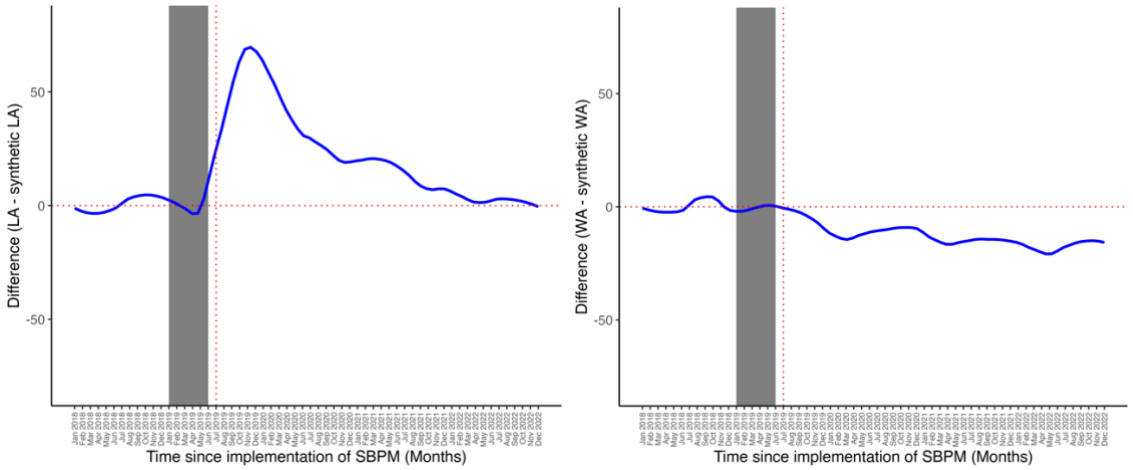
panel depicts the same for Washington. The shaded region corresponds to the omitted period, during which the average placebo effect estimates were −0.84 tests per 100 000 population per month for Louisiana and −1.13 tests per 100 000 population per month for Washington, indicating minimal deviation between observed and synthetic outcomes.

3.1.5. Cross-Validation of the synthetic control model for DAA initiation fills outcome



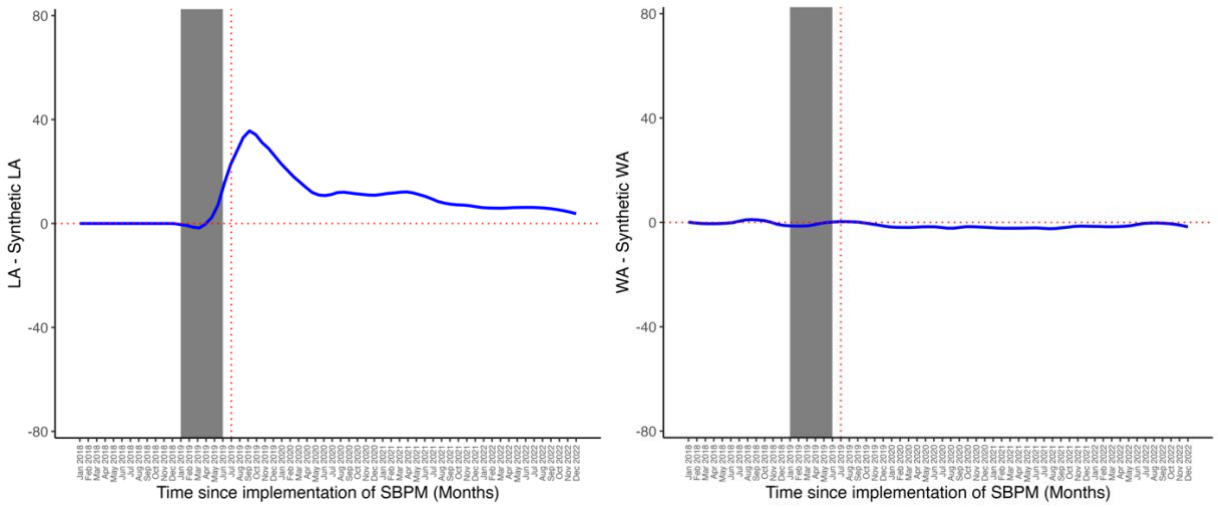
The left panel shows the difference between observed and synthetic Louisiana outcomes after removing January–June 2019 from the pre-intervention matching period in the synthetic control model; the right panel depicts the same for Washington. The shaded region corresponds to the omitted period, during which the average placebo effect estimates were 0.16 DAA initiation fills per 1000 patient per month for Louisiana and −1.43 DAA initiation fills per 1000 patient per month for Washington, indicating minimal deviation between observed and synthetic outcomes.

3.1.6. Cross-Validation of the synthetic control model for DAA refills outcome



The left panel shows the difference between observed and synthetic Louisiana outcomes after removing January–June 2019 from the pre-intervention matching period in the synthetic control model; the right panel depicts the same for Washington. The shaded region corresponds to the omitted period, during which the average placebo effect estimates were 0.34 DAA refills per 1000 patient per month for Louisiana and −1.41 DAA refills per 1000 patient per month for Washington, indicating minimal deviation between observed and synthetic outcomes.

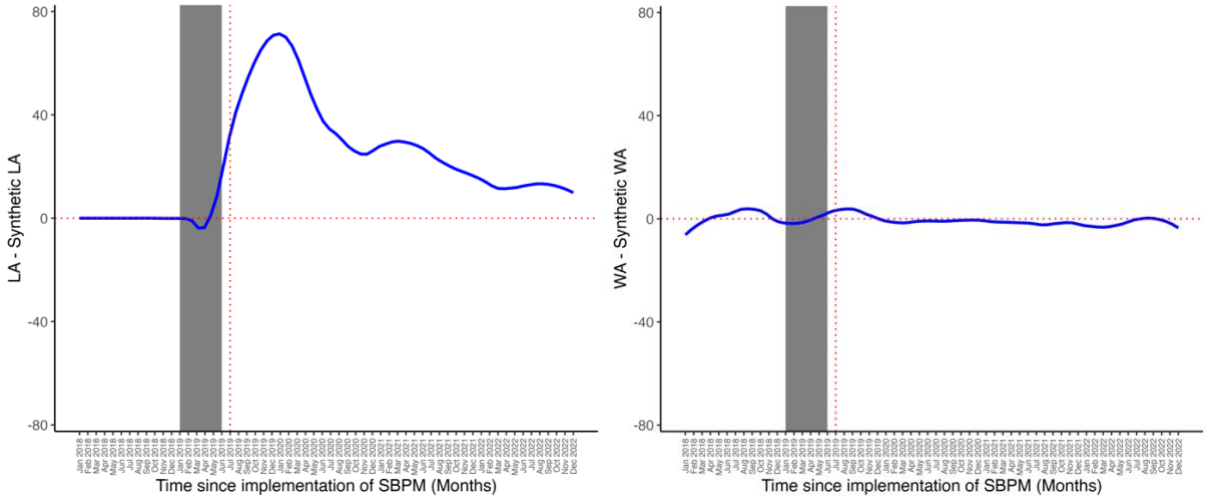
3.1.7. Cross-Validation of the synthetic control model for Epclusa and Mavyret initiation fills



The left panel shows the difference between observed and synthetic Louisiana outcomes after removing January–June 2019 from the pre-intervention matching period in the synthetic control model; the right

panel depicts the same for Washington. The shaded region corresponds to the omitted period, during which the average placebo effect estimates were 0.03 Epclusa initiation fills per 1000 patient per month for Louisiana and −0.98 Mavyret initiation fills per 1000 patient per month for Washington, indicating minimal deviation between observed and synthetic outcomes.

