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Evaluation of the Medicare Prior Authorization Model for Repetitive Scheduled Non-Emergent Ambulance Transport:

Final Report

Submitted to:

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Acknowledgements

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Contents

Tables

Figures

Acronyms

AMA	American Medical Association
AME	Average Marginal Effect
CAI	Computer-Assisted Interviewing
CERT	Comprehensive Error Rate Testing
CHIP	Children's Health Insurance Program
CMMI	Centers for Medicare and Medicaid Innovation
CMS	Centers for Medicare & Medicaid Services
CPI	Center for Program Integrity
DHHS	Department of Health and Human Services
ESRD	End-Stage Renal Disease
FFS	Fee-for-Service
HCC	Hierarchical Condition Category
HICN	Health Insurance Claim Number
MAC	Medicare Administrative Contractor
MACRA	Medicare Access and CHIP Reauthorization Act of 2015
NPI	National Provider Identifier
NPPES	National Plan and Provider Enumeration System
PAR	Prior Authorization Requests
PCS	Physician Certification Statement
PECOS	Provider Enrollment, Chain, and Ownership System
PRI	Provider Resources, Inc.
RSNAT	Repetitive Scheduled Non-Emergent Ambulance Transport
RSNAT-PA	RSNAT Prior Authorization
SD	Standard Deviation
SNF	Skilled Nursing Facility
SRS	Simple Random Sample

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Executive Summary

Overview

In December 2014, the Centers for Medicare & Medicaid Services (CMS) launched the Medicare Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport (RSNAT-PA) in selected states where expenditures for these services were high compared to other states. The RSNAT-PA model uses prior authorization to reduce ambulance transports that do not meet the Medicare criteria. The goal is to test whether prior authorization can decrease Medicare expenditures without affecting beneficiaries' access to or quality of care. Implementation of the model began in December 2014 in New Jersey, Pennsylvania, and South Carolina (hereafter referred to as Year 1 states). In January 2016, as required by Congress through the Medicare Access and Children's Health Insurance Program Reauthorization Act of 2015 (MACRA), CMS added five more states (Delaware, Maryland, North Carolina, Virginia, and West Virginia) and the District of Columbia (hereafter referred to as Year 2 states). The RSNAT-PA model was scheduled to run through December 1, 2020. On September 22, 2020, CMS announced that it would expand RSNAT-PA nationwide, as the model met expansion criteria under MACRA.[1] Because of the COVID-19 Public Health Emergency, however, CMS will continue to operate the model in the states currently participating but will delay expanding to additional states. CMS indicated that it will continue to monitor the Public Health Emergency and will provide public notice before implementing the model in new states.[2]

RSNAT-PA intends to reduce improper service utilization and expenditures by subjecting RSNAT requests to Medicare Administrative Contractor (MAC) review. The MAC review ensures that the requests comply with documentation and coverage rules (including medical necessity) before claims are submitted for payment. Prior authorization is a review of documentation performed before a provider renders a service and submits a claim for payment to ensure that the claim meets coverage, coding, and clinical documentation requirements. RSNAT-PA requires suppliers with ambulances garaged in the model states to obtain prior authorization for RSNAT services from their MAC, or else be subject to Medicare's prepayment review process. The Medicare prepayment review process is used to examine the claims that CMS-identified providers submit before these claims are paid; it is done to ensure that the provider complied with Medicare's payment rules.

CMS contracted with Mathematica to evaluate RSNAT-PA. The goal of the evaluation is to assess the impact of prior authorization on RSNAT utilization and expenditures, as well as on quality of and access to care, using a mixed-methods approach that includes both primary and secondary data analysis. Because RSNAT use is uncommon among Medicare beneficiaries, we focus impact analysis on beneficiaries with end-stage renal disease (ESRD) and/or severe pressure ulcers. This is the subset of beneficiaries who are more likely to use RSNAT services and who account for more than 85 percent of RSNAT claims, although even within this group the average probability of receiving an RSNAT service in a calendar quarter is less than 10 percent.

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[1] For more information, see https://www.cms.gov/Research-Statistics-Data-and-Systems/Monitoring-Programs/Medicare-FFS-Compliance-Programs/Prior-Authorization-Initiatives/Prior-Authorization-of-Repetitive-Scheduled-Non-Emergent-Ambulance-Transport-.

[2] 85 FR 74725, available at https://www.federalregister.gov/documents/2020/11/23/2020-25728/medicare-program-national-expansion-of-the-prior-authorization-model-for-repetitive-scheduled.

This report provides stakeholder insights from the early and mid-model implementation period, and quantitative data analyses cover the period from January 2012 through December 2019—three years before and five years after the model started for the Year 1 states, and four years before and four years after the model started for the Year 2 states.[3]

RSNAT-PA – From Model Goals to Program Outcomes

Figure ES.1 presents the RSNAT-PA model's key goals and a brief summary of the key results that the model realized.

Figure ES.1. RSNAT-PA goals and results

RSNAT-PA Goals and Results

Purpose: Reduce improper utilization and expenditures by subjecting RSNAT service requests to MAC review to ensure compliance with documentation and coverage rules.

Intervention: Requires suppliers with ambulances garaged in participating states to obtain prior authorization for RSNAT services from their MAC or be subject to prepayment review.

Policy goals	Results
Utilization and expenditures: Reduce unnecessary use and spending	Reduced RSNAT use and expenditures by over 70 percent
	Reduced total Medicare FFS expenditures by 2.4 percent
	Larger impacts in Year 1 states than Year 2 states
Quality and access to care: No widespread negative impact on quality of care and access to care	No increase in emergency service use, hospitalization, or death
	Some reports of delayed or missed treatment, emotional distress
Program operations: Minimize operational complexity	MACs reported successful implementation of the model
	MACs reported decreased PAR processing time
Provider and supplier exit and operations: Retain adequate number of Medicare ambulance service providers	Small, RSNAT-dependent suppliers more likely to exit
	Remaining suppliers reported model impact on operations
	Remaining suppliers were able to serve eligible beneficiaries
Claims denial and PAR non-affirmation: Improved conformity with claims and PAR requirements	Initial increase in denied claims followed by return to baseline

RSNAT= Repetitive Scheduled Non-Emergent Ambulance Transport; RSNAT-PA = RSNAT Prior Authorization; MAC = Medicare Administrative Contractor; FFS = fee-for-service; PAR = Prior authorization requests

Results

RSNAT-PA reduced RSNAT use by 72 percent and RSNAT expenditures by $746 million for the full study population—beneficiaries with ESRD and/or pressure ulcers. Total Medicare fee-for-service (FFS)

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[3] While the model continued through 2020, CMS decided not to evaluate the model beyond 2019 because the agency had adequate evidence to support an expansion decision.

expenditures also decreased in the full study population and for beneficiaries with ESRD, although they increased for beneficiaries with pressure ulcers only.

Overall, our results suggest that the model had no adverse effects on quality of care or access to care. We found no increase in emergency department use, hospitalization, or death among model state beneficiaries relative to comparison state beneficiaries. While we saw some small changes in dialysis use among beneficiaries with ESRD, we found no evidence of reduced access to care resulting in increased hospitalization for complications of ESRD. However, in focus groups, online surveys, and interviews, key stakeholders expressed some concerns about the model's potential effects on quality and access, including beneficiaries experiencing delayed or missed treatments and emotional distress.

In Table ES.1, we summarize key results from the evaluation.

Table ES.1. Final evaluation report findings, by research domain

Utilization and expenditures
• RSNAT-PA reduced RSNAT use and expenditures by 72 percent in model states for beneficiaries with ESRD and/or pressure ulcers, representing approximately $746 million in RSNAT-related savings.
• Both Year 1 and Year 2 cohort states experienced these reductions, but the magnitude of these reductions was generally much larger for the Year 1 states ($112 in Year 2 states, versus $481 in Year 1 states, per beneficiary per quarter), which had higher levels of pre-model RSNAT use. Percentage reductions in the two cohorts were more similar (a 64 percent reduction in Year 2 states, versus a 74 percent reduction in Year 1 states).
• Stakeholders perceived that prior authorization successfully reduced some transportation providers' fraudulent and questionable practices, and that enforcing the existing RSNAT medical necessity guidelines has resulted in significantly fewer RSNAT services being provided and fewer inappropriate prior authorization requests (PARs).

Quality of care and access to care
• RSNAT-PA did not appear to reduce quality of care or access to care for beneficiaries with ESRD and/or pressure ulcers. Beneficiaries were not more likely to use emergency services or to be admitted to the hospital. The model also did not affect the likelihood of death.
• Some destination service providers reported that beneficiaries who qualify for RSNAT under CMS's medical necessity definition may have experienced delayed or missed treatments because of the time required for ambulance suppliers to gather the supporting documentation needed to establish medical necessity and receive affirmation of a PAR.

Program operations
• MACs reported successful implementation of the model and decreased PAR processing over the course of the model.
• MACs reported they used standardized communications to tell suppliers why a PAR was not affirmed and what the resubmission must include, and they referred suppliers to a help center that could answer follow-up questions.
• Ambulance suppliers reported mixed results when they reached out for clarification on PARs. Some felt they received the help they needed, whereas others did not find the MAC help centers useful.

Provider and supplier exit and operations

- The number of RSNAT suppliers in Year 1 states decreased by 45 percent when RSNAT-PA went into effect, with most of the decrease occurring in the first year.
- Suppliers that were smaller and depended more heavily on RSNAT payments were more likely to leave the market.
- A large majority of ambulance suppliers reported difficulty obtaining supporting information from physicians and treatment facilities.
- Many ambulance suppliers and physicians felt that the medical necessity criteria were (1) too narrow, (2) unclear and not well understood, and (3) sometimes applied too rigidly by MACs.
- MAC staff felt that the medical necessity requirement was unclear to some ambulance suppliers, destination service providers, and physicians because application and enforcement of the criteria had been inconsistent before RSNAT-PA.
- Physicians in Year 1 states reported receiving little to no advance notice or educational material about prior authorization before implementation. Year 2 states reported similar problems, despite MAC efforts to improve education and outreach.

Claims denials and PAR non-affirmation

- The claims denial rate rose immediately upon implementation of RSNAT-PA, but within two years it decreased back to the pre-implementation rate.
- Early after implementation, a large portion of PARs were non-affirmed[4] either for technical reasons or because the beneficiary did not meet the medical necessity criteria. MAC personnel reported a sizeable decrease in the number of non-affirmed PARs and improved documentation for all submitted PARs, as ambulance suppliers developed a better understanding of medical necessity guidelines and required documentation.

ESRD = end-stage renal disease; FFS = fee-for-service; MAC = Medicare Administrative Contractor; PAR = Prior authorization request; RSNAT= repetitive scheduled non-emergent ambulance transport; RSNAT-PA =Prior Authorization Model for Repetitive Scheduled Non-emergent Ambulance Transport.

Conclusions

Over the first five years of model implementation for the Year 1 states and the first four years for the Year 2 states, RSNAT-PA had a dramatic favorable impact. For beneficiaries with ESRD and/or pressure ulcers, the model led to reductions in RSNAT use and expenditures—and in total Medicare expenditures. These reductions did not have meaningful adverse impacts on beneficiaries' access to care or quality of care, and ambulance service providers that exited the market were primarily ones that depended heavily on RSNAT. Although we found no evidence of negative impacts on quality of care and access to care based on claims data analysis, a substantial majority of dialysis facility staff, ambulance suppliers, beneficiaries, and physicians interviewed and surveyed believed that the program could have a negative impact on some vulnerable beneficiaries.

A key goal of the model was to use prior authorization to enforce existing coverage and medical necessity requirements. Stakeholders recognized that the model reduced fraud and overuse, but some expressed concerns with MAC administration of prior authorization, including not being able to speak directly with PAR reviewers and receiving unclear feedback on non-affirmations. In addition, many took issue with the current medical necessity requirements for RSNAT coverage,[5] seeing them as too strict.

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[4] Medicare refers to requests for prior authorization that are not approved as "non-affirmative determinations;" these claims are "not affirmed."
[5] This evaluation does not address the appropriateness of the medical necessity guidelines.

Our findings suggest that expanding RSNAT-PA nationwide could produce savings for Medicare without generating measurable adverse impacts on beneficiaries' health overall. That said, we believe these savings would be smaller than those estimated in this report. Given that CMS initially chose model states with particularly high baseline rates of RSNAT use, the findings here may not generalize to states that have more moderate rates of RSNAT use. Although RSNAT utilization and expenditures declined in both Year 1 and Year 2 states, the impacts were considerably smaller in magnitude and somewhat smaller in percentage for the Year 2 states. We believe the smaller savings realized for the Year 2 states provide a more realistic estimate of the potential savings that Medicare might achieve under a national prior authorization program, as compared with the estimated savings in the Year 1 states or for the combined Year 1 and Year 2 states. Furthermore, stakeholders' concerns about adverse impacts suggest that ongoing monitoring of the program is warranted, and that impacts on individual beneficiaries may occur.

While some ambulance suppliers left the market upon model implementation, the remaining suppliers were able to meet the demand for RSNAT services. Exiting suppliers tended to be small, depended heavily on RSNAT for revenue, and served primarily urban beneficiaries. A larger proportion of RSNAT suppliers exited in Year 1 states than in Year 2 states; by the end of the first year of operation, 45 percent of RSNAT suppliers had exited in Year 1 states compared to 13 percent in Year 2 states. We found no evidence that the model disproportionately affected rural beneficiaries, as might be expected if a rural regional sole supplier left the market. As with the beneficiary utilization and expenditure results, the findings for Year 2 state suppliers could provide a more reliable guide to what might occur if CMS extended prior authorization to more states.

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I. Introduction

On November 14, 2014, the Centers for Medicare & Medicaid Services (CMS) announced the implementation of a Medicare prior authorization model for repetitive scheduled non-emergent ambulance transports (RSNAT-PA). The model was initially implemented in selected states that had a high rate of improper payments for these services to ambulance suppliers.[6] Phase I of the model began in December 2014 in New Jersey, Pennsylvania, and South Carolina (hereafter referred to as Year 1 states). In January 2016, Phase II added five more states (Delaware, Maryland, North Carolina, Virginia, and West Virginia) and the District of Columbia (hereafter referred to as Year 2 states) to the RSNAT-PA model as mandated in the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA). CMS's purpose for the model was to test whether prior authorization helps reduce fraud, abuse, and associated expenditures while maintaining access to and quality of care.

In this Final Evaluation Report, we present findings from analyses of primary and secondary data from all eight model states and the District of Columbia (hereafter referred to as the nine model states). Our findings include estimated impacts of the RSNAT-PA model during its first five years as well as information on model implementation and the experiences of ambulance suppliers, destination service providers and staff, and beneficiaries.

Background

Prior authorization

Prior authorization is a utilization management strategy intended to reduce improper payments. Providers must request approval from health care payers for services they intend to provide before they can bill for the services. Payers can review service requests for compliance with coding, billing, and coverage rules (including medical necessity) before the services are provided or reimbursed. Prior authorization is designed to increase compliance with coverage rules and help contain expenditures by reducing waste, fraud, and abuse. Private sector health care payers and other government health care payers, including Medicare Part D pharmaceutical plans, already use prior authorization (TRICARE 2016; American Medical Association 2013; DHHS 2015). Research indicates that such policies can be effective in reducing expenditures for the related service or benefit (MacKinnon and Kumar 2001; Shrank et al. 2019).

A CMS demonstration involving prior authorization for scooters and power wheelchairs showed a large decrease in monthly expenditures for included devices (CMS 2014a). This finding caused CMS to make prior authorization a condition of payment for certain items of durable medical equipment, prosthetics, orthotics, and supplies that are frequently subject to unnecessary utilization.[7,8] A CMS model involving prior authorization for hyperbaric oxygen therapy when used to treat certain non-emergent conditions also found that prior authorization decreased expenditures (Asher et al. 2019). However, that model did not

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[6] Under Medicare, ambulance *suppliers* are freestanding entities. Hospital-based ambulance service entities (or *providers*) are exempt from the prior authorization model.

[7] For more information, see https://www.cms.gov/Research-Statistics-Data-and-Systems/Monitoring-Programs/Medicare-FFS-Compliance-Programs/DMEPOS/Downloads/DMEPOS_PA_Required-Prior-Authorization-List.pdf.

[8] For more information, see CMS 6050-F at https://www.govinfo.gov/content/pkg/FR-2015-12-30/pdf/2015-32506.pdf.

result in a change to Medicare reimbursement policy, as CMS believed that similar savings could be achieved through other means.

RSNAT

RSNAT is defined as medically necessary, non-emergent transportation by ambulance that occurs three times or more during a 10-day period or at least once per week for three weeks or longer. Common destinations for Medicare beneficiaries who require RSNAT include dialysis treatment, chemotherapy, and treatment of non-healing wounds such as debridement, dressing changes, and hyperbaric oxygen therapy. RSNAT is a covered service under Medicare Part B, as long as the recipient beneficiary meets certain criteria—such as being confined to bed or otherwise medically requiring the level of service provided by an ambulance (CMS 2014c).

Audits of Medicare claims and medical records revealed large numbers of improper payments for RSNAT services. A 2015 report from the Office of the Inspector General, U.S. Department of Health and Human Services (DHHS), found that, in the first half of 2012, Medicare paid $24 million for ambulance transports that did not meet Medicare requirements and an additional $30 million for transports that did not correspond to any Medicare services received at the origin or destination (DHHS 2015). That report followed a 2006 report stating that 25 percent of ambulance transports reimbursed in 2002 did not meet Medicare's requirements for coverage; a large share of the reimbursements were improper payments for transport to dialysis or other non-emergency transport (DHHS 2006). Despite consistent evidence that large percentages of RSNAT claims do not meet Medicare's coverage criteria, high rates of improper payments persist (CMS 2014b, 2014c). Also, ground ambulance transport service use grew by 33 percent from 2004 to 2010 (GAO 2012).

In July 2013, concerns about high risk of fraud, waste, or abuse associated with RSNAT claims in certain parts of the country led CMS to impose a moratorium on new ambulance suppliers in several areas (42 CFR §424.570(c); CMS 2016c). The moratorium prohibited new ambulance suppliers in Harris County, Texas, and surrounding counties, as well as in Philadelphia, Pennsylvania, and surrounding counties (including Burlington, Camden, and Gloucester counties in New Jersey) from enrolling in Medicare Part B. CMS extended the moratorium to prohibit any new non-emergency ambulance suppliers in Texas, Pennsylvania, and New Jersey from enrolling in Medicare Part B as of July 29, 2016 (CMS 2016b). The Texas moratorium was lifted effective September 1, 2017, and the moratoria in New Jersey and Pennsylvania were lifted effective January 30, 2019 (Werfel 2018 and 2019).

RSNAT-PA model

RSNAT-PA aims to lower improper Medicare fee-for-service (FFS) use and spending while maintaining quality of care by curtailing proposed RSNAT use that is insufficiently documented, thereby reinforcing the Medicare medical necessity requirement.[9] The model did not alter the conditions for medical necessity, but suppliers and certifying physicians often misunderstand and misapply them. However, there is a risk that prior authorization may result in some beneficiaries experiencing a delay in receiving needed care (Bergeson 2013).

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[9] Medicare's coverage rules state that RSNAT is appropriate if either (1) the beneficiary is bed-confined and other methods of transportation are contraindicated based on the severity of the beneficiary's condition, or (2) the beneficiary's medical condition is such that ambulance transportation is medically required, regardless of bed confinement (42 CFR §410.40(e)(1)).

In December 2014, CMS began RSNAT-PA for ambulance suppliers based in the Year 1 states, which had high rates of utilization and improper payment. Under Section 515 of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA; CHIP is the Children's Health Insurance Program), CMS added the six Year 2 states to the model in January 2016.

Under RSNAT-PA, if ambulance suppliers fail to seek prior authorization for billed services for a beneficiary, all of their RSNAT claims for that beneficiary are subject to automatic prepayment review.[10] Under the Medicare prepayment review process, CMS identifies high-risk providers and suppliers to be subject to prepayment review, and marks their claims as pending and not to be paid until they have been verified.[11] Because of the automatic prepayment review process, suppliers in model states that did not request prior authorization for RSNAT services are subject to prepayment review and could not evade scrutiny for medical necessity and appropriate use.

Due to the COVID-19 pandemic, enforcement of certain claims processing requirements was paused from March 29 through August 2, 2020. During the pause, RSNAT claims were not subject to prepayment review if ambulance suppliers failed to seek prior authorization. Following full resumption of the model, CMS's intention was for Medicare Administrative Contractors (MACs) to conduct post-payment reviews on claims that were subject to the model that were submitted and paid during the pause without prior authorization.

A *Federal Register* notice was published on November 23, 2020 to announce the national expansion of RSNAT-PA model to all states under section 1834(l)(16) of the Act, as added by section 515(b) of MACRA.[12] CMS is delaying implementation of the expansion to all additional states, however, until the COVID-19 public health emergency has ended. CMS will publish another *Federal Register* notice in the future to announce the implementation dates for the remaining states.

Evaluation overview

This evaluation assesses the impact of the RSNAT-PA model on beneficiaries, ambulance suppliers and other medical providers, and the Medicare program in 9 selected states. The evaluation has five domains:

1. **Utilization and expenditures:** Estimate the impact of prior authorization on the volume of RSNAT services delivered and on Medicare expenditures.

2. **Quality and access to care:** Assess whether and how prior authorization affects beneficiaries' quality of care and access to care.

3. **Program operations:** Evaluate the effect of the model on Medicare's (specifically, MACs') program operations

4. **Provider and supplier exit and operations:** Evaluate the effect of the model on ambulance suppliers, particularly their choice of whether to remain in the Medicare program, and other providers.

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[10] Prepayment review was paused in March 2020 due to the COVID-19 pandemic. That policy change did not affect this evaluation, which covers experience through 2019.

[11] As part of this verification, supporting documentation is reviewed to ensure billed services meet Medicare coverage, billing, and coding requirements before they are paid.

[12] For more information, see https://www.cms.gov/Research-Statistics-Data-and-Systems/Monitoring-Programs/Medicare-FFS-Compliance-Programs/Prior-Authorization-Initiatives/Prior-Authorization-of-Repetitive-Scheduled-Non-Emergent-Ambulance-Transport-.

5. **Claims denial and PAR non-affirmation[13]:** Assess whether prior authorization has an impact on the rate of claims denials.

Table I.1 presents the evaluation research questions that we examine in this report.

Table I.1. Evaluation research questions

Research questions, by domain
RSNAT service utilization and Medicare expenditures
How did prior authorization affect:
• RSNAT service use and total Medicare ambulance service use?
• Total expenditures for RSNAT services and for total Medicare ambulance services?
• Total Medicare expenditures?
Quality of care and access to care
Did prior authorization affect:
• Emergency department and emergency ambulance use?
• Unplanned inpatient hospitalizations?
• Mortality?
• Whether beneficiaries experience a delay in services?
• Whether beneficiaries experience lower use of dialysis?
Program operations
What was the impact of the model on MAC operations?
• How was prior authorization implemented by each MAC?
• How long did it take prior authorization staff to process decisions?
• How much of a time and cost burden does prior authorization impose on MACs?
Provider and supplier exit and operations
What was the impact of the model on suppliers' decision to remain in the Medicare program?
• Did the number of suppliers that operated in the market change after prior authorization?
• How did suppliers that exited around the start of prior authorization differ from those that stayed?
• What was the impact of the model on destination service provider operations?
Claims denial and PAR non-affirmation
Did prior authorization affect claims denial rates and PAR non-affirmation?

MAC = Medicare Administrative Contractor; PAR = Prior authorization request; RSNAT = Repetitive Scheduled Non-emergent Ambulance Transport.

To answer the research questions, Mathematica conducted statistical analysis of Medicare claims and other administrative data, and primary data collection and analysis to provide a 360-degree view of the impact of the RSNAT-PA model on beneficiaries, ambulance suppliers, other medical providers, and the Medicare program. For the analyses assessing impacts on expenditures, utilization, quality of care, and access to care, we constructed a comparison group of states similar to the model states and performed analyses at the beneficiary and supplier levels. We conducted both descriptive analyses and multivariate analyses (that is, using multiple independent variables) of key outcomes. We examined intended outcomes, such as changes in the volume of RSNAT services and total ambulance utilization and

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[13] Medicare refers to requests for prior authorization that are not approved as "non-affirmative determinations;" these claims are "not affirmed."

expenditures, as well as unintended outcomes, including impacts on quality of care and access to care. Chapter II provides more detail about the analytic methods we used.

For the primary data collection and analysis, we conducted an online survey with census samples of ambulance suppliers, dialysis and skilled nursing facility providers, and physicians[14] constructed from claims data matched to weekly prior authorization reports. We also conducted a small number of focus groups with participants recruited from those samples. To better understand the implementation process and any associated challenges, we conducted telephone interviews with MAC personnel responsible for maintaining the model and reviewing prior authorization requests (PARs). We also conducted site visits to dialysis facilities and interviewed beneficiaries who currently use or previously used RSNAT. We supplemented on-site interviews with longer beneficiary telephone interviews conducted after the site visits. The sampling and recruiting strategies used for each data collection activity are described in Chapter II. More detailed methodology, along with protocols and survey instruments, are included in Appendices H and I accompanying this report.

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[14] Physicians included here are those who have signed a physician certification statement (PCS), a written order certifying the medical necessity of non-emergency ambulance transports. A PCS is required before submitting a claim for non-emergency scheduled or repetitive ambulance services. The certifying physician's National Provider Identifier (NPI) appears on the ambulance transportation claim. In some cases, an ordering physician signs the PCS (typically the case for dialysis patients requesting RSNAT to and from dialysis from their homes). For beneficiaries residing in skilled nursing facilities (SNFs), the SNF attending physician typically signs the PCS. Throughout this report, "physicians" includes both ordering and attending physicians.

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II. Methods overview

In this chapter, we describe the quantitative and qualitative methods used to examine the research questions of interest in the evaluation of RSNAT-PA. We used a mixed-methods approach for the evaluation, combining secondary and primary data analysis to provide a 360-degree view of overall cost, service utilization, quality, and access impacts, to understand how the implementation process affected stakeholders. More details on methods for each domain are provided in the respective chapters.

Secondary data analysis

Data and study period

We use final action claims for Medicare FFS beneficiaries for dates of service in our study period, excluding duplicate and denied claims.[15] The secondary data analyses cover the period from January 2012 through December 2019. We therefore have data from three years before and five years after the model started for the Year 1 states, and four years before and four years after the model started for the Year 2 states. We compare how outcomes in the model states changed relative to those for the comparison states over this time period.[16] Throughout this report, we refer to the pre-model years as the baseline period.

Study population

States

The states CMS selected for the first year of the model were chosen for their high utilization of ambulance services and high improper payment rates. In contrast, the second-year states were identified in the MACRA law (U.S. Congress 2015) and their ambulance use was closer to the national average. Choosing a valid comparison group was challenging since few states had RSNAT utilization rates similar to the uniquely high RSNAT utilization of the Year 1 states. It is important for the validity of our analytic approach that the comparison group is made up of beneficiaries and suppliers from states with similar pre-model utilization patterns to the model states. To address this challenge, we used a statistical matching technique that is designed to select a group of states that are as similar as possible to the model states on a range of characteristics.

We matched the model states with potential comparison states. Each model state could be matched with up to two comparison states.[17] To support our main analyses, which combined the Year 1 and Year 2 model states, we chose not to distinguish between the Year 1 and Year 2 states when selecting comparison states. We matched on RSNAT utilization, availability of ambulance suppliers, and rural residence. Matching on rural residence was important because we expect prior authorization to affect urban and rural areas differently, given that rural areas have a more limited ambulance supply and fewer

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[15] For all included quarters, we allowed at least three months after the quarter end date for claims to be processed, resulting in at least 84 percent final action inpatient claims and at least 91 percent final action outpatient and professional service claims. In previous reports, we had longer runout, but for this analysis, we decided to include data for dates of service for the entire 2019 calendar year. This decision enabled us to use a full calendar year of claims to construct Hierarchical Condition Category (HCC) flags for sample inclusion and HCC scores for regression control. See the Glossary for more details about HCC flags and HCC scores.

[16] We did not examine the impact on individual states.

[17] The ratio of model to comparison states in matched groups ranged from 1/2 to 2.

transportation alternatives. Table II.1 lists the model and comparison states.[18] More information on our comparison group selection is included in Appendix A.

Table II.1. Model and matched comparison states

Model states (Year 1 states in bold)		Matched comparison states[a]	
Delaware	**South Carolina**	Alabama	Montana
Maryland	Virginia	Florida	Nebraska
New Jersey	West Virginia	Georgia	Ohio
North Carolina	Washington, DC	Indiana	Tennessee
Pennsylvania		Kentucky	Texas
		Louisiana	Washington
		Massachusetts	

[a] In the analysis, we compare the overall group of model states, as well as each model cohort (Year 1 or Year 2 states) to the entire set of comparison states.

Beneficiaries

We conducted the beneficiary analysis at the beneficiary-quarter level. We included a beneficiary-quarter if the beneficiary was enrolled in FFS Medicare for at least part of the quarter and was living in one of the included states (Year 1, Year 2, or comparison states). We excluded beneficiaries who moved between Year 1, Year 2, and comparison states during the study period. This exclusion was to avoid contaminating any of the three groups, and it resulted in excluding about 3 percent of otherwise qualified beneficiaries.

Because non-emergency ambulance service use is relatively rare in the Medicare population, we limited our study population in any given calendar quarter to beneficiaries whose service utilization in that calendar year indicated end-stage renal disease (ESRD) and/or severe (stage 3 or 4) pressure ulcers.[19] During the study period, over 85 percent of RSNAT users in our intervention and comparison states were beneficiaries with ESRD and/or severe pressure ulcers.[20] Restricting to beneficiaries with these conditions enabled us to examine RSNAT use among the beneficiaries who are most likely to use RSNAT, and therefore greatly improved our ability to detect impacts.[21] We identified beneficiaries with these conditions using Hierarchical Condition Category (HCC) flags, which are constructed using claims data.[22] Information on our selection of these conditions is included in Appendix B. Although both ESRD and pressure ulcers are associated with increased RSNAT use, they are very different conditions. These conditions have different implications for frequency of RSNAT use as well as for use of other health care services. For example, beneficiaries with ESRD had a much higher likelihood of using RSNAT in the

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[18] For the comparison group, we used the start date for Year 1 states for Georgia, Indiana, and Tennessee, and the Year 2 start date for the remaining comparison states.

[19] Pressure ulcers, also called decubitus ulcers or bedsores, are localized damage to the skin (and possibly the underlying tissue) that usually occur over a bony prominence as a result of pressure or a combination of pressure and friction. We included the most severe forms—pressure ulcer of skin with full thickness skin loss (stage 3) and pressure ulcer of the skin with necrosis through to muscle, tendon, or bone (stage 4).

[20] Specifically, the percentages of RSNAT use for those with ESRD and/or pressure ulcers were 83, 86, 86, 87, 89, 89, 90, and 92 percent, respectively for 2012 through 2019.

[21] We removed less than 15 percent of the beneficiaries on this basis; excluding them helps avoid bias in the estimated impacts because they might have markedly different characteristics or a dramatically different response to the model than beneficiaries who would likely be affected by RSNAT-PA.

[22] The ESRD groups included in this study were HCC 134 and HCC 136; the pressure ulcer groups were HCC 157 and HCC 158.

baseline period, especially in the Year 1 states (Table II.2). Beneficiaries with both ESRD and pressure ulcers had a utilization rate more than three times higher than the rate for beneficiaries with ESRD only. Therefore, in addition to analyzing the full study sample of beneficiaries with either or both of these conditions, we also considered outcomes for the three possible combinations of these chronic conditions: (1) ESRD only, (2) pressure ulcers only, and (3) ESRD and pressure ulcers.

Table II.2. RSNAT utilization rate in baseline period, by cohort and chronic condition

	Percentage of beneficiaries who used RSNAT in baseline period[a]		
	Year 1 cohort	Year 2 cohort	Comparison
Full sample	10.1%	4.7%	4.9%
ESRD only	13.5%	5.7%	6.1%
Pressure ulcers only	2.9%	2.3%	2.1%
ESRD and pressure ulcers	49.4%	24.8%	29.0%

[a]The baseline period includes 2012–2014 for Year 1 states and 2012–2015 for Year 2 states.

ESRD = end-stage renal disease; RSNAT = repetitive scheduled non-emergent ambulance transport.

We used a statistical weighting technique that is designed to balance the characteristics of the beneficiaries living in the comparison states with those living in the model states.[23] After applying the weights, beneficiaries in comparison states were similar on average to those in model states on all of the baseline demographic and health characteristics examined, indicating that we achieved good balance between the groups.[24] Balance on beneficiary characteristics is shown in Appendix C.

Our final study population consisted of 603,818 beneficiaries who resided exclusively in model states ("model-only" beneficiaries) and 1,129,439 beneficiaries who resided exclusively in comparison states ("comparison-only" beneficiaries). The number of quarters that each beneficiary was part of our sample ranged from 1 to 32 quarters, with a mean duration of 7.8 quarters for model-only beneficiaries and 7.9 quarters for comparison-only beneficiaries. We had a total of 13,590,603 beneficiary-quarters. Of these, 70 percent were for beneficiaries who had only ESRD in the quarter, 27 percent were for beneficiaries who had only pressure ulcers in the quarter, and 3 percent were for beneficiaries who had both conditions.

Suppliers

We identified suppliers from carrier claims based on National Provider Identifier (NPI) and provider state codes.[25] Our study population consisted of all nonhospital-based ambulance suppliers garaged in any of the model or comparison states that billed Medicare for ambulance services in any quarter of our study period. The population included 3,177 model state suppliers and 5,332 comparison state suppliers.

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[23] Appendix C describes this analysis and the specific technique we used in detail.

[24] Baseline differences on all characteristics were less than 15 percent of a standard deviation, which can be adjusted for by including a covariate in a regression model ("What Works Clearinghouse Standard Handbook, Version 4.0," available at https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_standards_handbook_v4.pdf.).

[25] If the provider state code indicated any of the model or comparison states, we matched the corresponding NPI with the National Plan and Provider Enumeration System (NPPES) file to verify the location of the supplier. We excluded three suppliers whose NPI numbers were invalid or who, when matched to the NPPES file, we determined were not garaged in a model or comparison state.

Analytic approach

We used a combination of descriptive and multiple regression analyses to examine the research questions in each domain.[26] The descriptive analyses cannot definitively establish the causal impact of RSNAT-PA, but they provide important high-level information. Our descriptive analyses on beneficiary utilization and expenditures set the stage for more in-depth regression analyses. We also conducted descriptive analysis of supplier exit from the Medicare market, which helps shed light on suppliers' business decisions before and after RSNAT-PA.

We conducted multiple regression analysis to understand the impacts of RSNAT-PA on beneficiaries and on denied claims. Our analysis consisted of estimating regression equations for each outcome using a difference-in-differences approach. Difference-in-differences analysis compares changes in outcomes between baseline and follow-up in the model states to changes in outcomes over the same time frame in the comparison states, controlling for any long-term trends. Its goal is to isolate the impact of the RSNAT model. The difference-in-differences analysis controls for unmeasured, beneficiary- and state-level characteristics that do not change over time and might be related to our outcomes. Our models also controlled for age, age squared, sex, race, rural residence, dual eligibility for Medicare and Medicaid, use of home health services, HCC score, an indicator for residing in a county with an active moratorium on new Medicare suppliers, and length of time since the start of an active moratorium. Standard errors were adjusted to account for correlation between observations on the same individual.

The data processing for this report was done using SAS software (SAS Version 9.4 for Windows; Copyright © [2002-2012] SAS Institute Inc; SAS Enterprise Guide Version 7.15 of the SAS system for Windows Copyright © [2017] SAS Institute Inc).[27] Programs used to optimally match beneficiaries and suppliers from the matched comparison states were written in R.[28] All regressions were conducted in Stata 15.[29]

Assumptions for causality. Under some conditions, estimates from the difference-in-differences approach can be interpreted as the impacts that RSNAT-PA caused. The key assumptions are: (1) trends in outcomes in the model and comparison states were parallel before the model start date; (2) the types of beneficiaries in the study population did not change over the study period; and (3) there were no other changes in the policy environment that could affect our outcomes of interest differently in the model and comparison states. We found support for the first assumption of parallel trends in outcomes—plots of the quarterly trends in key outcomes in model and comparison states revealed very similar patterns during the three- or four-year pre-model period.[30] We also found support for the second assumption in that the observable characteristics of patient populations were similar in the pre-and post-model periods. The characteristics of sample members in the implementation period were very similar to those in the baseline period, for both the treatment and comparison groups. Hence, including beneficiaries based on their diagnosed chronic conditions resulted in a stable population over our study period. For the third assumption, we examined the Medicare policy environment over the study period did not uncover specific

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[26] For definitions of descriptive analyses, multiple regression analyses, and other technical terms, see the Glossary at the end of this report.

[27] SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA.

[28] R is a programming language and free software environment for statistical computing and graphics supported by the R Foundation for Statistical Computing

[29] StataCorp. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC, 2017.

[30] See, for example, Figures III.3 and III.6.

policies that were likely to affect our key outcomes of RSNAT use and expenditures. However, we did learn of policy changes that might have affected our estimates of some quality and access outcomes related to hospitalization (see Section IV for more information).

Subgroups. We examined the impact of RSNAT-PA separately for our three chronic condition subgroups (ESRD only, pressure ulcers only, and both ESRD and pressure ulcers) to assess whether the model affected those groups differently. Because the Year 1 states were selected for their high baseline RSNAT utilization rates, we also estimated the impact of RSNAT-PA separately for the Year 1 and Year 2 model states.[31]

RSNAT-PA could have different impacts on rural and urban beneficiaries due to differences in transportation options. We therefore ran stratified analyses to explore differences in impact based on beneficiaries' type of residential area (rural or urban) to see if the model affected one subgroup more than the other. Similarly, we explored whether model impacts differed by dual eligibility for Medicare and Medicaid. Beneficiaries who qualify for Medicaid have worse health and lower income on average than those who do not, both of which might influence the need for RSNAT. Finally, we repeated our main analysis on the subgroup of beneficiaries who had claims for home health services.[32] We used a home health claim as a proxy for being bedbound, which could indicate a subgroup of beneficiaries who are more likely to qualify for RSNAT services. Balance on baseline characteristics was within acceptable levels for all subgroups.[33] See Appendix E for results from subgroup analyses.

The appendices provide additional detail on our analytical methods. In Appendix A, we describe the comparison group selection methodology and results. In Appendix B, we discuss our quantitative analytic approach for both beneficiaries and suppliers. We used the same regression models to investigate all the research questions. Appendix C shows how the treatment and comparison groups compare on beneficiary baseline characteristics; Appendix D compares characteristics of suppliers in the treatment and comparison states. Appendix E provides supplementary results in figures and tables, such as those that present detailed regression results. Appendices F and G provide statistical power calculations for estimates of impacts on utilization and expenditure measures. Appendix H includes more comprehensive information on coding and data collection methodology, as well as primary data collection protocols. Appendix I presents the online survey questionnaire and results.

Primary data collection and analysis

RSNAT-PA affects several stakeholder groups in the Medicare program. These groups include beneficiaries, destination service providers and staff at dialysis and skilled nursing facilities (SNFs), physicians, ambulance suppliers, and the MACs responsible for processing PARs. Mathematica worked in partnership with its subcontractor Provider Resources, Inc. (PRI) to conduct several rounds of primary

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[31] We used the full set of comparison states in regressions where the model states were limited to Year 1 or Year 2 cohorts.

[32] The stratified analyses are equivalent to including interaction terms between the stratifier (the characteristic used to divide and separately examine the study population, such as rural, dual-eligible, or home health) and all covariates, including the treatment variable. For the rural and dual-eligible subgroup analyses, we conducted additional analyses where we included only a single interaction term between the stratifier (rural or dual-eligible) and the treatment variable. Results were nearly identical to the stratified version. Additional details are provided in Appendix B.

[33] Differences on baseline characteristics were within 20 percent of a standard deviation for all subgroups, which can be controlled for using regression adjustment (see source in footnote 22).

data collection with key stakeholders, from May 2015 through October 2016. We conducted primary data collection in the Year 1 states (New Jersey, Pennsylvania, and South Carolina) and the Year 2 states (Delaware, District of Columbia, Maryland, North Carolina, Virginia, and West Virginia).

The evaluation used various data sources and methodologies to gather insights from these groups to inform CMS about the model's effect on major stakeholders. We selected these methods to capture the wide range of stakeholder perceptions and experiences. The data collection activities included in-depth telephone interviews with personnel from the two MACs administering the model; online focus groups with ambulance suppliers,[34] destination service providers and staff, and physicians; site visits to dialysis facilities that included in-person interviews with beneficiaries and staff; telephone interviews with beneficiaries; and an online survey of stakeholders in each state. Table II.3 summarizes these primary data collection efforts.

Table II.3. Stakeholders, data collection type, sample size, and timeline

Stakeholder group	Data collection type	Year 1 states (NJ, PA, SC) Sample size and timeline	Year 2 states (DE, DC, MD, NC, VA, WV) Sample size and timeline
MAC staff	Telephone interviews	13 participants March 2016	6 participants June 2016
Ambulance suppliers, dialysis providers and staff, skilled nursing facility staff, and physicians	Focus groups	85 participants March–May 2016	69 participants July–August 2016
Dialysis providers and staff	In-person[a] and telephone interviews	12 participants July 2016	2 participants September–December 2016
Beneficiaries and caregivers	Telephone interviews	26 participants July 2016	20 participants September–December 2016
Ambulance suppliers, dialysis and SNF staff, and physicians	Online survey	326 respondents August–September 2016	203 respondents December 2016–February 2017

[a]On-site interviews were only conducted in Year 1 states.

MAC telephone interviews

MACs are responsible for conducting medical necessity reviews, issuing notifications of affirmative or non-affirmative prior authorization determinations, and reviewing, paying, or denying claims.[35] PRI conducted semi-structured, in-depth telephone interviews with PAR reviewers, supervisors, and managers from the two MACs to collect a description of (1) the model ramp-up and early implementation activities, (2) MAC-specific protocols for processing RSNAT PARs, and (3) provider outreach and education efforts. In addition, we sought to obtain respondents' perspectives on (4) the model's initial effects on providers' billing behavior, and (5) preliminary lessons learned and best practices in implementing prior

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[34] Ambulance suppliers included in the study are those that were in operation at the time of each primary data collection activity. We did not conduct data collection with suppliers that closed and exited the Medicare program prior to data collection.

[35] Medicare refers to requests for prior authorization that are not approved as "non-affirmative determinations;" these claims are "not affirmed."

authorization. In Appendix H.1, we detail the interview timeline and number of participants from each MAC.

Focus groups

We conducted online focus groups with ambulance suppliers, destination service providers and staff from dialysis and skilled nursing facilities, and physicians. During each group's scheduled week, participants logged in and out of the discussion when it was most convenient for them—a critical factor in gaining cooperation among business and professional staff at these organizations. Further, given that the prior authorization model was taking place across several states, online focus groups allowed us to include participants in several locations at one time.

The evaluation team relied on weekly prior authorization reports from CMS matched to Medicare claims data to identify ambulance suppliers, dialysis providers, SNF staff, and physicians in model states that had documented experience with prior authorization. Using approved recruiting scripts, staff at Mathematica contacted stakeholders by telephone to ask them to participate in the focus groups. The recruiting protocols established stakeholders' eligibility (experience with prior authorization) before Mathematica staff invited them to participate in the appropriate online focus group.

When recruiting physicians by telephone, Mathematica staff experienced difficulty reaching physicians directly using the available contact information; for this reason, we supplemented the existing sample with the Manthan MDThink panel, a longitudinal panel of more than 250,000 physicians nationwide in more than 75 specialties. Manthan MDThink panel recruiters offered all physicians who met the study eligibility criteria (practicing in a model state and experience with prior authorization) incentives of $50 to $150, at the discretion of the recruiting team.

Focus groups were recruited on a first-come, first-served basis until each focus group was full; therefore, not all eligible stakeholders had the opportunity to participate in this activity and the results may not be representative of all stakeholders. In Appendix H.1, we detail the focus group procedures, timeline, and participation rate for each stakeholder group.

Site visits and beneficiary interviews

The evaluation team conducted site visits to outpatient dialysis facilities in Year 1 states to explore beneficiaries' experiences with the model. During the site visits, the evaluation team conducted brief in-person and telephone interviews with beneficiaries. Facility staff and social workers at approved facilities identified beneficiaries for interviews. Although we conducted no site visits in Year 2 states, we conducted beneficiary interviews by telephone.

Site visits were limited exclusively to dialysis facilities because ambulance claims data indicated that beneficiaries use RSNAT services primarily for transportation to and from dialysis treatment. Even though the site visits could not capture the full range of beneficiaries' access to outpatient dialysis treatments, we ensured that the target sample of sites within each state was as geographically diverse as possible to encompass a wide range of beneficiary experiences.

Beneficiary interviews focused on medical necessity, transportation utilization, health care utilization, beneficiaries' access to and quality of care, and beneficiaries' overall experiences and satisfaction. The evaluation team developed posters and postcards to promote patient awareness of and interest in the evaluation before the site visits Participating beneficiaries received a $20 Walmart debit card as a thank

you for talking about their experiences. More information on the beneficiary interviews can be found in Appendix H.5.

Interview and focus group analysis

We manually coded transcripts of recorded interviews and online focus groups using NVivo qualitative analysis software and then analyzed them by running coding queries focused on a specific evaluation research question. Because the site visit interviews with dialysis staff and beneficiaries were not audio recorded in Year 1 data collection, we relied on interviewer notes to incorporate those findings with the content analyzed in NVivo.

Online survey

After completing online focus groups and interviews with suppliers, destination service providers, beneficiaries, and physicians in Year 1 and Year 2 states, Mathematica developed and fielded a web-based survey with a wider group of stakeholders in model states to validate the key themes that emerged during earlier primary data collection with a larger population. The 15-minute online survey instrument contained a set of core questions for stakeholders being surveyed (ambulance suppliers, dialysis providers, SNF staff, physicians), along with additional questions specific to each stakeholder group. We revised the survey instrument slightly between Year 1 and Year 2 administration. The survey field period for Year 1 model states was August 3, 2016, to September 28, 2016, whereas the survey field period for the Year 2 states was December 13, 2016, to February 24, 2017. Appendix I presents response rates by stakeholder group.

The same sample file used to recruit ambulance suppliers, dialysis providers, SNF staff, and physicians for the online focus groups was used for the online survey of stakeholders. This file matched prior authorization reports of Medicare claims data that we used to identify stakeholders with documented prior authorization experience. In Year 1 states, we selected a stratified subsample of 450 physicians to receive invitations to participate in the survey. In Year 2 states, the full sample of physicians received survey invitations (522 physicians). To improve our contact rate with physicians, we used MMS, Inc., a health care list and email marketing company, to match our sampled physician NPIs to the American Medical Association (AMA) mailing list. We mailed physicians a $100 prepaid incentive check with the survey invitation packet in an effort to boost response rates among this hard-to-convert population. Through MMS, Inc., we emailed survey reminders to non-responding physicians at three points during data collection.

Online survey analysis. We analyzed survey data by running cross-tabulations and summary statistics within the computer-assisted interviewing (CAI) system as well as through MS Excel analysis templates. We ran the analysis by question, calculating summary statistics for our entire stakeholder group of interest as well as statistics for each stakeholder group.

III. Utilization and expenditures

We examined the research question, "How does the prior authorization model affect Medicare service use and expenditures?" We used a mixed-methods approach to shed light on changes in RSNAT utilization and expenditures, as well as on the potential for reduced fraud and abuse.

Summary of Findings

- RSNAT-PA reduced RSNAT use by 72 percent, and RSNAT expenditures by $746 million across the nine model states over the model period. Reductions were larger in Year 1 states, which had much higher baseline utilization and expenditures. For example, Year 1 states experienced $481 per beneficiary per quarter in reduced RSNAT expenditures compared to $112 in Year 2 states. Reductions were also larger for beneficiaries with ESRD.

- Total Medicare FFS expenditures declined 2.4 percent ($381 per beneficiary per quarter) for the full study population. Decreases were concentrated among beneficiaries with ESRD (with or without pressure ulcers), driven by the reductions in RSNAT expenditures. Total expenditures increased for beneficiaries with pressure ulcers only.

- Ambulance suppliers, dialysis providers and staff, SNF staff, and physicians perceived that some transportation suppliers had engaged in fraudulent or questionable practices before the prior authorization model was implemented. Ambulance suppliers in Year 1 states were more likely than suppliers in Year 2 states to report that fraud was common in their industry.

- The stakeholders perceived that the model successfully reduced the use of medically unnecessary ambulance transport.

Methods

Secondary data analysis

Using claims data, we conducted descriptive analyses to measure changes in RSNAT utilization and expenditures after implementation of RSNAT-PA. In particular, we considered two outcomes, both per beneficiary per quarter:

1. The probability of having an RSNAT service. A trip is considered RSNAT if it is non-emergent and occurs as part of a sequence of trips that satisfies the model definition of RSNAT.[36]

2. Payments to suppliers for RSNAT services.

We then conducted multiple regression using a difference-in-differences analysis to estimate the causal impact of RSNAT-PA on ambulance utilization and expenditures. We considered the following seven outcomes:[37]

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[36] RSNAT is defined as three or more medically necessary trips in a 10-day period, or at least once per week for three weeks or more.
[37] Findings on outcomes not shown in the main report are included in Appendix E.

1. Whether the beneficiary used RSNAT service

2. Number of RSNAT service trips

3. Whether the beneficiary used any ambulance (results in Appendix E)

4. Total number of ambulance trips (results in Appendix E)

5. RSNAT expenditures (including expenditures for mileage)

6. All ambulance expenditures (results in Appendix E)

7. Total Medicare FFS expenditures

Before the model was implemented, beneficiaries with ESRD and/or pressure ulcers in model states had consistently higher quarterly utilization of and expenditures for ambulance services than the comparison beneficiaries. RSNAT utilization was over 30 percent higher and expenditures were nearly 40 percent higher (Figure III.1).[38] This difference is by design—CMS selected states with high rates of RSNAT use for RSNAT-PA (Year 1 states). Other than expenditures related to RSNAT, the composition of baseline total expenditures was comparable between the model and comparison states with one exception: model states had much lower home health expenditures than comparison states.[39] Home health services typically require a beneficiary to be homebound, which is similar to the RSNAT requirements. The fact that model states had lower home health expenditures and yet higher RSNAT expenditures reinforces the likelihood that RSNAT was overused in the model states before implementation.[40] The similarity between model state and comparison state beneficiaries on most other types of expenditures suggests that the model state beneficiaries were not simply heavy users of health care in general, rather that their use of RSNAT was unusually high.

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[38] Figure III.1 compares utilization over the entire baseline period. We also verified that trends for each outcome measure were parallel for model and comparison states over the duration of the baseline period. For example, see Figure III.2.

[39] The difference arose primarily from a greater proportion of comparison state beneficiaries having any home health expenditures (18 percent versus 13 percent in model states). Among beneficiaries with any expenditures in a quarter, expenditure amounts were similar between model ($3,400) and comparison states ($3,600).

[40] Another possibility is that beneficiaries used RSNAT in lieu of home health—access to ambulance transportation could have facilitated office-based services among beneficiaries who would otherwise use home health services, even though transport to certain destinations, such as physician's offices, are not covered under Medicare.

Figure III.1. Percentage differences in baseline utilization and expenditures between model and comparison states
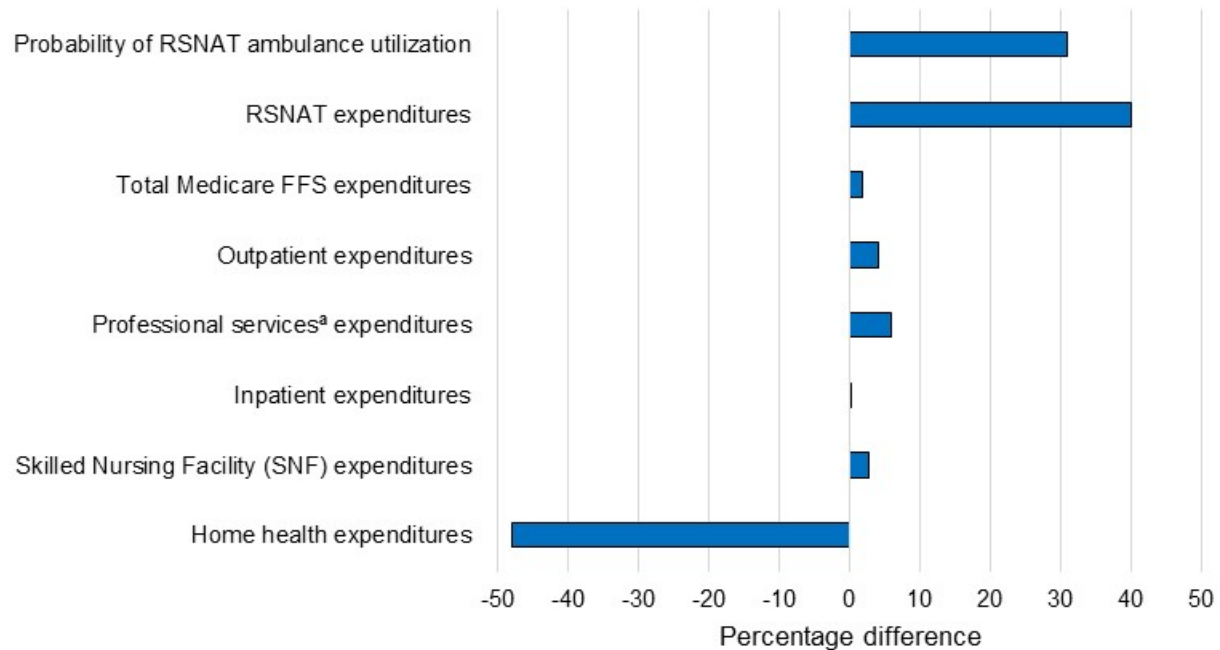
Note: The baseline period is 2012–2014 for Year 1 states and 2012–2015 for Year 2 states. Bars to the right of the 0-axis represent greater utilization/expenditures in the model states; bars to the left of the 0-axis represent lower utilization/expenditures in the model states. Utilization and expenditures are measured per beneficiary per quarter. Comparison group individuals are weighted to resemble model state individuals on baseline demographic and health characteristics. The model states were Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

[a] Professional services providers include physicians, physician assistants, clinical social workers, and nurse practitioners, as well as some organizational providers such as independent clinical laboratories, ambulance providers, free-standing ambulatory surgical centers, and free-standing radiology centers.

FFS = fee-for-service; RSNAT = repetitive scheduled non-emergent ambulance transport.

We used our difference-in-differences regression model framework to assess the impact of RSNAT-PA on RSNAT utilization and expenditures. We estimated these models over the full study population of beneficiaries with ESRD and/or pressure ulcers, as well as separately for the three chronic condition subgroups and for the two model cohorts. We also explored whether impacts differed between rural and urban beneficiaries or between dually eligible and non-dually eligible beneficiaries. Finally, we analyzed impacts for the subgroup of beneficiaries with a claim for home health services, which served as a proxy for meeting the RSNAT medical necessity criteria.

Primary data collection

Mathematica, in partnership with PRI, conducted interviews with MAC staff, followed by interviews, focus groups, and an online survey with destination service providers, physicians, and ambulance suppliers to shed light on how the introduction of prior authorization affected RSNAT service use and how medically unnecessary ambulance use changed. Table II.3 (in Chapter II: Methods Overview) provides the sample size and data collection schedule for each of these data collection activities, which

occurred between March 2016 and February 2017. Detailed methods, interview and focus group guides, and online survey questions appear in Appendices H and I.

Results

RSNAT utilization

Results from our mixed-methods approach indicate that RSNAT-PA substantially reduced utilization of RSNAT services in the model states. Analyses of claims data and stakeholder perceptions reflect large decreases in utilization attributable to prior authorization.

Analysis of claims data

Descriptive and multiple regression analyses using claims data show a large decrease in RSNAT utilization. We first plotted weighted, unadjusted RSNAT utilization over the study period (2012–2019). This enabled us to assess aggregate changes following model implementation. Our analysis shows about a 70 percent decrease between baseline and follow-up among beneficiaries with ESRD and/or pressure ulcers, but no discernible trend in comparison states (Figure III.2).[41] We observed a drop of around 70 percent in RSNAT utilization for Year 1 model states immediately following implementation at the end of 2014. We saw a smaller (but similar in percentage terms) decrease immediately following implementation in the Year 2 model states (which had started from a much lower utilization level) at the start of 2016. We saw no deviation from the baseline trend in the comparison states at the implementation date for either Year 1 or Year 2 states.

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[41] The figures showing unadjusted utilization and expenditures also show a seasonal pattern that arises from our strategy of including beneficiaries annually by HCC score. The study population in early quarters of the year includes beneficiaries who will eventually be diagnosed with qualifying conditions, but whose disease state is not yet advanced enough to require RSNAT. As a result, utilization rates are lower earlier in the year than later, when all included beneficiaries have received their diagnoses. This seasonal pattern is identical for model and comparison groups and does not pose a problem for our difference-in-differences design, which includes quarter fixed effects.

Figure III.2. Probability of RSNAT utilization among beneficiaries with ESRD and/or pressure ulcers, by quarter
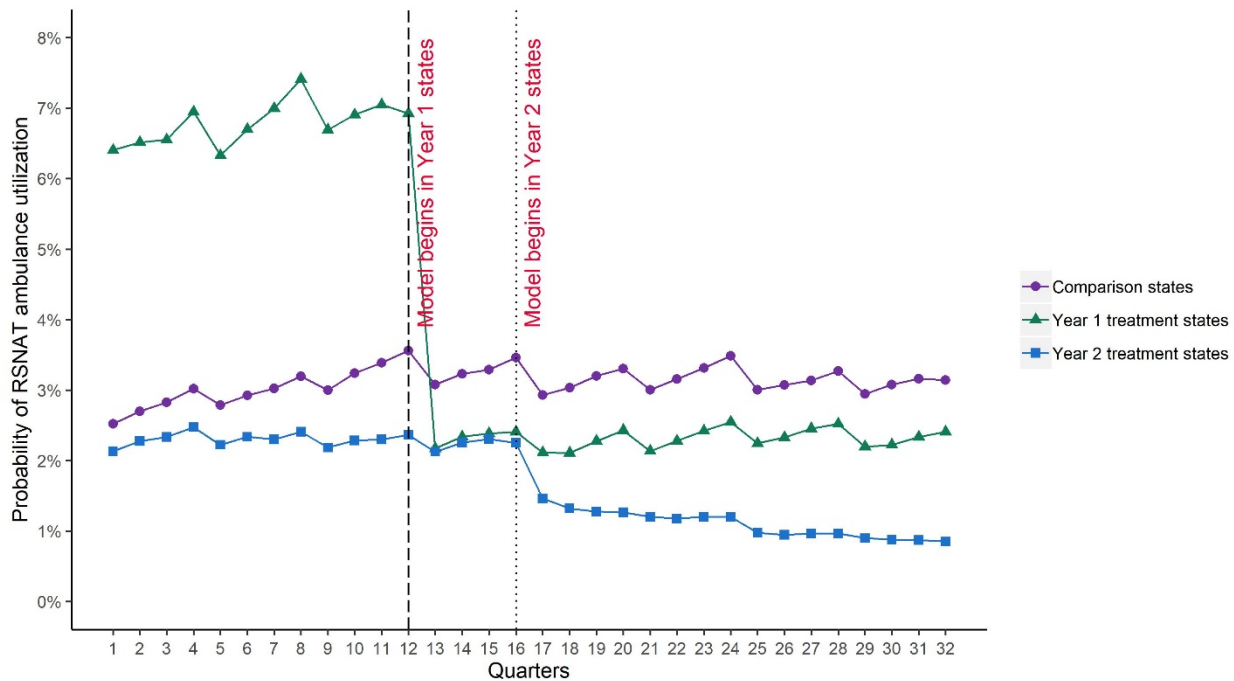
Source: Medicare FFS claims January–March 2012 (Q1) through October–December 2019 (Q32).

Note: Year 1 model states were New Jersey, Pennsylvania, and South Carolina. Year 2 model states were Delaware, Maryland, North Carolina, Virginia, West Virginia, and the District of Columbia.

ESRD = end-stage renal disease; RSNAT = repetitive scheduled non-emergent ambulance transport.

We next performed difference-in-differences regression analyses to build on the aggregate descriptive analysis and gauge the impact of RSNAT-PA. We performed these analyses on the full study population (beneficiaries with ESRD and/or pressure ulcers), as well as separately on the ESRD and pressure ulcer subgroups and in Year 1 versus Year 2 states. Each analysis provides important insights into the impact of the model and the possible explanations for the effects we observed. Appendices F and G describe the precision of the analysis.

Controlling for beneficiaries' demographic and health characteristics, we found that RSNAT utilization decreased as a result of RSNAT-PA. In the full sample of beneficiaries with ESRD and/or pressure ulcers, the probability of RSNAT service decreased by 3 percentage points relative to the comparison group. This represents a decrease of about 72 percent of their baseline utilization rate. The left panel of Figure III.3 illustrates this finding. We also found a decrease of a similar magnitude in any Medicare ambulance use, suggesting that other types of ambulance trips (such as emergency ambulance trips) did not substitute for RSNAT trips during the period when RSNAT trips declined. (Appendix Table E.5). It also suggests that other types of ambulance trips (such as emergency ambulance trips) did not substitute for RSNAT trips during the period when RSNAT trips declined.

We also examined the impacts on utilization in the subgroups of beneficiaries who had both ESRD and pressure ulcers, pressure ulcers only, and ESRD only. The right panel in Figure III.3 shows that the percentage point effects of the model were largest for beneficiaries with both ESRD and pressure ulcers, but the proportional decline was largest for those with ESRD only. Beneficiaries who had both conditions had the highest use of RSNAT services in the baseline period; the quarterly probability that they would

use RSNAT was 24 percent. During RSNAT-PA, utilization decreased over 11 percentage points for this subgroup, relative to beneficiaries in the comparison states. This change represents a decrease of almost one-half of their baseline utilization rate. In comparison, beneficiaries with pressure ulcers only had the lowest use of RSNAT services in the baseline period, at 1 percent. These beneficiaries experienced a decrease of 0.3 percentage points, a small absolute drop that nonetheless was nearly one-third of the baseline rate. Beneficiaries with ESRD only had an intermediate baseline use rate of 4 percent. They experienced a 3.2 percentage point decrease in the probability of RSNAT use, relative to the comparison group. This change represents a decrease of well over three-quarters of their baseline utilization rate.

Figure III.3. Impact of RSNAT-PA on RSNAT use per beneficiary per quarter, full sample and by chronic condition
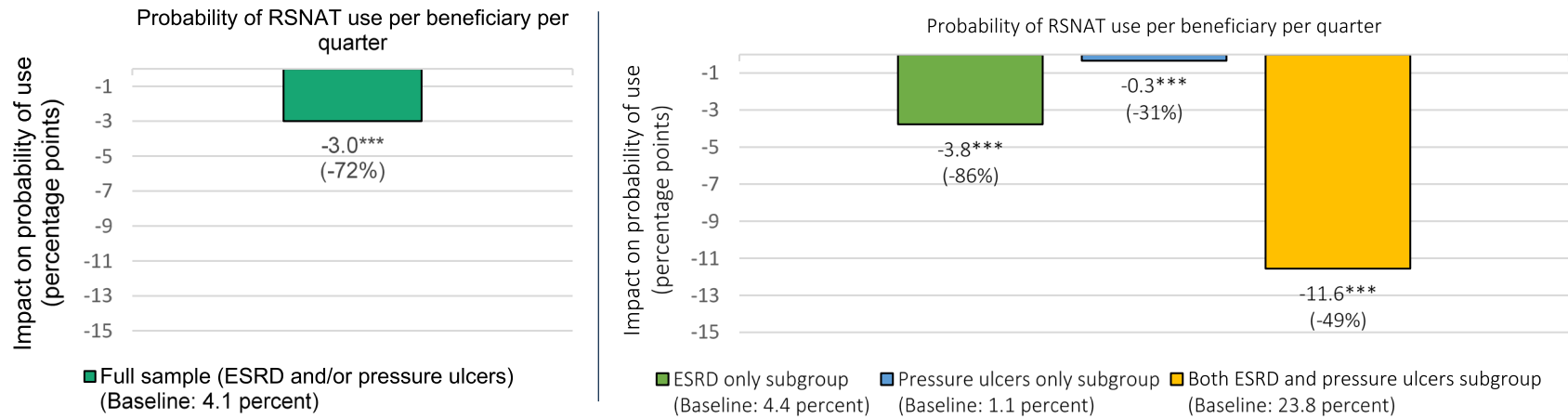
Note: Figure presents results from logistic regression analysis of claims between 2012 and 2019 for beneficiaries with ESRD and/or pressure ulcers (13,213,891 beneficiary-quarters), ESRD only (9,169,739 beneficiary-quarters), pressure ulcers only (3,645,439 beneficiary quarters), and both ESRD and pressure ulcers (398,713 beneficiary quarters).

*** p < 0.001.

ESRD = end-stage renal disease; RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

Results by model cohort. We estimated the impact of RSNAT-PA separately in the Year 1 and Year 2 model states.[42] We did so because CMS included them in the model for different reasons, and therefore the conclusions we can draw from the results might depend on whether the results differ by cohort.[43] Both cohorts had statistically significant decreases in utilization, but the absolute magnitudes were much larger for Year 1 model states. This result is not surprising, given that Year 1 states had substantially higher baseline utilization rates. The difference in impacts was statistically significant, indicating that RSNAT-PA did have a larger effect in the Year 1 states. Percentage declines relative to baseline were also somewhat larger in Year 1 states (70 percent) than in Year 2 states (58 percent). Figure III.4 presents the utilization results by model cohort.

Figure III.4. Impacts of RSNAT-PA on RSNAT utilization per beneficiary per quarter, by cohort
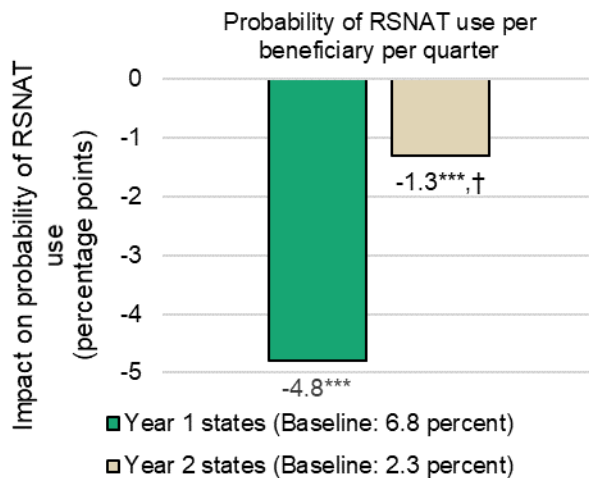
Note: Figure presents results from logistic regression analysis of claims between 2012 and 2019 for beneficiaries with ESRD and/or pressure ulcers (13,213,891 beneficiary-quarters).

*** $p < 0.001$.

† The difference between the Year 1 and Year 2 impact estimates is statistically significant at the 0.05 level.

FFS = fee-for-service; RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

Stakeholder perceptions

Ambulance suppliers and destination service providers across Year 1 and Year 2 states reported that prior authorization had a significant impact on RSNAT utilization. They perceived a notable decline in the number of beneficiaries approved for ambulance transport under RSNAT-PA. As shown in Figure III.5, a slight majority of stakeholders (ambulance suppliers, dialysis and SNF staff, and physicians) in both Year 1 and Year 2 states agreed or strongly agreed that "the prior authorization model has been successful in reducing the use of medically unnecessary ambulance transport" (59 percent in both Year 1 and Year 2 states).

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[42] We used the full set of comparative states for each regression, limiting to one set of model states at a time. A robustness check using the full set of states and a simple interaction term to capture the difference in impact between the Year 1 and Year 2 states yielded similar results.

[43] Year 1 states were selected for high RSNAT utilization; Year 2 states were included as required by MACRA.

Figure III.5. Stakeholders' perceptions of the model's effect on reducing medically unnecessary ambulance transport
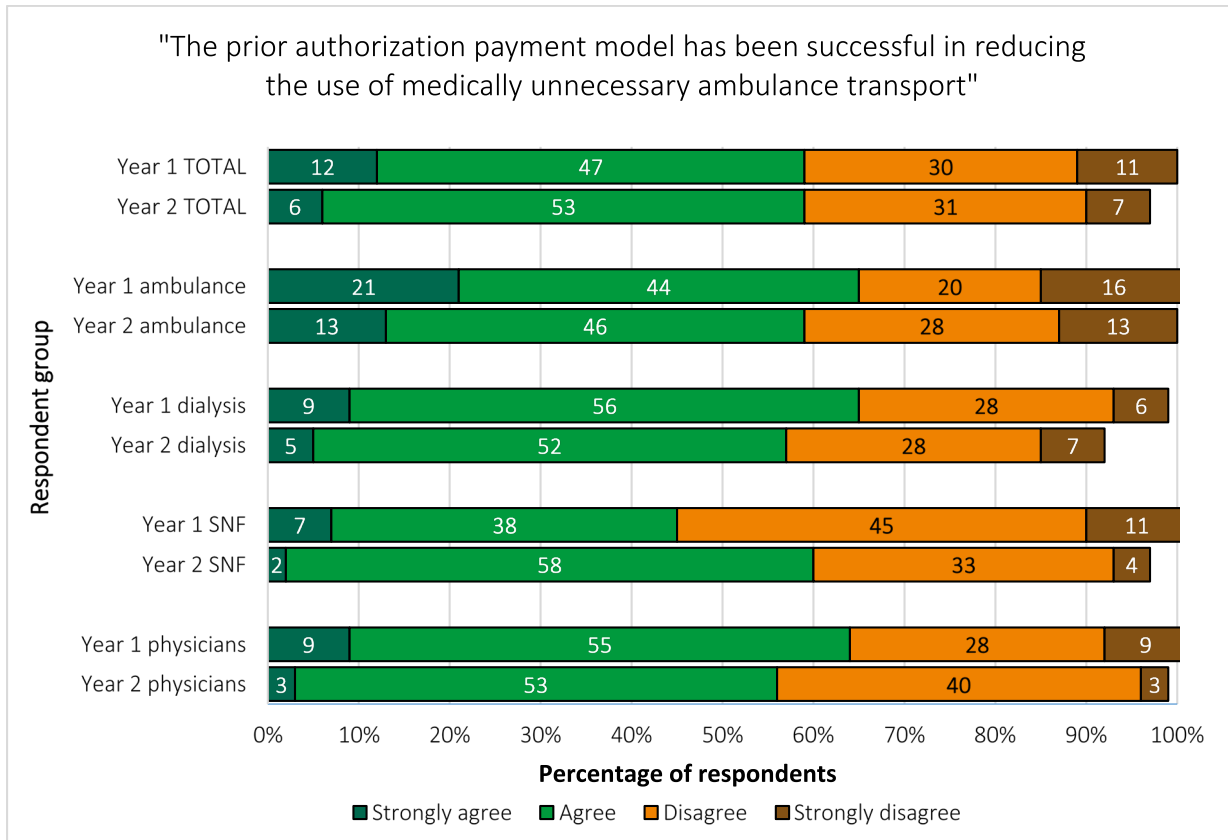
"The prior authorization payment model has been successful in reducing the use of medically unnecessary ambulance transport"

Respondent group	Strongly agree	Agree	Disagree	Strongly disagree
Year 1 TOTAL	12	47	30	11
Year 2 TOTAL	6	53	31	7
Year 1 ambulance	21	44	20	16
Year 2 ambulance	13	46	28	13
Year 1 dialysis	9	56	28	6
Year 2 dialysis	5	52	28	7
Year 1 SNF	7	38	45	11
Year 2 SNF	2	58	33	4
Year 1 physicians	9	55	28	9
Year 2 physicians	3	53	40	3

Percentage of respondents

■ Strongly agree ■ Agree ■ Disagree ■ Strongly disagree

Note: The information in this figure was obtained from online surveys conducted with ambulance suppliers, dialysis and SNF staff, and physicians.

Year 1 refers to Year 1 states; Year 2 refers to Year 2 states.

Percentage of respondents may not add to 100 percent due to respondent non-response on some items.

Percentage of respondents may exceed 100 percent when added due to rounding up to a whole number.

Respondent group total sample sizes = 326 for Year 1 states, and 203 for Year 2 states.

SNF = skilled nursing facility.

Potential explanations for reduced utilization

Across stakeholder groups, respondents reported that they believed prior authorization had reduced RSNAT utilization in two fundamental ways: (1) reduced fraud and (2) reduced use of non-authorized RSNAT services.

Reduced fraud. Ambulance suppliers[44] and dialysis facility staff reported in focus groups that, before prior authorization, some transportation suppliers engaged in fraudulent or questionable practices. These practices included "hanging out" at dialysis facilities to "actively recruit" ambulance transport beneficiaries who clearly did not require it. In the online surveys, majorities of stakeholders in both Year

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[44] These findings reflect the opinions of ambulance suppliers that remained in operation at the time of data collection, following implementation of RSNAT-PA.

1 and Year 2 states agreed or strongly agreed that fraud was a significant problem in the ambulance transportation industry before the model began, though the proportion of stakeholders in Year 2 states was slightly lower (62 percent of those in Year 1 states; 51 percent in Year 2 states). In both sets of states, ambulance suppliers were the most likely to agree that fraud was a significant problem before prior authorization, although ambulance suppliers in Year 2 states were less likely to agree this was the case compared to those in Year 1 states (83 percent of those in Year 1 states; 67 percent in Year 2 states). Nonetheless, a sizeable minority of providers did not agree that fraud was a problem. Detailed survey results for these and other questions can be found in Appendix I.

Reduced use of non-covered services. Ambulance suppliers, destination service providers, and physicians also commonly reported that prior authorization reduced RSNAT utilization by non-affirming PARs for beneficiaries whom they felt needed some level of transportation assistance. Ordering the unnecessary ambulance transport led to higher expenses than were warranted. In other cases, stakeholders reported that they felt patients required RSNAT because of their physical condition and mobility limitations, even if they did not meet the RSNAT medical necessity requirements. Stakeholders also perceived that some beneficiaries who do not need stretcher transport relied on RSNAT because it was their only affordable, reliable transportation option. We discuss this point further in Domain 2: Quality of Care and Access to Treatment.

The majority of destination service providers and ambulance suppliers in Year 1 and Year 2 states agreed or strongly agreed that "Some beneficiaries who 'truly' need ambulance transportation are now being non-affirmed for RSNAT because of the prior authorization model." In response to this statement, the majority of destination service providers and ambulance suppliers in Year 1 and Year 2 states agreed or strongly agreed this was the case (Appendix I). Our interviews with the MACs suggested that PARs were typically not affirmed because beneficiaries did not meet CMS's pre-model medical necessity requirements (which are defined in CFR, Title 42, Chapter IV, Part 410.40).[45] Stakeholders who participated in interviews and focus groups often noted that the medical necessity requirement was the source of many of what they view as "incorrect" PAR determinations. We discuss these points further in Domain 4: Provider and Supplier Exit and Operations.

Expenditures

Consistent with our quantitative estimates of reduced utilization and stakeholders' perceptions of reduced fraud and overuse, quantitative analyses of RSNAT expenditures indicated sizeable decreases attributable to RSNAT-PA. A plot of weighted, unadjusted RSNAT expenditures over the study period shows parallel baseline trends followed by an approximately 70 percent decrease between baseline and follow-up in

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[45] These regulations state the following: "Medical necessity requirements—(1) General rule. Medicare covers ambulance services, including fixed wing and rotary wing ambulance services, only if they are furnished to a beneficiary whose medical condition is such that other means of transportation are contraindicated. The beneficiary's condition must require both the ambulance transportation itself and the level of service provided in order for the billed service to be considered medically necessary. Nonemergency transportation by ambulance is appropriate if either: the beneficiary is bed-confined, and it is documented that the beneficiary's condition is such that other methods of transportation are contraindicated; or if his or her medical condition, regardless of bed confinement, is such that transportation by ambulance is medically required. Thus, bed confinement is not the sole criterion in determining the medical necessity of ambulance transportation. It is one factor that is considered in medical necessity determinations. For a beneficiary to be considered bed-confined, the following criteria must be met: (i) The beneficiary is unable to get up from bed without assistance. (ii) The beneficiary is unable to ambulate. (iii) The beneficiary is unable to sit in a chair or wheelchair."

model states, similar to the decrease seen above for RSNAT utilization (Figure III.6). The drop in expenditures in both sets of model states occurred immediately following implementation. We saw no deviation from the baseline trend in the comparison states at the implementation date for either Year 1 or Year 2 states.

Figure III.6. Average RSNAT expenditures among beneficiaries with ESRD and/or pressure ulcers, by quarter
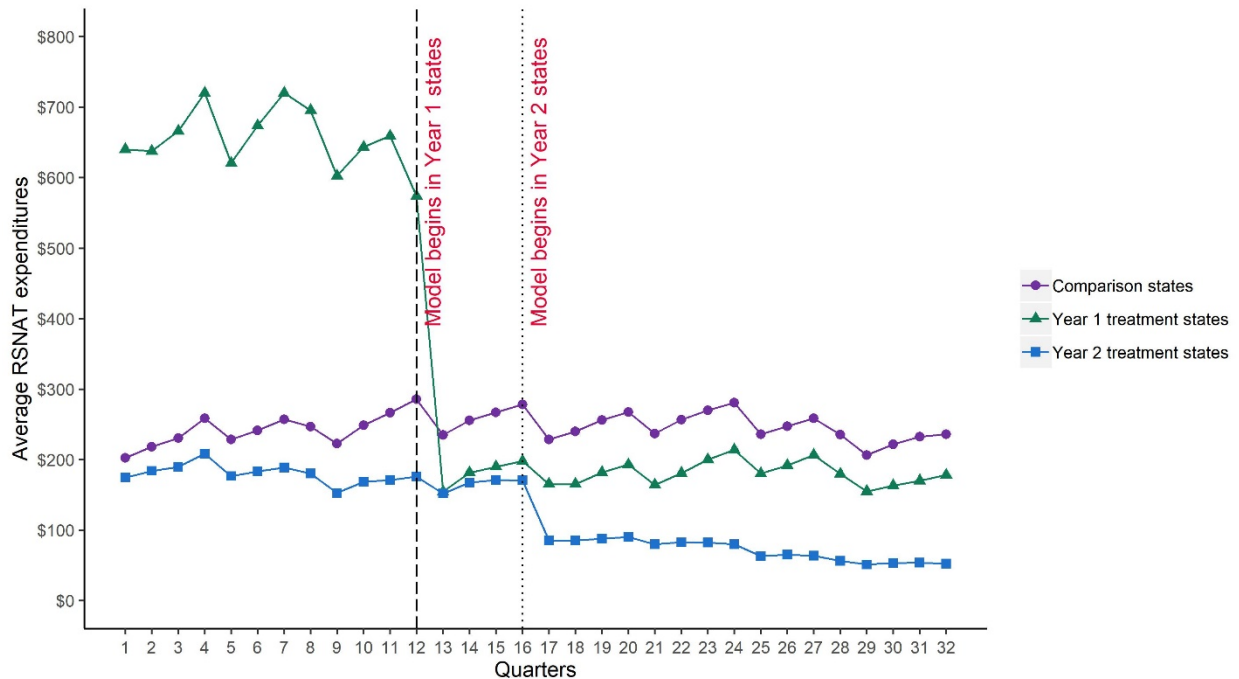
Source: Medicare FFS claims January–March 2012 (Q1) through October–December 2019 (Q32).

Note: Year 1 model states were New Jersey, Pennsylvania, and South Carolina. Year 2 model states were Delaware, Maryland, North Carolina, Virginia, West Virginia, and the District of Columbia.

ESRD = end-stage renal disease; RSNAT = repetitive scheduled non-emergent ambulance transport.

We next estimated difference-in-differences regression models to gauge the impact of RSNAT-PA on expenditures. We estimated impacts on expenditures for RSNAT services and on total Medicare FFS expenditures to examine whether RSNAT savings were counterbalanced by increased costs for substitute services.

RSNAT expenditures. We found that RSNAT expenditures declined as a result of the model. RSNAT expenditures decreased by 72 percent, or an average of $281 per beneficiary per quarter (left panel of Figure III.7). This translates into an estimated cumulative savings to Medicare of about $746 million for RSNAT services for beneficiaries with ESRD and/or pressure ulcers over the post-implementation study period (20 quarters for Year 1 states, 16 quarters for Year 2 states), or an average of $149 million per year since the model started. In addition, average quarterly expenditures on all Medicare ambulance services per beneficiary declined by $352, or 55 percent (Appendix Table E.5). Beneficiaries with ESRD (with or without pressure ulcers) accounted for most of the decrease in RSNAT expenditures (right panel of Figure III.7). Beneficiaries with pressure ulcers only saw a small decrease ($13 per beneficiary per quarter, or 47 percent).

Total Medicare expenditures. For the full sample (beneficiaries with ESRD and/or pressure ulcers), total Medicare health care expenditures decreased by 2 percent, or $381 per beneficiary per quarter (left panel of Figure III.8). This decrease is larger than the estimated reduction in expenditures on RSNAT services ($281) and translates to cumulative savings to Medicare of about $1 billion for beneficiaries with ESRD and/or pressure ulcers in the model states over the post-implementation study period. The total expenditure results differed between the three chronic condition subgroups (right panel of Figure III.8). Total Medicare expenditures fell by 4 percent, or $590 per beneficiary per quarter, for beneficiaries with ESRD only, and by 3 percent, or $1,188 per beneficiary per quarter, for beneficiaries with both ESRD and pressure ulcers.

In contrast, total Medicare expenditures increased by 1 percent, or $236 per beneficiary per quarter, for beneficiaries with pressure ulcers only.[46] We found that, although RSNAT expenditures decreased for beneficiaries with pressure ulcers, expenditures in all other categories increased by similar or larger amounts (Figure III.9). Given that this group saw only a small decrease in RSNAT use and expenditures, it may be that these estimated changes in other expenditure categories arise from factors outside the model that affected the intervention and comparison states differently, rather than as an impact of RSNAT-PA.[47]

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[46] These beneficiaries make up 27 percent of the study population.

[47] Such a pattern could also result from policy changes that differentially affected the model and comparison groups. For example, a change in reimbursement policy for long-term care hospitals (LTCHs) occurred during the study period, which significantly affected some of the comparison states. Our finding on hospitalization may therefore reflect the influence of the LTCH policy on the comparison group rather than an impact of the model. Although the LTCH reimbursement change would not be expected to directly influence emergency department utilization, there could be indirect effects through changes in other patterns of care use.

Figure III.7. Impact of RSNAT-PA on RSNAT expenditures per beneficiary per quarter, full sample and by chronic condition
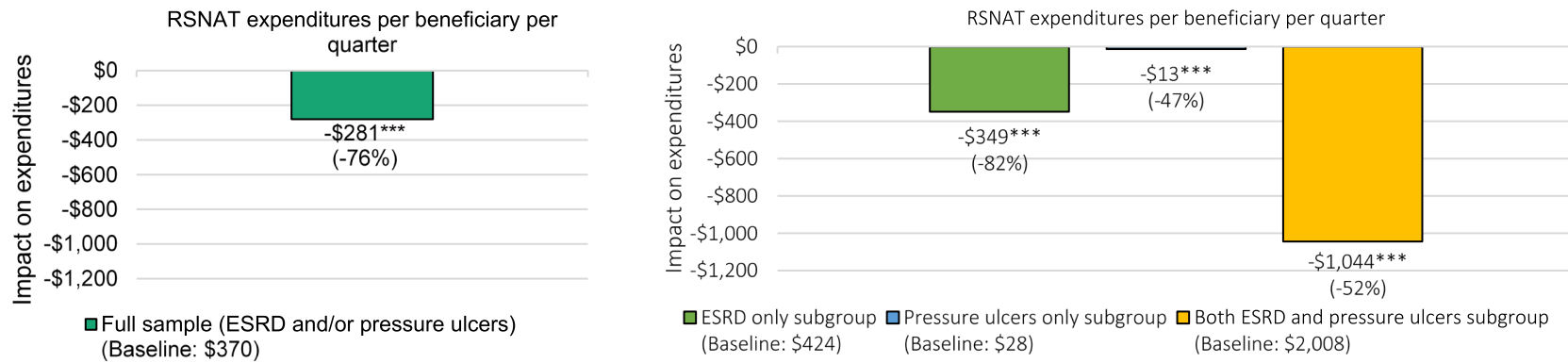
Note: Figure presents results from ordinary least squares regression analysis of claims between 2012 and 2019 for beneficiaries with ESRD and/or pressure ulcers (13,213,891 beneficiary-quarters), ESRD only (9,169,739 beneficiary-quarters), pressure ulcers only (3,645,439 beneficiary quarters), and both ESRD and pressure ulcers (398,713 beneficiary quarters).

*** p < 0.001.

ESRD = end-stage renal disease; RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

Figure III.8. Impact of RSNAT-PA on total Medicare FFS expenditures per beneficiary per quarter, full sample and by chronic condition

Note: Figure presents results from ordinary least squares regression analysis of claims between 2012 and 2019 for beneficiaries with ESRD and/or pressure ulcers (13,213,891 beneficiary-quarters), ESRD only (9,169,739 beneficiary-quarters), pressure ulcers only (3,645,439 beneficiary quarters), and both ESRD and pressure ulcers (398,713 beneficiary quarters).

*** $p < 0.001$.

ESRD = end-stage renal disease; FFS = fee-for-service; RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

Figure III.9. Impact of RSNAT-PA on expenditures per beneficiary per quarter, by chronic condition
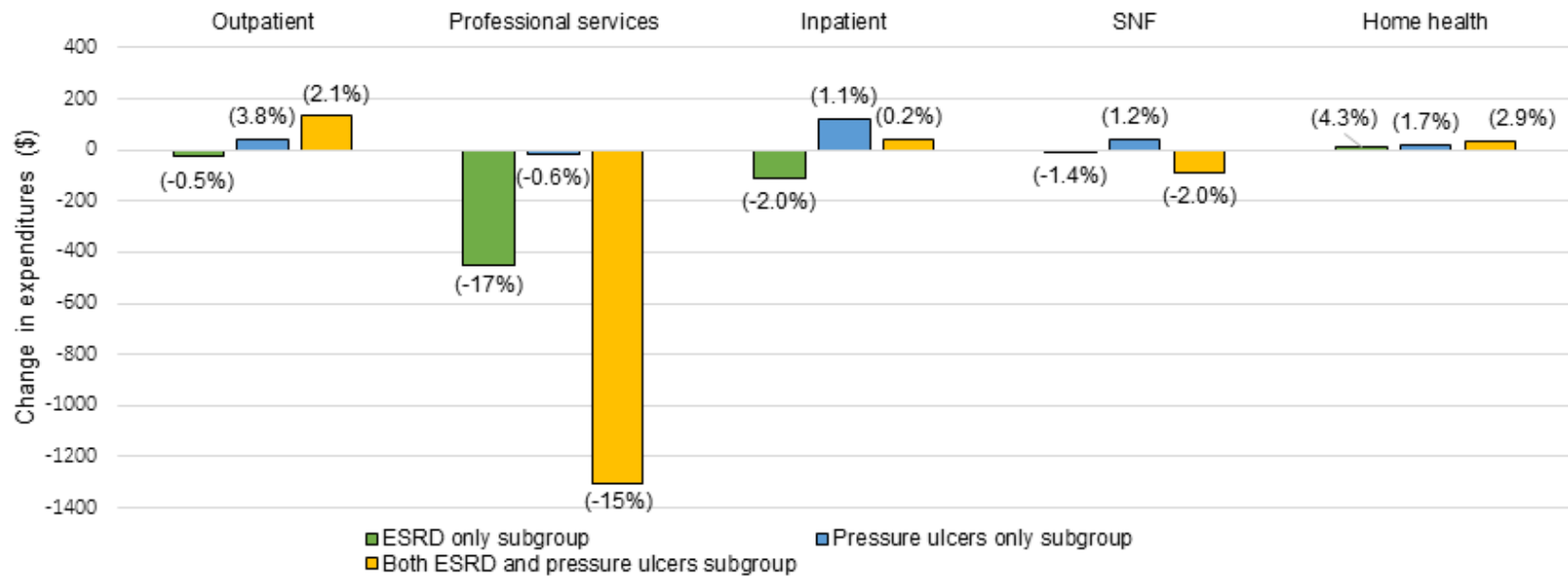
Note: RSNAT falls under professional services. Figure presents results from ordinary least squares regression analysis of claims between 2012 and 2019 for beneficiaries with ESRD only (9,169,739 beneficiary-quarters), pressure ulcers only (3,645,439 beneficiary quarters), and both ESRD and pressure ulcers (398,713 beneficiary quarters).

ESRD = end-stage renal disease; RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport; SNF = skilled nursing facility.

Results by model cohort. As with RSNAT utilization, RSNAT expenditures declined more in Year 1 states than Year 2 states, and the difference was statistically significant. We found the same pattern for total Medicare expenditures (Figure III.10), although the difference was smaller in magnitude and not statistically significant at conventional levels. This could suggest that, in response to the model, non-RSNAT expenditures tended to rise somewhat in the Year 1 states and to fall more substantially in the Year 2 states. When we examined expenditures by category, we found some differences between the cohorts (Figure III.11). Specifically, we found that expenditures for inpatient, outpatient, and SNF services increased among the Year 1 states while these expenditures decreased for the Year 2 states. All differences in expenditure category between the cohorts were statistically significant at conventional levels.[48]

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[48] This pattern could potentially arise from mismatch between model and comparison groups within cohort. Model-comparison balance for the Year 1 and Year 2 samples is within conventionally accepted bounds, with all differences within 0.25 standard deviations and thus amenable to regression adjustment. However, these differences are somewhat greater than they are for other subgroups, and therefore we cannot rule out a slight imbalance driving some of the differences in expenditures estimates.

Figure III.10. Impacts of RSNAT-PA on expenditures per beneficiary per quarter, by cohort
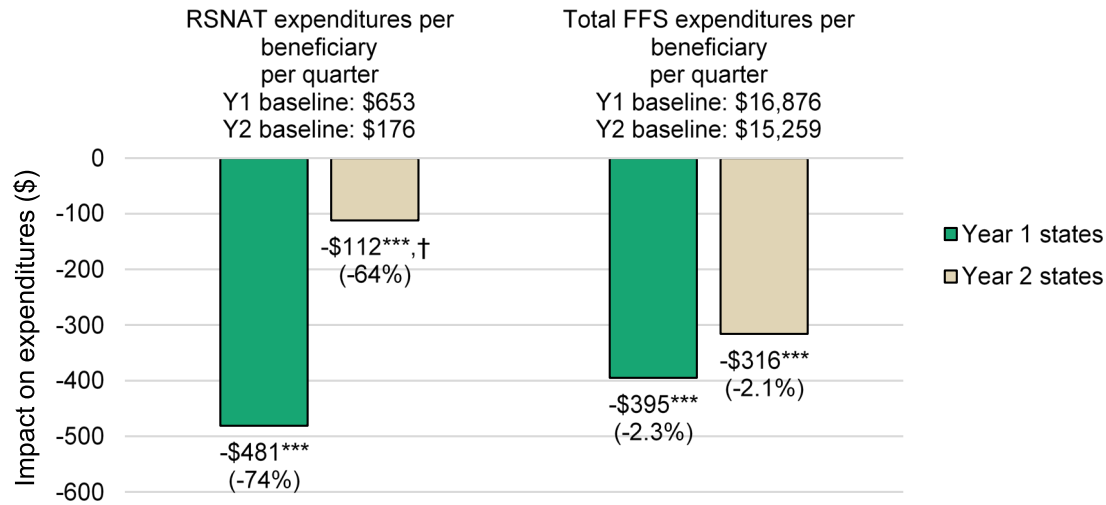
Note: Figure presents results from logistic regression analysis of claims between 2012 and 2019 for beneficiaries with ESRD and/or pressure ulcers (13,213,891 beneficiary-quarters).

*** p < 0.001.

† The difference between the Year 1 and Year 2 impact estimates is statistically significant at the 0.05 level.

FFS = fee-for-service; RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

**Figure III.11. Impact of RSNAT-PA on expenditures per beneficiary per quarter, by expenditure category and cohort**

Note: Figure presents results from ordinary least squares regression analysis of claims between 2012 and 2019 for beneficiaries with ESRD and/or pressure ulcers (13,213,891 beneficiary-quarters).

RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport; SNF = skilled nursing facility.

Subgroup analyses
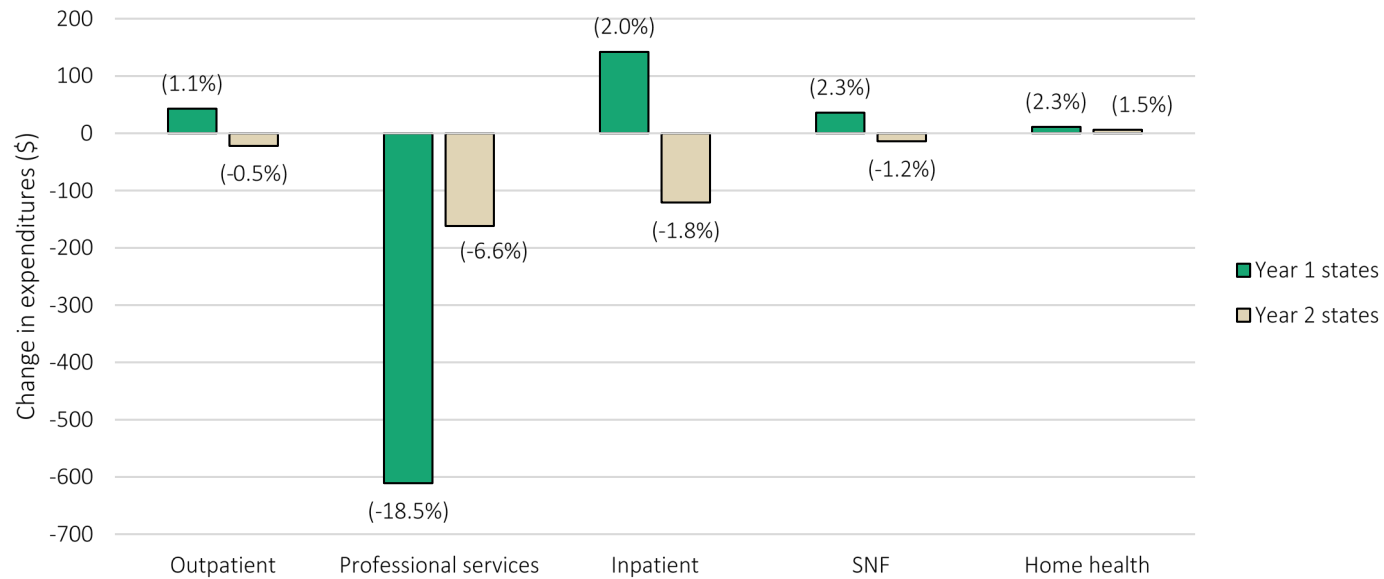
We repeated the quantitative analyses, dividing by rural residence and dual eligibility for Medicare and Medicaid.[49] More sizable use and expenditure reductions for beneficiaries in these groups could suggest a substantial decrease in their access to care. A potential concern with the RSNAT-PA model was that it might have affected rural beneficiaries, who have more limited transportation options, more than urban beneficiaries. Similarly, dually eligible beneficiaries tend to be more physically or socioeconomically vulnerable than non-dually eligible beneficiaries, so larger impacts in that group might be a cause for concern.

We did not identify substantial and concerning differences in the impacts of RSNAT-PA between these groups. The impacts on RSNAT use and expenditures were consistent across all subgroups, but the sizes of the changes we observed and percentage changes from baseline were, in general, much larger for urban residents than for rural residents. One possible reason for this difference is that unnecessary RSNAT use may have been more common in urban areas during the baseline period. The supplier analysis, discussed in Chapter IV, suggests that RSNAT-dependent suppliers were much more likely to serve urban beneficiaries. Estimated impacts for dually eligible beneficiaries were generally smaller than those observed for non-dually eligible beneficiaries in percentage terms, but the dollar amounts were larger. A possible reason for this difference is that dually eligible beneficiaries may have already been relying more on Medicaid-funded non-emergency transportation services to meet their needs.[50] We present the subgroup results in Appendix E.

We also analyzed impacts in the subgroup of beneficiaries who had one or more claims for a home health services.[51] We hypothesized that beneficiaries who have home health services likely have mobility limitations. Thus, we hoped to use home health claims to identify a subgroup of beneficiaries who were more likely to meet the coverage criterion of being bed bound.[52] The results for this subgroup were qualitatively similar to those for the full set of beneficiaries and to those for the subset of beneficiaries without a home health claim; beneficiaries with claims for home health services experienced reductions in RSNAT use and expenditures and in total Medicare FFS expenditures. These findings suggest that beneficiaries with home health claims may, in fact, not have a different experience under the model than other beneficiaries. The findings also suggest that having one or more home health claims may be a poor proxy for meeting the RSNAT coverage criterion of being bed bound and needing the level of support only an ambulance can provide. See Appendix E for the home health claim subgroup results.

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[49] Sensitivity analyses allowing for only a simple interaction between subgroup and treatment status yielded similar results.

[50] In general, state Medicaid programs include non-emergency transportation services that would fund the transport that is not permitted under Medicare.

[51] We examined 2,165,266 beneficiary-quarters.

[52] In a previous report, we examined the subpopulation of beneficiaries who had received a hospital bed. Results were similar to what we report here among beneficiaries with home health services. The report is available at: https://innovation.cms.gov/data-and-reports/2020/rsnat-secondintevalrpt.

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IV. Quality of care and access to care

We examined the research question: "How does the prior authorization model affect quality of and access to care (including service use that indicates access issues)?" We used a mixed-methods approach to investigate this research question.

Domain 2 summary

- Beneficiaries reported using a wide range of transportation alternatives, including family members, taxis, public transportation, community transportation services, driving themselves, and car-sharing services. Beneficiaries were sometimes notified right before a scheduled appointment that RSNAT prior authorization was not affirmed; as a result, they had to cancel the appointment or try to find an alternative means of transportation on very short notice.

- In the full study population, we found no evidence that RSNAT-PA had a major adverse impact on quality of care. Beneficiaries were not more likely to use emergency services or be admitted to the hospital. The model also did not affect the likelihood of death.

- Among beneficiaries with ESRD, we found small impacts on dialysis service use, including scheduled and emergency dialysis, but no impacts on hospitalization for complications of untreated ESRD. Some stakeholders perceived that beneficiaries relied on emergency department and hospital services when they were not affirmed for RSNAT to dialysis.

- Some destination service providers reported little or no evidence of delayed or missed treatments, while others did report evidence of these effects. Missed or delayed treatments can result from a lack of affordable and reliable transportation alternatives for beneficiaries who are not eligible for RSNAT. Some providers reported that prior authorization caused emotional distress for beneficiaries and their caregivers.

- MAC staff reported that beneficiaries can be transported without prior authorization, and they suggested that the model should not result in delayed care. At the time of the survey, some ambulance suppliers reported providing transport for beneficiaries before a PAR was affirmed, but some were limiting or stopping the practice.

Methods

Primary data collection

Between March 2016 and February 2017, Mathematica and PRI conducted interviews with MAC staff and beneficiaries, as well as interviews, focus groups, and an online survey with ambulance suppliers, destination service providers, and physicians to understand how the prior authorization model affected quality of and access to care. Researchers probed on how prior authorization affected hospitalizations and emergency care use, whether beneficiaries experienced a delay in services, and whether beneficiaries experienced a lower use of dialysis. Table II.3 (in Chapter II: Methods Overview) provides the sample size and schedule for each of these data collection activities. Details about the methods, interview and focus group guides, and online survey questions can be found in Appendices H and I.

Secondary data analysis

For the full set of beneficiaries with ESRD and/or pressure ulcers, we considered the following six measures of quality-related service use:

1. Whether the beneficiary had an emergency ambulance trip

2. Number of emergency ambulance trips

3. Whether the beneficiary had an emergency department visit

4. Number of emergency department visits

5. Whether the beneficiary had any unplanned inpatient admissions

6. Death

Baseline rates of these adverse events were similar for model and comparison states (Figure IV.1). We also verified that trends in these outcome measures over the baseline period were parallel. Thus, the comparison of the two groups during the program period should yield reliable estimates of program impacts.

Figure IV.1. Percentage differences between model and comparison states in quality-related service utilization measures at baseline

Note: The baseline period is 2012–2014 for Year 1 states and 2012–2015 for Year 2 states. Bars to the right of the 0-axis represent greater utilization in the model states; bars to the left of the 0-axis represent lower utilization in the model states. Utilization is measured per beneficiary per quarter. Comparison group individuals are weighted to resemble model state individuals on baseline demographic and health characteristics. The model states were Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

For beneficiaries with ESRD (including beneficiaries with ESRD only and beneficiaries with both ESRD and pressure ulcers), we studied access to care, including adverse outcomes for untreated ESRD. For this subgroup, we estimated impacts on the following seven outcomes:

1. Whether the beneficiary had any scheduled dialysis treatments

2. Number of days of scheduled dialysis treatments (results shown in Appendix E)

3. Average number of days between scheduled dialysis treatments[53]

4. Whether the beneficiary had any emergency dialysis

5. Number of emergency dialysis treatments (results shown in Appendix E)

6. Whether the beneficiary had an inpatient admission for ESRD complications

7. Number of inpatient admissions for ESRD complications

Figure IV.2 presents the baseline differences between model and comparison states on these ESRD-specific outcome measures. Emergency dialysis treatments were somewhat rarer among model than comparison group beneficiaries at baseline. The percentage differences are large because baseline utilization was low for both groups (less than 4 percent). Small differences in low utilization rates correspond to large percentage differences. On other measures, the two groups were similar.

Figure IV.2. Percentage differences in baseline access to care among beneficiaries with ESRD between model and comparison states

Note: The baseline period is 2012–2014 for Year 1 states and 2012–2015 for Year 2 states. Bars to the right of the 0-axis represent greater utilization in the model states; bars to the left of the 0-axis represent lower utilization in the model states. Utilization is measured per beneficiary per quarter. Comparison group individuals are weighted to resemble model state individuals on baseline demographic and health characteristics. The model states were Delaware, Maryland, New Jersey, North Carolina, Pennsylvania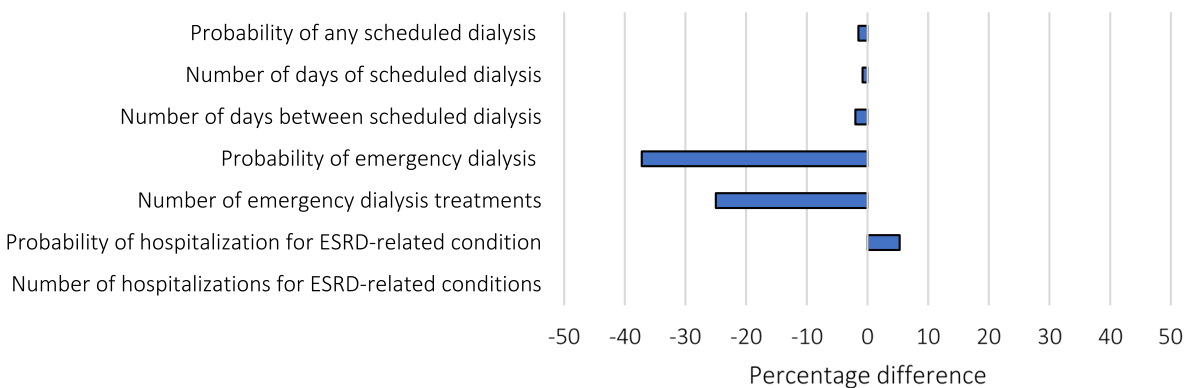, South Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

ESRD = end-stage renal disease.

We used the same regression modeling approach as we did for Domain 1 (see Chapter III: Domain 1: Utilization and Expenditures). As we did in that analysis, we examined impacts for the full sample, the study's three chronic condition subgroups, and the model's two cohorts. We also assessed whether

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[53] Several dialysis services can be delivered on a single day, but dialysis services must be delivered regularly. We therefore used the number of days of dialysis service and the number of days between treatments, rather than the total volume of dialysis services provided, to measure access to care. Because the recommended delivery schedule for dialysis typically does not vary for a given patient, an increase in the number of days between treatments could indicate a delay in receiving needed care.

impacts were different for our key subgroups: rural versus urban, dually eligible versus not dually eligible, and beneficiaries with a home health claim.

Results

Findings from our mixed-methods approach varied. Consistent with our findings in Chapter III, beneficiaries reported shifting to other forms of transportation once prior authorization of RSNAT went into effect. Out-of-pocket payments associated with some alternative transportation options often led to financial challenges for beneficiaries. However, it appears most beneficiaries were able to find alternative sources of transportation to medical care. Analysis of claims data showed no evidence of increased emergency service use among the full set of beneficiaries with ESRD and/or pressure ulcers, and only very small changes in dialysis use among beneficiaries with ESRD. However, some destination service providers and physicians perceived that beneficiaries had difficulty accessing their usual treatment because of transportation difficulties, and that some beneficiaries sought emergency care as a result. Some destination service providers, physicians, and beneficiaries also believed that prior authorization affected quality of care for beneficiaries by causing stress and anxiety, uncomfortable alternative transport, and pain and injury from incompetent alternative transport. These stakeholders also perceived that particular groups of beneficiaries, including those who lack financial resources and social supports as well as those living in areas with limited alternative transportation options, could be disproportionately affected by the model. These stakeholders' perceptions may reflect a small number of instances for beneficiaries who were especially disadvantaged by the loss of RSNAT transport.

Beneficiaries' use of alternative transportation options

In the previous chapter, we showed that use of RSNAT services declined dramatically after prior authorization began. Before the RSNAT model, many beneficiaries who did not meet the medical necessity requirement used RSNAT services because they (1) could not find another method of transportation or (2) needed a type of transportation assistance (such as a wheelchair van) that Medicare does not cover.[54] This suggests that RSNAT overutilization may reflect a lack of transportation options for Medicare-only beneficiaries who need affordable, reliable, accessible transportation.

After RSNAT-PA began, beneficiaries reported using a wide range of transportation alternatives, including family members, taxis, public transportation, community transportation services, driving themselves, and car-sharing services such as Uber. Stakeholders, particularly dialysis providers, expressed concern that even when alternatives are available, they may not be reliable, affordable, or appropriate for the patient's condition and mobility needs, which might affect the patient's access to timely care. Medicare does not cover these non-emergency transportation services.

In the online survey, we asked stakeholders to estimate the percentage of their beneficiaries they believe have had to find alternative forms of transportation since prior authorization was implemented (see Appendix I). In both Year 1 and Year 2 states, most respondents said that less than one-quarter of beneficiaries have had to find alternative transportation. Only 6 percent of Year 1 respondents and 4

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[54] This may be common among elderly and low-income beneficiaries who do not have Medicaid coverage and lack other means of reliable, affordable transportation. We did not empirically assess how common this was in either the treatment or comparison states.

percent of Year 2 respondents said that more than half of their beneficiaries have had to find alternative transportation.

Stakeholders in Year 1 and Year 2 states reported that "family and friends" were the most commonly used transportation alternative, followed closely by "medical transport paid for out-of-pocket by beneficiaries" (see Appendix I). In Year 1 states, 22 percent of survey respondents also said "CMS-paid transportation programs" was a commonly used alternative, likely referring to the use of Medicaid transportation benefits among dually eligible beneficiaries. In addition, most stakeholders in both sets of states agreed or strongly agreed that "prior authorization is resulting in significant out-of-pocket transportation costs for some beneficiaries" (79 percent of those in Year 1 states; 66 percent in Year 2 states).

Beneficiaries who relied on transportation options that require out-of-pocket payments described encountering financial challenges due to these payments. Several beneficiaries stressed that limited incomes and other major financial burdens, including medications and rent, make transportation costs difficult to manage. They described choosing less safe and less convenient transportation options due to cost, including driving themselves in hazardous conditions or relying on family members. Although car-sharing options often cost less than private ambulance services for beneficiaries,[55] many beneficiaries report that car-sharing services are less convenient.

To help Medicare beneficiaries who do not quality for RSNAT coverage, CMS shares information on alternative transportation options with beneficiaries who receive non-affirmed RSNAT decisions. Through July 2020, CMS contracted with Fed Pro Services, which provided customer service representatives to discuss beneficiaries' transportation needs and direct them to appropriate resources in their area, following their receipt of a RSNAT non-affirmation letter. Through this effort, beneficiaries are encouraged to ask other programs they may be a part of, such as Medicaid, Programs of All-inclusive Care for the Elderly (PACE), or Eldercare, if they quality for help with transportation coverage or whether there are other services that can help. Mathematica did not evaluate the availability or use of these resources by beneficiaries.

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[55] Beneficiaries reported that car-sharing or country transportation options can cost anywhere from $2 to $20, round trip, compared with significantly higher costs for ambulance services paid for out of pocket.

Quality of care and use of alternative services

We first considered whether reduced access to RSNAT resulted in increases in use of emergency or acute care services, or whether mortality increased as a result of the model. We found no evidence of adverse impacts on quality-related services or death.

Secondary data analysis

Results for the full sample and by chronic condition. In the full sample and in all three condition subgroups, our quantitative analyses found no evidence that RSNAT-PA had adverse impacts on beneficiaries. We found no change in use of emergency ambulance transportation as a substitute for RSNAT. Rather than increases, we found reductions in emergency department use and unplanned hospitalizations,[56] although the effects were very small and likely due to chance or to underlying differences between model and comparison groups rather than to the model itself (Table IV.1).[57] We found no change in mortality attributable to the model.

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[56] We also studied all hospital admissions (planned and unplanned together) and results were similar.

[57] Such small impact estimates could also result from policy changes that differentially affected the model and comparison groups (see footnote 45).

Table IV.1. Impact of RSNAT-PA on quality of care per beneficiary per quarter, by chronic condition

	Probability of emergency ambulance trip (percentage points) (I)	Number of emergency ambulance trips per 1,000 beneficiaries (II)	Probability of emergency department visit (percentage points) (III)	Number of emergency department visits per 1,000 beneficiaries (IV)	Probability of unplanned hospital admission (percentage points) (V)	Probability of death (percentage points) (VI)
Full sample: ESRD and/or pressure ulcers (13,213,891 beneficiary-quarters)						
Baseline mean	18.8	305.5	35.9	647.4	26.3	5.5
Impact on outcome	-0.0	-4.8**	-0.9***	-26.5***	-1.0***	-0.0
Impact as percentage of baseline mean	0.2	-1.6	-2.6	-4.1	-3.8	-0.2
ESRD only subgroup (9,169,739 beneficiary-quarters)						
Baseline mean	14.1	225.4	31.9	575.4	21.6	3.3
Impact on outcome	-0.1	-4.4*	-1.0***	-25.1***	-1.0***	-0.1
Impact as percentage of baseline mean	-0.7	-1.9	-3.1	-4.4	-4.7	-1.5
Pressure ulcers only subgroup (3,645,439 beneficiary-quarters)						
Baseline mean	31.3	509.8	45.7	804.6	38.1	11.3
Impact on outcome	0.1	-3.8	-1.0***	-34.0***	-1.0***	0.1
Impact as percentage of baseline mean	0.4	-0.7	-2.3	-4.2	-2.7	0.6
ESRD and pressure ulcers subgroup (398,713 beneficiary-quarters)						
Baseline mean	45.1	858.1	65.1	1,407.1	57.4	14.4
Impact on outcome	-0.6	-22.8	-1.8***	-74.6***	-1.9***	-0.5*
Impact as percentage of baseline mean	-1.3	-2.7	-2.8	-5.3	-3.4	-3.6

Note: The table presents estimated impacts on outcomes attributable to RSNAT-PA from weighted logistic (columns I, III, V, VI) and ordinary least squares (columns II, IV) regression analyses of claims between 2012 and 2019 for beneficiaries with ESRD and/or pressure ulcers. Control variables include age, age squared, sex, race, rural residence, dual eligibility for Medicare and Medicaid, hospital bed claim, an indicator for residing in a county with a moratorium on new Medicare suppliers, Hierarchical Condition Category (HCC) score, and length of time since the county moratorium took effect. Standard errors were adjusted to account for correlation between observations on the same individual. The model states were Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

"Baseline mean" is the unadjusted baseline mean of the outcome among model state beneficiaries. "Impact on outcome" is the impact of RSNAT-PA on the outcome in the units of the outcome measure (percentage points or counts) and is the regression-adjusted average marginal effect. "Impact as a percentage of baseline mean" gives the impact on outcome as a percentage of the baseline mean, to contextualize the magnitude of the impact.

$p < 0.05$, **$p<0.01$, ***$p < 0.001$.

ESRD = end-stage renal disease; RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

Results by model cohort. We also estimated the difference between the impacts in the Year 1 and Year 2 states (Table IV.2). The estimates suggest that beneficiaries in neither set of model states experienced meaningful adverse impacts attributable to the model. For Year 1 states, all estimates except the estimated impact on death were actually negative and statistically significant, but small (-2 to -6 percent). For Year 2 states, where baseline rates of RSNAT use were much lower, estimated impacts were mixed, with emergency ambulance use being higher but emergency department use being lower for the model state beneficiaries. Impact estimates for the two cohorts differed significantly from each other for all outcomes, except number of emergency department visits and probability of death.

Table IV.2. Impact of RSNAT-PA on quality of care per beneficiary per quarter, by cohort

	Probability of emergency ambulance trip (percentage points) (I)	Number of emergency ambulance trips per 1,000 beneficiaries (II)	Probability of emergency department visit (percentage points) (III)	Number of emergency department visits per 1,000 beneficiaries (IV)	Probability of unplanned hospital admission (percentage points) (V)	Probability of death (percentage points) (VI)
Year 1 cohort (10,823,782 beneficiary-quarters)						
Baseline mean	19.4	311.9	35.3	615.0	26.9	5.8
Impact on outcome	-0.7***	-17.5***	-0.9***	-27.4***	-0.7***	-0.0
Impact as percentage of baseline mean	-3.7	-5.6	-2.5	-4.5	-2.5	-0.5
Year 2 cohort (11,004,207 beneficiary-quarters)						
Baseline mean	18.4	301.0	36.4	669.7	25.9	5.2
Impact on outcome	0.5***,†	5.6**,†	-1.1***,†	-27.0***	-1.4***,†	0.0
Impact as percentage of baseline mean	2.8	1.9	-2.9	-4.0	-5.4	0.5

Note: The table presents estimated impacts on outcomes attributable to RSNAT-PA from weighted logistic (columns I, III, V, VI) and ordinary least squares (columns II, IV) regression analyses of claims between 2012 and 2019 for beneficiaries with ESRD and/or pressure ulcers. Control variables include age, age squared, sex, race, rural residence, dual eligibility for Medicare and Medicaid, hospital bed claim, an indicator for residing in a county with a moratorium on new Medicare suppliers, Hierarchical Condition Category (HCC) score, and length of time since the county moratorium took effect. Standard errors were adjusted to account for correlation between observations on the same individual. The model states were Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

**p < 0.01, ***p < 0.001.

† The difference from the Year 1 estimate is statistically significant at the 0.05 level.

RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

Subgroup analyses. Estimated impacts did not differ significantly across other subgroups of beneficiaries defined by rural/nonrural residence, dual eligibility, or whether they received home health care (see Appendix E). Adverse impacts were thus not measurably more likely in areas with fewer transportation

suppliers, among low-income beneficiaries, or among those who were most likely to meet the medical necessity criteria.

Stakeholders' perceptions

Destination service providers and physicians surveyed in Year 1 and Year 2 states were divided on whether prior authorization was resulting in greater use of other medical services in each set of states, with a slight majority of stakeholders saying it was not (Appendix I). Among ambulance suppliers, 67 percent in Year 1 states said prior authorization was resulting in higher utilization of other medical services, whereas in Year 2 states, 51 percent reported seeing this effect. In Year 2 states, we also asked which, if any, other medical services patients were using as a direct result of being unable to use RSNAT. Non-MAC stakeholders in these states believed that patients were most commonly using emergency departments and emergency ambulance transport as a direct result of having a non-affirmed RSNAT prior authorization.

In focus groups, several stakeholders who perceived that RSNAT affected access to care believed that the model increased utilization of emergency ambulance transport, emergency department visits, hospitalizations, and extended stays in rehabilitation or nursing facilities for beneficiaries ineligible for RSNAT under the model. They mentioned ancillary health impacts including treatment for falls and other injuries related to the use of non-stretcher transportation. Some stakeholders perceived that beneficiaries relied on emergency department and hospital services when they were not approved for RSNAT to dialysis. Several stakeholders reported that these impacts were particularly acute immediately after RSNAT-PA was implemented but leveled out over time. Thus, while the regression models did not show any systematic adverse impacts on beneficiaries, stakeholder reports captured specific occurrences of adverse events. These observations may reflect the experiences of the most vulnerable beneficiaries—those who were ineligible for RSNAT and had few alternative transportation options and resources.

Access to destination services

Secondary data analysis

We also found that RSNAT-PA was associated with only small changes in use of dialysis treatment (Table IV.3), and no evidence of reduced access to care resulting in increased hospitalization for complications of ESRD—in fact, the estimated effects were statistically significant reductions in hospital use. Beneficiaries with ESRD only and beneficiaries with both ESRD and pressure ulcers saw similarly small changes in outcomes.

Table IV.3. Impact of RSNAT-PA on access to care per beneficiary per quarter, all ESRD beneficiaries and by chronic condition

	Probability of scheduled dialysis (percentage points) (I)	Probability of emergency dialysis (percentage points) (II)	Average number of days between scheduled dialysis services (III)	Probability of hospitalization due to ESRD complications (percentage points) (IV)	Number of hospitalizations due to ESRD complications per 1,000 beneficiaries (V)
All ESRD beneficiaries (9,568,452 beneficiary-quarters)					
Baseline mean	54.3	2.3	2.4	1.9	20.9
Impact on outcome	-0.8***	0.5***	-0.0**	-0.3***	-3.5***
Impact as percentage of	-1.5	19.9	-0.4	-15.5	-16.9
ESRD only (9,169,739 beneficiary-quarters)					
Baseline mean	53.6	2.3	2.4	1.8	20.0
Impact on outcome	-0.9***	0.4***	-0.0*	-0.3***	-3.4***
Impact as percentage of baseline mean	-1.7	18.8	-0.3	-15.5	-16.9
ESRD and pressure ulcers (398,713 beneficiary-quarters)					
Baseline mean	74.8	4.1	2.8	4.5	50.0
Impact on outcome	0.2	1.2***	-0.0	-0.6***	-8.9***
Impact as percentage of baseline mean	0.3	28.5	-0.8	-13.4	-17.9

Note: The table presents estimated impacts on outcomes attributable to RSNAT-PA from weighted logistic (columns I, II, IV) and ordinary least squares (columns III and V) regression analyses of claims between 2012 and 2019 for beneficiaries with ESRD. Control variables include age, age squared, sex, race, rural residence, dual eligibility for Medicare and Medicaid, hospital bed claim, an indicator for residing in a county with a moratorium on new Medicare suppliers, Hierarchical Condition Category (HCC) score, and length of time since a relevant county moratorium took effect. Standard errors were adjusted to account for correlation between observations on the same individual. The model states were Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

*p < 0.05, **p<0.01, ***p < 0.001.

ESRD = end-stage renal disease; RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

Results by model cohort. We examined outcomes related to ESRD separately for the Year 1 and Year 2 cohorts of states. We found that the reduction in scheduled dialysis was concentrated among beneficiaries in the Year 2 states, but that beneficiaries in both Year 1 and Year 2 states experienced increases in emergency dialysis use (Table IV.4). Neither cohort had increased admissions for ESRD-related conditions.

Table IV.4. Impact of RSNAT-PA on access to care per beneficiary per quarter, all ESRD beneficiaries and by cohort

	Probability of scheduled dialysis (percentage points) (I)	Probability of emergency dialysis (percentage points) (II)	Average number of days between scheduled dialysis services (III)	Probability of hospitalization due to ESRD complications (percentage points) (IV)	Number of hospitalizations due to ESRD complications per 1,000 beneficiaries (V)
Year 1 states (7,712,839 beneficiary-quarters)					
Baseline mean	52.4	1.8	2.4	1.7	19.2
Impact on outcome	-0.2	0.4***	-0.0	-0.3***	-3.7***
Impact as percentage of baseline mean	-0.3	19.2	-0.0	-18.5	-19.2
Year 2 states (7,468,892 beneficiary-quarters)					
Baseline mean	54.4	2.6	2.4	1.9	20.5
Impact on outcome	-1.5***,†	0.6***,†	-0.0**,†	-0.3***	-3.8***
Impact as percentage of baseline mean	-2.8	22.2	-0.5	-17.0	-18.4

Note: The table presents estimated impacts on outcomes attributable to RSNAT-PA from weighted logistic (columns I, II, IV) and ordinary least squares (column III and V) regression analyses of claims between 2012 and 2019 for beneficiaries with ESRD and/or pressure ulcers. Control variables include age, age squared, sex, race, rural residence, dual eligibility for Medicare and Medicaid, hospital bed claim, an indicator for residing in a county with a moratorium on new Medicare suppliers, Hierarchical Condition Category (HCC) score, and length of time since the county moratorium took effect. Standard errors were adjusted to account for correlation between observations on the same individual. The model states were Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

**p<0.01, ***p < 0.001.

† The difference between the Year 1 and Year 2 impact estimates is statistically significant at the 0.05 level.

ESRD = end-stage renal disease; RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

Stakeholders' perceptions

Stakeholders, especially dialysis providers, believed that missed or delayed treatment can result from a lack of affordable and reliable transportation alternatives for beneficiaries who are not eligible for RSNAT. Although some physicians, dialysis providers, and SNF staff reported few cases of delayed or missed treatments due to loss of RSNAT, others said this was a significant problem for some beneficiaries. Some physicians also believed that the estimated two or three days it takes for ambulance suppliers to document, sign, and submit a PAR can interrupt a patient's treatment schedule, even though ambulance suppliers can transport patients before PAR approval. Compared with dialysis facility staff, SNFs reported fewer instances of delayed or missed destination services because the SNF arranges patient transportation rather than the beneficiaries and their caregivers.

It was difficult for stakeholders to quantify the extent of missed or delayed services. Some destination service providers gave examples of one or two beneficiaries who had rescheduled or missed a treatment, or of beneficiaries who delayed or missed treatment "1 out of 10 times." Beneficiaries and caregivers noted in interviews that they were sometimes notified right before a scheduled appointment that RSNAT prior authorization was not being affirmed, and as a result they had to cancel appointments or try to find an alternative means of transportation on very short notice.

In online surveys, most suppliers, destination service providers, and physicians reported prior authorization has had mostly or completely negative effects on beneficiaries' ability to get to and from treatment (66 percent of those in Year 1 states; 51 percent in Year 2 states) and their access to timely care (59 percent of those in Year 1 states; 53 percent in Year 2 states). To further probe the potential effect of prior authorization on access to care, study staff asked stakeholders in Year 2 states if any of their patients had delayed or canceled scheduled treatments because their RSNAT PAR was not affirmed. Overall, 64 percent of stakeholders said yes (see Appendix I). This finding is consistent with the quantitative finding above that emergency dialysis may have increased for a small number of beneficiaries.

Perceived impacts on quality of and patient responsiveness to care

In addition to potential effects on access to care, stakeholders believed prior authorization affected overall quality of care for beneficiaries in various ways. In rough order of frequency, the most cited effects were:

1. Stress and anxiety that beneficiaries may experience about their ability to get to and from treatment, about paying for transport, or about how transporting them will burden their family members.

2. The physical impact on beneficiaries who may have used RSNAT before prior authorization implementation but do not meet medical necessity guidelines. For example, these beneficiaries may now rely on wheelchairs to get in and out of treatment facilities and may need to be lifted into treatment chairs.

3. Pain and injury to beneficiaries that may occur when family members transport them, especially if the beneficiaries have mobility issues and are in very poor health.

Survey responses echoed perceptions about the emotional strain prior authorization may place on beneficiaries and their caregivers. A large majority of stakeholders in both Year 1 (76 percent) and Year 2 (72 percent) states agreed with the statement that prior authorization was causing emotional distress for beneficiaries and their caregivers (Appendix I).

Perceptions of disproportionate impacts on some beneficiaries

Some stakeholders perceived disproportionate impacts on particular groups of beneficiaries, as the RSNAT-PA model interacted with local transportation availability issues. Groups they felt were disproportionately affected include:

•   Elderly beneficiaries who lack the financial resources or social support system to find alternative transportation and cannot drive themselves.

•   Medicare-only beneficiaries who, unlike Medicare-Medicaid dually eligible beneficiaries, have no covered transportation alternatives.

•   Patients who do not meet the guideline for bed confinement but who cannot go up or down steps or need a lift to move to and from beds and chairs.

- Beneficiaries living in areas with limited public transportation or community-provided resources, such as those residing in rural communities.

In addition to these groups, several stakeholders suggested that dialysis patients who require ongoing, scheduled care may be affected by prior authorization more than those who use RSNAT for more episodic treatment, such as chemotherapy or wound care. Despite these perceptions, secondary data analysis did not uncover differences in quality of care when isolating these groups of beneficiaries. We found no adverse impacts among beneficiaries with ESRD, and likewise no adverse impacts among rural beneficiaries, dual-eligible beneficiaries, or beneficiaries with home health service claims. The difference between these findings may reflect individualized and less-common situations being reported in focus groups and interviews.

V. Program operations

For Domain 3 we examined the research question, "How does the prior authorization model affect Medicare (MAC) program operations?" We used primary data collection and analysis to investigate this research question.

> **Domain 3 summary**
> - MACs reported successful implementation of the model and decreased PAR processing time over the course of the model.
> - MACs reported they used standardized communications to tell suppliers why a PAR was not affirmed and what the resubmission must include, and they referred suppliers to a help center that could answer follow-up questions.
> - Ambulance suppliers reported mixed results when they reached out for clarification on PARs. Some felt they received the help they needed, whereas others did not find the MAC help centers useful.

Methods

The evaluation team conducted interviews with MACs, as well as focus groups and an online survey with ambulance suppliers between March 2016 and February 2017. These activities aimed to explore (1) how the MACs implemented prior authorization, (2) how long prior authorization staff took to process decisions, and (3) the staff time and cost burden prior authorization imposed on MACs. Table II.3 (in Chapter II: Methods Overview) provides the sample size and data collection schedule for each of these data collection activities. Details about the methods, interview and focus group guides, and online survey questions appear in Appendices H and I.

Results

MACs reported they used a two-tiered review system in which they (1) assessed PARs for technical completeness (completed forms, signatures, correct dates, and so on) and then (2) reviewed them for medical necessity. If reviewers found technical issues, they returned the PAR to the ambulance supplier who submitted it, or called the supplier to say they could not process the PAR because of missing or incomplete information. Many suppliers experienced challenges providing adequate documentation and working with the tiered MAC review system. In contrast, MACs felt this approach—in which PARs moved to clinical reviewers only after a technical review confirmed that all documentation is complete— ensured an accurate clinical review and efficient use of resources. As a MAC interviewee explained, even though the documentation requirements for medical necessity were in place before the model was implemented, "at the beginning it was obvious that [ambulance] providers did not already keep the documentation they should have had on hand all along."

In line with feedback from MACs, about half of ambulance suppliers who responded to the online survey in Year 1 and Year 2 states reported that the typical response time from Medicare for an initial request for prior authorization was 6 to 10 business days. MACs reported that this response time decreased as ambulance suppliers gained experience with the model; over time, ambulance suppliers submitted better

documentation, and Medicare received fewer PARs for beneficiaries who did not meet medical necessity guidelines.

Another challenge ambulance suppliers noted was not being able to speak directly with the reviewer who designated a PAR as non-affirmed. MACs reported they used standardized communications to tell suppliers why a PAR was not affirmed and what the resubmission must include, and they referred suppliers to a help center that could answer follow-up questions. PAR reviewers are nurses, but the help center is staffed by people who do not have medical training but serve as conduits between reviewers and suppliers. Suppliers reported mixed results when they reached out for clarification. Some felt they received the help they needed, whereas others did not find the help centers useful. Although MACs viewed their communications as detailed and clear, some suppliers in focus groups reported getting "vague" feedback and being unsure what the MAC required to affirm a PAR.

The MACs overseeing model implementation in the Year 2 states had the benefit of the experiences in Year 1 states, so they reported few challenges in implementing prior authorization or handling the influx of new PARs. In addition, MACs in Year 2 states reported that they had a more collaborative system in place between their staff and the doctors and nurses, along with effective training and knowledge for MAC staff to deal with new states and a higher volume of requests. MAC personnel noted that they encountered similar issues in Year 1 and Year 2 states, which made it easier to plan for appropriate staffing.

VI. Provider and supplier exit and operations

In this chapter we examine the research question, "How does the prior authorization model affect supplier exit, and among those that do not exit, how does it affect their operations, behavior, and satisfaction?" We used mixed methods to understand how RSNAT-PA affected the number of suppliers that continue operating in the market, the impact of the model on suppliers' operations, and whether suppliers consciously changed practices in response to the model. We also explored the experiences of providers that were tangentially affected by the model, such as physicians, dialysis clinic staff, and SNF staff.

Domain 4 summary

- The number of RSNAT suppliers per 100,000 FFS beneficiaries in Year 1 states decreased by about half as soon as RSNAT-PA went into effect. Suppliers that depended heavily on RSNAT payments were more likely to leave the market. The relationship between dependence on RSNAT payments and exiting the market was much weaker in the Year 2 states and comparison states.

- Ambulance suppliers that remained in the market, as well as other providers, reported that the model impacted their day-to-day operations. Most ambulance suppliers reported difficulty obtaining supporting information from physicians and treatment facilities when requested.

- Many ambulance suppliers and physicians felt that the medical necessity criteria are (1) too narrow, (2) unclear and not well understood, and (3) sometimes applied inappropriately by MACs.

- MAC staff felt that the medical necessity requirement was unclear to some stakeholders because application and enforcement of the criteria had been inconsistent before RSNAT-PA. They also felt that lack of knowledge concerning specific eligibility criteria contributed to stakeholders' assertions that the model inappropriately reduced RSNAT utilization.

- Physicians reported a lack of awareness of the program before launch, noting they first learned about prior authorization when they received requests for documentation from beneficiaries or transportation suppliers. Physicians' RSNAT-PA awareness improved over time.

Methods

Secondary data analysis

Using claims data, we conducted descriptive analyses of supplier exit. Because the types and quality of supplier data available to us were limited,[58] we relied on descriptive data analysis to examine the question of whether the model influenced supplier exit from the Medicare program. We first assessed the number of Medicare Part B ambulance suppliers per 100,000 FFS beneficiaries. We then considered the subset of

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[58] Neither Medicare Provider Enrollment, Chain, and Ownership System (PECOS) nor National Plan and Provider Enumeration System (NPPES) data contained analytic data of sufficient quality for ambulance suppliers other than contact and location information. As a result, we were unable to use these data in the analysis.

suppliers who billed Medicare Part B for RSNAT services before the model was implemented. We divided the subset into three groups:

1. Stayers, who billed Medicare in at least two years after the model was implemented;

2. Triers, who billed Medicare in the first year after implementation, but not after that;[59]

3. Leavers, who did not bill Medicare at any point after model implementation.

To determine the characteristics of the beneficiary population each supplier served, we attributed beneficiaries to suppliers based on "catchment areas." A supplier's catchment area consists of the set of zip codes in which that supplier's Medicare customers reside. We compared stayers, triers, and leavers on the characteristics of their customer base as well as on service provision and payments received in the year before implementation. The comparisons enabled us to comment on which suppliers were more likely to leave the market after RSNAT-PA took effect.

Primary data collection

The evaluation team conducted interviews with MACs, as well as interviews, focus groups, and an online survey with destination service providers, physicians, and ambulance suppliers between March 2016 and February 2017, to understand the impact of the model on ambulance suppliers' operations and whether suppliers consciously changed practices in response to the model. Table II.3 (in Chapter II: Methods Overview) provides the sample size and data collection schedule for each of these data collection activities. Detailed methods, interview and focus group guides, and online survey questions appear in Appendices H and I.

Results

In this chapter, we report findings on how the prior authorization model affected ambulance supplier exit, and for both remaining ambulance suppliers and destination service providers, their behavior and satisfaction.

Ambulance suppliers and market exit

Ambulance suppliers were most directly affected by RSNAT-PA because their reimbursement was directly tied to receiving prior authorization to transport beneficiaries. By reducing Medicare expenditures for RSNAT services (see Domain 1), RSNAT-PA could cause some suppliers to exit the market. In this section, we assess whether the model was associated with suppliers exiting the Medicare program and what types of suppliers were more likely to exit. For this descriptive quantitative analysis, we examined all claims billed by suppliers, not only those for services to beneficiaries with ESRD and/or pressure ulcers.

Aggregate supplier exit

Before RSNAT-PA, the Year 1 states had many more RSNAT suppliers per 100,000 FFS beneficiaries than the Year 2 and comparison states did, but the number of suppliers decreased during the study period

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[59] We added the triers category for this report. Previous reports included only leavers and stayers, and defined stayers as suppliers who billed at any point after model implementation. We divided this group into stayers and triers to assess how often suppliers continued to bill Medicare for a short time after model implementation before concluding that they should leave the Medicare program.

(Figure VI.1). There were 16 RSNAT suppliers per 100,000 FFS beneficiaries in the Year 1 states in 2012, and only 7 by 2019, a decrease of more than half. All three Year 1 model states experienced a decrease in the number of suppliers, but the decreases were larger for Pennsylvania and New Jersey than for South Carolina (not shown). The pattern therefore likely reflects a combination of two important factors: (1) suppliers leaving the market in response to the model and (2) the impact of the moratorium preventing new suppliers from entering in some Pennsylvania and New Jersey counties.[60]

The ratio of RSNAT suppliers to FFS beneficiaries was far lower in the Year 2 states, at about 6 per 100,000 FFS beneficiaries in 2012. It remained fairly constant until 2016, when the model went into effect in the Year 2 states and the number of RSNAT suppliers per 100,000 FFS beneficiaries began to decline to about 4 per 100,000 FFS beneficiaries. The number of comparison state suppliers per 100,000 FFS beneficiaries remained around 7 during the study period.

Figure VI.1. Number of RSNAT suppliers per 100,000 FFS beneficiaries in model and comparison states
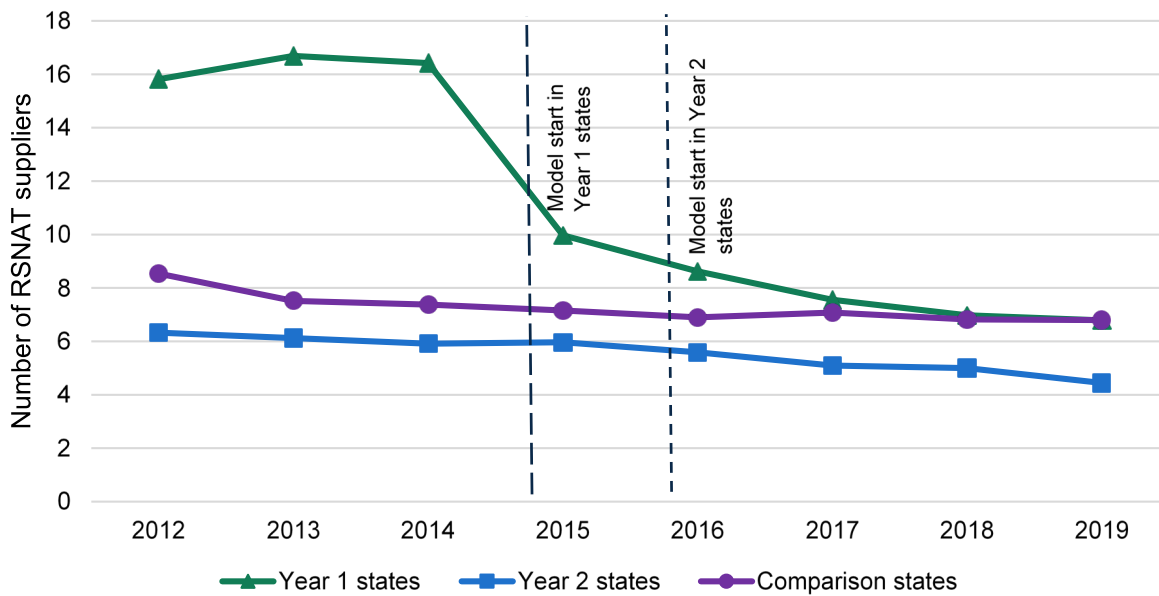
Note: Year 1 model states (start date December 2014) were New Jersey, Pennsylvania, and South Carolina. Year 2 model states (start date January 2016) were Delaware, Maryland, North Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

FFS = fee-for-service; RSNAT = repetitive, scheduled, non-emergent ambulance transport.

The decrease in the number of RSNAT suppliers per 100,000 FFS beneficiaries came both from suppliers exiting the market and from fewer new suppliers entering. In the Year 1 states, the number of new RSNAT suppliers per 100,000 FFS beneficiaries (suppliers that had not billed previously for RSNAT)

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[60] In July 2013, CMS imposed a moratorium on new Medicare Part B ambulance suppliers in Harris County, Texas, and surrounding counties in Texas, as well as in Philadelphia, Pennsylvania, and surrounding counties (including the New Jersey counties of Burlington, Camden, and Gloucester) due to extensive overuse of ambulance services. CMS extended the moratorium to prohibit any new non-emergency ambulance suppliers in Texas, Pennsylvania, and New Jersey from enrolling in Medicare Part B as of July 29, 2016.

decreased from 4 in 2013 to 1 in 2019. The Year 2 states and the comparison states saw much smaller changes in the number of new entrants over the study period (Figure VI.2).

Figure VI.2. New RSNAT suppliers per 100,000 FFS beneficiaries in model and comparison states

Note: New RSNAT suppliers are those that had not billed Medicare in the prior year. Because our study period begins in 2012, we cannot observe which suppliers were new in 2012.
Year 1 model states (start date December 2014) included New Jersey, Pennsylvania, and South Carolina.
Year 2 model states (start date January 2016) Delaware, Maryland, North Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.
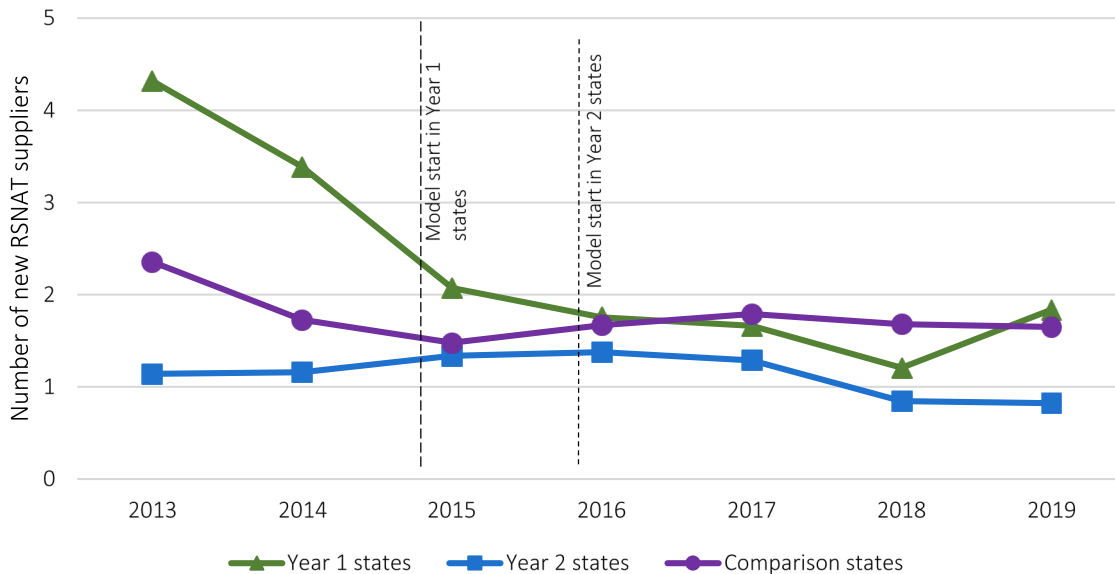
FFS = fee-for-service; RSNAT = repetitive, scheduled, non-emergent ambulance transport.

Characteristics of exiting suppliers

To assess whether certain types of ambulance suppliers were more likely to exit the market, we compared the pre-RSNAT-PA characteristics of RSNAT suppliers that left the market to those that stayed.[61] We divided these suppliers into three types: (1) stayers, which also billed Medicare in two or more years after the model went into effect; (2) triers, which billed Medicare in the first year after model implementation but not after that; and (3) leavers, which billed before the model was implemented but did not bill Medicare at any point after the model was implemented.[62]

Overall, 36 percent of RSNAT suppliers in the model states exited the market within one year of model implementation. That said, supplier responses to RSNAT-PA differed substantially between the Year 1 and Year 2 model states. Almost one-half of RSNAT suppliers (45 percent) in the Year 1 model states exited the market within one year of model implementation, and nearly two-thirds of those suppliers

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[61] To assess changes among suppliers in the comparison group, we used the Year 1 start date for the states directly matched to the Year 1 model states, and the Year 2 start date for the states directly matched to the Year 2 model states. This approach enabled us to separate changes in suppliers over time in the model states that were due to RSNAT-PA from changes due to other factors.

[62] A small fraction (0.5 percent) of suppliers that billed Medicare for ambulance services prior to the model start did not fit in any of these categories and were excluded from this analysis.

exited before the model went into effect (leavers). Much smaller percentages of suppliers in the Year 2 model states and comparison states exited the market (13 and 15 percent, respectively, with 4 and 7 percent leaving before the model start date). Figure VI.3 illustrates the differences between the study groups. Thus, a large fraction of suppliers in the Year 1 model states appear to have anticipated that their businesses would not be viable under RSNAT-PA and left the Medicare market.

Figure VI.3. Percentage of RSNAT suppliers that were stayers, triers, and leavers in model and comparison states
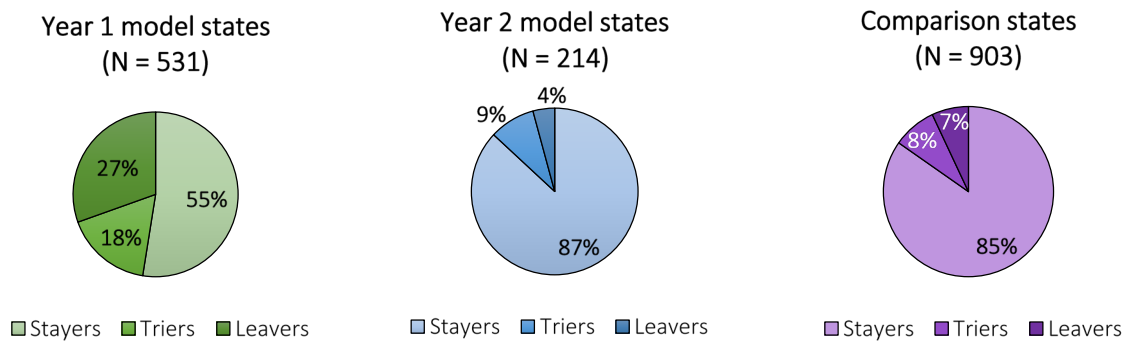
Year 1 model states (N = 531)
Stayers 55%, Triers 18%, Leavers 27%

Year 2 model states (N = 214)
Stayers 87%, Triers 9%, Leavers 4%

Comparison states (N = 903)
Stayers 85%, Triers 8%, Leavers 7%

Note: Stayers, triers, and leavers are defined based on billing activity in the year before and two years after model implementation (2014–2016 in Year 1 states and 2015–2017 in Year 2 states). Stayers are suppliers that were active both before and in at least two years after implementation; triers were active before and in the first year of implementation; leavers were active before, but not after, implementation.

Comparing the stayers, triers, and leavers revealed several differences between the groups of states that possibly reflect the workings of the model. Differences between the Year 1 and Year 2 states are likely attributable to the especially high RSNAT utilization rates in the Year 1 states before the model.

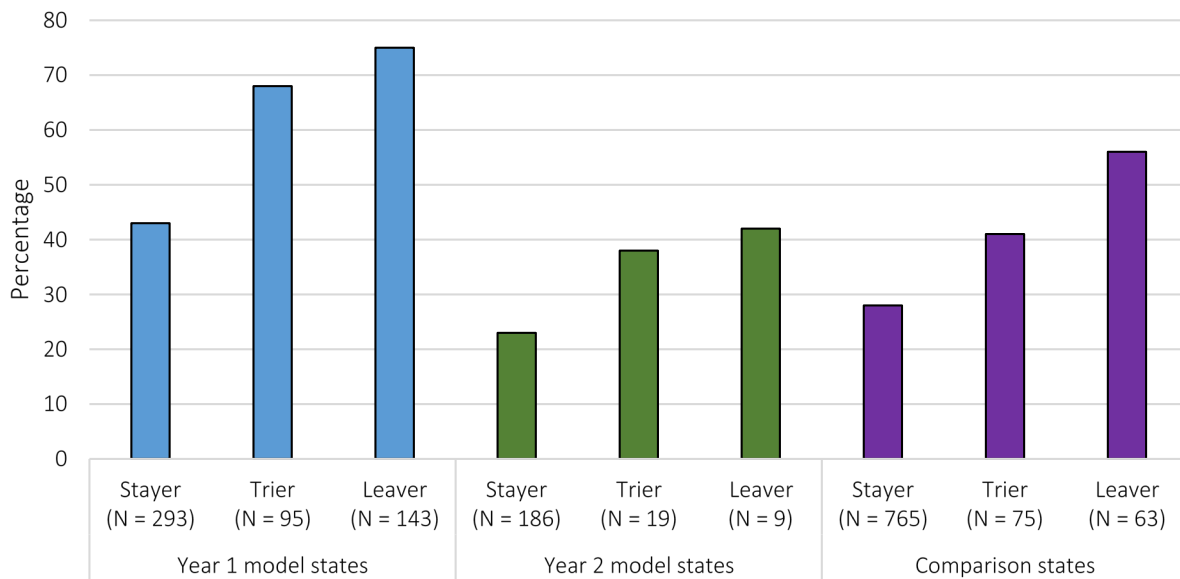In the comparison states, stayers, triers, and leavers had similar customer bases. In contrast, stayers, triers, and leavers in the model states served significantly different types of Medicare beneficiaries. Model suppliers that exited the market (triers and, especially, leavers) served customer bases that were less white, less rural, sicker (higher HCC scores), and more likely to be dually eligible for Medicare and Medicaid (see Table E.17 in Appendix E). Year 1 state suppliers were most different from comparison state suppliers; Year 2 suppliers were different in the same ways, but less so.

In all states, triers and leavers (types that left the market) were more dependent on income from RSNAT services than stayers. Triers and leavers tended to be smaller than stayers, as measured by their total Medicare revenue (Table VI.2), and smaller suppliers possibly have greater churn than larger suppliers, even absent the model. However, the dependence was especially pronounced in the Year 1 states. For example, among Year 1 leavers, 75 percent of Medicare revenue was for RSNAT trips versus 42 and 56 percent in Year 2 and comparison states. Among triers, 68 percent of all Medicare revenue was for RSNAT in Year 1 states, as compared to 38 and 41 percent among Year 2 and comparison state triers. Figure VI.4 illustrates the differences between types of suppliers and study groups. The percentage of ambulance trips supplied that were RSNAT trips followed a similar pattern.

Figure VI.4. Percentage of Medicare revenue from RSNAT services for stayers, triers, and leavers

Note: Stayers, triers, and leavers are defined based on billing activity in the year before and two years after model implementation (2014–2016 in Year 1 states and 2015–2017 in Year 2 states). Stayers are suppliers that were active both before and in at least two years after implementation; triers were active before and in the first year of implementation; leavers were active before, but not after, implementation.

RSNAT = repetitive, scheduled, non-emergent ambulance transport.

There were also noteworthy differences between triers and leavers, particularly in the Year 1 states. Among triers, RSNAT comprised only a slightly smaller fraction of services and payments, but on average these suppliers provided more trips and earned more from Medicare for RSNAT services than leavers (Table VI.2). [63] Thus, leavers, which chose not to operate in the market at all once RSNAT-PA was implemented, were smaller and more highly specialized in RSNAT. Triers were larger, on average, and perhaps expected they could survive with reduced payments under the model. Ultimately, they still depended enough on RSNAT that continuing to operate under the prior authorization model was unsustainable.[64]

In summary, a sizeable fraction of suppliers in Year 1 states left the market, with most such suppliers leaving before RSNAT-PA went into effect. Suppliers that left the market tended to depend heavily on payments for RSNAT services. Any reductions in those payments that occurred as a result of stricter enforcement of coverage rules under RSNAT-PA or increases in costs from the need to obtain prior authorization might have made continuing to operate untenable and might have influenced their decision

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[63] We repeated the analysis, limiting to suppliers who delivered at least one RSNAT service in the baseline year. Results were similar.

[64] We conducted a placebo test using the 2012–2013 calendar year boundary to define stayers, triers, and leavers. We term this a "placebo" because no prior authorization program took effect between those years, and thus any difference between the three groups regarding RSNAT services should reflect normal churn in the market rather than an impact of the model. Between 2012 and 2013, in Year 1, Year 2, and comparison states, suppliers that relied more on RSNAT were more likely to leave the market. However, the rate at which RSNAT-dependent suppliers left the market in Year 1 states was half as large as it was in our main analysis, closer to the Year 2 and comparison state levels. We conclude, therefore, that RSNAT-PA influenced some suppliers to exit.

to leave the market. Despite this pattern of exit, our findings from Domains 1 and 2 suggest that enough suppliers remained that beneficiaries could access RSNAT and destination services at rates that avoided adverse outcomes.

Table VI.1. Quarterly services provided and payments received by stayers, triers, and leavers in the year before RSNAT-PA

	Year 1 model states			Year 2 model states			Comparison states		
	Stayers	**Triers**	**Leavers**	**Stayers**	**Triers**	**Leavers**	**Stayers**	**Triers**	**Leavers**
	Weighted mean			Weighted mean			Weighted mean		
RSNAT services provided									
Number of beneficiaries served (RSNAT)	12	13	8*,†	8	18	14	12	11	6*
Number of RSNAT trips	533	670*	359*,†	348	701	582	518	477	240*
Average number of RSNAT trips per beneficiary	40	46*	39†	35	37	26	37	39	33
Percentage of ambulance trips that were RSNAT	56	81*	87*	38	52	54	41	59*	75*
Payments received									
RSNAT payments ($1,000)	87	115	62*,†	54	110*	92	80	73	36*
Percentage of payments from RSNAT (%)	43	68*	75*,†	23	38*	42	28	41*	56*
Total Medicare FFS payments ($1,000)	240	162*	87*,†	306	286	164	356	191*	85*,†
Number of suppliers	293	95	143	186	19	9	765	75	63

Note: The table presents means and (standard deviations) of supplier characteristics from before model implementation, weighted using matching weights. Stayers, triers, and leavers are defined based on billing activity in the year before and two years after model implementation (2014–2016 in Year 1 states and 2015–2017 in Year 2 states). Stayers are suppliers that were active both before and in at least two years after implementation; triers were active before and in the first year of implementation; leavers were active before, but not after, implementation. Comparison state suppliers are weighted to resemble model state suppliers in the demographic and health characteristics of their customer base. The model states were Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, West Virginia, and the District of Columbia. The comparison states were Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

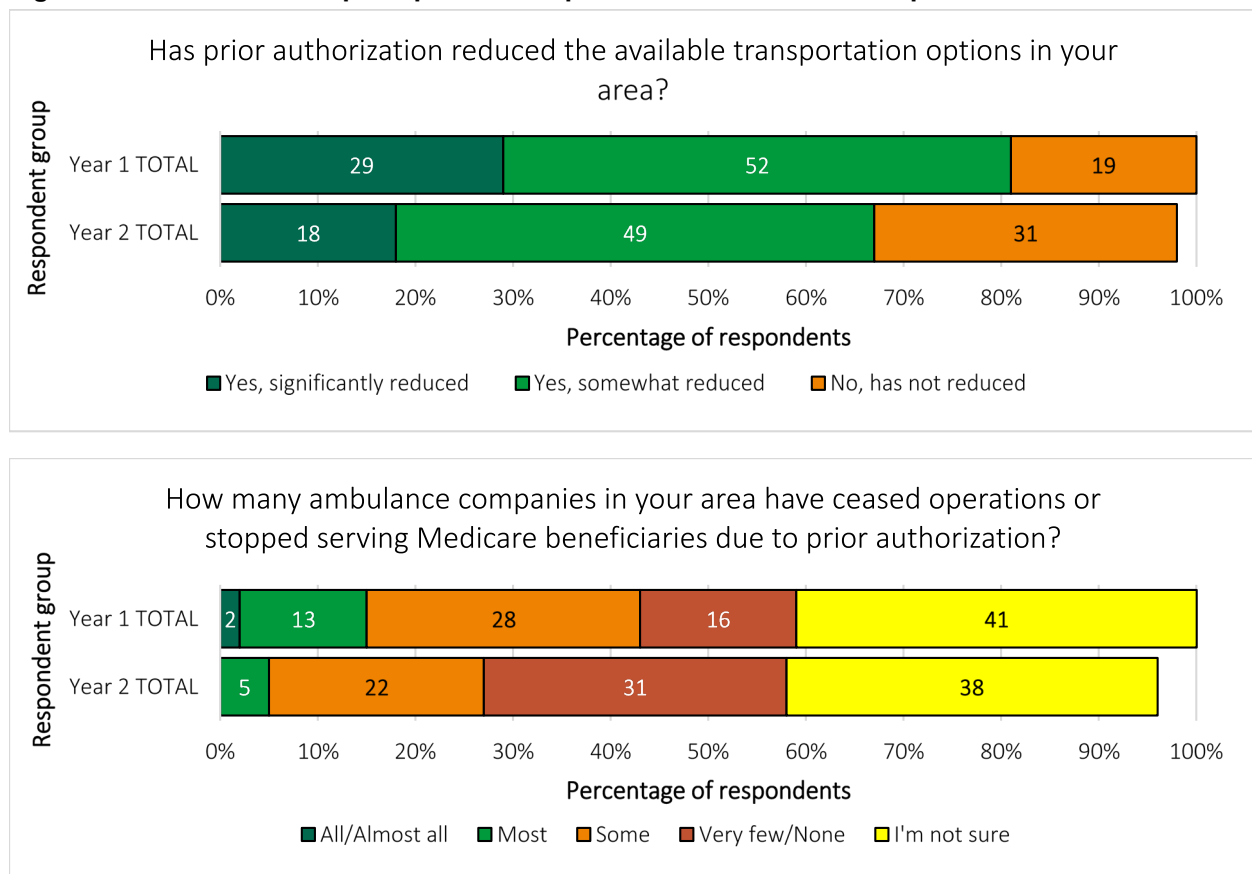*Statistically significantly different from stayer value at 0.05 level.

† Statistically significantly different from trier value at 0.05 level.

RSNAT-PA = Prior Authorization Model for Repetitive, Scheduled, Non-Emergent Ambulance Transport.

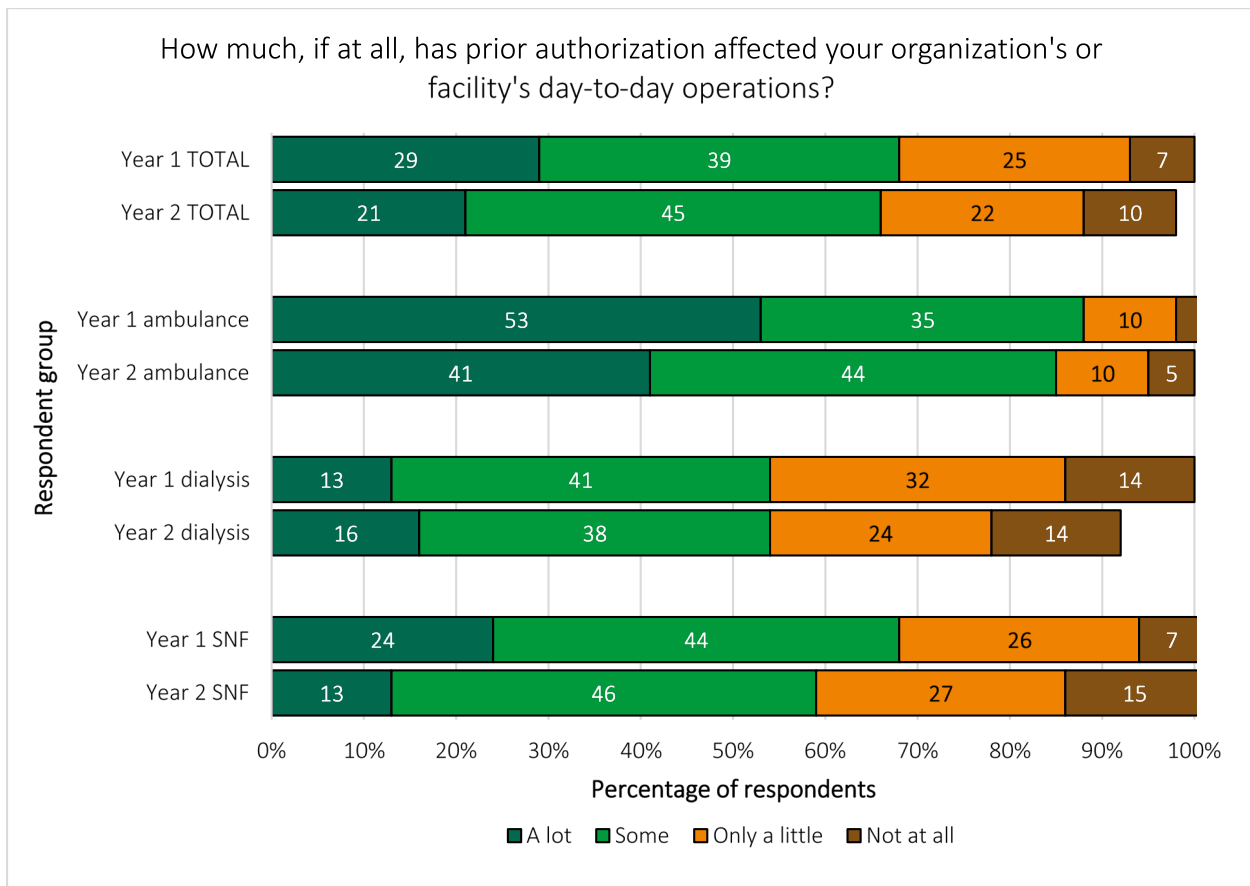**Effects on supplier and destination service provider operations**

As shown above, some suppliers chose to leave the market rather than operate under RSNAT-PA. A majority of stakeholders in both Year 1 and Year 2 states reported that they saw a reduction in transportation options as a result of RSNAT-PA, although when study staff asked specifically whether ambulance companies closed or were no longer serving Medicare beneficiaries, many respondents were unsure that RSNAT-PA had this effect (Figure VI.5). Suppliers that remained in the market after RSNAT-PA went into effect were also affected by the prior authorization model, as were other providers involved in care for beneficiaries that used RSNAT before the model began. In both Year 1 and Year 2 states, a majority of survey respondents reported that prior authorization affected their organization or facility's day-to-day operations at least somewhat. These responses varied considerably across ambulance suppliers, dialysis facilities, and SNFs (Figure VI.6). In addition, slightly more than half of Year 1 stakeholders overall reported that prior authorization has had a negative effect on their organization's or facility's financial condition. In Year 2 states, that proportion dropped to 36 percent.

Figure VI.5. Stakeholders' perceptions of impact of RSNAT-PA on transportation markets

Has prior authorization reduced the available transportation options in your area?

Respondent group	Yes, significantly reduced	Yes, somewhat reduced	No, has not reduced
Year 1 TOTAL	29	52	19
Year 2 TOTAL	18	49	31

How many ambulance companies in your area have ceased operations or stopped serving Medicare beneficiaries due to prior authorization?

Respondent group	All/Almost all	Most	Some	Very few/None	I'm not sure
Year 1 TOTAL	2	13	28	16	41
Year 2 TOTAL		5	22	31	38

Note: The information in this figure was obtained from online surveys conducted with ambulance suppliers, dialysis and SNF staff, and physicians.

Year 1 refers to Year 1 states; Year 2 refers to Year 2 states.

Percentage of respondents may not add to 100 percent due to respondent non-response on some items.

Percentage of respondents may exceed 100 percent when added due to rounding up to a whole number.

Respondent group total sample sizes = 326 in Year 1 states, and 203 in Year 2 states.

RSNAT-PA = Prior Authorization Model for Repetitive Scheduled Non-Emergent Ambulance Transport.

Figure VI.6. Reported impact of prior authorization on daily operations

How much, if at all, has prior authorization affected your organization's or facility's day-to-day operations?

Respondent group	A lot	Some	Only a little	Not at all
Year 1 TOTAL	29	39	25	7
Year 2 TOTAL	21	45	22	10
Year 1 ambulance	53	35	10	
Year 2 ambulance	41	44	10	5
Year 1 dialysis	13	41	32	14
Year 2 dialysis	16	38	24	14
Year 1 SNF	24	44	26	7
Year 2 SNF	13	46	27	15

Percentage of respondents

■ A lot ■ Some ■ Only a little ■ Not at all

Note: The information in this figure was obtained from online surveys conducted with ambulance suppliers, dialysis and SNF staff, and physicians.

Year 1 refers to Year 1 states; Year 2 refers to Year 2 states.

Percentage of respondents may not add to 100 percent due to respondent non-response on some items.

Percentage of respondents may exceed 100 percent when added due to rounding up to a whole number.

Respondent group total sample sizes = 326 for Year 1 states, and 203 for Year 2 states.

In Year 1 states, 39 percent of ambulance suppliers reported that prior authorization had not affected the number of beneficiaries they transport; that figure rose to 69 percent in Year 2 states. Many ambulance suppliers in Year 1 states (57 percent) reported that the number of Medicare beneficiaries transported by their organization *decreased* after model implementation. In Year 2 states, just 30 percent of suppliers reported a decrease. (Please refer to Chapter IV for quantitative information on changes in the number of beneficiaries served.)

Other impacts that ambulance suppliers reported in focus groups and surveys included losing staff, being unable to upgrade vehicles, and going out of business. Of all stakeholder groups, ambulance suppliers in both sets of states reported the greatest impact on staff administrative burden. In Year 1 states, 72 percent of suppliers said administrative burden had increased "a lot" since model implementation began; the same was true for 74 percent of ambulance suppliers in Year 2 states.

Some ambulance suppliers, dialysis facilities, and SNFs made—or plan to make—significant changes to their operating procedures in response to the effects they experienced. In addition to no longer transporting Medicare beneficiaries at all (13 percent of ambulance suppliers in each set of states) or no longer transporting them before receiving authorization (38 percent of ambulance suppliers in Year 1 states, and 26 percent in Year 2 states), a majority of suppliers in both sets of states (60 percent in Year 1,

and 54 percent in Year 2) reported that they provide beneficiaries with an advance notice of non-coverage to make them aware that Medicare might not cover non-emergent ambulance transport. At the time of each survey, only 1 percent of ambulance suppliers in Year 1 states and 3 percent in Year 2 states reported moving vehicles to states that do not require prior authorization.

Stakeholders' reported challenges with RSNAT-PA

Stakeholders reported three challenges with RSNAT-PA. First, all stakeholders reported lack of awareness of the model prior to launch and a learning curve following the start of the model. Second, ambulance suppliers, dialysis service providers, and physicians believed that current medical necessity criteria were too narrow, unclear, and sometimes applied too rigidly. Third, ambulance suppliers reported issues obtaining the correct documentation from physicians.

Awareness of RSNAT-PA

A central challenge in both the Year 1 and Year 2 states was a lack of awareness of the program before launch. Most physicians reported they first learned about prior authorization when they received requests for documentation from beneficiaries or transportation suppliers. This pattern was true in both Year 1 and Year 2 states, indicating that advance communication about prior authorization continued to be a challenge after Year 1, despite increased communication efforts.

Many stakeholders, particularly social workers at dialysis centers, reported in focus groups that professional networks were a major source of information about prior authorization. Although some respondents felt there was a lack of outreach and education by CMS and MACs, others noted that not many ambulance suppliers took advantage of informational sessions or opportunities to submit mock PARs in advance of program implementation. Suppliers who attended these trainings provided by MACs gave them mixed reviews. Some said they were very helpful, whereas others described them as "vague" and "worthless."

Providers and suppliers in Year 1 and Year 2 states reported that they experienced a significant learning curve after the model launched. In both sets of states, stakeholders felt much better informed about the model at the time of the survey than they recalled feeling when the model began.[65] In both Year 1 and Year 2 states, physicians felt particularly uninformed about the model when it launched, compared with other stakeholder groups. In the words of one physician from the Year 1 states: "The communications have been extremely sparse, most likely buried in an electronically posted bulletin that no practicing physician will read—or care to." Yet, by the time of the surveys, 20 months into program operation, about half of physicians in each set of states reported feeling "very well informed" or "somewhat well informed," indicating progress in this area. Ambulance suppliers, the group most affected by prior authorization, were also most likely to report that they were aware of prior authorization when the model launched. Fifty-seven percent of ambulance suppliers in Year 1 states, and 64 percent in Year 2 states recalled that they felt at least somewhat well informed at launch. This indicates that communication and education efforts for ambulance suppliers were better reaching their target.

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[65] The Year 1 state survey took place approximately 20 months into implementation in August 2016 and the Year 2 state survey took place about 12 months after Year 2 state implementation in December 2016.

Medical necessity and other service eligibility issues

Ambulance suppliers, dialysis service providers, and physicians commonly reported that prior authorization reduced RSNAT utilization by not affirming RSNAT for beneficiaries whom they felt needed specialized transport. This was partly due to a lack of knowledge about the criteria for RSNAT eligibility. Similarly, stakeholders noted in interviews and focus groups that the medical necessity requirement was the source of many of what they view as "incorrect" PAR determinations. These stakeholders believed that current medical necessity criteria are (1) too narrow, (2) unclear and not well understood by some stakeholders, and (3) sometimes applied inappropriately by MACs.

1. Current medical necessity criteria are too narrow. Some stakeholders believed the current criteria for medical necessity were not broad enough to cover all patients they feel need ambulance-level transportation.[66] Ambulance suppliers and dialysis facility staff in particular cited examples of beneficiaries whose PARs for RSNAT were not affirmed but whom they felt should not be transported any other way. In some instances, suppliers and dialysis service providers perceived that beneficiaries were not approved for RSNAT service because they were deemed able to use wheelchair transportation instead of stretcher transportation that is rendered through RSNAT service.

To probe stakeholders' perceptions about the medical necessity guidelines, we added a question to the Year 2 survey asking if respondents viewed the criteria as too broad, too narrow, or appropriate as currently written. In Year 2 states, 46 percent of stakeholders in Year 2 states viewed medical necessity criteria as too narrow, whereas only 12 percent considered them too broad, and 25 percent perceived that they were appropriate as currently written (Figure VI.7).

Figure VI.7. Stakeholders' perceptions of scope of medical necessity criteria
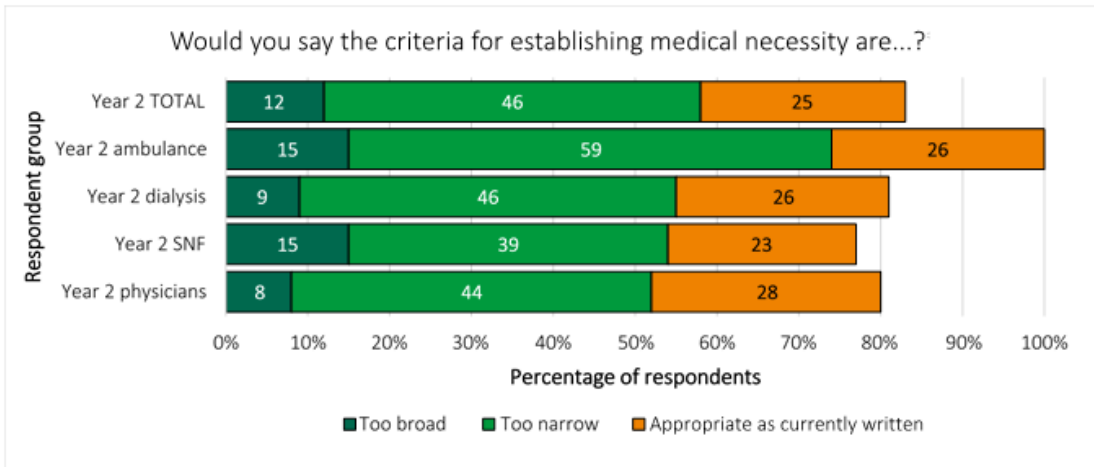
Note: The information in this figure was obtained from online surveys conducted with ambulance suppliers, dialysis and SNF staff, and physicians.

Year 2 refers to Year 2 states.

Percentage of respondents may not add to 100 percent due to respondent non-response on some items.

Percentage of respondents may exceed 100 percent when added due to rounding up to a whole number.

Respondent group total sample size = 203.

Question asked only in Year 2 states.

SNF = skilled nursing facility.

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[66] Mathematica did not evaluate the appropriateness of RSNAT medical necessity standards in this study.

2. Current medical necessity criteria are unclear or some stakeholders misunderstand them. MAC
personnel reported they applied two specific criteria to determine medical necessity: (1) bed confinement
and (2) risk to the patient's health from being transported any way other than by ambulance stretcher.
Focus groups and interviews indicated that, although most ambulance suppliers and dialysis providers
were aware of these criteria, none of the physicians who participated in focus groups listed these specific
requirements. To learn more about this issue, study staff asked physicians how they interpreted CMS's
definition of medical necessity. Physicians' responses indicated that some incorrectly believed medical
necessity was tied to specific diagnostic codes, or they confused medical necessity for Medicare non-
emergency ambulance transport with medical necessity for the treatment to which the patient was being
transported. Examples of these perceptions are:

> *"I think of medical necessity as meaning that the patient's illness would prevent them from making
> it to the office for their visit, such as a patient who has a hemiparesis from a CVA that cannot
> walk may be transported on a trolley."*

> *"Medical necessity means they have to do it for their medical problems."*

> *"Medical necessity means the health or life of the person will be threatened if it doesn't happen."*

> *"I interpret this as the ability to come to the appointment without assistance or whether assistance
> is required. This is certainly a reflection of MOBILITY [respondent emphasis]. I have many
> patients with multiple sclerosis or Parkinson's disease or stroke problem[s]. This is a major
> issue."*

Some ambulance suppliers are also at times confused about medical necessity criteria, especially in
situations where the criteria may be applied inconsistently. One ambulance supplier described his
experience with inconsistency in the prior authorization process, referring to a patient who was previously
affirmed and then subsequently not affirmed without an improvement in status:

> *"There are some cases that I still cannot determine why the patient's transports are being
> 'denied.' For example, we transported a gentleman at least three times a week to dialysis and to
> wound healing and specialty clinics as he endured losing several of his extremities. We
> transported him routinely for about a year. His transports were approved January 1 through mid-
> June. He passed away recently, and the very next week we received notice that his transports were
> "non-affirmed" because his medical records did not address his inability to walk or transfer...It
> was the same documentation that had been used to support his transports for several months...and
> he obviously did not get better, so why were the transports suddenly 'denied'?" – Ambulance
> supplier*

In interviews, some beneficiaries and their caregivers reported similar confusion about how RSNAT
medical necessity criteria are set and how eligibility decisions are made.

MAC interviewees noted the medical necessity requirement may be unclear to some stakeholders because
application and enforcement of the criteria were inconsistent before the RSNAT model. Many
beneficiaries, physicians, and even some dialysis providers mistakenly assumed RSNAT was a covered
service for *all beneficiaries with mobility issues* because medical necessity guidelines had not been
strictly enforced in the past. Several respondents noted they were surprised to learn how many
beneficiaries were not actually eligible for RSNAT.

To counter this confusion, MACs reported that much of the early implementation process focused on
communicating to ambulance suppliers the *specific* criteria for medical necessity, which are defined more
restrictively for RSNAT than for many other covered services, and the supporting documentation required
to meet those criteria. Many ambulance suppliers then found themselves in the role of intermediary,

communicating to physicians what constituted medical necessity and what types of documentation were needed to support a PAR.

According to MAC personnel, although most ambulance suppliers seemed to understand the requirements or have learned them over time, confusion still exists among physicians who provide the supporting documentation. As one MAC interviewee explained, "Physicians see it as 'prescribing' ambulance transport, but it's not a prescription—they don't realize they need to provide supporting evidence, that it is needed. [They] also don't understand that a diagnosis (COPD) does not equate to medical necessity." Survey data seem to support these perceptions; in both Year 1 and Year 2 states, ambulance suppliers reported higher levels of familiarity with medical necessity requirements than did physicians.

MAC personnel highlighted the need to educate stakeholders, particularly beneficiaries, in the Year 2 states earlier in the process. They believed stakeholder education was insufficient in the Year 1 model states. Interviews indicated that beneficiaries and their caregivers had little awareness about RSNAT medical necessity guidelines and the prior authorization process. Most reported relying on their transportation supplier and/or staff at treatment facilities to know the details of the PAR process.

In online surveys, a large majority of stakeholders in both Year 1 and Year 2 states reported being very familiar or somewhat familiar with the medical necessity requirement. When asked in a subsequent question about the clarity of medical necessity criteria, majorities of stakeholders in both Year 1 and Year 2 states described them as very or mostly clear (66 percent in Year 1 states, 64 percent in Year 2 states). Because these surveys took place 14 to 20 months after model implementation, the figures represent familiarity levels and perceived clarity after regular communication with MACs.

3. Stakeholders perceive that current medical necessity criteria may be applied too rigidly. A third reason stakeholders often cited for PARs not being affirmed when they felt they should be affirmed was the perception that MACs applied the medical necessity criteria too rigidly. Whereas MAC personnel consistently reported taking a holistic approach to reviewing PARs—considering the patient's full history when making determinations and trying to understand the full picture of the patient's condition—ambulance suppliers and dialysis providers often perceived that MACs applied medical necessity criteria strictly, using a "black and white" definition of medical necessity.

As noted above, physicians found it difficult to cite CMS's medical necessity criteria for non-emergency ambulance transport, which have been in effect since before the RSNAT-PA model. Yet they often questioned[67] how MACs were applying medical necessity criteria and believed that this judgment should be left to the physician's discretion. One physician asserted that he would prefer "a checklist of conditions or medical probabilities which would establish prima facie necessity." It is important to note that the MACs use trained reviewers, many of whom have nursing or other clinical experience, and the reviewers are backed up by MAC physicians.

Survey results echo concerns about how MACs make RSNAT prior authorization determinations. Few stakeholders in either Year 1 or Year 2 states "strongly agree" that "final prior authorization determinations are usually correct," though more stakeholders in Year 2 states agreed than disagreed with this statement (Appendix I).

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[67] Mathematica did not evaluate the validity of this critique.

Documentation challenges for ambulance suppliers

Ambulance suppliers reported that working with physicians to obtain the correct documentation was a challenge. From the perspective of many stakeholders, getting appropriate documentation and signatures from physicians and other staff is often a struggle. As one MAC reviewer described it, physicians have "no skin in the game" because their reimbursement is not contingent on affirmation of an RSNAT PAR. One SNF focus group participant noted:

> *"The only barrier has been getting the physicians onboard with writing and signing extensive progress notes and assessments outlining the potential for a specific injury or adverse reaction as sequel—for example, 'cause and effect.' I stress to the doctors that he or she has to link causation. Many of them want to write that the patient 'will fall' without adding the potential injury, 'why' they will fall, and placing emphasis on one means of transport versus another." – SNF staff*

In focus groups, physicians described the process of completing the physician certification statement to document medical necessity in different ways. Generally, they indicated that nursing staff fill out the form, and then a physician signs it. Some respondents said it was a simple five-minute process, but others said it was tedious and time-consuming and that the information requirements were not clear.

Survey responses indicate that, in both Year 1 and Year 2 states, a large majority of ambulance suppliers found it difficult or extremely difficult to obtain supporting information from physicians and treatment facilities. In the Year 2 survey, the study added a question to probe the relative frequency of challenges ambulance suppliers face in gathering this documentation (Figure VI.8). The two most cited challenges were inadequate or missing documentation and slow response time (experienced by 87 and 85 percent of suppliers, respectively) (Appendix I).

In focus groups, ambulance suppliers often reported having the same PAR returned repeatedly for different reasons. They also expressed considerable frustration at PARs being returned for what they saw as "clerical" mistakes that seemed inconsequential to outcome decisions.

According to ambulance suppliers who completed the survey, the average percentage of their submitted PARs approved upon initial submission was 36 percent in Year 1 states and 45 percent in Year 2 states (Figure VI.8). These findings align with MAC reports that a large portion of submitted PARs are returned to suppliers for resubmission. On average, Year 1 suppliers reported that another 31 percent of PARs were affirmed upon resubmission, and Year 2 suppliers reported an average of 28 percent were approved after resubmission. This indicates that, for a significant portion of PARs, suppliers do successfully address the issues that led to the initial non-affirmation. However, this reflects conditions in early implementation; approval rates have increased over time as fewer PARs are submitted for beneficiaries whom suppliers know are not eligible and as the quality of documentation has improved.

Figure VI.8. Outcomes of prior authorization requests submitted by ambulance suppliers

What percentage of the PARs your organization has submitted have resulted in each outcome?		Year 1 states		Year 2 states	
		Mean	**Median**	**Mean**	**Median**
PAR outcomes	Affirmed upon initial submission	36%	30%	45%	50%
	Affirmed after one or more resubmissions	31%	25%	28%	20%
	Other[a]	4%	0%	--	--
	In process/no outcome to date	1%	0%	3%	0%
	Never approved	29%	10%	25%	5%

Note: Sample sizes = 92 in Year 1 states, and 39 in Year 2 states.

[a] We did not include this response option in the Year 2 online survey.

PAR = Prior authorization request.

VII. Claims denial and PAR non-affirmation

To investigate the research question, "How does the prior authorization model affect claims denial rates and PAR non-affirmation?", we examined claims for non-emergency ambulance trips, which are usually scheduled in advance rather than summoned in response to an emergency health situation. Such trips bring beneficiaries to scheduled appointments or treatments rather than to an emergency department. RSNAT-PA applies only to non-emergency ambulance trips. We also conducted interviews with MACs.

Domain 5 summary

- The claims denial rate rose immediately upon implementation of RSNAT-PA, but it declined back to the baseline rate within two years.

- Early after implementation, a large portion of PARs were non-affirmed either for technical reasons or because the beneficiary did not meet the medical necessity criteria. MAC personnel reported a sizeable decrease in the number of non-affirmed PARs and improved documentation for all submitted PARs, as ambulance suppliers developed a better understanding of medical necessity guidelines and required documentation.

Methods

Secondary data analysis

We estimated the impact of RSNAT-PA on the number of denied claims for non-emergency ambulance services per beneficiary-quarter. We used a variant of the regression model that included separate indicator variables for each quarter after model implementation in the model states. This version of the regression analysis enabled us to assess whether the impact of the model varied over time. Specifically, we were interested in determining whether claims denial increased immediately following implementation but reverted to baseline levels as patients and suppliers acclimated to the model.

Claims denials for this type of trip are uncommon at the beneficiary level. Before the model took effect, the average number of non-emergency ambulance claims denied was about 7 per 100 beneficiaries per quarter (about 3.5 percent of non-emergency ambulance claims).

Primary data collection

The evaluation team conducted interviews with 13 MAC staff in March 2016 (Year 1 states) and 6 MAC staff in June 2016 (Year 2 states) to understand the impact of the model on PAR non-affirmation. Interview guides appear in Appendix H.3.

Results

Claims denials

Claims denials increased after the model went into effect. However, this effect reduced over time—by eight quarters after implementation, the number of claims denied was not statistically significantly

different from the baseline level (Figure VII.1).[68] This pattern might reflect learning on the part of ambulance suppliers about the appropriate documentation for prior authorization requests or fewer submissions by non-compliant providers, who may have been more likely to exit Medicare in the model states over time. Table I2

Figure VII.1. Regression-adjusted change in number of non-emergency ambulance claims denied per 100 beneficiaries per quarter compared to baseline
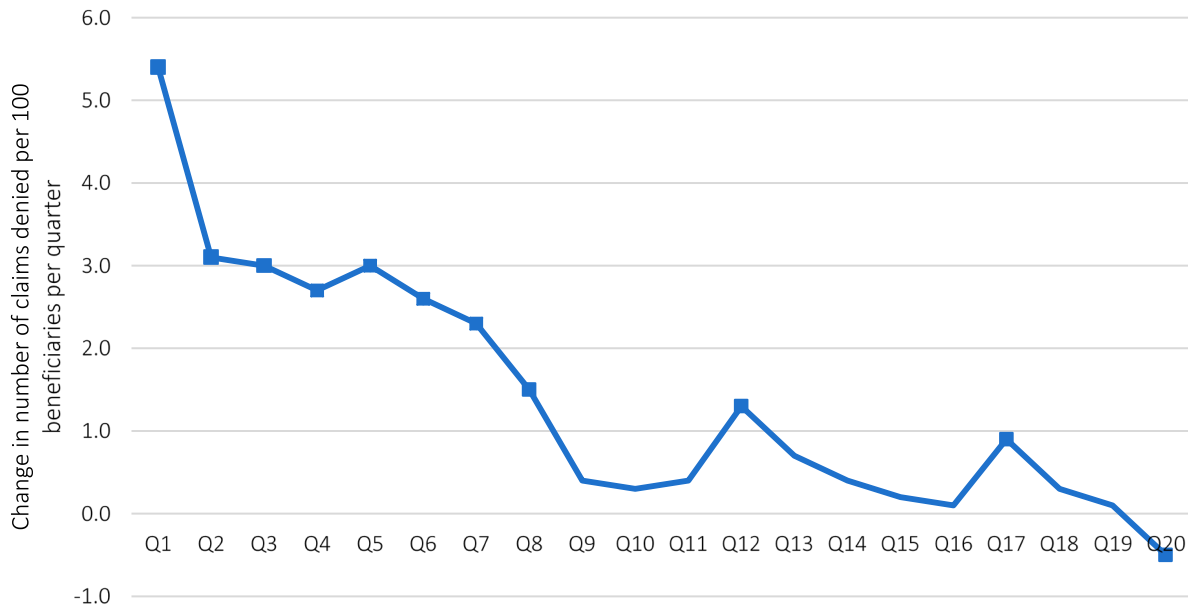
Note: Figure shows regression-adjusted differences from baseline in each quarter after implementation. Q1 corresponds to Jan–Mar 2015 for Year 1 states and Jan–Mar 2016 for Year 2 states. Points with a square marker indicate the value is statistically significantly different from the baseline value at the 0.01 level.

PAR non-affirmation

According to MAC personnel interviewed, in the first several months after implementation, a large portion of PARs were non-affirmed either for technical reasons (inadequate documentation, missing signatures, or incorrect dates) or because the beneficiary did not meet the medical necessity criteria. MAC personnel reported a sizeable decrease in the number of non-affirmed PARs and improved documentation for all submitted PARs, as ambulance suppliers developed a better understanding of medical necessity guidelines and required documentation. As a result, there were significant decreases in the volume of RSNAT PARs for beneficiaries who did not meet medical necessity guidelines and the number of PARs with insufficient or questionable documentation. MAC personnel overseeing the RSNAT model reported they had no difficulty reviewing the volume of PARs or turning them around in the specified time frame[69]; the decreased volume during the first year and increase in suppliers' and providers' knowledge about appropriate documentation helped make this possible.

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[68] There was one observation slightly below baseline that we believe reflects expected fluctuation and does not represent a change in the trend.
[69] MACs review timeframes during the model were specified as 10 days for initial PARs, 20 days for subsequent requests, and 2 days for expedited requests.

VIII. CONCLUSIONS

Our analysis of the effects of RSNAT-PA suggests that the model reduced the use of RSNAT services substantially. We found no evidence that RSNAT-PA had adverse impacts on beneficiaries as measured by increased emergency service use, hospitalizations, or deaths. We further found that RSNAT-PA was associated with only small changes in use of dialysis treatment among beneficiaries with ESRD. We found no evidence of reduced access to care resulting in increased hospitalization for complications of ESRD. Some beneficiaries reported experiencing emotional distress and financial strain as a result of being non-affirmed for RSNAT and having to seek alternative transportation options.

Limitations. The conclusions in this report are based on analysis of both primary and secondary data from Year 1 and Year 2 model states. In drawing these conclusions, we considered not only the direction and strength of the findings, but also the quality of the evidence, given the limitations of the study.

The primary limitation of our secondary data analysis is that it does not rely on random assignment—the gold standard for evaluations—because CMS selected states based on pre-model utilization levels. A further limitation is that the states selected for the Year 1 cohort had particularly high rates of RSNAT service use before RSNAT-PA went into effect. This made it difficult to find a set of comparison states that could serve as an appropriate counterfactual. As a result, the analysis could yield biased impacts if the comparison states did not experience similar changes over the study period to what the model states would have experienced in the absence of RSNAT-PA. Recognizing this possibility, we took various steps to attempt to remove any major source of bias in our estimates. These efforts included (1) selecting a credible comparison group from multiple states, (2) weighting to make the comparison states closely match our model states, (3) verifying parallel baseline trends in outcome variables, and (4) using difference-in-differences regression models to adjust for and difference out potentially confounding factors.

The main limitation of our primary data analysis is that the data collected relied on nonprobability samples of physicians, staff at nursing homes and dialysis facilities, and ambulance providers and convenience samples of beneficiaries and caregivers to gather insights into model operations and impacts. In addition, insights from the focus groups and interviews are based on information obtained from a small number of stakeholders, and response rates to the online survey were low. Given these constraints, our qualitative findings may not represent the experience of all stakeholders or identify all important concerns or perspectives of the stakeholders in the study states.

Another important limitation is the timing between primary data collection and analysis and secondary data analysis. Primary data collection activities occurred early in model implementation, from March 2016 through February 2017, while secondary data analyses cover the period from January through December 2019. The secondary data findings thus reflect outcomes over a longer period of the model operations.

Utilization and expenditures

The model was highly effective in reducing RSNAT service utilization and expenditures for beneficiaries with ESRD and/or pressure ulcers. