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Kevin Callison
Rena M. Conti
Jonathan Gruber
Jacob Wallace

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Spending to Save: The Subscription Model for Eradicating Hepatitis C in Louisiana
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ABSTRACT

How should payers balance fiscal sustainability with access to transformative medical technology? We study Louisiana's 2019 Medicaid subscription model for hepatitis C (HCV), the first example of a U.S. state employing a two-part tariff to secure unlimited access to curative medicines. Using a differences-in-differences design comparing spending on beneficiaries with HCV to those with diabetes or HIV, we find that treatment volume tripled, medical spending fell, and new HCV diagnoses declined 23 percent. The state's $37 million in incremental spending on antivirals generated $266 million in five-year savings. Innovative financing models can generate health benefits and near-term savings for payers.

Kevin Callison
Tulane University
Celia Scott Weatherhead School
of Public Health and Tropical Medicine
Department of Health Policy and Management,
and Murphy Institute for Political Economy
kcallison@tulane.edu

Rena M. Conti
Boston University
Questrom School of Business
Department of Pediatrics
rconti@bu.edu

Jonathan Gruber
Massachusetts Institute of Technology
Department of Economics
and NBER
gruberj@mit.edu

Jacob Wallace
Yale University
Yale School of Public Health
Department of Health Policy and Management
and NBER
jacob.wallace@yale.edu

1 Introduction

The single biggest threat to the finances of state governments in the U.S. is spending on the Medicaid program—a $900 billion program that provides largely free health insurance to more than 70 million people and represents roughly 30 percent of state budgets in 2025 (MACPAC, 2025). This fiscal pressure has intensified over time, reflecting both secular growth in program enrollment and increases in per-member spending. Further compounding this pressure, the U.S. Congress recently enacted legislation that will cut Medicaid spending by nearly $1 trillion over the next decade (CBO, 2025). While Medicaid is jointly financed between states and the federal government, states have historically addressed their share of these growing costs by restricting program eligibility, reducing provider reimbursement rates, raising taxes, and cutting spending on other state services.

Adding to state fiscal stress is new coverage decisions for a growing class of highly effective, and highly expensive, new therapies targeting diseases that disproportionately affect Medicaid beneficiaries. A prominent example is the advent of direct-acting antivirals (DAAs) for the hepatitis C virus (HCV), an infectious disease that can lead to liver failure, cancer, and liver transplantation or death. Introduced in December 2013, DAAs effectively cure HCV with a single 8–12 week course of treatment and represent one of the most substantial public health breakthroughs of the 21st century (CDC, 2014). However, the high cost of these medicines ($84,000–$94,000 per person at launch) poses a severe fiscal challenge for state Medicaid programs.[1] In Louisiana, for example, treating the state's roughly 40,000 HCV-positive Medicaid members with DAAs at launch prices would have required an outlay of approximately $3 billion, representing 40 percent of the state's Medicaid budget and exceeding its annual K-12 education spending (LDH, 2017; LOPH, 2016).

Faced with this tension, many states have chosen to slow-walk coverage or impose strict access restrictions on transformative new therapies. Rationing a cure of this kind is a puzzle. As untreated HCV progresses, annual treatment costs rise from roughly $10,000 to more than $100,000 (McAdam-Marx *et al.*, 2011). DAAs halt this costly progression and, because HCV is communicable, prevent transmission of the virus. For a payer that bears these downstream costs, there are prices for these therapies at which states could achieve a rare "win-win," where treatment is both socially efficient and lowers state spending. The fact that many states rationed the cure despite this opportunity

[1] HCV is not unique in this respect. Gene therapies such as Zolgensma (spinal muscular atrophy, $2 million per patient), Kymriah (certain blood cancers, $425,000 per patient), and Luxturna (inherited retinal dystrophy, $425,000 per eye) offer one-time curative treatments for conditions with few prior options (Wong *et al.*, 2023), while Glucagon-Like Peptide-1 (GLP-1) receptor agonists, which have shown remarkable promise for diabetes, obesity, and cardiovascular disease, initially cost $16,000 per person per year (Japsen, 2025).

reflects two frictions. First, the costs of treatment are incurred today but the savings from curing patients and reducing transmission accrue in the future. A government with access to debt markets would finance the outlay and repay it from the savings (Barro, 1979); but states operating under balanced-budget mandates cannot (Poterba, 1994). Second, per-unit drug pricing creates budget uncertainty, since total expenditure depends on how many patients are screened, diagnosed, and treated. With no way to insure this risk, states use access restrictions to reduce spending and increase budget predictability (Gifford *et al.*, 2020), forgoing the socially efficient policy.

In this paper, we study a solution to this puzzle: Louisiana's "subscription model" for HCV treatment. Under the model, Louisiana paid Gilead Science's subsidiary Asegua Therapeutics a fixed fee of approximately $175 million over five years in exchange for unrestricted access to DAA therapy once a contracted quantity cap was reached, with treatments above the cap provided at zero marginal cost through supplemental rebates (DHHS, 2020).[2] Structured as a two-part tariff, the fixed fee lets the state amortize the upfront cost of expanding treatment across the years over which its savings accrue and the zero marginal cost holds expenditures constant regardless of treatment volume. Using Louisiana Medicaid claims data from 2017 through 2023, along with national DAA prescription sales data from IQVIA, we evaluate the impact of the subscription model on health care spending, disease transmission, and the net fiscal return to the state.

The raw data highlight several striking patterns. Following the launch of the subscription model in July 2019, the number of Louisiana Medicaid members treated with DAAs increased four-fold, while use remained flat among Medicaid members in other Southern states and among those with non-Medicaid insurance coverage in Louisiana. Among those newly diagnosed with HCV, the share receiving DAA therapy within six months of diagnosis rose from fewer than 20 percent before the subscription model to more than 80 percent after its implementation. DAA treatment was also associated with lower downstream costs as average annual spending fell from approximately $15,200 before treatment to approximately $12,000 afterward (a 21 percent reduction), while spending for untreated HCV enrollees continued to rise. Finally, new HCV diagnoses in Louisiana Medicaid fell from approximately 1,400 cases per quarter in the two years prior to the subscription model to fewer than 800 cases per quarter by its fourth year, consistent with broad-based DAA availability reducing disease transmission. While these patterns are compelling, they should be interpreted with caution, as each may reflect concurrent shocks unrelated to the subscription model, including

[2]The full contracted amount covered both the state Medicaid program and the state's incarcerated population at a total cost of approximately $225 million over five years. We estimate that $175 million of this total reflects the cost for the Medicaid population, which is the focus of our analysis.

Louisiana's Medicaid expansion, the Medicaid program's expanded coverage of substance abuse treatment, the COVID-19 pandemic, and the extension of continuous Medicaid enrollment under the Families First Coronavirus Response Act of 2020.

To address these concerns, we use a difference-in-differences (DD) strategy that compares spending changes for HCV Medicaid members before and after the subscription model to changes for members diagnosed with diabetes or HIV. Diabetes patients, like HCV patients, require chronic disease management and generate substantial healthcare spending, but diabetes is not transmissible. Like HCV, HIV requires chronic management, is transmissible, and is concentrated among vulnerable populations. Critically, neither diabetes nor HIV treatment was affected by Louisiana's subscription model and, because all three groups are drawn from the same Louisiana Medicaid population, this within-state design absorbs Louisiana-specific shocks that might otherwise confound our estimates. We apply the same DD framework to estimate transmission effects, comparing trends in newly-diagnosed HCV cases to trends in newly-diagnosed diabetes and HIV cases. We then combine the resulting spending reductions from treatment with the healthcare costs of averted HCV infections to construct a total savings measure, which we compare against several counterfactual scenarios to assess whether the model generated net savings for Louisiana Medicaid. This exercise also provides insight into whether the manufacturer was better off under the subscription model than under the status quo.

Using this DD design and averaging across our two comparison groups, we find that Louisiana's subscription model reduced non-DAA healthcare spending for HCV enrollees by approximately $1,045 annually, a 6.1 percent reduction relative to baseline spending for the HCV cohort.[3] These savings grew over the course of the contract, reaching nearly $1,800 per HCV enrollee by the fourth year, as the health benefits of DAA treatment accrued. Although the subscription model made DAA therapy available to all Louisiana Medicaid members with HCV, the DAA treatment rate rose by only 21.6 percentage points, from 9.3 percent to 30.9 percent, over the contract period. Scaling our estimates to reflect this incomplete take-up implies annual savings of approximately $4,800 per treated enrollee.

Infectious disease treatment is different from that of chronic disease in that an increase in treatment rates reduces transmission and disease incidence. Consistent with this, new HCV diagnoses in Louisiana Medicaid fell by approximately 330 per quarter relative to diabetes and HIV, a 23

[3]Throughout the introduction we report the simple average of the DD estimates from the diabetes and HIV comparison models. Tables 2 and 3 report each comparison separately.

percent decline from the pre-policy mean, implying that more than 7,500 Medicaid HCV cases were averted over the model's first five years. Our transmission findings align with estimates of infections averted in the public health literature. For example, global modeling suggests that each DAA cure averts between 0.46 and 0.70 downstream infections (WHO, 2018). Dividing our estimated cases averted by the number of Louisiana Medicaid members treated with DAAs through the model yields a ratio of 0.49 averted infections per treated patient, near the lower end of this range. The reductions in incidence occurred 6 to 9 months after the start of the subscription model, reflecting the time it took the state to expand access to DAAs and the 8-12 weeks required for patients to be cured before treatment can impact transmission.

Applying these estimates to the roughly 25,000 Louisiana Medicaid members diagnosed with HCV before the policy and to the flow of patients treated after its launch, we estimate $266 million in gross healthcare savings over the five-year contract period: $116 million attributable to treating the existing stock of HCV patients, $60 million from treating those newly diagnosed after the model began, and $90 million from infections averted through reduced transmission. These savings built gradually. Measured against the cost of the subscription model in gross terms, the model ran a deficit in its first two years on a cumulative basis before generating savings in years three through five. Savings lag the treatments that generate them, the same intertemporal wedge that leads states to ration. The subscription model did not eliminate this mismatch, but it allowed the state to finance it. Under per-unit pricing, the surge in treatment that followed the model's launch would have concentrated costs in exactly the years when savings had yet to accrue.

Translating these gross savings into a net fiscal return requires a counterfactual, since absent the subscription model Louisiana would have continued purchasing DAAs at per-unit prices. Under our preferred counterfactual, the state maintains its pre-policy treatment volume—treating 4,345 Medicaid enrollees with DAAs over the five-year contract—while paying the declining competitive market prices observed in peer Southern-state Medicaid programs, for a total cost of $127 million. Instead, the subscription model cost the state $164 million (the present value of the $175 million nominal contract, discounted at Louisiana's borrowing rate of 3.22 percent) and expanded DAA treatment to 11,992 enrollees, nearly three times the number who would have received treatment under the status quo. The $37 million difference is the incremental amount Louisiana spent to expand DAA access through the subscription model. Weighed against the $266 million in total medical savings, this implies net savings of approximately $229 million—or $6.19 in fiscal benefit for every incremental dollar of DAA spending—with positive net returns in every year of the

contract.[4]

Our paper makes several contributions to the literature. We provide the first empirical evidence that a novel, medical technology can generate net near-term savings for a payer. The argument that upfront treatment costs can be offset by downstream reductions in healthcare spending is appealing in principle, but the empirical evidence suggests that new technologies, including those that promise savings, are commonly found to be cost increasing for payers (Acemoglu & Restrepo, 2019; Baicker *et al.*, 2012; Chandra & Skinner, 2012). For HCV, simulation studies have projected that expanded DAA access could generate substantial savings for public payers (Chhatwal *et al.*, 2023; Kaplan *et al.*, 2022; Roebuck, 2022; Roebuck & Liberman, 2019), but these projections rely on assumptions about disease progression and treatment uptake that have not been validated against realized outcomes from a large-scale program in the U.S. Our estimates indicate that downstream medical savings from a high-cost, curative therapy not only materialize in practice but, in this case, were large enough to more than offset the subscription model's cost premium. Moreover, Louisiana's cost offsets accrue primarily from direct savings on patients treated. Stock and flow savings alone total $176 million, more than four times the model's $37 million incremental cost, so the fiscal case does not depend on the transmission channel. The reduction in HCV transmission adds a further $90 million—more than a third of gross savings—a channel that simulation studies of cost offsets do not typically account for and that our results suggest have potential value when applied to expanding treatment for infectious diseases.

Two contemporaneous studies also evaluate Louisiana's subscription model, and our findings complement both. Flynn *et al.* (2025) combine state-level surveillance, prescription, vital statistics, and transplant registry data in a synthetic control design that compares Louisiana to other states, finding that the model increased DAA prescribing, reduced HCV-related mortality by 11-13 percent, and reduced liver transplants by 27 percent; Elsisi *et al.* (2025) use administrative claims data and a synthetic control method, finding that Louisiana's subscription model increased HCV testing and DAA initiation and refill rates. These studies establish that the model delivered population health benefits, but their data do not recover the object at the center of the rationing puzzle: the payer's fiscal return. Using individual-level Medicaid claims, we estimate that return directly. The results are complementary: Flynn *et al.* (2025) document the health improvements generated by expanded DAA access, and we show that these gains translate into lower medical spending and

[4]We scale net savings by incremental rather than total DAA spending because Louisiana would have incurred the $127 million in counterfactual DAA costs under the status quo; only the $37 million premium reflects spending attributable to the subscription model. Scaled by the full contract cost, the ratio is $1.62 per dollar.

reduced disease transmission.

We also contribute to the literature on the fiscal consequences of pharmaceutical innovation and state Medicaid policy by demonstrating that the intertemporal mismatch between high upfront pharmaceutical costs and downstream medical savings can be resolved through innovative financing arrangements. The high prices of new medicines reflect manufacturers' temporary monopoly power and their incentives to profit off sales that reward the costs and risks of innovation. State Medicaid programs face annual balanced-budget requirements, which may harm patient health and frustrate manufacturer profit seeking, but the savings generated by curative HCV treatment accrue over multiple years. States cannot borrow against future savings to finance current treatment costs, and so forego long-run savings to preserve short-run fiscal feasibility (Gifford *et al.*, 2020).

Louisiana's subscription model addresses this mismatch by converting per-use drug expenditures into a fixed annual commitment, a two-part tariff that reduces the marginal cost of treatment to zero for high-volume use and gives the state budget certainty while guaranteeing the manufacturer a fixed revenue stream. This arrangement is an application of the advance market commitment (AMC) concept, which has been used primarily to stimulate innovation and improve access to vaccines and medicines targeting low- and middle-income countries (Auty *et al.*, 2022; Kremer *et al.*, 2020; Mueller-Langer, 2013; Berndt *et al.*, 2007a). Most AMCs are designed to generate dynamic efficiency gains by guaranteeing future profits for products not yet brought to market. Louisiana's subscription model is instead designed to enable access to a treatment that already exists but is priced beyond the short-run fiscal reach of the state. Our analysis extends the AMC literature to this understudied application, providing the first empirical evidence on the fiscal return to a domestic subscription model for a public payer and complementing the theoretical work on two-part tariff arrangements in pharmaceutical markets with evidence from a large-scale, real-world implementation (Brekke *et al.*, 2022).

The current policy environment makes our findings particularly salient. An estimated 2.2 million Americans are living with HCV, with fewer than 35 percent of the infected having achieved viral clearance despite the availability of curative DAA therapy for more than a decade (Hall *et al.*, 2025; Wester, 2023). Many states continue to restrict access to high-cost therapies, relying on prior authorization and other utilization management strategies to contain spending even when the long-run fiscal case for broader treatment may be compelling. Following Louisiana's example, some states have pursued subscription arrangements for HCV treatment, but the model has not spread widely, and rigorous empirical evidence on whether such arrangements generate net savings

for public payers is lacking (Liu *et al.*, 2020). Bipartisan federal legislation introduced in 2025 proposed a federal subscription model for HCV treatment covering Medicaid enrollees, incarcerated individuals, and the uninsured, with the Congressional Budget Office estimating $6.6 billion in federal savings over ten years (CBO, 2025). Our findings are consistent with large potential savings from a national HCV treatment program and, given the disruptions caused by the COVID-19 pandemic, the conservative assumptions underlying our savings estimates, and the fact that the CBO estimate does not explicitly include transmission savings, indicate that this estimate may understate the proposed national program's true fiscal return.

Finally, the challenges resolved by the innovative structure of Louisiana's subscription model are not unique to HCV. Gene therapies and GLP-1 receptor agonists represent a growing class of high-cost therapies for which broad access may generate downstream medical savings, and the framework we develop here offers a template for evaluating whether subscription-style arrangements could generate analogous fiscal returns in other settings.

The remainder of this paper is structured as follows. Section 2 provides background on HCV, its treatment, and Louisiana's subscription model. Section 3 describes our data, while Section 4 presents our empirical strategy and results on health care spending and HCV transmission. Section 5 presents our cost-benefit calculations and Section 6 concludes.

2 Background

2.1 What is Hepatitis C and How is it Treated?

HCV is the most common bloodborne infection in the U.S., with more than 2 million Americans diagnosed, though the true number infected is likely around 4 million due to a dearth of testing and the long asymptomatic period of disease progression (Vermehren *et al.*, 2018). Many are unaware of their infection status because HCV produces little to no clinical symptoms initially; however, more than half of those with acute HCV will go on to develop chronic infection (Ryerson, 2020). Over years to decades, chronic HCV infection can cause cirrhosis, end-stage liver disease, and hepatocellular carcinoma, conditions that may necessitate liver transplantation and account for nearly 19,000 U.S. deaths each year (NASEM, 2017). Historically the prevalence of HCV was highest among the baby boomer generation, however the opioid epidemic has spurred rising rates of HCV among young adults, who now constitute the majority of new infections (Rosenberg *et al.*, 2018).

The financial burden of HCV on the health system is also substantial. The costs of treating HCV in a patient grows as the disease is diagnosed and progresses. In a commercially insured cohort, McAdam-Marx *et al.* (2011) estimated that annual healthcare costs attributable to HCV range from roughly $9,000 per patient without advanced liver disease to more than $43,000 for those with decompensated cirrhosis, nearly $68,000 for those with hepatocellular carcinoma, and more than $145,000 for those requiring a liver transplant (in 2024 dollars). For Medicaid beneficiaries specifically, Roebuck & Liberman (2019) estimated annual HCV-attributed costs of approximately $13,000 for noncirrhotic patients and $57,000 for those with end-stage liver disease (in 2024 dollars). Using the Louisiana Medicaid claims data described below, we find that over the five years after being diagnosed with HCV, patients spend approximately $85,000 (in 2024 dollars), or 223 percent of the mean Medicaid spending for non-elderly adults without HCV.

There were existing treatments for HCV prior to the introduction of the DAAs, but DAAs offer significant advantages over earlier technologies. Older HCV medications were non-curative, entailed unpleasant side effects, and were associated with significant treatment non-adherence (NASEM, 2017). DAAs, which are taken orally once per day for 8 to 12 weeks, inhibit viral replication with minimal side effects. As a result of DAA introduction, HCV can now be effectively cured in more than 95 percent of patients (Bhattacharya *et al.*, 2023).[5] Physician groups and public health organizations now recommend universal screening for HCV and treatment with DAAs for all those infected (Schillie, 2020; Waters & Broder, 2018).

Yet, DAA treatments come at a considerable cost. At launch in December 2013, a 12-week course of Gilead's Sovaldi was priced at $84,000, and Harvoni, a better tolerated DAA from the same manufacturer, launched at $94,000 in October 2014. Independent cost-effectiveness assessments determined that even at these prices the drugs offered value from a social perspective (Chhatwal *et al.*, 2015; Tice *et al.*, 2015). However, treating the entire estimated U.S. HCV population with Sovaldi in 2014 would have cost $310 billion, nearly doubling national prescription drug spending (Schumock *et al.*, 2015). In fact, between 2014 and 2018, U.S. spending on DAA-based HCV treatment totaled $59 billion and accounted for approximately half of the total rise in U.S. prescription drug spending over this period (Shakeri *et al.*, 2020; Schumock *et al.*, 2019, 2015).

Brand competition has driven the average price paid by payers, excluding discounts and rebates, for a course of DAA therapy from approximately $94,000 in 2014 to just over $20,000 in 2023 (see

[5]Reinfection is possible, highlighting the importance of the transmission channel we investigate in our analyses below.

Appendix Figure 1). Other brand drug manufacturers, AbbVie and Merck, launched their own therapeutically similar DAAs after Gilead (see Appendix Table 1). The most precipitous decline in price occurred in 2017, when AbbVie released Mavyret, a DAA priced at around $26,000 per treatment course. Gilead responded to Mayvret's release in January 2019 with the introduction of their subsidiary Asegua Therapeutics' authorized generic versions of Harvoni and Epclusa.[6]

2.2 Background on State Financed HCV Treatment

Ensuring affordability and widespread access to transformational medicines, including DAAs, has been a challenge for state Medicaid programs, which have finite budgets and may insure a disproportionate share of the population needing treatment (Gifford *et al.*, 2020). Federal law requires state Medicaid programs to cover all FDA-approved drugs from manufacturers and in exchange receive "best price" unit rebates off purchases through the the Medicaid Drug Rebate Program (MDRP) (MACPAC, 2018). Under the MDRP, manufacturers offer a statutory rebate to states after drugs are dispensed, currently set as the lower of the drug's average manufacturer price minus 23.1 percent or the Medicaid best price. States or contracted managed care plans typically negotiate for supplemental rebates with brand drug manufacturers facing some therapeutic competition, and these rebates are not disclosed to the public (MACPAC, 2018; Hwang *et al.*, 2017).

High and rising brand drug costs have prompted state Medicaid programs to rely on utilization management strategies, notably prior authorization, to constrain spending (Gifford *et al.*, 2020; U.S. SFC, 2015). In the specific case of DAAs, cost pressures led most state Medicaid programs to restrict access. For example, before the subscription model, Louisiana Medicaid limited DAA access to beneficiaries with advanced fibrosis or cirrhosis; required documented sobriety or substance use counseling; and restricted prescribing to specialists (hepatologists, gastroenterologists, or infectious disease physicians). These state restrictions disproportionately reduced DAA access among people with mild or moderate disease, injection drug users, and rural residents, resulting in public outcry and ultimately a U.S. Congressional investigation into the price-setting of DAAs by drug manufacturers (Breskin *et al.*, 2019; U.S. SFC, 2015). States were sued by patient advocacy groups aiming to improve access. For example, several Louisiana state prisoners filed lawsuits against the

[6] Authorized generics are approved brand drugs sold by brand companies or their licensee under a different label. This is a distinct competitive pathway from generics sold by competing manufacturers under the abbreviated new drug approval pathway (Alam & Conti, 2025; Berndt *et al.*, 2007b). In September 2018, Gilead announced their subsidiary and the expected launch of the authorized generics in January 2019 at a list price of $24,000, anticipating their launch would improve patient affordability for those insured and subject to out of pocket cost sharing, and further expand sales into state Medicaid programs (Gilead Sciences, 2018).

Louisiana Department of Corrections in 2018 and 2019, arguing that officials were failing to provide access to the DAAs to treat HCV, which they described as an "egregious act" or a "let them die" policy (Toohey, 2019).

From an economic perspective, DAA access restrictions in state Medicaid programs reflect the intertemporal mismatch between upfront treatment costs and downstream potential health benefits and savings. Drug manufacturers price their products based on therapeutic value, ease of use relative to competitors, and the temporary monopoly rights conferred by patents. Because the marginal cost of producing additional units is low, prices above cost translate directly into profits that reward the time, risk, and expense of drug development. For states, balanced-budget requirements operate over annual budget cycles, while the potential savings generated by curative HCV treatment–avoided liver disease, averted new infections–accrue over multiple years. Because states typically lack a mechanism to borrow against potential future savings, annual budget pressures force them to preserve short-run fiscal feasibility at the expense of potential longer-run gains. Per-unit drug pricing also creates budget uncertainty, since total expenditure depends on how many patients are screened, diagnosed, and treated. Access restrictions therefore serve not only to contain spending but also to reduce its variance. From the manufacturer's perspective, access restrictions result in unrealized sales and profits.

2.3 Louisiana's HCV Subscription Model and its Economic Foundations

In July 2019, Louisiana became the first state in the U.S. to implement a subscription model for HCV treatment for its state Medicaid and incarcerated populations (DHHS, 2020).[7] Louisiana's model is structured as a two-part tariff where the state paid Gilead Sciences' subsidiary Asegua Therapeutics a fixed fee of approximately $175 million over five years benchmarked to the state's DAA outlays in fiscal year 2018 (July 2018 through June 2019), when access to the medicine remained heavily restricted. Prescriptions dispensed above an annual spending cap were provided at zero marginal cost to the state through supplemental Medicaid rebates. Under the agreement,

[7]Louisiana applied for and received a Medicaid State Plan Amendment (SPA) from the Centers for Medicare and Medicaid Services to pursue this program in 2018. The state announced a request for proposals (RFP) from drug manufacturers selling DAAs in the U.S. market in January 2019, received company bids, and announced Asegua as the winner of the RFP on March 26, 2019 (LDH, 2019b). More operational details about Louisiana's subscription model can be found in Auty *et al.* (2022). The states of Washington, Michigan, Colorado, and Oklahoma followed the example of Louisiana in their use of subscription models to address HCV and other diseases, though public details on the specific contractual arrangements in these other states are scarce (Liu *et al.*, 2020). States have also used partnerships with 340B safety net providers to extend access to selected high-cost medicines to Medicaid beneficiaries, uninsured and incarcerated populations (Williamson & Horvath, 2019). In addition, Egypt in 2014, Australia in 2018, and Scotland in 2019 have pursued their own DAA subscription models (Frank *et al.*, 2021).

Louisiana offered Asegua exclusive formulary designation and eliminated prior authorization for DAAs, expanding access for patients with less severe HCV disease or a history of injection drug use without the requirement of sobriety.

While novel, Louisiana's subscription model has economic roots in advance market commitments (AMCs), a class of purchasing arrangements designed to address market failures stemming from monopoly pricing and insufficient incentives for manufacturer innovation (Auty *et al.*, 2022; Kremer *et al.*, 2020; Mueller-Langer, 2013; Berndt *et al.*, 2007a). AMCs are voluntary agreements in which a monopsonist purchaser commits to acquire a medicine at specified prices and quantities, targeting two market failures simultaneously. Static inefficiency arises because manufacturers operating as temporary monopolists price drugs far above marginal cost, restricting access to beneficial treatments. Dynamic inefficiency occurs when pharmaceutical manufacturers have insufficient incentive to invest in R&D for diseases concentrated among populations unable to pay premium prices. AMCs typically address static inefficiency by capping per-unit price near marginal cost, removing the access barrier created by monopoly pricing. Dynamic inefficiency is addressed through a top-up payment above marginal cost that compensates manufacturers for upfront R&D, making it profitable for them to develop treatments for diseases concentrated among low-income populations (Kremer *et al.*, 2020).[8]

Louisiana's DAA subscription model is a specific type of AMC designed to expand access to an existing medicine with a per-unit price that would make broad coverage fiscally prohibitive under state budget constraints. It can be viewed as both a *financing innovation*, to better align the certain costs of treatment with potential long-term savings, and a *pricing innovation* that reduces budget uncertainty for the payer and unit sale uncertainty for the drug manufacturer. Focused on addressing static inefficiency, the key design feature of Louisiana's model is the two-part tariff structure described above, which sets the marginal cost of treatment to zero above the contracted spending cap. For DAAs, the marginal cost of producing an additional course of treatment is estimated at approximately \$50–\$200 (van de Ven *et al.*, 2015), far below prevailing list prices in the U.S. Therefore, eliminating the above-marginal-cost pricing wedge removes the static inefficiency that leads states to ration access, ensuring that all eligible patients can be treated without additional cost to the state. Whether a subscription model achieves net savings depends

[8]The 2007 pneumococcal AMC, a \$1.5 billion commitment funded by donor governments and the Gates Foundation, is a leading example. By guaranteeing demand at a top-up price while capping the per-unit cost paid by participating countries, the pneumococcal AMC induced competing manufacturers to supply vaccines at near-marginal-cost prices. By 2018, an estimated 700,000 lives had been saved as a result of the program (Kremer *et al.*, 2020).

critically on how the fixed fee is set relative to the counterfactual of per-unit pricing. Brekke *et al.* (2022) show that competitive bidding for an exclusive formulary contract drives the fixed fee of the two-part tariff toward the payer's outside option, a result consistent with Louisiana's approach of benchmarking the contract to its prior-year DAA spending under restricted access.

Subscription models offer several advantages over per-unit pricing for public payers and drug manufacturers. The fixed fee converts open-ended, per-use drug expenditures into a predictable annual commitment that is easier to accommodate within annual Medicaid budgets. From the drug manufacturer's perspective, the subscription model reduces uncertainty over the quantity of sales and corresponding profits over those sales that would otherwise go unfulfilled. By eliminating per-unit costs above the spending cap, the model aligns payer and manufacturer incentives toward broad access rather than restriction. And by capping the state's total drug spending regardless of treatment volume, the subscription model provides insurance against the scenario in which widespread treatment demand would otherwise exhaust the pharmacy budget. In fact, because the fixed fee is sunk regardless of how many patients are treated, the state maximizes the value of its fixed payment only by treating as many eligible patients as possible. For communicable diseases like HCV, these access-enabling features may also generate larger transmission benefits than would accrue under restricted-access, per-unit pricing.

Subscription models also entail risks. The most prominent is the risk of payer overpayment to the manufacturer if treatment volume falls short of expectations. In that case, the payer pays the full fixed fee while treating fewer patients than the contract was designed to cover, while the drug manufacturer profits in full off the contracted amount. This risk to the payer is amplified when pent-up demand is limited, as in Washington state, where prior authorization restrictions had already been removed before the subscription model was adopted (Auty *et al.*, 2022). A related risk is market lock-in if per-unit prices continue to fall after the contract is signed, or if a superior therapy enters the market during the contract period.

A final challenge for subscription models is implementation. Screening and treating patients requires significant investments in provider education and may entail special programs and labor to effectuate; efforts which may be particularly challenging in budget constrained policy environments. HCV disproportionately affects vulnerable populations, including those with substance use disorder, who are often unaware of their infection status and lack a regular source of care. Reaching these patients is further complicated by the absence of a point-of-care test to facilitate rapid screening and treatment initiation. Implementation challenges clearly impacted the outcomes of the Washington

state subscription model (Auty *et al.*, 2022). To address these barriers, Louisiana, with support from Asegua, invested in a broad outreach effort which began prior to the model's launch, including pre-screening of potential patients, public awareness campaigns, and physician education targeting non-specialists and rural providers. Louisiana also expanded harm reduction strategies for people with substance use disorder, including adding methadone maintenance therapy as a covered benefit in the state's Medicaid program in early 2020.

3 Data

We construct and present descriptive statistics of DAA use and associated spending estimates using an empirical difference-in-differences framework. For both, we use Medicaid claims and enrollment data provided by the Louisiana Department of Health and focus primarily on the period from July 2017 through July 2023. Louisiana expanded Medicaid eligibility under the Affordable Care Act in July 2016, extending coverage to more than 400,000 people, which altered the demographic composition of the state's Medicaid population and resulted in a large increase in the number of members with an HCV diagnosis (see Appendix Figure 2) (Barnes *et al.*, 2018). Enrollment and utilization patterns associated with Medicaid expansion had largely stabilized by July 2017, and so we define our pre-policy period to include data from July 2017 through June 2019, one month prior to the subscription model launch.

It is important to note that much of our post-policy period coincided with the implementation of the Continuous Enrollment Condition, established under the Families First Coronavirus Response Act (FFCRA) of 2020 (DHHS, 2024). This federal provision temporarily increased the federal medical assistance percentage (FMAP) for state Medicaid programs, contingent upon states suspending Medicaid eligibility redeterminations and disenrollments. As a result, individuals who might otherwise have lost Medicaid coverage due to changes in income or administrative churn were able to remain continuously enrolled throughout the public health emergency. This is reflected in the low rate of attrition that occurs for Medicaid members over our sample period (see Appendix Figure 3). Louisiana resumed Medicaid redeterminations in April 2023 and subsequent disenrollments began in July 2023 (CMS, 2023).

Despite this low rate of attrition, one might be concerned that the attrition that remains is selective. For example, if HCV patients with the highest costs were more likely to exit Medicaid relative to high-cost diabetes/HIV patients, that could bias our estimates in favor of finding a

cost savings. While we find this scenario unlikely, we show results below both with and without individual fixed effects to control for any potential compositional bias.

We compare the experience of Louisiana Medicaid's HCV population to two control groups: Louisiana Medicaid members with diabetes and members with HIV. Diabetes patients, like HCV patients, require chronic disease management and generate substantial health care spending (Cutler *et al.*, 2022). However, unlike HCV, diabetes is not transmissible. We therefore also use members with HIV as a control group as HIV requires chronic management and is transmissible. Critically, neither diabetes nor HIV treatment was affected by Louisiana's subscription model. By showing parallel analyses for both control groups, we can assess the robustness of our findings.

We identified Louisiana Medicaid members with chronic HCV, diabetes or HIV using validated, claims-based algorithms applied to principal and subsequent ICD-10 and ICD-9 diagnosis codes. For chronic HCV, a member qualified under any one of three criteria: (1) at least one claim with a chronic HCV diagnosis; (2) at least two claims on different service dates with an unspecified HCV or HCV carrier diagnosis; or (3) at least two claims at least six months apart with an unspecified, carrier, or acute HCV diagnosis (Gordon *et al.*, 2012). For diabetes, a member qualified if they had at least one inpatient claim or at least two outpatient claims on different service dates within a two-year window with a diabetes diagnosis (Andes *et al.*, 2019; Sakshaug *et al.*, 2014). For HIV, a member qualified if they had at least one inpatient claim or at least two outpatient claims on different service dates with an HIV diagnosis (Pocobelli *et al.*, 2024; Macinski *et al.*, 2020). For each condition, the date of the first qualifying claim is defined as the member's index diagnosis date and members with HCV are excluded from the diabetes and HIV samples.

We identified exposure to DAAs using National Drug Codes (NDC) linked to prescription fills in the claims data. The majority of Louisiana Medicaid members treated with DAAs were required to fill two separate prescriptions 28 days apart to complete a full course of therapy. Approximately 75 percent of members in the data with a first DAA prescription claim had a second claim within 3 months. Therefore, we defined the date of DAA exposure as the date of a member's first DAA prescription fill.

Following the subscription model's launch, diagnosis and treatment patterns may have shifted in ways that altered the composition of newly identified HCV cases. To avoid this compositional change, we restrict our primary analytic sample to members whose index HCV diagnoses occurred prior to July 2019. Table 1 presents summary statistics for Louisiana Medicaid enrollees with and without HCV. Consistent with previous research, prior to the start of the subscription model we find

that the majority of members with HCV are non-Hispanic white (54 percent) and male (54 percent), whereas members with diabetes and HIV, are predominantly non-Hispanic Black (54 percent and 65 percent) and female (66 percent and 63 percent). Members with HCV are similar in age to those with diabetes and generally older than those with HIV, while members with diabetes are more likely to live in rural areas than those with HCV or HIV. Across all three diagnoses, per person average treatment costs are approximately the same prior to the model, roughly $4,000-$6,000 per person-quarter. Finally, while average quarterly Medicaid spending for diabetes and HIV members increases from the pre-policy to the post-policy period, spending for HCV members falls (excluding spending for DAAs). These divergent spending trends are consistent with the subscription model reducing HCV-related costs, a hypothesis we examine more formally below.

To construct counterfactual DAA spending, we use state and payer-specific data from the IQVIA National Sales Perspective (NSP) and Longitudinal Prescription Claims (LRx) datasets. The NSP data measure dollar and unit sales for prescription drugs dispensed to patients and sold by retail, mail, and non-retail pharmacies. Data is collected from a panel of wholesalers, distributors and drug manufacturers representing 92 percent of the pharmaceutical market and projected to a national total. NSP dollar sales reflect the wholesale prices paid for medicines and do not include rebates or discounts. The LRx data report unprojected prescriptions dispensed to patients by 90 percent of retail pharmacies and 60–85% of mail pharmacies nationwide and contain state and payer identifiers. These datasets are considered the gold standard for assessing prescription drug sales in the U.S. and are commonly used by the pharmaceutical industry, government reports and academic studies.

4 Estimating the Effects of the Subscription Model on Medicaid Spending and Disease Transmission

4.1 Descriptive Evidence

We first provide descriptive evidence that Louisiana's subscription model led to a substantial increase in people treated with DAA prescriptions. Figure 1 presents unadjusted quarterly counts of Louisiana Medicaid enrollees treated with DAAs, along with data for Medicaid enrollees in other southern states and for the non-Medicaid insured in Louisiana.

Prior to the subscription model's launch in July 2019, DAA treatment rates among Louisiana Medicaid patients with diagnosed HCV were low but trending slightly upward, likely reflecting growing physician awareness and patient screening in advance of the model. Following the launch,

demarcated by the dashed vertical line, the number of Louisiana Medicaid enrollees treated with DAAs rose sharply, from under 300 in the second quarter of 2019 to nearly 1,200 in the third quarter. The COVID-19 pandemic partially disrupted the program beginning in early 2020, however the first three quarters of the subscription model period still saw 3,637 more Louisiana Medicaid members treated than in the comparable pre-launch period, a 430 percent increase. Over the four years following the policy, 11,579 Louisiana Medicaid enrollees were treated with DAAs.

No comparable pattern emerges in either comparison group in Figure 1. For Medicaid enrollees in other southern states, DAA treatment trends tracked Louisiana's in the pre-period but remained flat after July 2019, while individuals with non-Medicaid coverage in Louisiana showed no comparable increase in DAA prescribing around 2019. Together, the patterns in Figure 1 suggest that the post-2019 spike in Louisiana Medicaid DAA treatment reflects the launch of the subscription model, rather than a broader national or statewide expansion in DAA access.[9] The subscription model also sharply reduced the time between HCV diagnosis and DAA treatment initiation. As shown in Appendix Figure 5, fewer than 20 percent of members diagnosed with HCV before the subscription model received DAA therapy within six months of diagnosis, compared to more than 80 percent of those diagnosed after the model's launch.

We next present suggestive evidence of health care spending reductions around the initiation of DAA therapy for HCV enrollees. Figure 2 plots mean quarterly spending relative to each enrollee's first quarter of DAA use, adjusting for quarter relative to HCV diagnosis to account for differences across individuals in the time from diagnosis to treatment initiation.[10] In the two years before treatment, average annual spending was approximately $15,200 per enrollee, compared to $6,600 for non-elderly adult Medicaid enrollees without HCV, and was rising at roughly 3.5 percent per quarter. Following treatment initiation, this spending pattern reverses, with annual spending declining and then plateauing at about $12,000 per year or 21 percent below pre-treatment levels. Appendix Figure 7 disaggregates these spending trajectories by disease severity, and shows that the reduction in spending following DAA initiation is larger for enrollees with evidence of advanced

[9] This is a curious finding as the average wholesale prices of DAAs fell nationwide starting around 2019 based on data in Appendix Figure 1, yet we do not observe substantial increases in use of the DAAs across southern state Medicaid programs nor among the non-Medicaid insured in Louisiana. While there is an economic literature on the price elasticity of demand for prescription drugs in Medicare (Einav *et al.*, 2018), and data suggesting Medicaid managed care plans are price sensitive when choosing products to cover on the formulary, we are not aware of empirical evidence suggesting a significant demand response to lower medicine prices in Medicaid. This is an important subject for future study.

[10] Appendix Figure 4 illustrates why the adjustment for quarter relative to diagnosis matters. Spending relative to the quarter of HCV diagnosis rises steeply at diagnosis and plateaus at a higher level thereafter. Furthermore, post-diagnosis spending levels are lower in the subscription model era, consistent with expanded DAA access under the program.

liver disease than for those without.

While these patterns are striking, they are descriptive and should be interpreted with caution. First, before the launch of the subscription model, enrollees with HCV who initiated DAA treatment were generally sicker than the average HCV enrollee as prior authorization restrictions concentrated access among the most severely ill (Kapadia *et al.*, 2023). Second, within-enrollee spending trends around DAA initiation may reflect mean reversion, disease progression, or anticipatory changes in healthcare utilization rather than the causal effect of treatment (Grant *et al.*, 2005).

4.2 Subscription Model and Medicaid Spending

To address these concerns, we deploy a difference-in-differences (DD) design exploiting the introduction of the subscription model to estimate the effect of expanded access to DAAs for HCV treatment on health care spending. Due to compositional shifts over time in the Medicaid population, our treatment group is defined as enrollees diagnosed with HCV before the model's launch (i.e., index diagnosis occurs prior to July 2019). Applying the same restriction, we define two disease-specific comparison groups as enrollees diagnosed with diabetes or HIV without co-morbid HCV.

Our baseline specification is:

$$Y_{it} = \alpha + \beta(HCV_i \times Post_t) + \gamma HCV_i + \delta Post_t + \omega X_{it} + \tau_t + (\lambda_i) + \varepsilon_{it} \tag{1}$$

where Y_{it} is quarterly Medicaid spending per enrollee, excluding DAA drug spending[11], i indexes individuals and t indexes time (quarters or years). HCV is an indicator for enrollees diagnosed with HCV before the policy change and $Post$ is an indicator for time periods after DAA access expands in July 2019. X_{it} controls for age, sex, parish of residence, months relative to diagnosis, and months relative to enrollment in Medicaid. In some specifications, we replace time-invariant characteristics with individual fixed effects, λ. β is the coefficient of interest, capturing the impact of broader access to DAAs on Medicaid spending for enrollees with HCV, before and after the policy change, compared to changes in spending for enrollees with diabetes or HIV. To assess the robustness of our findings, we estimate the models separately for each comparison group. Because our treatment occurs at a single point in time across all treated units (July 2019), we rely on the canonical two-

[11] We exclude DAA expenditures from our outcome measure to isolate downstream changes in non-DAA Medicaid spending associated with the subscription model. We then incorporate the state's spending on DAAs under the subscription model in our cost-benefit analysis in Section 5.

way fixed effects, difference-in-differences specification rather than the newer estimators designed for staggered adoption settings (Goodman-Bacon, 2021; Callaway & Sant'Anna, 2021).

Next, we assess how the subscription model treatment effect evolves over time, using an event study specification:

$$Y_{it} = \alpha + \sum_{k \neq -1} \beta_k (HCV_i \times 1\{t = k\}) + \omega X_{it} + \tau_t + \lambda_i + \varepsilon_{it} \tag{2}$$

where β_k captures the differential outcome for treated units k periods relative to the baseline period ($k = -1$), just before the policy's implementation. The specification includes individual fixed effects, λ, and time fixed effects, τ. The coefficients on the leads (i.e. $k < 0$) serve as a test of the parallel trends assumption, while coefficients on the lags (i.e. $k \geq 0$) trace the post-treatment evolution of the policy's effects. We omit the $k = -1$ indicator to normalize the event study and interpret all estimates relative to a reference period immediately prior to the start of the subscription model. Though the subscription model initially ran for five years, we end our post-period after year four (July 2023) to avoid confounding from compositional change introduced by Louisiana's Medicaid unwinding.

Figure 3 presents trends in quarterly Medicaid spending and event study estimates for enrollees with HCV relative to comparison groups with diabetes and HIV. Panel A shows raw spending trends for the HCV and diabetes cohorts from July 2017 through July 2023, plotted on separate y-axes to account for differences in baseline spending levels. Prior to the subscription model's launch, spending for both groups followed approximately parallel trends. After July 2019, the two series diverge markedly, with spending for the diabetes cohort rising nearly monotonically from approximately $3,986 per enrollee per quarter at the policy's launch to $4,402 by July 2023, a gain of roughly 10 percent, while spending for the HCV cohort declined and remained below its pre-policy trajectory through the end of the analysis period. The steady rise in diabetes spending over the post-period is consistent with natural aging and disease progression among a cohort diagnosed prior to July 2019, and provides a plausible counterfactual for the trajectory HCV spending would have followed in the absence of the subscription model.

Panel B of Figure 3 presents the corresponding event study spending estimates based on the comparison between those with HCV and those with diabetes. The lead coefficients support the identifying assumption of parallel pre-trends, while the post-policy coefficients show a relative decline in spending among the HCV cohort after the subscription model's launch. After narrowing

briefly around the onset of the COVID-19 pandemic, the spending gap widens steadily, reaching approximately $500 per enrollee in quarterly savings by July 2023.

Panels C and D of Figure 3 provide analogous comparisons of Medicaid spending between the HCV and HIV cohorts. Both cohorts exhibit similar pre-period spending trends that diverge following the subscription model's launch. By July 2023, quarterly spending for the HCV cohort was approximately $650 per enrollee lower than for the HIV cohort, similar in magnitude to the estimates from the diabetes comparison.

Table 2 presents DD estimates of the subscription model's effect on Medicaid spending in the four years following its implementation. The first three columns use the diabetes comparison group, presenting our base specification and a version that adds individual fixed effects to address potential selective attrition. Both specifications yield similar estimates, which is not surprising given the low rates of attrition in our sample. Using our preferred fixed-effects specification, we find economically and statistically significant reductions in Medicaid spending of $271 per enrollee per quarter, or $1,083 annually, a 6.4 percent reduction relative to the pre-period HCV cohort mean.

Column 3 of Table 2 presents our DD estimates of Medicaid spending for the HCV cohort relative to the diabetes comparison group, disaggregated by post-policy year. Consistent with the event study patterns in Panel B of Figure 3, the estimated spending reductions for the HCV cohort grow over time, increasing from $132 per enrollee per quarter in the first post-policy year to $430 in the fourth, representing a 10 percent reduction from baseline spending levels.

Table 2 also includes DD estimates using HIV as the comparison group (Columns 4-6). The preferred fixed-effects specification in Column 5 shows reductions in Medicaid spending of $252 per enrollee per quarter ($1,008 annually), a 5.9 percent reduction relative to the pre-period HCV cohort mean and similar in magnitude to the diabetes estimate in Column 2. The year-by-year estimates in Column 6 show a somewhat different trajectory from the diabetes comparison, with spending reductions remaining relatively stable at roughly $200 per enrollee per quarter in the first three post-policy years before rising to $460 per enrollee per quarter in the fourth year, a level comparable in magnitude to the diabetes estimate for year four.

Rows 7 and 8 of Table 2 report the share of the HCV cohort receiving DAA treatment in the pre- and post-subscription model periods. Although the subscription model led to a substantial increase in DAA prescribing, the treatment rate among our pre-policy diagnosed cohort rose by only 21.6 percentage points, from 9.3 percent in the pre-period to 30.9 percent in the post-period. Our DD estimates should therefore be interpreted as intent-to-treat (ITT) effects, reflecting the

average impact of the subscription model across all HCV enrollees regardless of whether and when they received DAA treatment. To recover the spending reduction per treated enrollee, we scale our ITT estimates by the model-induced increase in the DAA treatment rate. Dividing our preferred spending estimates in Columns 2 and 5 of Table 2 by the treatment rate increase (0.216) yields spending reductions of $1,255 per treated enrollee per quarter ($5,022 annually) when using the diabetes comparison group and $1,167 ($4,672 annually) when using the HIV comparison group. We report these "Wald" estimates of the Medicaid spending reductions associated with the subscription model in Row 9 of Table 2.

One potential concern with our main estimates in Table 2 is that Louisiana expanded Medicaid coverage for methadone treatment dispensed at opioid treatment providers in January 2020, 6 months after the subscription model's launch. Appendix Figure 8 shows that per-capita Medicaid spending on methadone increased sharply among Medicaid members with an opioid use disorder (OUD) as a result. Given the significant overlap between the HCV and OUD populations, this concurrent policy change could bias our estimates of medical savings attributable to the subscription model, though the direction of that bias is not clear. Higher methadone spending in the post period mechanically increases Medicaid spending for members of our treatment group relative to our controls[12], attenuating our savings estimates. Conversely, supplementing status quo OUD treatment with methadone maintenance therapy could reduce downstream medical spending, causing us to overstate the savings we attribute to the subscription model, although the evidence on whether methadone reduces net medical spending is mixed (Murphy & Polsky, 2016; McCarty *et al.*, 2010; Gourevitch *et al.*, 2007). Notably, however, Latsko *et al.* (2025) find that methadone dispensing at opioid treatment providers in Louisiana did not change meaningfully following the January 2020 coverage expansion, indicating that the rise in Medicaid OUD spending largely reflects a shift in the source of funding rather than an increase in actual treatment. As an additional check, Panel B of Appendix Table 2 presents estimates from a sample that excludes members with an OUD diagnosis. These estimates are approximately 30–40% smaller than our main estimates, but support the conclusion that the subscription model reduced Medicaid spending for HCV members in Louisiana Medicaid.

[12]Approximately 40 percent of our HCV cohort has a history of OUD compared to around 10 percent of the non-HCV diabetes and HIV cohorts.

4.3 Disease Transmission

HCV's status as an infectious disease creates a second channel through which Louisiana's subscription model may have generated savings for the state. By curing infected individuals before they can transmit the virus, expanded DAA access reduces future HCV incidence and, with it, the downstream medical costs of a larger pool of infected patients. Population-scale DAA initiatives in Egypt, Australia and Scotland were associated with reductions in new HCV diagnoses (Iversen *et al.*, 2023; Palmateer *et al.*, 2021; Shiha *et al.*, 2021). In the U.S., simulation studies examining the fiscal return to national HCV elimination programs have cited transmission reductions as an important source of savings, but none has estimated these effects empirically from a large-scale real-world implementation (Chhatwal *et al.*, 2023; Kaplan *et al.*, 2022; Roebuck, 2022). We address this gap by applying our DD framework to estimate the impact of Louisiana's subscription model on new HCV diagnoses in Louisiana Medicaid.

Figure 4 plots new HCV diagnoses by year-quarter for Louisiana Medicaid members over the sample period. Panel A compares these trends to new diabetes diagnoses and Panel B to new HIV diagnoses.[13] In contrast to our spending analysis, which is restricted to members diagnosed before July 2019, the counts in Figure 4 include all Louisiana Medicaid members newly diagnosed with each condition throughout the study period. In both panels, new diagnoses across all three conditions followed broadly parallel downward trends in the pre-policy period, reflecting a natural decline after the spike associated with Louisiana's Medicaid expansion in 2016 (see Appendix Figure 2). Following the subscription model's launch and the subsequent COVID-19 Public Health Emergency, new diabetes and HIV diagnoses leveled off before rising again as Medicaid enrollment expanded under the Continuous Enrollment Condition.[14] New HCV diagnoses, however, are observed to decline, falling to roughly half their pre-policy level by July 2023. This divergence is consistent with broad DAA access reducing the pool of infectious HCV patients over time in Louisiana Medicaid. Furthermore, reduced incidence appears to occur in the raw data about 6–9 months after the model's implementation, consistent with a course of treatment requiring 8–12 weeks and needing enough people to be cured to have a material impact on population infection rates.

Table 3 presents DD estimates of the reduction in new HCV diagnoses attributable to the subscription model. Columns 1 and 3 provide estimates of the average quarterly change in new HCV

[13] Because the transmission analysis requires aggregating new diagnoses to the condition-year-quarter level rather than tracking individual members, event studies analogous to those in Panels B and D of Figure 3 are not identified.

[14] Louisiana's Medicaid enrollment grew from 1,451,896 in July 2019 to 1,895,058 by July 2023 (KFF, 2026b).

diagnoses relative to new diabetes and HIV diagnoses over the first four years of the subscription model. Columns 2 and 4 disaggregate estimates by post-policy year.[15] Estimates in Table 3 indicate that new HCV diagnoses declined by approximately 314 cases per quarter relative to new diabetes diagnoses and by 342 cases per quarter relative to new HIV diagnoses. The year-by-year estimates using the diabetes comparison in Column 2 are positive and statistically insignificant in the first year of the subscription model before turning negative in years 2 through 4, ranging from 402 to 734 fewer diagnoses per quarter. Estimates using the HIV comparison group in Column 4 are negative and statistically significant in all four years, growing from 158 fewer diagnoses in year 1 to 522 fewer diagnoses by year 4. Averaging across the two comparison groups, our estimates imply that 5,618 HCV cases were averted in the first four years of the subscription model.

Our findings on the effect of Louisiana's subscription model on HCV transmission among Medicaid beneficiaries are consistent with estimates of infections averted in the public health literature. For example, global modeling suggests that each DAA cure averts between 0.46 and 0.70 downstream infections (WHO, 2018). Dividing our estimated 5,618 averted cases by the 11,579 Louisiana Medicaid members treated with DAAs over the first four years of the model yields a ratio of 0.49 averted infections per treated patient, near the lower end of this range. These averted infections represent an important component of the subscription model's fiscal return, which we quantify in the next section.

5 Cost Benefit Analysis

In the preceding section, we estimated the impact of Louisiana's subscription model on Medicaid healthcare spending and HCV transmission. We now combine those estimates to assess the model's net fiscal return. We begin by translating our spending and transmission estimates into total medical savings over the five-year contract period and then compare those savings to the net cost of the subscription model under several counterfactual scenarios.

5.1 Aggregate Medicaid Savings

We estimate total five-year Medicaid savings from Louisiana's subscription model, Ω, as the sum of three components: (1) the reduction in Medicaid spending for enrollees diagnosed with HCV before the policy took effect (stock savings); (2) the reduction in spending for enrollees

[15] We cannot estimate specifications in Table 3 that include individual fixed effects as data on new diagnoses are aggregated to the condition-year-quarter level.

newly diagnosed and treated with DAAs during the contract period (flow savings); and (3) the Medicaid spending avoided by preventing new HCV infections through reduced disease transmission (transmission savings). For each savings component, we use the simple average of the DD estimates from the diabetes and HIV comparison models in Tables 2 and 3, with all estimates expressed in 2024 dollars and discounted to the start of the contract at Louisiana's borrowing rate of 3.22 percent per year (Barnett & Weitzman, 2019). We formalize this savings calculation in Equation (3) as follows:

$$\Omega = \underbrace{\sum_{t=1}^{T} \beta_t \cdot N_t}_{\text{Stock savings}} + \underbrace{\sum_{t=1}^{T} \sum_{j=1}^{T-t+1} \lambda_j \cdot D_t}_{\text{Flow savings}} + \underbrace{\sum_{y=1}^{T} \sum_{k=1}^{y} A_k \cdot \epsilon_{y-k+1}}_{\text{Transmission savings}} \tag{3}$$

The first term in Equation (3) captures the *stock savings* associated with the subscription model, the reduction in health care spending for the approximately 25,000 Medicaid enrollees already diagnosed with HCV when the policy took effect. For each year t of the contract, we multiply our year-specific DD estimate β_t from Table 2 by the count of pre-policy HCV enrollees remaining in the program, N_t.[16] Because our DD estimates cover only the first four years of the contract, we assume year-four savings continues into year five for each savings component, a conservative assumption given that savings grew steadily over the contract period.

The second term captures the *flow savings*, or the reduction in health care spending from additional, model-induced DAA treatment among Medicaid enrollees newly diagnosed with HCV after the policy began. We treat this group separately from the stock population because expanded DAA access altered the composition of HCV patients receiving treatment. For example, Appendix Figure 6 shows that members treated after the policy's launch were far less likely to have advanced liver disease than those treated under the prior authorization regime, and subgroup-specific DD estimates for patients without advanced liver disease are 15–17% lower than our main estimates in Table 2 (see Panel A of Appendix Table 2). Not all post-policy DAA treatments among the newly diagnosed should be attributed to the subscription model, however. Some newly diagnosed enrollees, particularly those with advanced liver disease, would likely have received DAA treatment in the absence of the model. Therefore, to avoid overstating flow savings, we exclude enrollees

[16] N_t reflects the stock of pre-policy HCV enrollees remaining in the Medicaid program in each contract year, declining over time due to program attrition. We estimate annual attrition rates from the pre-policy period, before the Continuous Enrollment Condition suspended Medicaid disenrollments, and apply those rates to the approximately 25,000 enrollees with an HCV diagnosis at the subscription model's launch. The resulting annual counts are 21,338 in year one, 20,232 in year two, 19,125 in year three, 17,870 in year four, and 16,626 in year five.

with advanced liver disease from the flow population. We apply acuity-adjusted Wald estimates λ_j to the remaining flow population, where λ_j divides our DD estimate for this population in the j-th year following treatment by the model-induced increase in the DAA treatment rate. For each post-policy year, these estimates are applied to the count of enrollees in this population completing a full course of DAA therapy, D_t, with each annual treated cohort accumulating savings over the years remaining in the contract window (e.g., five years for cohorts treated in year one, four for those treated in year two, and so on).

The third term captures the *transmission savings* defined as Medicaid spending avoided by preventing new HCV infections through reduced disease transmission. Our DD estimates from Table 3 provide year-specific counts of HCV diagnoses averted in each post-policy year, A_k.[17] To translate these counts into cost savings, we use pre-policy claims data to estimate ϵ, the incremental Medicaid cost of HCV in each year following infection.[18] We then apply ϵ_{y-k+1} to each cohort of averted cases, where y denotes the contract year and k the year cases were averted. For example, cases averted in year two of the contract generate year-one incremental savings in contract year two, year-two incremental savings in contract year three, and year-four incremental savings by the end of the contract period. Each subsequent cohort of averted cases accumulates savings over the remaining contract years, with cases averted earlier in the contract period contributing more total savings than those averted later.

Table 4 presents our estimates of the medical savings generated by Louisiana's subscription model. Over the five-year contract period, the model generated an estimated $266 million in total Medicaid savings. Stock savings account for the largest share at $116 million (44 percent), reflecting spending reductions for the approximately 25,000 enrollees diagnosed with HCV before the policy. Flow savings contribute $60 million (23 percent), driven by the additional 5,336 enrollees newly diagnosed and treated with DAAs during the contract period. Transmission savings add a further $90 million (34 percent), generated by an estimated 7,585 averted diagnoses. Annual savings grow substantially over the contract period, from $20 million in year one to $80 million in year five,

[17] Averaging across the two comparison groups, the year-one DD estimate in Table 3 implies a small net increase in HCV diagnoses rather than a reduction. This is driven by the estimate from the diabetes comparison group which suggests that, relative to new diabetes diagnoses, new HCV diagnoses increased by 339.75 per quarter in the first year of the subscription model. While it is possible that the model led to increased diagnoses through enhanced outreach and screening, we view this as unlikely given the negative year-one estimate from the HIV comparison group and the trend in new HCV diagnoses shown in Appendix Figure 2. We therefore set year-one cases averted to zero in the cost-savings calculations that follow.

[18] Specifically, we calculate the incremental cost of HCV as the difference between Medicaid spending in each post-diagnosis year compared to spending in the year prior to diagnosis assuming that pre-diagnosis spending would have grown at the rate of medical inflation absent infection. Our estimates of the annual incremental cost of an HCV diagnosis are $7,999 in year one, $5,033 in year two, $4,839 in year three, $4,309 in year four, and $5,203 in year five.

as treated cohorts and averted cases accumulate savings over a longer horizon. We note that the savings will continue to grow over time, so that this not a full long run estimate, but rather a direct comparison for the initial five-year period of the subscription model.

To assess the net fiscal return of the subscription model, we compare these savings to the costs Louisiana would have incurred under counterfactual DAA pricing and access scenarios in the following subsection.

5.2 Net Fiscal Return

The $266 million in medical savings reported in Table 4 represents gross savings to the state attributable to the subscription model over its first five years. Translating these savings into a net fiscal return requires more than a simple comparison of savings to the contract cost, since absent the agreement Louisiana would have continued financing DAAs on a pay-per-use basis. We therefore compare gross savings to costs under three distinct counterfactual scenarios that vary in their assumptions concerning DAA payment structure and utilization to provide a range of plausible net savings estimates. We also consider the drug manufacturer's gains and losses under the subscription model and the counterfactual scenarios.

Table 5 reports DAA spending, the number of Medicaid members treated, medical savings, and the resulting net fiscal position for the realized subscription model under three different counterfactual scenarios. The net fiscal position column reports the change in five-year Louisiana Medicaid spending relative to counterfactual 1 (CF1), our baseline and most plausible scenario, which assumes Louisiana continued treating its Medicaid HCV population at the pre-policy rate of approximately 217 enrollees per quarter, or 4,345 over the five-year contract period, while paying the declining per-unit prices observed in peer southern state Medicaid programs. Using the IQVIA data, we find that DAA prices in peer states declined by approximately 20 percent over the contract period (see Appendix Figure 1). Applying these prices to Louisiana's baseline DAA utilization implies a total five-year discounted cost of approximately $127 million under CF1. The realized subscription model cost the state an estimated $164 million (excluding the incarcerated population) but enabled treatment of 11,992 enrollees, nearly three times the CF1 total. Combined with the $266 million in medical savings from Table 4, the model's $37 million incremental DAA cost relative to CF1 yields a net improvement in Louisiana's fiscal position of $229 million. From the drug manufacturer's perspective, under CF1, Asegua would have achieved $127 million in sales at most if it had sold all DAAs in Louisiana compared to the $164 million from participating in the subscription model.

Our second counterfactual (CF2) considers the least plausible scenario where Louisiana could have achieved the same treatment expansion under its prior pay-per-use system. Under CF2, Louisiana would treat the same 11,992 enrollees as the realized subscription model but pay the per-unit DAA price observed in peer southern state Medicaid programs rather than the fixed contract price. Using the IQVIA data, we estimate this would have cost Louisiana approximately $370 million over five years, more than twice the subscription model contract price. Because CF2 and the subscription model treat the same number of enrollees, the $266 million in medical savings applies equally under both scenarios. However, the substantially higher DAA spending under CF2 results in an incremental cost of $243 million for the state relative to CF1, leaving a net fiscal improvement of only $22 million. Under CF2, Asegua has the potential to realize additional sales and profits compared to the subscription model and CF1, while the degree of additional sales depends on how many units it is able to sell relative to its competitors.

Our third counterfactual (CF3) considers a scenario in which Louisiana enters the subscription contract but fails to expand DAA utilization beyond pre-policy levels. This counterfactual highlights a key risk of the subscription model that we discussed in Section 2.3, namely that a state may pay a subscription premium to a participating drug manufacturer without achieving the utilization expansion needed to generate offsetting medical savings. Under CF3, the state commits to the same $164 million contract price as the realized subscription model but treats only the 4,345 enrollees it would have treated under CF1. Because utilization does not expand beyond the CF1 baseline, there are no incremental treatments and therefore no incremental medical savings. The state pays $37 million more than it would have under CF1 for the same number of DAA treatments, yielding a net fiscal loss of $37 million. From the drug manufacturer's perspective, under CF3 Asegua realizes an additional $37 million in sales off the subscription model without incurring any additional costs.

Taken together, CF1, CF2 and CF3 illustrate that the subscription model's fiscal success required both the pricing advantage of the fixed contract and the utilization expansion it enabled. Neither element alone would have generated the $229 million net benefit achieved under the realized subscription model. Louisiana's subscription model satisfied both conditions, locking in a fixed contract price that held DAA costs substantially below pay-per-use alternatives while expanding treatment to nearly 8,000 enrollees who would not otherwise have received DAA therapy. The result was a net improvement in Louisiana's five-year Medicaid fiscal position of $229 million relative to the most plausible status-quo baseline, or approximately $6.19 in net fiscal benefit for every dollar of incremental DAA spending. Moreover, the drug manufacturer is clearly better off under the

subscription model compared to CF1 and CF3, while losing out on potential upside benefits under CF2.

Appendix Table 3 decomposes the net fiscal return over each of the model's five years and illustrates why the timing of these savings matters for state budgeting. Under a gross view, comparing annual medical savings directly to the annual subscription payment, the model appears to lose money in the first two years of the contract, with a cumulative shortfall of $14.7 million in year one and $11.5 million in year two. The program turns profitable under this gross measure in year three and reaches a cumulative gain of $101.3 million by year five. This pattern reflects the intertemporal mismatch we describe in Section 2.3, in which the fixed cost of expanded access is paid upfront while the resulting medical savings accumulate gradually. However, once we net out CF1 spending, the program is fiscally beneficial in every year of the contract, including year one, when it improved Louisiana's fiscal position by $16.7 million relative to the status quo. This distinction underscores a key lesson for policymakers considering similar arrangements. A subscription model may appear to be a budgetary loss when measured against a naive year-one baseline, even when it is generating real fiscal benefits relative to the status quo a state would otherwise face.

6 Conclusion

Louisiana's subscription model for HCV treatment produced substantial fiscal benefits for the state's Medicaid program. Using a difference-in-differences design that compares spending for Medicaid members with HCV to members with diabetes and HIV, we find that the subscription model reduced Medicaid spending for HCV enrollees by approximately $1,045 annually, a 6.1 percent reduction relative to baseline. These savings grew steadily over the contract period, reaching nearly $1,800 per enrollee annually by the fourth year as the health benefits of DAA treatment accumulated. Consistent with broad-based DAA access reducing the pool of infectious patients over time, we also find significant reductions in new HCV diagnoses in Louisiana Medicaid, with an estimated 7,585 cases averted over the five-year contract period. Combining direct spending reductions with the healthcare costs of averted HCV infections, we estimate total Medicaid savings of $266 million over the contract period, approximately $116 million from treating the pre-existing stock of HCV patients, $60 million from treating newly diagnosed patients, and $90 million from reduced disease transmission. Relative to our preferred and most plausible counterfactual scenario where Louisiana maintained its pre-subscription treatment volume at the declining per-unit DAA prices

observed in peer state Medicaid programs, the subscription model improved Louisiana's net fiscal position by $229 million over the program's first five years. The participating drug manufacturer in Louisiana's subscription model was also made better off under the arrangement compared to this counterfactual, achieving more sales and, consequently, higher profits.

Savings to the state reflects complementary benefits made possible by the subscription model's two-part tariff structure. First, by reducing the marginal cost of treatment to zero for high-volume use, the model aligned the drug manufacturer and the state's incentives toward treating as many eligible patients as possible, eliminating the access barriers that had previously concentrated DAA therapy among the most severely ill. The four-fold increase in DAA prescribing following the model's launch, combined with a broad outreach and screening campaign, extended treatment to the larger population of enrollees with mild-to-moderate HCV who could benefit but were excluded under prior authorization restrictions. Second, the reduction in active HCV infections through expanded DAA access generated transmission savings that are often absent from, or underdeveloped in, prior cost-effectiveness or cost-offset analyses. Preventing new infections averts not only the direct healthcare costs of treating the infected individual but also downstream disease progression that, without treatment, can result in cirrhosis, liver cancer, and liver transplantation.

Prior economic studies find that new medical technology typically increases payer spending under traditional financing structures (Acemoglu & Restrepo, 2019; Baicker *et al.*, 2012; Chandra & Skinner, 2012). We provide the first evidence that, under an innovative financing arrangement, a high-cost curative treatment can instead generate net near-term savings for a public payer at scale. Our findings also complement the theoretical literature on two-part tariff pricing in pharmaceutical markets, offering the first empirical estimates of the fiscal return to a domestic subscription model (Brekke *et al.*, 2022). Similarly, our work advances studies projecting the fiscal returns to expanded DAA access in the U.S. under a two-part tariff structure (Chhatwal *et al.*, 2023; Kaplan *et al.*, 2022; Roebuck, 2022; Roebuck & Liberman, 2019), which rely on simulation models with assumptions about treatment uptake and disease progression that have not been validated against realized outcomes from a large-scale public program. Our difference-in-differences design, applied to administrative claims from more than 25,000 Medicaid enrollees with HCV over a six-year period, confirms that the projected savings from simulation models are realized in practice and large enough to yield a substantial net fiscal return to the state within the initial five-year contract window. We are also the first to empirically estimate transmission effects and their contribution to payer savings, a dimension not captured in prior simulation studies. Direct medical savings alone

generate a net fiscal return to the state, though our estimates suggest transmission savings expand net program benefits further. Finally, we add to more recent work valuing the health benefits from observed increases in HCV screening and treatment (Callison *et al.*, 2025; Elsisi *et al.*, 2025; Flynn *et al.*, 2025).

Our analysis has several limitations. First, our estimates apply to Medicaid enrollees in Louisiana, and the generalizability of the fiscal return will depend on the characteristics of the HCV population, the baseline level of DAA utilization, the terms of the subscription agreement, and the implementation strategy and strength in other states. At the time Louisiana entered its agreement, Medicaid DAA access was heavily restricted, and screening and patient and provider education were not widespread. This created a large reservoir of untreated and undiagnosed patients and, consequently, substantial pent-up demand. As utilization restrictions have eased over time, states with lower HCV prevalence, fewer untreated Medicaid members, or less robust implementation efforts may see smaller savings. Second, the exact contract terms between the Louisiana Department of Health and Asegua Therapeutics, as well as any additional resources dedicated to outreach, were not publicly disclosed, which introduces some imprecision into our net fiscal return calculations, including a lack of insight into true net pricing per treated patient with DAAs. However, public reporting and our communications with the Louisiana Department of Health indicate that the contract cost was benchmarked to the state's pre-policy DAA spending trajectory, which we are able to accurately and independently measure in our data. Third, our transmission savings estimates may reflect, in part, benefits of expanded DAA access among Louisiana's incarcerated population. We were unable to obtain data on DAA distribution among those incarcerated. Consequently, our net benefits to the state from transmission may be biased upwards. Our transmission estimates may also reflect the influence of the COVID-19 pandemic, but here the direction of the bias is less clear. On the one hand, the pandemic limited access to clinical care, reducing infectious disease detection and treatment, and consequently increasing HCV spread (Lamadrid *et al.*, 2026). This would lead to our transmission estimates being biased downwards, holding all else constant. On the other hand, clinical reports indicate that the pandemic increased injection drug cessation efforts and concentrated shared needle use in the persistent population (Wang *et al.*, 2025), reducing transmission, and biasing our estimates upwards. Fourth, our analysis covers only the first five years of the subscription model and focuses exclusively on medical spending. We cannot measure the longer-run fiscal consequences of expanded DAA access, particularly transmission savings that will continue to accumulate as averted infections avoid future disease progression. Fifth, more

broadly, our estimates do not account for potential non-medical fiscal benefits of HCV treatment, such as the increased earnings and labor force participation of cured patients that would generate additional state tax revenue. This is an important direction for future research.

Despite these limitations, our findings have direct relevance for ongoing policy debates at both the state and federal level. An estimated 2.2 million Americans remain infected with HCV, and fewer than 35 percent have achieved viral clearance despite more than a decade of DAA availability in the U.S. (Hall *et al.*, 2025; Wester, 2023). Several states have adopted subscription arrangements following Louisiana's example, and bipartisan federal legislation proposed in 2025 would extend a subscription model to Medicaid enrollees, incarcerated individuals, and the uninsured, with the Congressional Budget Office estimating $6.6 billion in federal savings over ten years (CBO, 2025). The conservative assumptions underlying our analysis and the CBO's omission of transmission savings suggest that the true fiscal return to a national HCV program may be much larger than currently projected.

Finally, Louisiana's demonstrated success in converting a fiscally prohibitive per-unit drug cost into a manageable fixed commitment, while simultaneously enabling the utilization expansion necessary to generate downstream savings, offers a template that may apply to other publicly financed high-cost curative therapies. However, whether this template generates comparable fiscal returns in other contexts depends on several conditions. Our results suggest the model is most valuable when pent-up demand is large, downstream medical savings are substantial, and transmission savings are possible; conditions clearly satisfied in Louisiana but potentially less applicable in states where prior authorization restrictions on DAAs had already been eased before a subscription arrangement was considered. Market timing was also a critical factor in the Louisiana subscription model's success. The fiscal case for a fixed-fee arrangement is strongest when manufacturer competition for market access in a resource-constrained payer environment gives the state meaningful bargaining power, and generic entry has not yet resolved the affordability challenge on its own. States considering subscription contracts in markets with fewer competing manufacturers or a high likelihood of superior therapies or generic products entering mid-contract may find the pricing, utilization, and implementation conditions needed to generate net savings difficult to achieve.

References

Acemoglu, Daron, & Restrepo, Pascual. 2019. Automation and new tasks: How technology displaces and reinstates labor. *Journal of economic perspectives*, **33**(2), 3–30.

Alam, Rubaiyat, & Conti, Rena M. 2025. *Entry Delays and Fighting Brands: Evidence from Generics and Authorized Generics*. https://rubaiyat-alam.github.io/website/pharma_ag_rubaiyat_conti.pdf. Accessed: 7/17/2026.

Andes, Linda J, Li, Yanfeng, Srinivasan, Meera, Benoit, Stephen R, Gregg, Edward, & Rolka, Deborah B. 2019. Diabetes Prevalence and Incidence Among Medicare Beneficiaries — United States, 2001–2015. *MMWR Morbidity and Mortality Weekly Report*, **68**(43), 961–966.

Auty, Samantha G, Griffith, Kevin N, Shafer, Paul R, Gee, Rebekah E, & Conti, Rena M. 2022. Improving access to high-value, high-cost medicines: the use of subscription models to treat hepatitis C using direct-acting antivirals in the United States. *Journal of health politics, policy and law*, **47**(6), 691–708.

Baicker, Katherine, Chandra, Amitabh, & Skinner, Jonathan S. 2012. Saving money or just saving lives? Improving the productivity of US health care spending. *Annu. Rev. Econ.*, **4**(1), 33–56.

Barnes, SR, Henderson, M, Terrell, D, & Virgets, S. 2018. *2017 Louisiana Health Insurance Survey Report*. https://ldh.la.gov/assets/media/2017-Louisiana-Health-Insurance-Survey-Report.pdf. Accessed: 12/17/2025.

Barnett, Chip, & Weitzman, Aaron. 2019. *Municipal Bonds Remain Firm as Louisiana, North Carolina Deals Come to Market*. https://www.bondbuyer.com/news/municipal-bonds-hold-in-as-la-nc-deals-come-to-market. Accessed: 7/17/2026.

Barro, Robert J. 1979. On the determination of the public debt. *Journal of political Economy*, **87**(5, Part 1), 940–971.

Berndt, Ernst R, Glennerster, Rachel, Kremer, Michael R, Lee, Jean, Levine, Ruth, Weizsäcker, Georg, & Williams, Heidi. 2007a. Advance market commitments for vaccines against neglected diseases: estimating costs and effectiveness. *Health Economics*, **16**(5), 491–511.

Berndt, Ernst R, Mortimer, Richard, Bhattacharjya, Ashoke, Parece, Andrew, & Tuttle, Edward.

2007b. Authorized generic drugs, price competition, and consumers' welfare. *Health Affairs*, **26**(3), 790–799.

Bhattacharya, Debika, Aronsohn, Andrew, Price, Jennifer, Re, Vincent Lo, & Panel, AASLD-IDSA HCV Guidance. 2023. Hepatitis C guidance 2023 update: AASLD-IDSA recommendations for testing, managing, and treating hepatitis C virus infection. *Clinical infectious diseases: an official publication of the Infectious Diseases Society of America*, ciad319.

Brekke, Kurt R, Dalen, Dag Morten, & Straume, Odd Rune. 2022. Paying for pharmaceuticals: uniform pricing versus two-part tariffs. *Journal of Health Economics*, **83**, 102613.

Breskin, Alexander, Westreich, Daniel, Hurt, Christopher B, Cole, Stephen R, Hudgens, Michael G, Seaberg, Eric C, Thio, Chloe L, Tien, Phyllis C, & Adimora, Adaora A. 2019. The effects of hepatitis C treatment eligibility criteria on all-cause mortality among people with human immunodeficiency virus. *Clinical Infectious Diseases*, **69**(9), 1613–1620.

Callaway, Brantly, & Sant'Anna, Pedro HC. 2021. Difference-in-differences with multiple time periods. *Journal of econometrics*, **225**(2), 200–230.

Callison, Kevin, Darden, Michael E, & Teltser, Keith F. 2025. Externalities from medical innovation: Evidence from organ transplantation. *Journal of Political Economy Microeconomics*, **3**(4), 763–797.

Centers for Disease Control and Prevention (CDC). *Surveillance for Viral Hepatitis - United States, 2014*. https://archive.cdc.gov/www_cdc_gov/hepatitis/statistics/2014surveillance/commentary.htm. Accessed: 7/17/2026.

Centers for Medicare& Medicaid Services (CMS). 2024. *State Timelines for Initiating Unwinding-Related Renewals*. https://www.medicaid.gov/resources-for-states/downloads/ant-2023-time-init-unwin-reltd-ren-06292023.pdf. Accessed: 7/17/2026.

Chandra, Amitabh, & Skinner, Jonathan. 2012. Technology growth and expenditure growth in health care. *Journal of Economic Literature*, **50**(3), 645–680.

Chhatwal, Jagpreet, Kanwal, Fasiha, Roberts, Mark S, & Dunn, Michael A. 2015. Cost-effectiveness and budget impact of hepatitis C virus treatment with sofosbuvir and ledipasvir in the United States. *Annals of internal medicine*, **162**(6), 397–406.

Chhatwal, Jagpreet, Aaron, Alec, Zhong, Huaiyang, Sood, Neeraj, Irvin, Risha, Alter, Harvey J, Zhuo, Yueran, Sharfstein, Joshua M, & Ward, John W. 2023. *Projected health benefits and health care savings from the United States National Hepatitis C Elimination Initiative.* Tech. rept. National Bureau of Economic Research.

Congressional Budget Office (CBO). *Estimated Budgetary Effects of Public Law 119-21, to Provide for Reconciliation Pursuant to Title II of H. Con. Res. 14, Relative to CBO's January 2025 Baseline.* https://www.cbo.gov/publication/61570. Accessed: 7/17/2026.

Cutler, David M, Ghosh, Kaushik, Messer, Kassandra L, Raghunathan, Trivellore, Rosen, Allison B, & Stewart, Susan T. 2022. A satellite account for health in the United States. *American Economic Review*, **112**(2), 494–533.

Department of Health and Human Services. 2020. *Eliminating Hepatitis C in Louisiana: An Innovative Payment and Outreach Model Case Study.* https://www.hhs.gov/sites/default/files/HCV_Affinity_Group_LA_Case_Study.pdf. Accessed: 7/17/2026.

Department of Health and Human Services. 2024. *States' Medicaid Eligibility and Enrollment Actions Concluding the COVID-19 Public Health Emergency.* https://oig.hhs.gov/reports/work-plan/browse-work-plan-projects/w-00-24-31567/. Accessed: 7/17/2026.

Einav, Liran, Finkelstein, Amy, & Polyakova, Maria. 2018. Private provision of social insurance: drug-specific price elasticities and cost sharing in Medicare Part D. *American Economic Journal: Economic Policy*, **10**(3), 122–153.

Elsisi, Zizi, Li, Jing, Kim, Nina, & Basu, Anirban. 2025. Hepatitis C Elimination via Subscription-Based Payment Models: A Synthetic Control Study from Washington and Louisiana. *Value in Health*, **28**(6), S216–S217.

Flynn, James M., Lemont, Bethany I., & Willage, Barton. 2025. Subscriptions to Prescriptions: Lessons from Louisiana's Effort to Elminate Hepatitis C. *NBER Working Paper, No. 33617.*

Frank, Richard G, Dach, Leslie, & Lurie, Nicole. 2021. *It was the government that produced COVID-19 vaccine success.* https://www.healthaffairs.org/content/forefront/government-produced-covid-19-vaccine-success. Accessed: 7/17/2026.

Gifford, K, Winter, A, Wiant, L, Dolan, R, Tian, M, & Garfield, R. 2020. *How State Medicaid Programs Are Managing Prescription Drug Costs: Results from a State Medicaid Pharmacy*

Survey for State Fiscal Years 2019 and 2020. https://www.kff.org/medicaid/how-state-medicaid-programs-are-managing-prescription-drug-costs-results-from-a-state-medicaid-pharmacy-survey-for-state-fiscal-years-2019-and-2020/#66036855-e122-4897-bdbe-6c17fa021022. Accessed: 7/17/2026.

Gilead Sciences. 2018. *Gilead Subsidiary to Launch Authorized Generics of Epclusa® (Sofosbuvir/Velpatasvir) and Harvoni® (Ledipasvir/Sofosbuvir) for the Treatment of Chronic Hepatitis C.* https://www.theadvocate.com/baton_rouge/news/crime_police/louisiana-inmates-with-hepatitis-c-claim-in-lawsuits-that-prison-had-policy-to-let-them/article_ad331064-2bd5-11e9-964b-434255449abb.html. Accessed: 7/17/2026.

Goodman-Bacon, Andrew. 2021. Difference-in-differences with variation in treatment timing. *Journal of econometrics*, **225**(2), 254–277.

Gordon, Stuart C, Pockros, Paul J, Terrault, Norah A, Hoop, Robert S, Buikema, Ami, Nerenz, David, & Hamzeh, Fayez M. 2012. Impact of disease severity on healthcare costs in patients with chronic hepatitis C (CHC) virus infection. *Hepatology*, **56**(5), 1651–1660.

Gourevitch, Marc N, Chatterji, Pinka, Deb, Nandini, Schoenbaum, Ellie E, & Turner, Barbara J. 2007. On-site medical care in methadone maintenance: associations with health care use and expenditures. *Journal of Substance Abuse Treatment*, **32**(2), 143–151.

Grant, William C, Jhaveri, Ravi R, McHutchison, John G, Schulman, Kevin A, & Kauf, Teresa L. 2005. Trends in health care resource use for hepatitis C virus infection in the United States. *Hepatology*, **42**(6), 1406–1413.

Hall, Eric W, Bradley, Heather, Barker, Laurie K, Lewis, Karon C, Shealey, Jalissa, Valverde, Eduardo, Sullivan, Patrick, Gupta, Neil, & Hofmeister, Megan G. 2025. Estimating hepatitis C prevalence in the United States, 2017–2020. *Hepatology*, **81**(2), 625–636.

Hwang, Thomas J, Kesselheim, Aaron S, & Sarpatwari, Ameet. 2017. Value-based pricing and state reform of prescription drug costs. *Jama*, **318**(7), 609–610.

Iversen, Jenny, Wand, Handan, McManus, Hamish, Dore, Gregory J, & Maher, Lisa. 2023. Incidence of primary hepatitis C virus infection among people who inject drugs in Australia pre-and post-unrestricted availability of direct acting antiviral therapies. *Addiction*, **118**(5), 901–911.

Japsen, Bruce. 2025. *Lilly's Obesity Drug Zepbound to be Key 2025 Health Cost Driver*. https://www.forbes.com/sites/brucejapsen/2025/01/01/lillys-obesity-drug-zepbound-to-be-key-health-cost-driver-for-2025/. Accessed: 7/17/2026.

Kaiser Family Foundation (KFF). 2026. *Total Monthly Medicaid CHIP Enrollment and Pre-ACA Enrollment*. https://www.kff.org/affordable-care-act/state-indicator/total-monthly-medicaid-and-chip-enrollment/. Accessed: 7/17/2026.

Kapadia, Shashi N, Zhang, Hao, Gonzalez, Christopher J, Sen, Bisakha, Franco, Ricardo, Hutchings, Kayla, Wethington, Elaine, Talal, Andrew, Lloyd, Audrey, Dharia, Arpan, *et al.* 2023. Hepatitis C treatment initiation among US Medicaid enrollees. *JAMA Network Open*, **6**(8), e2327326.

Kaplan, David E, Serper, Marina, Kaushik, Ankita, Durkin, Claire, Raad, Angie, El-Moustaid, Fadoua, Smith, Nathaniel, & Yehoshua, Alon. 2022. Cost-effectiveness of direct-acting antivirals for chronic hepatitis C virus in the United States from a payer perspective. *Journal of managed care & specialty pharmacy*, **28**(10), 1138–1148.

Kremer, Michael, Levin, Jonathan, & Snyder, Christopher M. 2020. Advance market commitments: insights from theory and experience. *AEA Papers and Proceedings*, **110**, 269–273.

Lamadrid, Angelo, Leiva-Escobar, Ignacio, Soza, Alejandro, & Quentin, Wilm. 2026. Impact of the COVID-19 pandemic on hepatitis C care across the cascade of care: a scoping review. *BMC Infectious Diseases*, **26**(1), 1139.

Latsko, Ellen, Denham, Alina, & Barnett, Michael L. 2025. Medicaid And Methadone For Opioid Use Disorder: Expanded Coverage Increased Distribution In 10 States, 2019–24: Article examines access to methadone for opioid use disorder in Medicaid programs in 10 states. *Health Affairs*, **44**(9), 1112–1121.

Liu, HH, Mulcahy, AW, & Rose, AJ. 2020. Subscription Models for Prescription Drugs. *RAND Corporation: Perspective, Expert Insights on a Timely Policy Issue*.

Louisiana Department of Health (LDH). 2017. *Department Communication to Johns Hopkins School of Public Health*. https://freepdfhosting.com/8f39b91349.pdf. Accessed: 7/17/2026.

Louisiana Department of Health (LDH). 2019. *Louisiana Launches Hepatitis C Innovative Payment Model with Asegua Therapeutics, Aiming to Eliminat the Disease*. https://ldh.la.gov/news/5181. Accessed: 12/17/2025.

Louisiana Office of Public Health (LOPH). 2016. *What is the Prevalence of Hepatitis C in Louisiana?* https://ldh.la.gov/assets/oph/Center-PHCH/Center-CH/infectious-epi/Hepatitis/HepC/HepCPrevalenceEstimateLA.pdf. Accessed: 7/17/2026.

Macinski, Sarah E, Gunn, Jayleen K L, Goyal, Mona, Neighbors, Charles, Yerneni, Rajeev, & Anderson, Bridget J. 2020. Validation of an Optimized Algorithm for Identifying Persons Living With Diagnosed HIV From New York State Medicaid Data, 2006–2014. *American Journal of Epidemiology*, **189**(5), 470–480.

McAdam-Marx, Carrie, McGarry, Lisa J, Hane, Christopher A, Biskupiak, Joseph, Deniz, Baris, & Brixner, Diana I. 2011. All-cause and incremental per patient per year cost associated with chronic hepatitis C virus and associated liver complications in the United States: a managed care perspective. *Journal of Managed Care Pharmacy*, **17**(7), 531–546.

McCarty, Dennis, Perrin, Nancy A, Green, Carla A, Polen, Michael R, Leo, Michael C, & Lynch, Frances. 2010. Methadone maintenance and the cost and utilization of health care among individuals dependent on opioids in a commercial health plan. *Drug and alcohol dependence*, **111**(3), 235–240.

Medicaid and CHIP Payment and Access Commission (MACPAC). *Medicaid Payment for Outpatient Prescription Drugs*. https://www.macpac.gov/wp-content/uploads/2015/09/Medicaid-Payment-for-Outpatient-Prescription-Drugs.pdf. Accessed: 7/17/2026.

Medicaid and CHIP Payment and Access Commission (MACPAC). *Spending*. https://www.macpac.gov/topic/spending/. Accessed: 7/17/2026.

Mueller-Langer, Frank. 2013. Neglected infectious diseases: are push and pull incentive mechanisms suitable for promoting drug development research? *Health Economics, Policy and Law*, **8**(2), 185–208.

Murphy, Sean M, & Polsky, Daniel. 2016. Economic evaluations of opioid use disorder interventions. *Pharmacoeconomics*, **34**(9), 863–887.

National Academies of Sciences, Engineering, & (NASEM), Medicine. 2017. *A national strategy for the elimination of hepatitis B and C: phase two report*. Washington, DC: National Academies Press.

Organization, World Health. 2018. *Guidelines for the screening care and treatment of persons with chronic hepatitis C infection*. World Health Organization.

Palmateer, Norah E, McAuley, Andrew, Dillon, John F, McDonald, Scott, Yeung, Alan, Smith, Shanley, Barclay, Stephen, Hayes, Peter, Shepherd, Samantha J, Gunson, Rory N, *et al.* 2021. Reduction in the population prevalence of hepatitis C virus viraemia among people who inject drugs associated with scale-up of direct-acting anti-viral therapy in community drug services: real-world data. *Addiction*, **116**(10), 2893–2907.

Pocobelli, Gaia, Oliver, Malia, Albertson-Junkans, Ladia, Gundersen, Gabrielle, & Kamineni, Aruna. 2024. Validation of Human Immunodeficiency Virus Diagnosis Codes Among Women Enrollees of a U.S. Health Plan. *BMC Health Services Research*, **24**, 234.

Poterba, James M. 1994. State responses to fiscal crises: The effects of budgetary institutions and politics. *Journal of political Economy*, **102**(4), 799–821.

Roebuck, M Christopher. 2022. Impact of Direct-Acting Antiviral Use for Chronic Hepatitis C on Health Care Costs in Medicaid: Economic Model Update. *American Journal of Managed Care*, **28**(12).

Roebuck, M Christopher, & Liberman, Joshua N. 2019. Assessing the burden of illness of chronic hepatitis C and impact of direct-acting antiviral use on healthcare costs in Medicaid. *Am J Manag Care*, **25**(8 Suppl), S131–S139.

Rosenberg, Eli S, Rosenthal, Elizabeth M, Hall, Eric W, Barker, Laurie, Hofmeister, Megan G, Sullivan, Patrick S, Dietz, Patricia, Mermin, Jonathan, & Ryerson, A Blythe. 2018. Prevalence of hepatitis C virus infection in US states and the District of Columbia, 2013 to 2016. *JAMA network open*, **1**(8), e186371–e186371.

Ryerson, A Blythe. 2020. Vital signs: newly reported acute and chronic hepatitis C cases—United States, 2009–2018. *MMWR. Morbidity and mortality weekly report*, **69**.

Sakshaug, Joseph W, Weir, David R, & Nicholas, Lauren H. 2014. Identifying Diabetics in Medicare Claims and Survey Data: Implications for Health Services Research. *BMC Health Services Research*, **14**, 150.

Schillie, Sarah. 2020. CDC recommendations for hepatitis C screening among adults—United States, 2020. *MMWR. Recommendations and Reports*, **69**.

Schumock, Glen T, Li, Edward C, Suda, Katie J, Wiest, Michelle D, Stubbings, Joann, Matusiak, Linda M, Hunkler, Robert J, & Vermeulen, Lee C. 2015. National trends in prescription drug expenditures and projections for 2015. *American Journal of Health-System Pharmacy*, **72**(9), 717–736.

Schumock, Glen T, Stubbings, JoAnn, Hoffman, James M, Wiest, Michelle D, Suda, Katie J, Rim, Matthew H, Tadrous, Mina, Tichy, Eric M, Cuellar, Sandra, Clark, John S, *et al.* 2019. National trends in prescription drug expenditures and projections for 2019. *American Journal of Health-System Pharmacy*, **76**(15), 1105–1121.

Shakeri, Ahmad, Srimurugathasan, Narthaanan, Suda, Katie J, Gomes, Tara, & Tadrous, Mina. 2020. Spending on hepatitis C antivirals in the United States and Canada, 2014 to 2018. *Value in Health*, **23**(9), 1137–1141.

Shiha, Gamal, Soliman, Reham, Mikhail, Nabiel NH, & Easterbrook, Philippa. 2021. Reduced incidence of hepatitis C in 9 villages in rural Egypt: progress towards national elimination goals. *Journal of Hepatology*, **74**(2), 303–311.

Tice, JA, Ollendorf, DA, Chahal, HS, Kahn, JG, Marseille, E, Weissberg, J, Shore, KK, & Pearson, SD. 2015. The comparative clinical effectiveness and value of novel combination therapies for the treatment of patients with genotype 1 chronic hepatitis C infection: a technology assessment. *Institute for Clinical and Economic Review*.

Toohey, Grace. 2019. *Louisiana Inmates with Hepatitis C Claim in Lawsuits That Prison Had Policy to "Let Them Die"*. https://www.theadvocate.com/baton_rouge/news/crime_police/louisiana-inmates-with-hepatitis-c-claim-in-lawsuits-that-prison-had-policy-to-let-them/article_ad331064-2bd5-11e9-964b-434255449abb.html. Accessed: 7/17/2026.

U.S. Senate Finance Committee. 2015. *The Price of Sovaldi and Its Impact on the US Health Care System.* finance.senate.gov/download/introduction-hepatitis-c-background-development-of-sovaldi-and-gileads-acquistion-of-pharmasset-introduction-sections-1-and-2. Accessed: 12/17/2025.

van de Ven, Nikolien, Fortunak, Joe, Simmons, Bryony, Ford, Nathan, Cooke, Graham S, Khoo, Saye, & Hill, Andrew. 2015. Minimum target prices for production of direct-acting antivirals and associated diagnostics to combat hepatitis C virus. *Hepatology*, **61**(4), 1174–1182.

Vermehren, Johannes, Park, James S, Jacobson, Ira M, & Zeuzem, Stefan. 2018. Challenges and perspectives of direct antivirals for the treatment of hepatitis C virus infection. *Journal of hepatology*, **69**(5), 1178–1187.

Wang, Jasmine, Genberg, Becky L, Feder, Kenneth A, Kirk, Gregory D, Mehta, Shruti H, Grantz, Kyra, & Wesolowski, Amy. 2025. Impact of pandemic-induced service disruptions and behavioral changes on hepatitis C virus and HIV transmission amongst people who inject drugs: a modeling study. *The Journal of Infectious Diseases*, **231**(3), 633–642.

Waters, Phil, & Broder, Tina. 2018. Rationing Care: Barriers to Direct-Acting Antiviral Treatment in Medicaid Treatment Criteria. *Clinical Liver Disease*, **12**(5), 122–124.

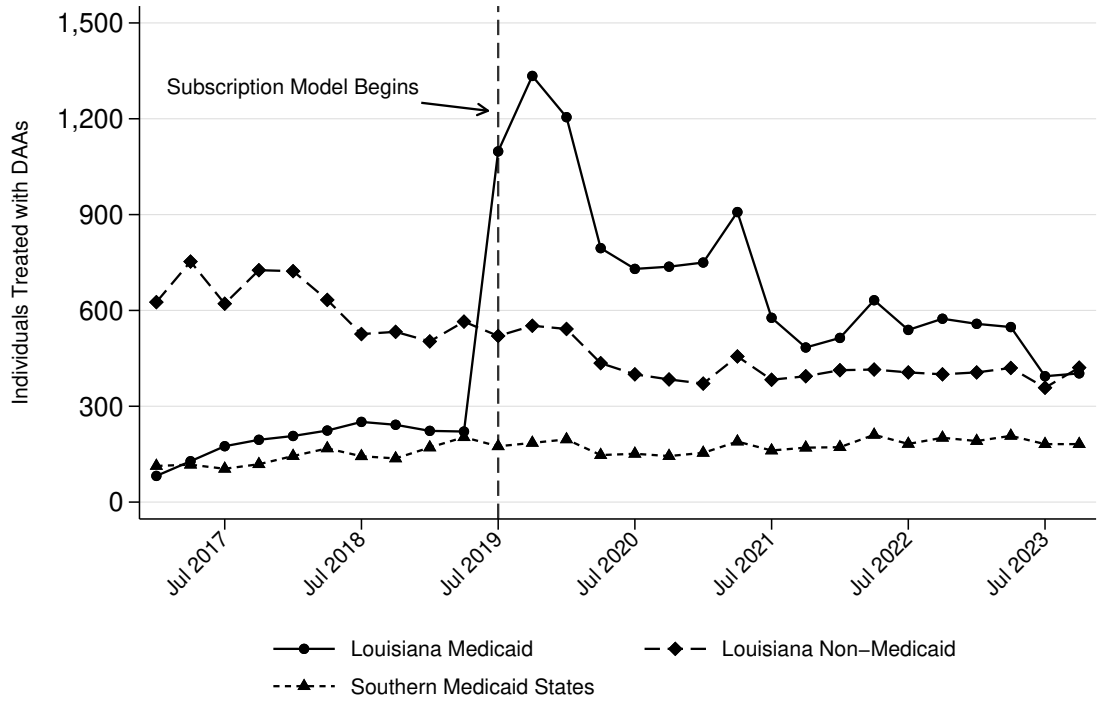
Wester, Carolyn. 2023. Hepatitis C virus clearance cascade—United States, 2013–2022. *MMWR. Morbidity and mortality weekly report*, **72**.

Williamson, K, & Horvath, J. 2019. *State Approaches to Leverage the 340B Drug Discount Program.* https://etf.wi.gov/boards/wpcsc/2019/09/26/item3/direct. Accessed: 7/17/2026.

Wong, Chi Heem, Li, Dexin, Wang, Nina, Gruber, Jonathan, Lo, Andrew W, & Conti, Rena M. 2023. The estimated annual financial impact of gene therapy in the United States. *Gene Therapy*, **30**(10), 761–773.

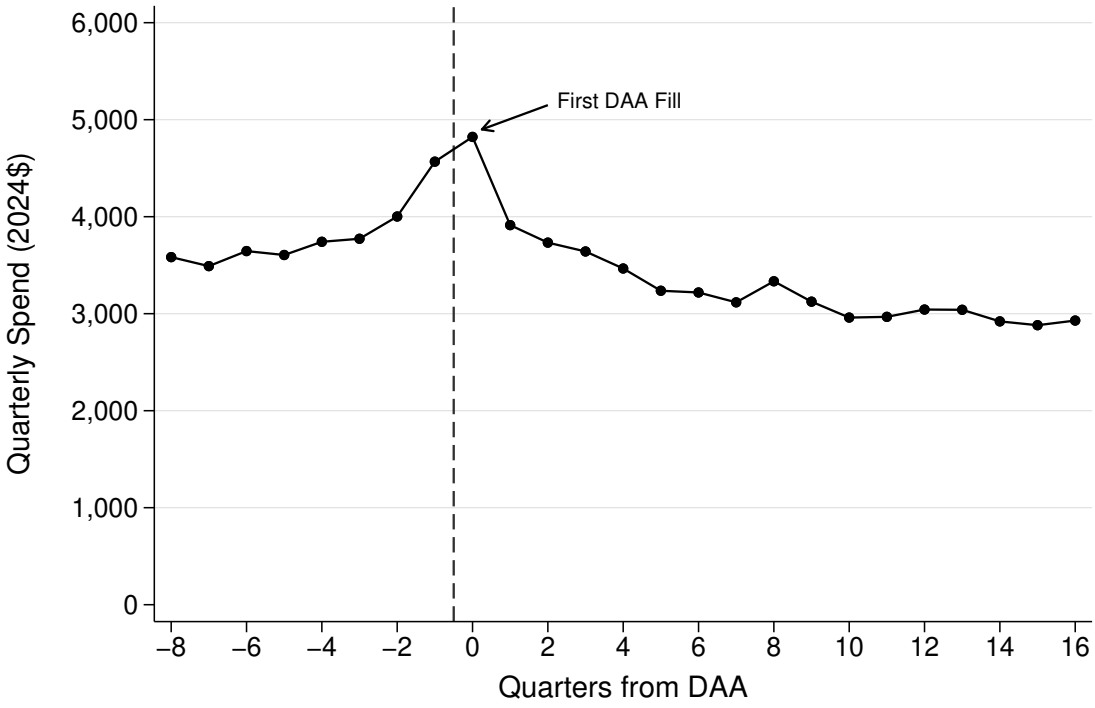
7 Figures & Tables

Figure 1: Number of Individuals Treated with DAAs in Louisiana Medicaid, Louisiana Non-Medicaid, and Southern States



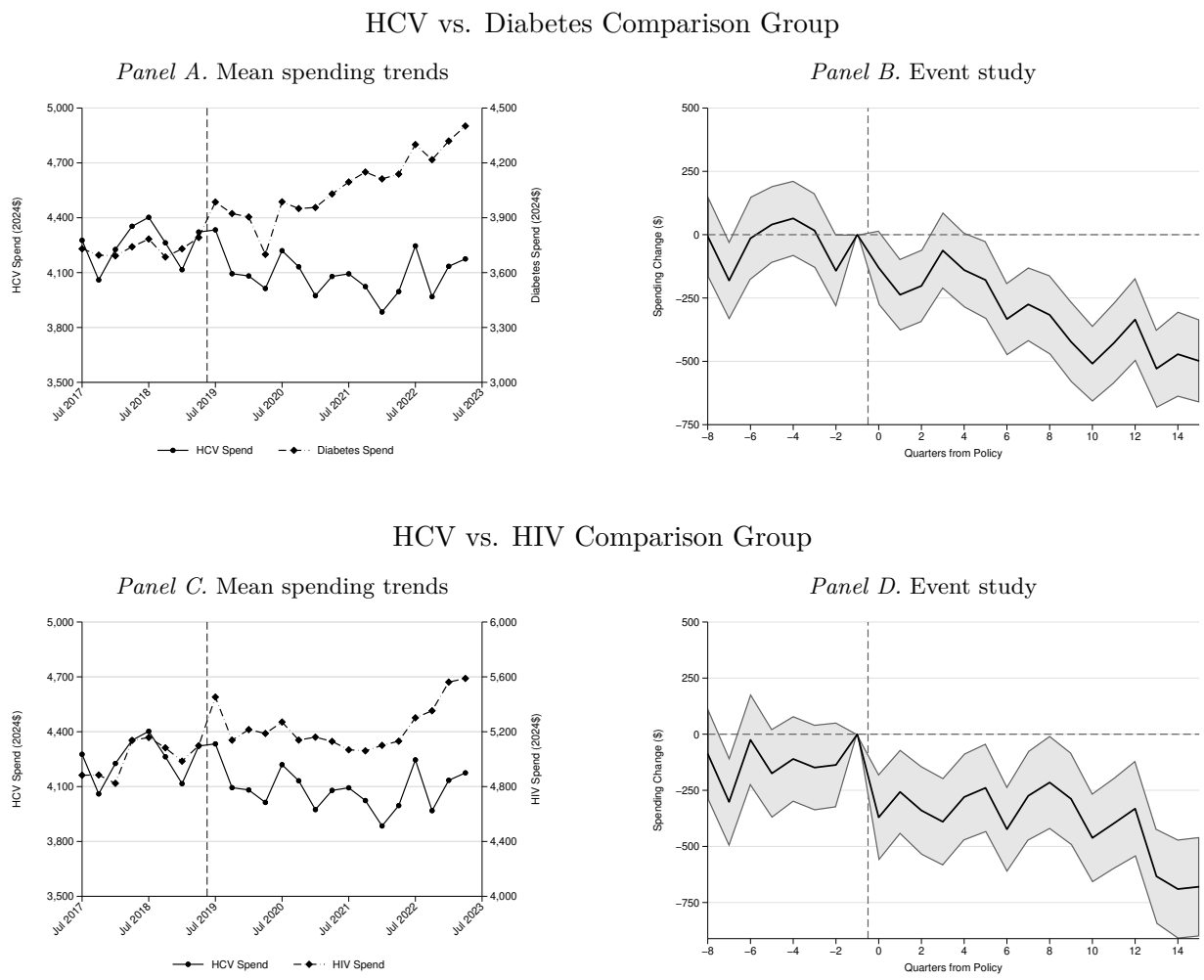
Notes: Southern states include states in the South Census Region (AL, AR, DC, DE, FL, GA, MD, MS, NC, SC, TN, TX, VA, WV). We exclude Kentucky and Oklahoma because those states implemented policies to expand access to DAAs for Medicaid and incarcerated populations during our study period. We average across these states to generate DAA treatment counts in the southern states. Data come from the Iqvia National Sales Perspective dataset.

Figure 2: Spending Relative to DAA Initiation Among Louisiana Medicaid Members



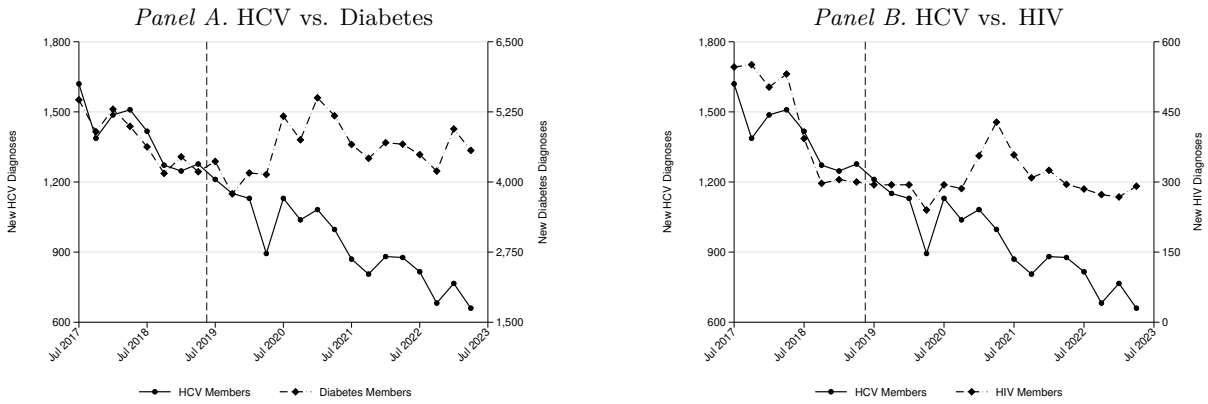
Notes: Sample consists of Louisiana Medicaid members treated with a DAA between July 2017 and June 2023 (n=13,512). Quarterly spend excludes DAA spending and is adjusted for quarters from HCV diagnosis and quarters from Medicaid enrollment.

Figure 3: HCV, Diabetes, and HIV Spending Trends & Event Studies



Notes: Sample is restricted to members who were diagnosed with HCV, diabetes, or HIV prior to July 2019. Quarterly spend excludes DAA spending. The event study specification includes controls for year-quarter, quarters from diagnosis, quarters from Medicaid enrollment, member age, and individual fixed effects. Standard errors are calculated using the Huber/White sandwich estimator.

Figure 4: Trends in the Incidence of HCV, Diabetes, and HIV



Notes: Sample includes those newly diagnosed with HCV, diabetes, or HIV between July 2017 and June 2023. New diagnoses are defined as the first instance of a diagnosis code for HCV, diabetes, or HIV on an individual's claim history.

Table 1: Descriptive Statistics

	HCV		Diabetes		HIV	
	Pre-Policy	Post-Policy	Pre-Policy	Post-Policy	Pre-Policy	Post-Policy
Age	49.06	49.13	48.71	48.86	36.83	38.74
Female	0.46	0.47	0.66	0.66	0.63	0.64
Hispanic	0.05	0.06	0.06	0.07	0.10	0.10
Non-Hispanic Black	0.38	0.34	0.54	0.53	0.65	0.65
Non-Hispanic White	0.54	0.57	0.36	0.36	0.22	0.22
Other Race/Ethnicity	0.01	0.01	0.01	0.01	0.01	0.01
Unknown Race/Ethnicity	0.03	0.02	0.02	0.02	0.02	0.02
Rural	0.13	0.13	0.22	0.22	0.12	0.12
Medicaid Spending	4254.08	4092.94	3732.06	4065.38	5008.97	5238.71
Observations	185,450	339,405	739,284	1,358,071	100,705	190,320
Medicaid Beneficiaries	30,338	26,053	118,305	102,905	15,362	13,886

Notes: Sample is restricted to members who were diagnosed with HCV, diabetes, or HIV prior to July 2019. Members with diabetes or HIV have not also been diagnosed with HCV. Quarterly spend excludes DAA spending and is in 2024 dollars. Observations are at the person-year-quarter level.

Table 2: Estimates of Subscription Model Effects on Quarterly HCV Spending

	DD w/ Diabetes			DD w/ HIV		
	(1)	(2)	(3)	(4)	(5)	(6)
HCV x Post	-361.90***	-270.78***		-389.67***	-251.88***	
	(33.00)	(26.63)		(43.23)	(37.94)	
HCV x Year 1			-132.06***			-219.49***
			(33.59)			(45.32)
HCV x Year 2			-204.10***			-183.94***
			(34.84)			(47.88)
HCV x Year 3			-390.88***			-218.60***
			(37.63)			(52.25)
HCV x Year 4			-429.66***			-459.52***
			(39.67)			(57.07)
Baseline Mean HCV Spending	4,254.08	4,254.08	4,254.08	4,254.08	4,254.08	4,254.08
Pre-Policy DAA Exposure	0.093	0.093	0.093	0.093	0.093	0.093
Post-Policy DAA Exposure	0.309	0.309	0.309	0.309	0.309	0.309
Wald Estimate	-1,678.06	-1,255.55	-1,992.22 (y4)	-1,806.81	-1,167.93	-2,130.67 (y4)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual FEs	No	Yes	Yes	No	Yes	Yes
Observations	2,622,210	2,622,210	2,622,210	815,880	815,880	815,880

Notes: Sample is restricted to members who were diagnosed with HCV, diabetes, or HIV prior to July 2019. Controls include age, sex, race and Hispanic ethnicity, parish of residence, number of quarters from condition diagnosis, and number of quarters since Medicaid enrollment. Quarterly spend excludes DAA spending. Standard errors are calculated using the Huber/White sandwich estimator.
*p<0.10, **p<0.05, ***p<0.01

Table 3: Estimates of Subscription Model Effects on HCV Transmission

	DD w/ Diabetes		DD w/ HIV	
	(1)	(2)	(3)	(4)
HCV x Post	-314.37*		-342.44***	
	(174.24)		(48.92)	
HCV x Year 1		339.75		-157.75**
		(231.80)		(60.72)
HCV x Year 2		-734.00***		-253.00***
		(242.09)		(59.93)
HCV x Year 3		-402.25*		-437.00***
		(199.53)		(31.77)
HCV x Year 4		-461.00*		-522.00***
		(243.81)		(44.66)
Baseline Mean HCV Diagnoses	1,402	1,402	1,402	1,402
Observations	48	48	48	48

Notes: Diagnoses are aggregated to the condition-year-quarter level. All models include year-quarter controls. Standard errors are calculated using the Huber/White sandwich estimator.
*p<0.10, **p<0.05, ***p<0.01

Table 4: Savings Associated with the Louisiana Subscription Model

	Stock Treatment Savings		Flow Treatment Savings		Transmission Savings		
	# Treated from Stock	Stock Savings	# Treated from Flow	Flow Savings	Cases Averted	Savings from Cases Averted	Total Savings
Year 1	3,220	-16,209,173	927	-4,090,640	0	0	-20,299,812
Year 2	1,398	-16,434,911	1,163	-7,797,215	1,974	-12,866,483	-37,098,610
Year 3	821	-23,645,933	1,117	-11,146,404	1,679	-18,867,382	-53,659,719
Year 4	697	-31,228,078	1,141	-16,313,392	1,966	-26,628,075	-74,169,546
Year 5	520	-28,146,582	988	-20,630,116	1,966	-31,667,762	-80,444,461
Total	6,656	-115,664,678	5,336	-59,977,767	7,585	-90,029,702	-265,672,147

Notes: Stock savings equal the product of year-specific DD estimates from Table 2, averaged across the diabetes and HIV comparison groups, and the count of pre-policy HCV enrollees adjusted for sample attrition. Flow savings apply acuity-adjusted Wald estimates for enrollees without advanced liver disease, averaged across comparison groups, to the count of post-policy diagnosed enrollees without advanced liver disease treated with DAAs, with each treated cohort accumulating savings over the remaining contract years. Transmission savings apply the incremental Medicaid cost of HCV in each post-infection year to annual counts of diagnoses averted from Table 3, averaged across comparison groups. Year-one cases averted are set to zero as described in the text. For all three components, year-four DD estimates are used as proxies where year-five estimates are unavailable. All estimates are reported in 2024 dollar, adjusted for sample attrition, and discounted at Louisiana's 2019 borrowing cost of 3.22%.

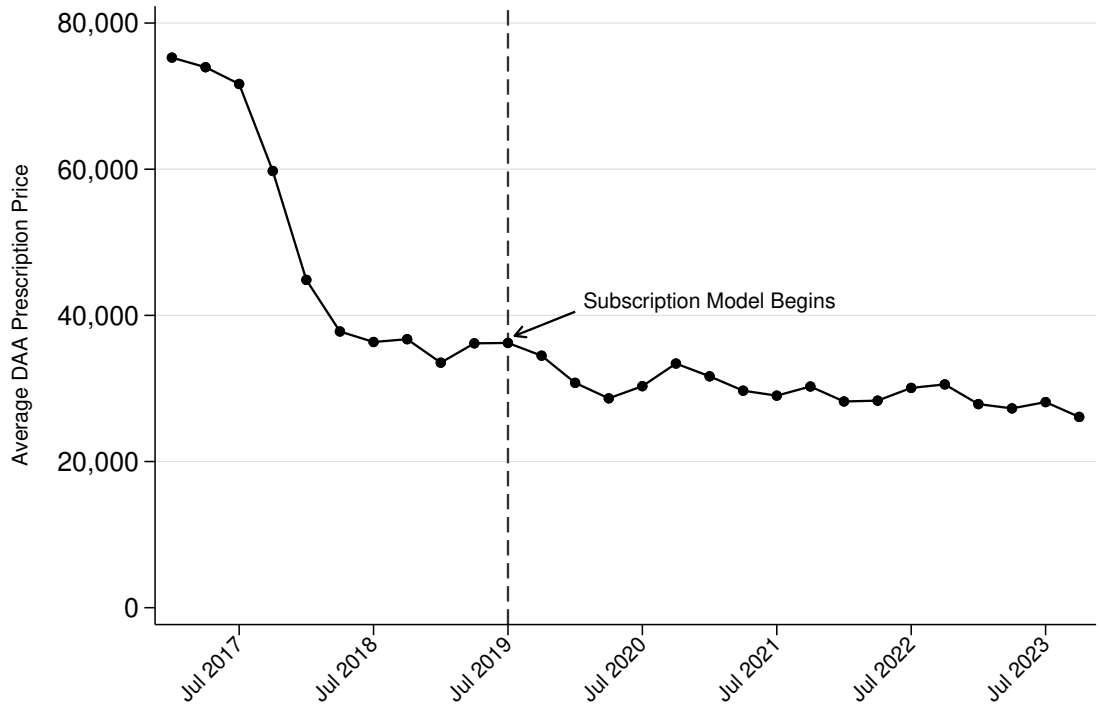
Table 5: Cost-Benefit of the Louisiana Subscription Model Against Counterfactuals

	DAA spending	People treated	Medical savings	Net fiscal position
Baseline (Counterfactual 1): LA continues its pay-per-use model and low utilization (217/qtr)	$127M	4,345	—	*$0 (baseline)*
Subscription model	$164M	11,992	$266M	+$229M
Counterfactual 2: pay-per-use, expanded utilization	$370M	11,992	$266M	+$22M
Counterfactual 3: subscription, no utilization expansion	$164M	4,345	—	–$37M

Notes: All figures are five-year totals (July 2019–June 2024) in 2024 dollars, discounted at Louisiana's 2019 borrowing cost of 3.22%. Medical savings combine the stock, flow, and transmission components from Table 4 ($266M total). The realized subscription model treated 11,992 Louisiana Medicaid enrollees with DAAs at a fixed contract cost of $164M. *Counterfactual 1* (CF1) assumes Louisiana continued treating 217 enrollees per quarter (4,345 over five years) at the falling DAA prices observed in peer Southern Medicaid programs (Figure 1, Panel A). *Counterfactual 2* (CF2) assumes Louisiana achieved the same expanded volume (11,992) under pay-per-use at peer-state prices. *Counterfactual 3* (CF3) assumes Louisiana entered the subscription contract but failed to expand utilization beyond status-quo levels, locking in the $164M payment for only 4,345 treatments while forgoing observed price declines. The *Net fiscal position* column reports the change in five-year Louisiana Medicaid spending relative to CF1, the most plausible status-quo baseline.

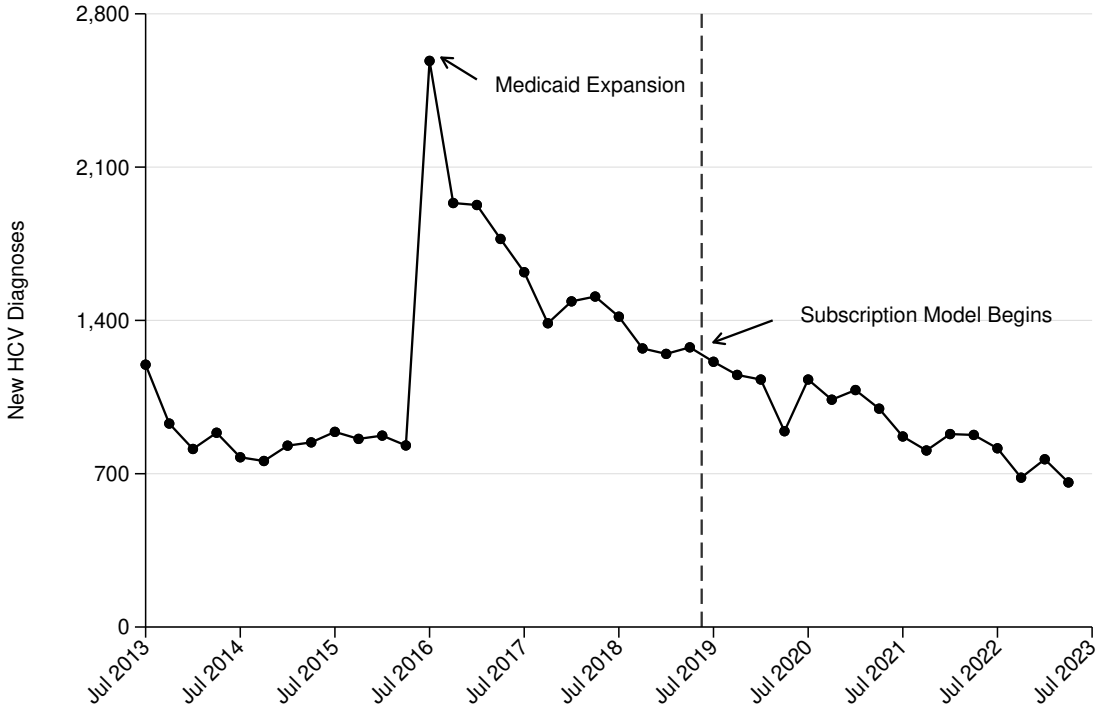
8 Appendix

Appendix Figure 1: Average DAA Medicaid Prescription Price in Southern States



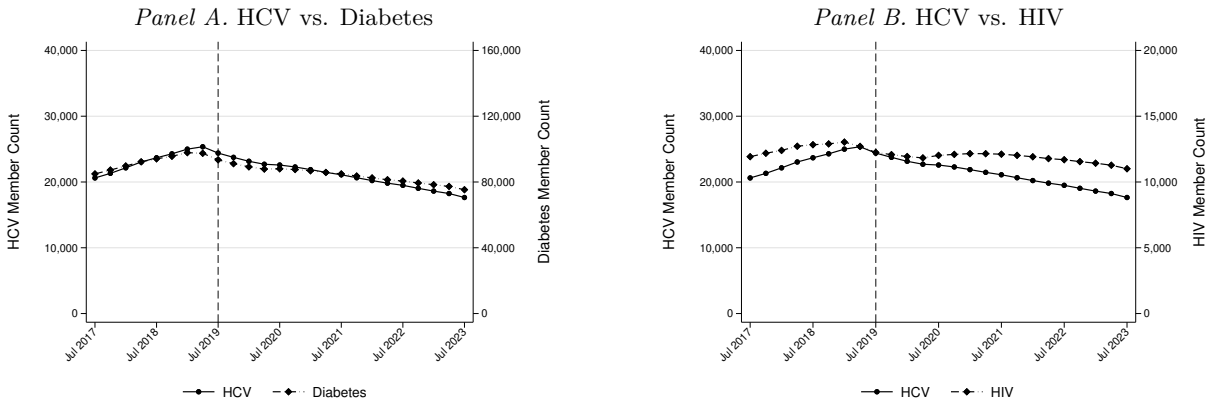
Notes: Southern states include states in the South Census Region (AL, AR, DC, DE, FL, GA, MD, MS, NC, SC, TN, TX, VA, WV). We exclude Kentucky and Oklahoma because those states implemented policies to expand access to DAAs for Medicaid and incarcerated populations during our study period. We average across these states to generate DAA prices in the southern states. Data come from the Iqvia National Sales Perspective dataset and represent prescription wholesale acquisition cost.

Appendix Figure 2: Count of HCV Diagnoses by Quarter for Louisiana Medicaid Members



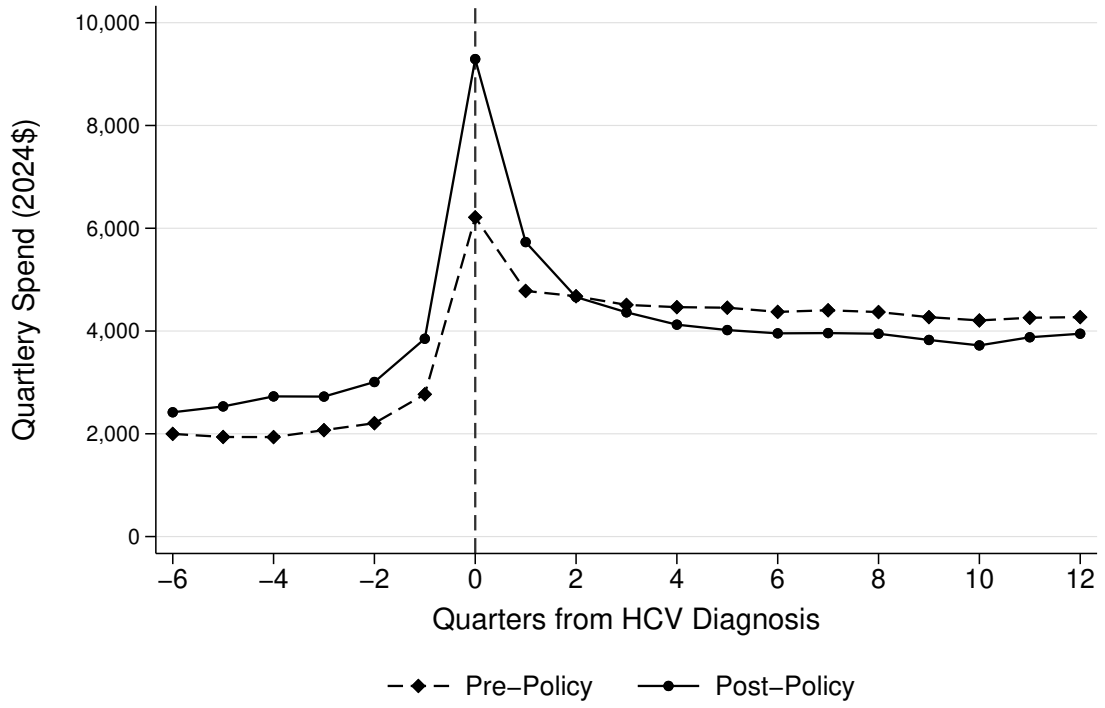
Notes: Sample consists of Louisiana Medicaid members with at least one inpatient claim with an HCV diagnosis or at least two outpatient claims on different service dates with HCV diagnoses. The initial service date is used to define a member's diagnosis date.

Appendix Figure 3: HCV vs. Diabetes and HCV vs. HIV Louisiana Medicaid Member Attrition



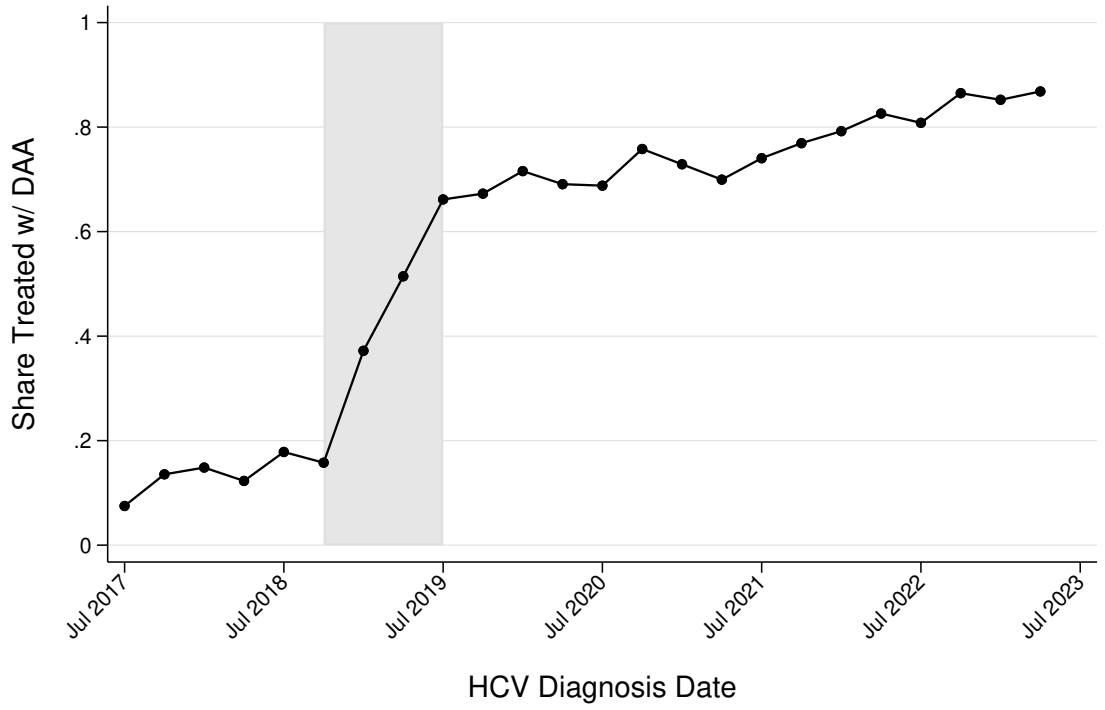
Notes: Sample is restricted to members who were diagnosed with HCV, diabetes, or HIV prior to July 2019.

Appendix Figure 4: HCV Spending Relative to Diagnosis Before and After Louisiana's Subscription Model



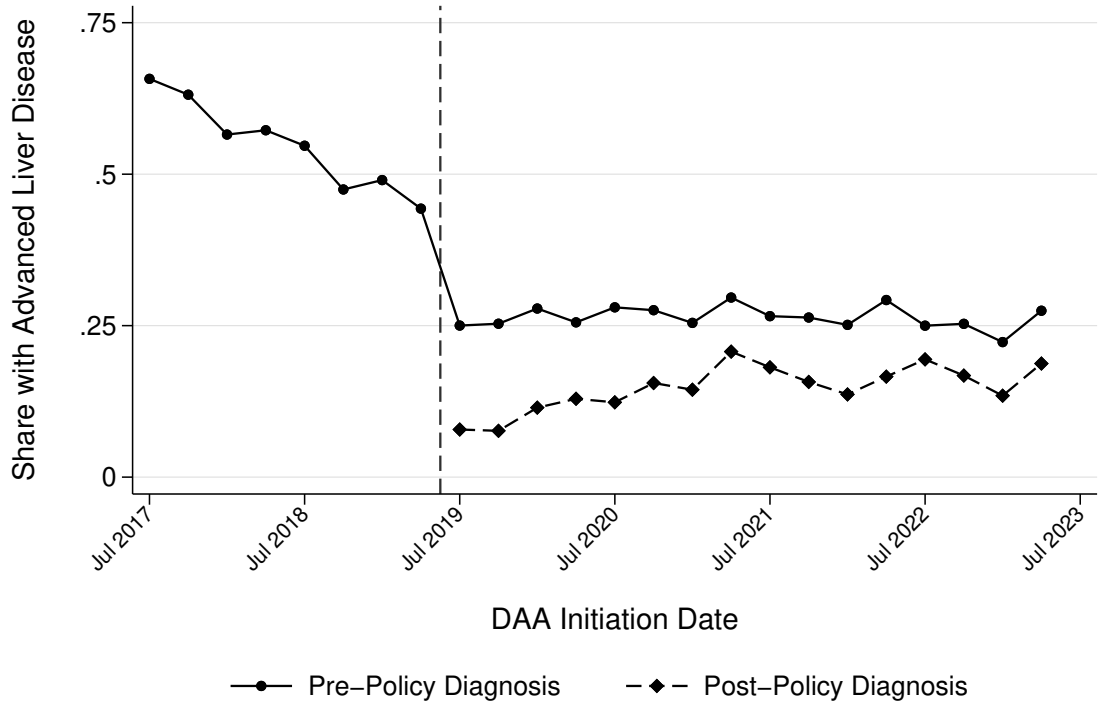
Notes: Pre-policy group diagnosed on or before June 2016. Post-policy group diagnosed on or after July 2019.

Appendix Figure 5: Share of Louisiana Medicaid Members Treated with DAAs Within 6 Months of HCV Diagnosis



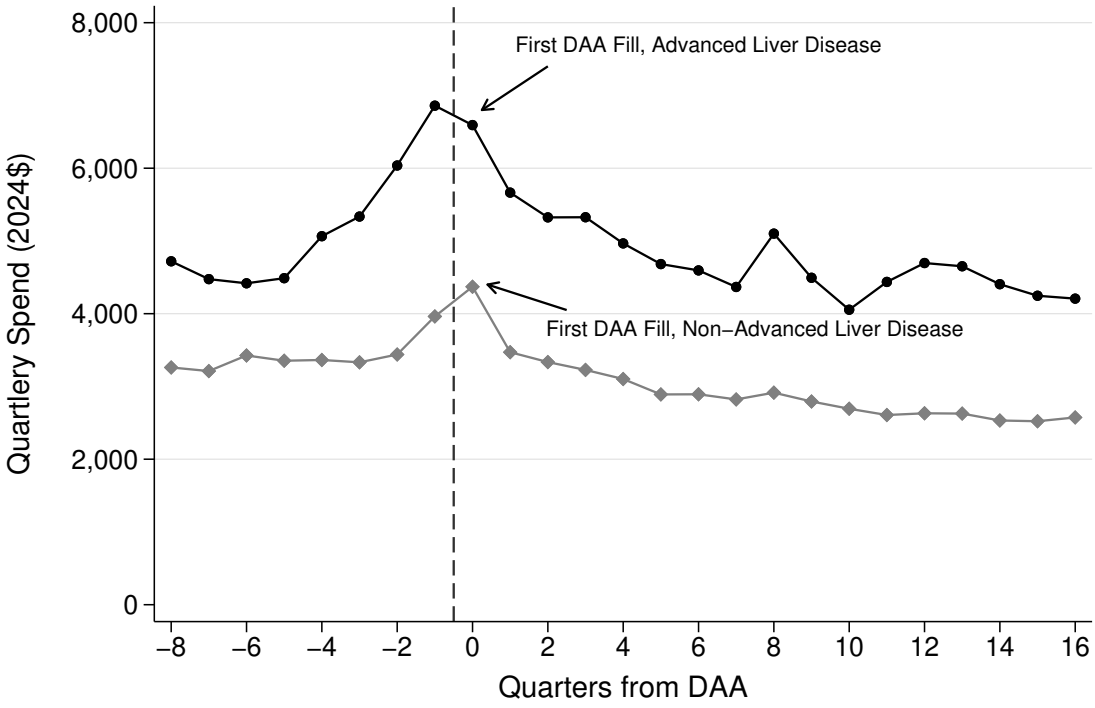
Notes: Sample consists of Louisiana Medicaid members diagnosed with HCV and treated with a DAA between July 2017 and July 2022 (n = 9,344). The shaded portion of the graph represents diagnosis quarters within 6 months of the policy.

Appendix Figure 6: DAA Initiation Before and After Louisiana's Subscription Model by Disease Progression



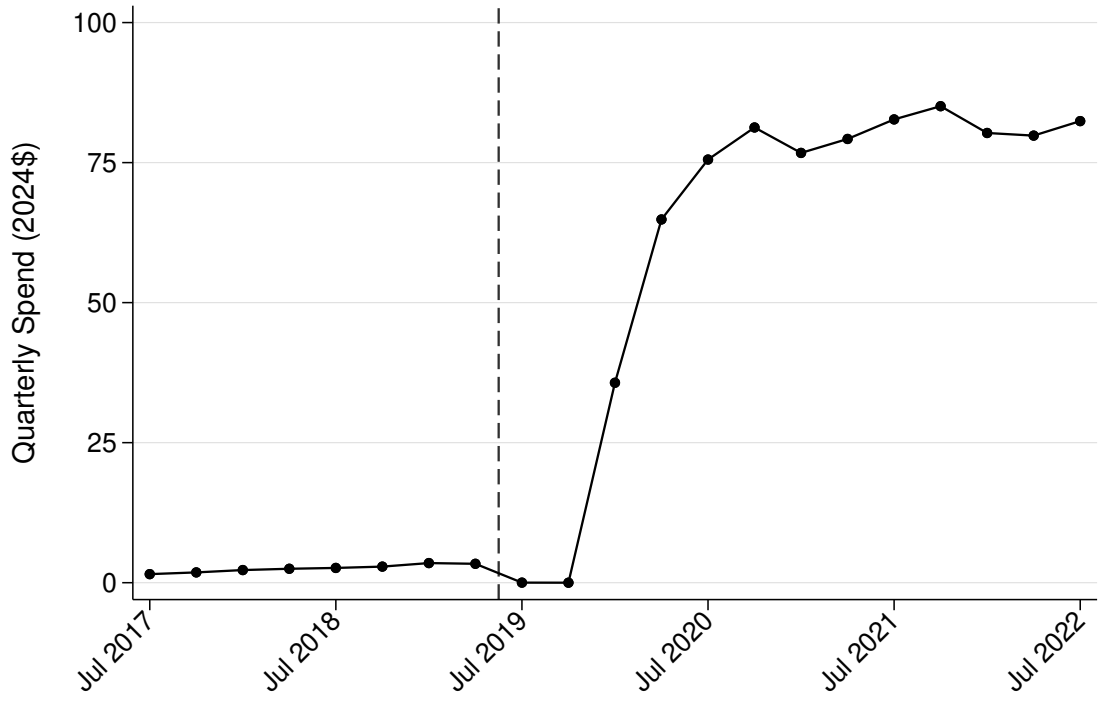
Notes: Advanced liver disease includes diagnoses of cirrhosis, advanced or unspecified fibrosis, hepatic failure, ascites, esophageal varices, hepatorenal syndrome, jaundice, or portal hypertension.

Appendix Figure 7: HCV Spending Relative to DAA Initiation by Liver Disease Progression



Notes: Advanced liver disease includes diagnoses of cirrhosis, advanced or unspecified fibrosis, hepatic failure, ascites, esophageal varices, hepatorenal syndrome, jaundice, or portal hypertension.

Appendix Figure 8: Louisiana Medicaid Average Per Capita Spending on Methadone among Members with OUD



Notes: Sample is restricted to Louisiana Medicaid members with an opioid use disorder diagnosis. Quarterly spend excludes DAA spending.

Appendix Table 1: Direct-Acting Antiviral Agents for Hepatitis C

Chemical Name(s)	Brand Name	Company	US Launch Date	HCV Genotype	Treatment Regimen	Launch Price
Sofosbuvir	Sovaldi	Gilead Sciences	Dec-13	1, 2, 3, 4	combination older agents, 12–14 weeks	$84,000
Ledipasvir/Sofosbuvir	Harvoni	Gilead Sciences	Oct-14	1, 4, 5, 6	once daily, 12–14 weeks	$94,500
Ombitasvir/Paritaprevir/ Ritonavir + Dasabuvir	Viekira Pak	AbbVie	Dec-14	1	twice daily, 12 weeks	$83,319
Daclatasvir	Daklinza	BMS	Jul-15	1, 3	once daily in combination sofosbuvir, 12 weeks	$63,000
Elbasvir/Grazoprevir	Zepatier	Merck	Jan-16	1, 4	once daily, 12–14 weeks	$54,600
Glecaprevir/Pibrentasvir	Mavyret	AbbVie	Aug-17	1–6	once daily, 8 weeks	$26,000

Appendix Table 2: Estimates of Subscription Model Effects on Quarterly HCV Spending, By Subgroup

	DD w/ Diabetes	DD w/ HIV
	(1)	(2)
Panel A: Members w/o Late-Stage Liver Disease		
HCV x Post	-231.26***	-208.87***
	(28.07)	(38.24)
Baseline Mean HCV Spending	3,663.42	3,663.42
Controls	Yes	Yes
Individual FEs	Yes	Yes
Observations	2,483,673	677,343
Panel B: Members w/o Opioid Use Disorder		
HCV x Post	-191.35***	-148.13***
	(36.11)	(52.48)
Baseline Mean HCV Spending	4,060.92	4,060.92
Controls	Yes	Yes
Individual FEs	Yes	Yes
Observations	2,162,596	527,472

Notes: Sample is restricted to members who were diagnosed with HCV, diabetes, or HIV prior to July 2019. HCV members with late-stage liver disease are excluded from the sample used to generate estimates in Panel A. All members with an OUD are excluded from the sample used to generate estimates in Panel B. Quarterly spend excludes DAA spending. Standard errors are calculated using the Huber/White sandwich estimator.
*p<0.10, **p<0.05, ***p<0.01

Appendix Table 3: Year-by-Year Net Fiscal Position of the Louisiana Subscription Model

	Medical	Subscription	CF1 cost	Gross savings ($M)		Net of CF1 ($M)	
Year	**savings ($M)**	**cost ($M)**	**($M)**	**Annual**	**Cumulative**	**Annual**	**Cumulative**
1	20.3	35.0	31.4	−14.7	−14.7	+16.7	+16.7
2	37.1	33.9	28.4	+3.2	−11.5	+31.6	+48.3
3	53.7	32.9	24.9	+20.8	+9.3	+45.7	+94.0
4	74.2	31.8	23.5	+42.4	+51.7	+65.9	+159.9
5	80.4	30.8	19.5	+49.6	+101.3	+69.1	+229.0
Total	**265.7**	**164.4**	**127.7**	**+101.3**		**+229.0**	

Notes: All figures are in millions of 2024 dollars, discounted at Louisiana's 2019 borrowing cost of 3.22%. Annual medical savings are the sum of stock, flow, and transmission components from Table 4. The subscription contract pays a fixed nominal installment of $35M per year; the Subscription cost column reports each year's payment in present-value terms, discounted at Louisiana's 2019 borrowing cost of 3.22% to the start of the contract, which is why it declines from $35.0M in year one to $30.8M in year five even though nominal payments are constant. *Gross savings* columns report annual medical savings minus the annual subscription payment, with no counterfactual netting. *Net of CF1* columns net out the spending Louisiana would have incurred under Counterfactual 1 (CF1), which assumes the state continued treating 217 enrollees per quarter at the falling DAA prices observed in peer Southern Medicaid programs (Figure 1, Panel A); annual CF1 costs reflect the declining peer-state price path applied to constant volumes. The annual *Net of CF1* figure equals annual medical savings minus the difference between the annual subscription payment and the CF1 cost in that year. The five-year *Net of CF1* total reconciles to the headline figure of $229M reported in Sections 5 and 6. The contrast between the two sets of columns illustrates the longer-run budgeting perspective discussed in the text: under the gross view, the program is money-losing in years 1–2 and breaks even cumulatively only in year 3, whereas the more appropriate CF1-netted view shows the program is money-saving in every year.

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