3.1.8. Cross-Validation of the synthetic control model for Epclusa and Mavyret refills



The left panel shows the difference between observed and synthetic Louisiana outcomes after removing January–June 2019 from the pre-intervention matching period in the synthetic control model; the right panel depicts the same for Washington. The shaded region corresponds to the omitted period, during which the average placebo effect estimates were 0.03 Epclusa refills per 1000 patient per month for Louisiana and −0.01 Mavyret refills per 1000 patient per month for Washington, indicating minimal deviation between observed and synthetic outcomes.

3.1.9. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, DAA refills, Epclusa initiation fills, Epclusa refills, Mavyret initiation fills, Mavyret refills

	Unit weight											
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills		Epclusa initiation fills	Epclusa refills	Mavyret initiation fills	Mavyret refills
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Louisiana	Synthetic Washington	Synthetic Washington
CA	-	0.69	-	0.46	0.06	-	-	-	-	-	0.08	0.27
NV	-	0.23	0.14	-	0.05	-	-	-	-	-	-	-
NY	0.35	-	-	-	-	-	-	-	-	-	-	-
NJ	-	-	-	-	0.38	0.69	0.32	0.21	-	-	-	-
MA	0.08	-	-	-	0.02	-	0.11	-	-	-	-	-
NM	-	-	0.05	0.22	-	-	-	-	-	-	-	-
PA	-	0.08	0.16	0.28	-	-	-	-	0.03	-	-	-
DE	-	-	0.01	-	-	-	-	-	-	-	-	-
GA	0.20	-	0.10	-	-	-	-	-	0.82	0.36	-	-
KY	0.38	-	0.27	-	0.34	-	0.45	0.40	0.15	0.12	-	-
IL	-	-	0.13	-	0.07	0.05	0.09	-	-	-	-	0.12
SC	-	-	-	-	-	-	-	-	-	0.52	0.19	-
WI	-	-	0.13	-	-	-	-	-	-	-	0.21	-
NH	-	-	-	0.04	0.08	0.25	0.03	0.39	-	-	0.52	0.61

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero

3.1.10. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in males

	Unit weight							
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	0.55	-	0.24	-	-	-	-
NV	-	0.06	-	-	0.24	-	-	-
NY	0.36	0.08	-	0.29	-	-	-	-
NJ	-	-	-	-	-	0.46	-	0.38
MA	-	-	-	-	0.01	-	-	0.03
NM	0.35	0.15	0.04	0.12	-	-	-	-
PA	-	-	0.41	0.25	-	-	-	-
DE	-	-	0.12	-	0.14	0.14	0.07	-
GA	-	-	0.01	-	-	-	-	-
KY	0.28	-	0.16	-	0.35	-	0.93	0.15
IL	-	0.02	-	-	0.05	-	-	0.08
SC	-	-	0.26	-	-	-	-	-
WI	-	0.11	-	0.05	0.05	-	-	-
NH	-	0.03	-	0.05	0.15	0.40	-	0.37

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero

3.1.11. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in females

Unit weight								
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	0.66	-	0.35	-	-	0.01	-
NV	-	-	-	-	-	-	-	-
NY	0.27	-	-	-	-	-	-	-
NJ	-	-	0.24	-	0.61	0.68	0.61	0.20
MA	0.10	-	-	-	0.05	0.06	0.02	-
NM	-	0.34	-	0.58	-	-	-	-
PA	-	-	0.23	0.06	-	-	-	-
DE	-	-	-	-	0.09	-	-	-
GA	0.22	-	0.23	-	-	-	-	-
KY	0.42	-	0.19	-	0.06	-	0.03	0.51
IL	-	-	0.11	-	0.15	0.14	0.17	-
SC	-	-	-	-	0.05	-	0.01	-
WI	-	-	-	-	-	-	-	-
NH	-	-	-	-	-	0.12	0.16	0.29

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero

3.1.12. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in age group 18 - 29

	Unit weight							
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	0.32	0.41	-	0.46	0.02	0.17	-	0.07
NV	-	0.19	-	-	0.19	-	0.10	0.20
NY	0.40	-	0.28	-	-	-	-	-
NJ	-	-	0.28	-	-	0.11	0.01	-
MA	-	-	-	-	-	0.04	0.13	0.28
NM	-	0.14	-	0.05	-	-	0.07	0.25
PA	-	-	-	0.50	-	-	-	-
DE	0.08	-	0.03	-	-	-	-	0.19
GA	-	-	-	-	-	-	-	-
KY	0.16	-	0.06	-	0.44	0.17	0.07	-
IL	-	-	0.26	-	0.14	0.14	-	-
SC	-	0.01	0.08	-	-	-	0.13	-
WI	-	0.25	-	-	-	0.12	-	-
NH	0.04	-	-	-	0.21	0.26	0.49	-

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero

3.1.13. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in age group 30 - 39

	Unit weight							
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	0.41	-	-	-	-	-	-
NV	-	-	-	-	0.09	0.11	0.12	-
NY	0.16	-	-	0.04	-	-	-	-
NJ	0.05	0.33	0.12	-	0.14	-	-	0.74
MA	0.13	-	-	-	-	-	-	-
NM	-	-	-	0.38	-	-	-	-
PA	-	-	0.23	0.11	-	-	-	-
DE	-	0.07	-	-	0.33	0.66	0.08	-
GA	-	-	-	-	-	-	-	-
KY	0.27	-	0.05	-	-	-	-	0.02
IL	0.40	0.17	0.27	-	0.21	-	0.17	-
SC	-	-	-	0.46	0.10	-	0.10	-
WI	-	-	0.33	-	-	-	-	-
NH	-	0.02	-	0.02	0.12	0.23	0.52	0.23

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero

3.1.14. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in age group 40 - 49

	Unit weight							
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	-	0.31	-	-	-	-	0.08
NV	-	-	-	-	-	0.26	-	-
NY	0.24	0.05	0.21	0.49	-	-	-	-
NJ	-	0.57	-	-	0.31	-	-	-
MA	0.05	-	0.02	-	0.01	0.03	-	0.03
NM	-	-	-	0.41	-	0.06	-	-
PA	0.33	0.05	0.20	0.11	-	-	-	-
DE	0.05	-	-	-	-	-	-	-
GA	-	0.15	-	-	-	-	-	-
KY	0.33	-	0.26	-	0.28	-	0.71	0.30
IL	-	-	-	-	0.24	-	-	0.25
SC	-	0.10	-	-	-	-	-	-
WI	-	-	-	-	-	-	-	-
NH	-	0.09	-	-	0.16	0.65	0.29	0.34

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero

3.1.15. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in age group 50 - 64

	Unit weight							
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	0.30	-	0.30	0.12	-	-	-
NV	-	-	-	0.10	0.19	-	-	-
NY	0.16	-	-	-	-	-	-	-
NJ	-	-	-	-	0.20	0.68	-	0.60
MA	-	0.09	-	-	0.02	-	0.16	-
NM	-	0.32	-	0.30	-	-	-	-
PA	0.84	0.21	0.27	0.18	-	-	-	-
DE	-	-	0.44	0.04	-	-	-	-
GA	-	-	-	-	-	-	-	-
KY	-	-	0.28	-	0.18	-	0.63	-
IL	-	-	-	-	0.18	0.01	0.21	-
SC	-	-	-	-	-	-	-	-
WI	-	-	-	-	0.12	-	-	-
NH	-	0.09	-	0.08	-	0.31	-	0.40

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero

3.1.16. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in patients without diabetes

	Unit weight							
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	0.61	-	0.40	0.02	-	-	-
NV	-	0.22	-	-	0.08	-	-	-
NY	0.40	-	0.63	-	-	-	-	-
NJ	-	-	-	-	0.45	0.68	0.65	0.22
MA	0.17	-	-	-	-	-	0.04	-
NM	0.10	-	0.04	0.25	-	-	-	-
PA	-	0.16	0.05	0.31	-	-	-	-
DE	-	-	-	-	-	-	-	-
GA	0.09	-	-	-	-	-	-	-
KY	0.24	-	0.28	-	0.19	-	-	0.36
IL	-	-	-	-	0.12	0.04	0.29	-
SC	-	-	-	-	-	0.03	0.02	0.03
WI	-	0.01	-	-	0.02	-	-	-
NH	-	-	-	0.05	0.12	0.26	-	0.38

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero

3.1.17. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in patients with diabetes

	Unit weight							
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	0.69	-	0.22	0.22	-	-	-
NV	-	-	-	-	-	-	0.03	-
NY	0.50	-	-	0.15	-	-	-	-
NJ	-	-	-	-	0.17	-	-	0.21
MA	0.02	-	0.08	-	0.01	0.15	0.06	0.12
NM	-	0.09	-	0.26	0.34	0.17	0.51	-
PA	0.12	-	0.37	0.15	-	-	-	-
DE	-	-	0.12	0.03	-	-	-	-
GA	-	-	-	-	0.10	-	0.02	-
KY	0.36	-	0.11	-	-	-	-	-
IL	-	0.22	0.31	-	-	0.34	0.33	0.18
SC	-	-	-	-	0.16	-	-	-
WI	-	-	-	0.19	-	-	0.03	-
NH	-	-	-	-	-	0.35	0.01	0.49

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero

3.1.18. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in patients without substance use disorder (SUD)

	Unit weight							
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	0.72	-	0.43	0.32	0.38	-	0.03
NV	-	0.09	-	-	0.09	-	0.03	-
NY	0.45	-	0.34	-	-	-	-	-
NJ	-	-	-	-	-	-	0.43	-
MA	-	-	-	-	0.02	0.03	0.09	0.07
NM	-	0.08	-	0.22	-	-	-	-
PA	-	-	0.17	0.34	-	-	-	-
DE	-	-	0.02	-	0.03	-	0.02	-
GA	0.24	-	-	-	-	-	0.06	-
KY	0.31	-	0.47	-	0.35	-	0.24	0.28
IL	-	-	-	-	0.04	0.04	0.12	0.06
SC	-	-	-	-	-	-	-	0.11
WI	-	0.07	-	-	-	-	-	-
NH	-	0.04	-	-	0.15	0.56	-	0.44

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero.

3.1.19. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills in patients with substance use disorder (SUD)

	Unit Weight							
	Overall HCV screening		RNA testing		DAA initiation fills		DAA refills	
State	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	0.76	-	-	-	-	-	-
NV	-	0.16	0.41	-	-	-	-	-
NY	0.09	0.08	-	0.71	-	-	-	-
NJ	0.26	-	-	-	0.43	0.89	-	0.35
MA	-	-	-	-	-	0.02	-	-
NM	0.07	-	0.09	0.13	-	-	-	-
PA	-	-	0.09	-	-	-	-	-
DE	-	-	0.01	-	-	0.09	-	-
GA	0.07	-	-	-	-	-	-	-
KY	0.40	-	0.28	-	0.25	-	0.69	0.35
IL	0.06	-	-	0.16	0.10	-	0.04	-
SC	0.05	-	-	-	-	-	-	-
WI	-	-	0.12	-	0.07	-	-	-
NH	-	-	-	-	0.15	-	0.27	0.30

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero.

3.1.20. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and synthetic Washington for evaluating overall HCV screening in patients with and without HIV

	Unit weight			
	Patients without HIV		Patients with HIV	
States	Synthetic Louisiana	Synthetic Washington	Synthetic Louisiana	Synthetic Washington
CA	-	0.65	-	-
NV	-	0.25	-	0.28
NY	0.35	-	0.53	0.10
NJ	-	-	-	-
MA	0.09	-	0.05	-
NM	0.03	0.01	0.15	0.30
PA	-	0.08	-	-
DE	-	-	0.04	0.01
GA	0.19	-	-	0.05
KY	0.33	-	0.19	0.21
IL	-	-	-	-
SC	-	-	-	-
WI	-	-	-	-
NH	-	0.02	0.04	0.04

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero.

3.1.21. The unit weights that the synthetic control method's optimization algorithm assigned to each control state to construct synthetic Louisiana and Washington regions for evaluating overall HCV screening, RNA testing, DAA initiation fills, and DAA refills

	Unit weight									
	Overall HCV screening					RNA testing				
State	Synthetic Louisiana			Synthetic Washington		Synthetic Louisiana			Synthetic Washington	
	Northern	Central	Southern	Eastern	Western	Northern	Central	Southern	Eastern	Western
CA	-	-	-	0.87	0.45	-	-	-	0.22	0.40
NV	-	-	-	0.02	-	0.49	-	0.19	0.50	-
NY	-	0.69	0.52	-	-	-	-	0.01	-	-
NJ	-	-	-	-	-	-	-	-	-	-
MA	-	-	-	-	-	-	-	-	-	-
NM	-	-	0.09	-	0.19	-	-	-	0.25	0.19
PA	-	-	-	-	-	-	-	0.39	-	0.39
DE	-	-	-	-	-	-	-	-	-	-
GA	0.64	0.31	0.02	-	-	0.37	0.75	-	-	-
KY	0.22	-	0.37	-	-	0.13	0.25	0.37	-	-
IL	-	-	-	-	0.28	-	-	-	-	-
SC	0.13	-	-	-	-	-	-	0.03	-	-
WI	-	-	-	0.11	-	-	-	-	-	-
NH	-	-	-	-	0.08	-	-	-	0.02	0.02
	DAA initiation fills					DAA refills				
State	Synthetic Louisiana			Synthetic Washington		Synthetic Louisiana			Synthetic Washington	
	Northern	Central	Southern	Eastern	Western	Northern	Central	Southern	Eastern	Western
CA	-	-	-	-	-	-	-	-	-	-
NV	-	-	0.08	-	-	-	-	-	0.11	-
NY	-	-	-	-	-	-	-	-	-	-
NJ	-	-	0.30	-	0.79	-	-	-	-	0.27
MA	-	-	-	-	-	-	-	0.13	0.26	-
NM	-	-	-	-	-	-	-	-	-	-
PA	-	-	-	-	-	-	-	-	-	-
DE	-	-	0.11	-	-	-	-	0.06	-	-
GA	-	-	-	-	-	-	-	0.02	-	-
KY	0.72	0.26	0.43	0.10	-	0.48	0.61	0.78	0.20	0.27
IL	-	0.74	-	0.38	-	-	-	-	0.44	-
SC	-	-	-	0.08	-	0.30	-	-	-	-
WI	-	-	-	0.14	-	-	-	-	-	-
NH	0.28	-	0.08	0.30	0.21	0.22	0.39	-	-	0.46

Note: The sum of unit weights for each synthetic control equals 1, but minor rounding approximations may result in small deviations from this total in the table. Cells with missing values mean zero.

3.1.22. Covariate balance between treatment states, synthetic states, and the unweighted sample average of all 14 states in the donor pool, before the implementation of the Subscription-based Payment Model (SBPM), January 2018–December 2022 for overall HCV screening rates

Variable	Louisiana		V	Washington		V	All control states
	Real [a]	Synthetic [b]		Real [a]	Synthetic [b]		
Females [c]	64428	63877	<0.01	52514	57346	0.07	62287
Age (Years) [c]							
18 – 29	37395	35564	<0.01	34394	35529	0.04	34942
30 – 39	23818	24494	0.07	24065	21823	<0.01	24973
40 – 49	15751	17750	0.03	15607	16137	0.03	16952
50 - 64	23036	22192	0.03	25934	26511	0.15	23133
Documented SUD [c]	13946	13324	<0.01	15564	10249	<0.01	14437
Diabetes [c]	10311	11560	0.01	6862	12094	<0.01	10175
HIV [c]	1301	907	0.06	552	779	<0.01	798
Education level [d]							
Less than high school	132	112	0.04	85	150	<0.01	104
High school diploma	315	265	0.02	211	211	0.10	262
College or associate's degree	285	280	<0.01	333	290	<0.01	286
Bachelor's degree or higher	268	343	0.01	371	348	0.06	348
Income level [d]							
Below FPL	179	141	0.07	107	127	<0.01	126
Race [d]							
Black only	340	177	0.04	41	62	<0.01	131
White only	608	714	<0.01	763	631	<0.01	732
Ethnicity [d]							
Hispanic only	49	93	0.01	103	347	<0.01	150
All offices or clinics of physicians per sqm	0.2	0.4	0.01	0.2	0.5	<0.01	0.5
Outpatient mental health clinics and substance abuse clinics per sqm	0.01	0.02	0.01	0.01	0.03	<0.01	0.02
All outpatient medical clinics including urgent care and HMO per sqm	0.1	0.1	0.01	0.04	0.12	<0.01	0.10
Employees in all offices or clinics of physicians [d]	11.3	9.9	0.01	9.4	7.5	<0.01	9.1
Employees in outpatient mental health clinics and substance abuse clinics [d]	0.7	0.8	0.03	0.7	0.7	0.04	0.7

Employees in outpatient medical clinics including urgent care and HMO [d]	5.0	4.6	0.08	4.5	4.6	0.03	4.0
HCV screening [c]							
Jan 2018	1489	1508	0.00	1268	1134	0.04	1249
Feb 2018	1391	1434	0.01	1019	1006	0.03	1172
Mar 2018	1564	1533	0.03	1143	1122	0.05	1258
Apr 2018	1568	1572	0.02	1071	1071	0.01	1257
May 2018	1632	1608	0.03	1130	1114	0.01	1299
Jun 2018	1556	1545	0.03	1000	1061	0.07	1232
Jul 2018	1556	1553	0.02	994	1049	0.01	1213
Aug 2018	1763	1658	0.09	1098	1142	0.00	1279
Sep 2018	1455	1467	0.02	981	1008	0.07	1153
Oct 2018	1642	1655	0.01	1118	1134	0.01	1293
Nov 2018	1398	1437	0.00	1037	972	0.04	1128
Dec 2018	1285	1330	0.00	876	888	0.01	1046
Jan 2019	1765	1743	0.04	1223	1167	0.02	1354
Feb 2019	1542	1556	0.01	982	1017	0.05	1227
Mar 2019	1542	1652	0.01	1143	1117	0.01	1278
Apr 2019	1643	1651	0.01	1113	1127	0.02	1297
May 2019	1696	1653	0.04	1085	1114	<0.01	1298
Jun 2019	1586	1515	0.07	991	1029	0.03	1188

Abbreviations: V; Variable importance weight, SUD; Substance use disorder, HIV; Human immunodeficiency virus, FPL; Federal poverty level, sqm; square mile, HMO; Health maintenance organizations.

[a] Observed values from Louisiana or Washington, [b] Synthetic values of Louisiana or Washington representing a weighted average of the control states computed by the synthetic control method, [c] rates expressed as per 100,000 population, [d] rates expressed as per 1000 population.

3.1.23. Covariate balance between treatment states, synthetic states, and the unweighted sample average of all 14 states in the donor pool, before the implementation of the Subscription-based Payment Model (SBPM), January 2018–December 2022 for RNA screening rates

Variable	Louisiana		V	Washington		V	All control states
	Real [a]	Synthetic [b]		Real [a]	Synthetic [b]		
Females [c]	64428	64716	0.03	52514	57812	0.05	62287
Age (Years) [c]							
18 – 29	37395	37256	0.03	34394	35765	<0.01	34942
30 – 39	23818	26089	<0.01	24065	23552	<0.01	24973
40 – 49	15751	17066	<0.01	15607	16260	<0.01	16952
50 - 64	23036	19589	0.02	25934	24422	0.03	23133
Documented SUD [c]	13946	15316	<0.01	15564	14422	0.09	14437
Diabetes [c]	10311	9552	<0.01	6862	10686	<0.01	10175
Education level [d]							
Less than high school	132	118	0.07	85	140	<0.01	104
High school diploma	315	291	0.01	211	229	0.09	262
College or associate's degree	285	296	0.1	333	310	0.02	286
Bachelor's degree or higher	268	296	0.07	371	321	<0.01	348
Income level [d]							
Below FPL	179	146	<0.01	107	148	<0.01	126
Race [d]							
Black only	340	151	<0.01	41	40	0.01	131
White only	608	737	<0.01	763	704	<0.01	732
Ethnicity [d]							
Hispanic only	49	109	0.05	103	385	<0.01	150
All offices or clinics of physicians per sqm	0.2	0.3	0.02	0.2	0.3	<0.01	0.5
Outpatient mental health clinics and substance abuse clinics per sqm	0.01	0.01	0.01	0.01	0.01	0.03	0.02
All outpatient medical clinics including urgent care and HMO per sqm	0.1	0.1	0.02	0.04	0.06	0.02	0.10
Employees in all offices or clinics of physicians [d]	11.3	9.4	0.02	9.4	8.0	<0.01	9.1
Employees in outpatient mental health clinics and substance abuse clinics [d]	0.7	0.8	0.04	0.7	0.6	0.03	0.7
Employees in outpatient medical clinics including urgent care and HMO [d]	5.0	4.7	0.04	4.5	4.3	<0.01	4.0

RNA screening [c]							
Jan 2018	184	183	0.01	232	220	0.02	164
Feb 2018	178	175	0.01	191	177	0.01	150
Mar 2018	191	189	0.02	202	206	0.07	161
Apr 2018	202	201	0.01	187	183	0.03	167
May 2018	204	205	0.04	227	189	0.01	167
Jun 2018	186	195	0.06	180	170	<0.01	158
Jul 2018	190	199	0.05	169	170	0.02	156
Aug 2018	228	221	0.03	181	200	0.06	170
Sep 2018	185	189	0.02	176	182	0.01	162
Oct 2018	221	219	0.05	180	188	0.06	170
Nov 2018	187	189	0.03	155	166	0.02	161
Dec 2018	166	167	0.03	144	128	0.03	130
Jan 2019	225	230	0.02	185	204	0.06	179
Feb 2019	208	214	0.03	139	168	0.06	172
Mar 2019	208	211	<0.01	181	171	<0.01	172
Apr 2019	222	213	0.01	196	181	0.04	167
May 2019	230	222	<0.01	172	166	0.03	169
Jun 2019	204	196	0.03	146	146	0.04	154

Abbreviations: V; Variable importance weight, SUD; Substance use disorder, FPL; Federal poverty level, sqm; square mile, HMO; Health maintenance organizations.

[a] Observed values from Louisiana or Washington, [b] Synthetic values of Louisiana or Washington representing a weighted average of the control states computed by the synthetic control method, [c] rates expressed as per 100000 population, [d] rates expressed as per 1000 population.

3.1.24. Covariate balance between treatment states, synthetic states, and the unweighted sample average of all 14 states in the donor pool, before the implementation of the Subscription-based Payment Model (SBPM), January 2018–December 2022 for DAA initiation fill rates

Variable	Louisiana		V	Washington		V	All control states
	Real [a]	Synthetic [b]		Real [a]	Synthetic [b]		
Females [c]	444	510	0.04	415	475	0.04	492
Age (Years) [c]							
18 – 29	62	158	<0.01	98	102	0.04	106
30 – 39	172	320	<0.01	194	221	0.04	218
40 – 49	177	208	<0.01	182	164	0.03	173
50 - 64	615	338	<0.01	545	533	0.02	538
Documented SUD [c]	545	657	<0.01	601	582	0.01	607
Diabetes [c]	195	136	0.04	126	200	<0.01	209
Education level [d]							
Less than high school	132	104	<0.01	85	84	0.03	104
High school diploma	315	295	0.11	211	251	0.011	262
College or associate's degree	285	304	0.01	333	256	0.01	286
Bachelor's degree or higher	268	296	0.05	371	409	<0.01	348
Income level [d]							
Below FPL	179	139	0.03	107	92	<0.01	126
Race [d]							
Black only	340	100	<0.01	41	105	0.01	131
White only	608	836	<0.01	763	747	0.01	732
Ethnicity [d]							
Hispanic only	49	55	<0.01	103	148	<0.01	150
All offices or clinics of physicians per sqm	0.2	0.3	0.04	0.2	1.3	<0.01	0.5
Outpatient mental health clinics and substance abuse clinics per sqm	0.01	0.02	0.02	0.01	0.05	<0.01	0.02
All outpatient medical clinics including urgent care and HMO per sqm	0.1	0.1	0.02	0.04	0.2	<0.01	0.10
Employees in all offices or clinics of physicians [d]	11.3	9.0	0.02	9.4	9.5	<0.01	9.1
Employees in outpatient mental health clinics and substance abuse clinics [d]	0.7	1.0	0.01	0.7	0.8	0.07	0.7

Employees in outpatient medical clinics including urgent care and HMO [d]	5.0	4.8	0.04	4.5	3.5	<0.01	4.0
DAA initiation fills [c]							
Jan 2018	13	15	0.03	8	15	0.08	23
Feb 2018	13	14	0.06	15	11	0.02	23
Mar 2018	12	12	0.07	9	11	0.02	23
Apr 2018	11	17	0.11	7	10	0.02	19
May 2018	18	17	0.01	7	12	0.04	21
Jun 2018	16	16	0.02	10	7	0.02	17
Jul 2018	13	12	<0.01	8	9	0.01	13
Aug 2018	15	10	<0.01	9	7	0.02	13
Sep 2018	11	8	<0.01	6	6	<0.01	10
Oct 2018	13	12	<0.01	6	9	0.04	15
Nov 2018	9	11	0.09	6	8	0.08	13
Dec 2018	11	10	<0.01	4	7	0.08	10
Jan 2019	12	11	<0.01	6	10	0.05	13
Feb 2019	11	13	0.02	5	9	0.06	12
Mar 2019	8	10	0.06	6	6	0.02	14
Apr 2019	9	11	0.05	8	7	0.02	12
May 2019	12	10	<0.01	7	6	0.02	12
Jun 2019	9	12	<0.01	6	8	0.05	14

Abbreviations: V; Variable importance weight, SUD; Substance use disorder, FPL; Federal poverty level, sqm; square mile, HMO; Health maintenance organizations.

[a] Observed values from Louisiana or Washington, [b] Synthetic values of Louisiana or Washington representing a weighted average of the control states computed by the synthetic control method, [c] rates expressed as per 1000 patient, [d] rates expressed as per 1000 population.

3.1.25. Covariate balance between treatment states, synthetic states, and the unweighted sample average of all 14 states in the donor pool, before the implementation of the Subscription-based Payment Model (SBPM), January 2018–December 2022 for DAA refill rates

Variable	Louisiana		V	Washington		V	All control states
	Real [a]	Synthetic [b]		Real [a]	Synthetic [b]		
Females [c]	444	511	0.06	415	481	<0.01	492
Age (Years) [c]							
18 – 29	62	149	<0.01	98	134	0.01	106
30 – 39	172	310	<0.01	194	271	<0.01	218
40 – 49	177	217	<0.01	182	178	0.07	173
50 - 64	615	350	<0.01	545	436	<0.01	538
Documented SUD [c]	545	654	<0.01	601	610	0.03	607
Diabetes [c]	195	160	<0.01	126	157	0.04	209
Education level [d]							
Less than high school	132	108	0.03	85	87	0.04	104
High school diploma	315	289	0.08	211	266	<0.01	262
College or associate's degree	285	301	0.02	333	277	<0.01	286
Bachelor's degree or higher	268	302	0.03	371	371	<0.01	348
Income level [d]							
Below FPL	179	146	0.04	107	104	0.01	126
Race [d]							
Black only	340	92	<0.01	41	82	0.02	131
White only	608	843	<0.01	763	815	0.02	732
Ethnicity [d]							
Hispanic only	49	51	0.03	103	97	0.08	150
All offices or clinics of physicians per sqm	0.2	0.3	0.06	0.2	0.8	<0.01	0.5
Outpatient mental health clinics and substance abuse clinics per sqm	0.01	0.01	0.04	0.01	0.03	<0.01	0.02
All outpatient medical clinics including urgent care and HMO per sqm	0.1	0.1	0.05	0.04	0.2	<0.01	0.10
Employees in all offices or clinics of physicians [d]	11.3	9.2	0.07	9.4	9.3	<0.01	9.1
Employees in outpatient mental health clinics and substance abuse clinics [d]	0.7	1.0	<0.01	0.7	0.9	0.02	0.7

Employees in outpatient medical clinics including urgent care and HMO [d]	5.0	5.1	0.05	4.5	4.2	0.03	4.0
DAA refills [c]							
Jan 2018	65	60	<0.01	45	53	0.10	107
Feb 2018	32	37	0.07	30	30	0.06	74
Mar 2018	32	32	0.02	27	28	0.04	61
Apr 2018	29	38	0.07	24	25.	0.02	52
May 2018	35	40	0.05	21	27	0.03	52
Jun 2018	37	37	<0.01	22	24	0.01	46
Jul 2018	34	34	<0.01	21	24	0.01	39
Aug 2018	37	30	0.01	29	21	<0.01	38
Sep 2018	30	24	<0.01	24	15	<0.01	28
Oct 2018	34	26	<0.01	25	19	<0.01	35
Nov 2018	28	25	0.01	20	19	<0.01	32
Dec 2018	27	22	<0.01	12	16	0.06	29
Jan 2019	27	23	<0.01	17	18	0.02	29
Feb 2019	25	25	<0.01	16	20	0.06	30
Mar 2019	22	25	0.06	18	17	0.09	32
Apr 2019	23	26	0.09	22	17	0.03	31.4
May 2019	25	25	0.04	20	14	0.03	31
Jun 2019	23	26	0.02	16	19	0.07	31

Abbreviations: V; Variable importance weight, SUD; Substance use disorder, FPL; Federal poverty level, sqm; square mile, HMO; Health maintenance organizations.

[a] Observed values from Louisiana or Washington, [b] Synthetic values of Louisiana or Washington representing a weighted average of the control states computed by the synthetic control method, [c] rates expressed as per 1000 patient, [d] rates expressed as per 1000 population.

3.1.26. Covariate balance between treatment states, synthetic states, and the unweighted sample average of all 14 states in the donor pool, before the implementation of the Subscription-based Payment Model (SBPM), January 2018–December 2022 for generic Epclusa initiation and refill rates

Variable	Louisiana (Generic Epclusa initiation fills)		V	Louisiana (Generic Epclusa refills)		V	All control states
	Real [a]	Synthetic [b]		Real [a]	Synthetic [b]		
Females [c]	444	733	<0.01	444	614	<0.01	492
Age (Years) [c]							
18 – 29	62	120	<0.01	62	98	0.03	106
30 – 39	172	269	0.01	172	224	0.02	218
40 – 49	177	183	0.13	177	162	0.08	173
50 - 64	615	476	<0.01	615	554	0.04	538
Documented SUD [c]	545	562	0.06	545	577	0.05	607
Diabetes [c]	195	248	<0.01	195	217	0.05	209
Education level [d]							
Less than high school	132	123	0.19	132	116	0.05	104
High school diploma	315	255	<0.01	315	276	0.05	262
College or associate's degree	285	286	0.06	285	303	0.05	286
Bachelor's degree or higher	268	336	<0.01	268	305	0.06	348
Income level [d]							
Below FPL	179	144	0.05	179	153	0.05	126
Race [d]							
Black only	340	314	0.21	340	262	0.05	131
White only	608	581	0.09	608	673	0.05	732
Ethnicity [d]							
Hispanic only	49	99	<0.01	49	58	0.06	150
All offices or clinics of physicians per sqm	0.2	0.3	0.02	0.2	0.3	0.05	0.5
Outpatient mental health clinics and substance abuse clinics per sqm	0.01	0.01	0.02	0.01	0.01	0.06	0.02
All outpatient medical clinics including urgent care and HMO per sqm	0.1	0.1	0.02	0.10	0.10	0.05	0.10
Employees in all offices or clinics of physicians [d]	11.3	9.6	0.02	11.3	9.4	0.04	9.1
Employees in outpatient mental health clinics and substance abuse clinics [d]	0.7	0.4	<0.01	0.7	0.7	0.05	0.7

Employees in outpatient medical clinics including urgent care and HMO [d]	5.0	4.2	0.10	5.0	3.9	0.02	4.0
Mean generic Epclusa initiation/refill [c]	0.13	0.11	0.01	0.14	0.17	0.04	0.6* (initiate) 1.08** (refill)

Abbreviations: V; Variable importance weight, SUD; Substance use disorder, FPL; Federal poverty level, sqm; square mile, HMO; Health maintenance organizations.

[a] Observed values from Louisiana, [b] Synthetic values of Louisiana representing a weighted average of the control states computed by the synthetic control method, [c] rates expressed as per 1000 patient, [d] rates expressed as per 1000 population. *The average number of initiation fills per 1000 patients in all control states. ** The average number of refills per 1000 patients in all control states.

3.1.27. Covariate balance between treatment states, synthetic states, and the unweighted sample average of all 14 states in the donor pool, before the implementation of the Subscription-based Payment Model (SBPM), January 2018–December 2022 for Mavyret initiation and refill rates

Variable	Washington (Mavyret initiation fills)		V	Washington (Mavyret refills)		V	All control states
	Real [a]	Synthetic [b]		Real [a]	Synthetic [b]		
Females [c]	415	464	0.03	415	457	0.03	492
Age (Years) [c]							
18 – 29	98	136	<0.01	98	133	0.03	106
30 – 39	194	249	<0.01	194	250	0.02	218
40 – 49	182	148	<0.01	182	158	0.04	173
50 - 64	545	491	0.02	545	479	0.01	538
Documented SUD [c]	601	606	0.02	601	591	0.03	607
Diabetes [c]	126	129	0.03	126	144	0.03	209
Education level [d]							
Less than high school	85	82	0.02	85	96	0.02	104
High school diploma	211	263	<0.01	211	260	<0.01	262
College or associate's degree	333	305	0.04	333	300	0.03	286
Bachelor's degree or higher	371	349	0.03	371	344	<0.01	348
Income level [d]							
Below FPL	107	108	0.01	107	110	0.06	126
Race [d]							
Black only	41	78	0.03	41	69	0.03	131
White only	763	844	<0.01	763	823	0.02	732
Ethnicity [d]							
Hispanic only	103	68	0.02	103	102	0.02	150
All offices or clinics of physicians per sqm	0.2	0.2	0.03	0.2	0.3	0.02	0.5
Outpatient mental health clinics and substance abuse clinics per sqm	0.01	0.01	0.03	0.01	0.02	<0.01	0.02
All outpatient medical clinics including urgent care and HMO per sqm	0.04	0.05	0.03	0.04	0.06	0.02	0.10
Employees in all offices or clinics of physicians [d]	9.4	8.9	0.06	9.4	8.9	0.02	9.1
Employees in outpatient mental health clinics and substance abuse clinics [d]	0.7	0.9	<0.01	0.7	0.9	<0.01	0.7

Employees in outpatient medical clinics including urgent care and HMO [d]	4.5	3.8	0.02	4.5	4.3	0.02	4.0	
DAA refills [c]							*	**
Jan 2018	10	11	0.04	29	34	0.079	19	56
Feb 2018	8	7	0.03	18	18	0.039	19	43
Mar 2018	10	9	0.04	22	15	0.005	18	39
Apr 2018	3	5	0.03	14	16	0.050	16	37
May 2018	4	7	0.04	11	16	0.075	16	35
Jun 2018	6	7	0.04	13	14	0.025	15	32
Jul 2018	6	5	0.03	11	12	0.013	11	26
Aug 2018	7	5	0.03	18	12	0.005	10	25
Sep 2018	5	3	0.02	17	10	0.010	9	19
Oct 2018	4	6	0.04	16	15	0.018	12	24
Nov 2018	4	3	0.02	14	14	0.013	9	21
Dec 2018	4	5	0.04	9	12	0.018	9	21
Jan 2019	4	4	0.02	12	10	0.024	11	22
Feb 2019	3	8	0.05	10	15	0.060	11	24
Mar 2019	5	5	0.02	12	13	0.070	10	23
Apr 2019	6	7	0.03	15	13	0.017	9	22
May 2019	4	4	0.03	12	11	0.014	8	18
Jun 2019	5	6	0.03	10	12	0.004	9	17

Abbreviations: V; Variable importance weight, SUD; Substance use disorder, FPL; Federal poverty level, sqm; square mile, HMO; Health maintenance organizations.

[a] Observed values from Washington, [b] Synthetic values of Washington representing a weighted average of the control states computed by the synthetic control method, [c] rates expressed as per 1000 patient, [d] rates expressed as per 1000 population. *The average number of initiation fills per 1000 patients in all control states. ** The average number of refills per 1000 patients in all control states.

3.2. APPENDIX 2

3.2.1. Impact inventory table per the Second Panel on Cost-Effectiveness in Health and Medicine

Sector	Type of impact (Relative list of categories in HCV research)	Included or not	Reason if not included and Notes
Formal health care sector			
Health	Health outcomes (effects)		
	Longevity effects (Life Years of patients in WA/LA vs synthetic control)	Included	
	Health related quality of life effects (the inputs of the model will include health-related quality of life HRQOL of each state to eventually calculate quality-adjusted life years QALY)	Included	HRQOL of caregiver burden was not included as it is unavailable in the literature
	Treatment-related adverse events	Included	
	Secondary transmission of infection	Not included	A dynamic transmission model is needed to simulate secondary transmission of infection due to interaction with HCV patients, therefore this was not included
	Medical costs		
	Paid for by third party payers (Antibody screening, RNA screening, drug cost, staff costs, disease management costs)	Included	
Health	Paid for by patients' out-of-pocket costs (Antibody screening, RNA screening, drug cost, disease management costs)	Included	Since this is a Medicaid population, it is expected that out-of-pocket costs will be minimal
	Future related medical costs (payers and patients)	Included	We calculated the costs of future related medical costs of conditions known to be linked to HCV as diabetes and chronic kidney disease. This approach was also carried out by Chhatwal et al.[58]
	Future unrelated medical costs (payers and patients)	Included	We calculated the future unrelated medical costs associated with survival and death published by Jiao et al.[69]
Informal health care sector			

Health	Patient-time costs	Not Included	Lack of available published literature
	Unpaid care-giver time	Not included	Lack of evidence in the literature
	Transportation costs	Not included	Lack of evidence in the literature
Non-Health care sector costs			
Productivity	Labor market earnings lost (percent of absenteeism, percent of presentism, mean monetary equivalent of work time lost per year per patient, mean monetary equivalent of work time lost per year per caregiver)	Included	
	Cost of unpaid lost productivity due to illness	Included	
	Cost of uncompensated household production	Included	
Consumption	Future consumption unrelated to health	Not included	Lack of evidence in the literature
Social services	Cost of social services as part of intervention	Not included	Lack of evidence in the literature
Legal or Criminal Justice system	Number of crimes related to intervention	Not included	Not applicable (although having HCV is associated with being in the criminal justice system, having a greater access to DAA through SBPM will not affect the number of crimes)
	Cost of crimes related to intervention	Not included	Not applicable (although having HCV is associated with being in the criminal justice system, having a greater access to DAA through SBPM will not affect the number of crimes)
Education	Impact of intervention on educational achievement of population	Not included	Lack of evidence in the literature.
Housing	Cost of intervention on home improvements (eg, removing lead paint)	Not included	Not applicable
Environment	Production of toxic waste pollution by intervention	Not included	Not applicable
Other	Other impacts	Not included	Not applicable

3.2.2. Model inputs

Parameters	Input	Range in sensitivity analysis		Reference
Clinical transition probabilities (annual)				
From F0 to F1	0.12	0.10	0.13	[73,74]
From F1 to F2	0.09	0.08	0.10	[73,74]
From F2 to F3	0.12	0.11	0.13	[73,74]
From F3 to F4	0.12	0.10	0.13	[73,74]
From F4 to DC	0.04	0.01	0.08	[75]
From F4 to HCC	0.01	0.01	0.08	[75]
From DC to HCC	0.07	0.03	0.08	[76]
From DC to LRD (1st year)	0.18	0.07	0.19	[76]
From DC to LRD (After 1st year)	0.11	0.07	0.19	[76]
From HCC to LRD	0.43	0.33	0.86	[75]
From DC to LT	0.02	0.01	0.06	[77]
From HCC to LT	0.04	0.00	0.14	[78]
From LT to LRD (1st year)	0.12	0.06	0.42	[79]
From LT to LRD (After 1st year)	0.04	0.02	0.11	[79]
From F4_SVR to DC	0.01	0.00	0.04	[80]
From F4_SVR to HCC	0.01	0.00	0.01	[80]
Other co-morbidities				
Prevalence of Diabetes in HCV infected	0.18	0.11	0.28	[58]
Prevalence of Diabetes in non-HCV infected	0.14	0.13	0.15	[58]
Incidence of diabetes in untreated HCV	0.037	0.037	0.038	[58]
Incidence of diabetes in DAA treated	0.030	0.029	0.032	[58]
Prevalence of CKD in HCV infected	0.20	0.15	0.25	[58]
Prevalence of CKD in non-HCV infected	0.131	0.121	0.144	[58]
Incidence of CKD in untreated HCV	0.0340	0.0335	0.0347	[58]
Incidence of CKD in DAA treated	0.0310	0.0299	0.0322	[58]
Behavioral transition probabilities (annual)				
Louisiana				
Overall HCV screening in year 1	0.21	0.18	0.25	Aim one
Overall HCV screening in year 2	0.22	0.18	0.26	
Overall HCV screening in year 3	0.23	0.18	0.27	
RNA testing in year 1	0.03	0.02	0.03	
RNA testing in year 2	0.03	0.02	0.03	
RNA testing in year 3	0.03	0.02	0.03	
DAA initiation in year 1	0.26	0.21	0.32	
DAA initiation in year 2	0.25	0.20	0.30	
DAA initiation in year 3	0.23	0.19	0.28	
Incidence in year 1	0.00098	0.00079	0.00118	
Incidence in year 2	0.00059	0.00047	0.00071	
Incidence in year 3	0.00037	0.00029	0.00044	
Prevalence	0.020	0.016	0.024	

Size of population	338,037			Aim one
Average age	48.0	38.4	57.6	
Synthetic Louisiana				
Overall HCV screening in year 1	0.19	0.15	0.22	Aim one
Overall HCV screening in year 2	0.20	0.16	0.24	
Overall HCV screening in year 3	0.20	0.16	0.24	
RNA testing in year 1	0.021	0.017	0.025	
RNA testing in year 2	0.021	0.016	0.025	
RNA testing in year 3	0.020	0.016	0.024	
DAA initiation in year 1	0.11	0.08	0.13	
DAA initiation in year 2	0.10	0.08	0.12	
DAA initiation in year 3	0.10	0.08	0.12	
Washington				
Overall HCV screening in year 1	0.14	0.11	0.17	Aim one
Overall HCV screening in year 2	0.20	0.16	0.24	
Overall HCV screening in year 3	0.15	0.12	0.18	
RNA testing in year 1	0.016	0.013	0.019	
RNA testing in year 2	0.016	0.013	0.019	
RNA testing in year 3	0.016	0.012	0.019	
DAA initiation in year 1	0.05	0.04	0.06	
DAA initiation in year 2	0.05	0.04	0.06	
DAA initiation in year 3	0.05	0.04	0.05	
Incidence in year 1	0.00062	0.00050	0.00075	
Incidence in year 2	0.00030	0.00024	0.00036	
Incidence in year 3	0.00019	0.00016	0.00023	
Prevalence	0.015	0.012	0.018	
Size of population	130,390			
Average age	47.0	37.6	56.4	
Synthetic Washington				
Overall HCV screening in year 1	0.15	0.12	0.18	Aim one
Overall HCV screening in year 2	0.22	0.18	0.26	
Overall HCV screening in year 3	0.18	0.14	0.22	
RNA testing in year 1	0.017	0.013	0.020	
RNA testing in year 2	0.016	0.013	0.020	
RNA testing in year 3	0.016	0.013	0.019	
DAA initiation in year 1	0.08	0.06	0.01	
DAA initiation in year 2	0.08	0.06	0.09	
DAA initiation in year 3	0.08	0.06	0.09	
National estimates				
Genotype distribution				
G1	76%			[61]
G2	11%			[61]
G3	12%			[61]
G4-6	2%			[61]
Mavyret SVR rates				

G1 : F0 - F3	95%			[58]
G1: F4	90%			[58]
G2: F0 - F3	99%			[58]
G2: F4	99%			[58]
G3: F0 - F3	95%			[58]
G3: F4	90%			[58]
G4-6: F0 - F3	99%			[58]
G4-6: F4	99%			[58]
Epclusa SVR rates				
G1 : F0 - F3	95%			[58]
G1: F4	90%			[58]
G2: F0 - F3	99%			[58]
G2: F4	99%			[58]
G3: F0 - F3	95%			[58]
G3: F4	90%			[58]
G4-6: F0 - F3	99%			[58]
G4-6: F4	99%			[58]
Utilities				
No HCV	1.00	0.99	1.00	[64,65,81]
F0	0.79	0.79	0.99	[64,65,81]
F1	0.79	0.79	0.99	[64,65,81]
F2	0.79	0.79	0.99	[64,65,81]
F3	0.79	0.79	0.99	[64,65,81]
F4	0.748	0.75	0.95	[64,65,81]
DC	0.672	0.57	0.93	[64,65,81]
HCC	0.61	0.54	0.93	[64,65,81]
LT	0.65	0.65	0.93	[64,65,81]
LRD	0	0	0	
Other death	0	0	0	
SVR: F0 - F3	0.84	0.84	1	[64,65,81]
SVR: F4	0.799	0.799	0.92	[64,65,81]
Costs				
Cost of disease management (annual)				
F0	$6,751.18	$961.76	$7,889.62	[66]
F1	$6,751.18	$961.76	$7,889.62	[66]
F2	$6,751.18	$961.76	$7,889.62	[66]
F3	$6,751.18	$1,974.65	$17,691.49	[66]
F4	$7,765.89	$2,454.94	$23,897.54	[66]
DC	$53,406.69	$25,622.87	$57,313.29	[66]
HCC	$93,480.15	$47,075.33	$142,205.96	[66]
LT - 1st year	$239,273.06	$136,127.08	$259,970.90	[66]
LT - following years	$58,874.76	$38,054.48	$65,008.64	[66]
F0 - F2 SVR	$0.00	$0.00	$0.00	[67]
F3 SVR	$721.07	$721.07	$11,174.38	[67]
F4 SVR	$782.49	$782.49	$13,428.54	[67]

Diabetes	$14,059.11	$10,544.93	$17,574.49	[58]
CKD	$36,152.35	$27,114.86	$45,191.03	[58]
Cost of screening and diagnosis				
HCV RNA test	$109.15	$87.32	$130.98	[68]
HCV Antibody screening test	$14.27	$11.42	$17.12	[68]
HCV Antibody confirmatory screening test	$15.49	$12.39	$18.59	[68]
Acute hepatitis panel	$47.63	$38.10	$57.16	[68]
Productivity costs (annual)				
Productivity gains due to treatment	$5,357.00	$3,183.25	$7,549.75	[71]
Productivity loss due to HCV	$758.00	$3,183.25	$7,549.75	[70]
Pre-policy parameters				
Louisiana incidence	0.00197			[82]
Louisiana prevalence	0.02			[83]
Washington incidence	0.0007			[84]
Washington incidence after 2016	0.0008			[85]
Washington prevalence	0.09			[86]
Louisiana screening rate	0.17			Aim one
Washington screening rates	0.12			Aim one
Louisiana fibrosis distribution at the start of policy				
F0_U	48.4%			Running the model pre-policy
F1_U	44.5%			
F2_U	4.0%			
F3_U	1.6%			
F4_U	0.7%			
F4_D	0.6%			
Washington fibrosis distribution at the start of the policy				
F0_U	30.3%			Running the model pre-policy
F0_D	17.9%			
F1_U	16.4%			
F1_D	13.6%			
F2_U	5.7%			
F2_D	5.1%			
F3_U	2.7%			
F3_D	2.1%			
F4_U	1.2%			
F4_D	0.6%			
DC	< 0.1%			
HCC	< 0.1%			
LT	< 0.1%			
SVR: F0 - F3	3.8%			
SVR: F4	< 0.1%			

Abbreviations: DC; decompensated cirrhosis, HCC; hepatocellular carcinoma, LRD; liver-related deaths, LT; liver transplant, SVR; sustained virologic response, HCV; hepatitis C virus, CKD; chronic kidney disease, DAA; Direct acting antivirals, U; undiagnosed, D; diagnosed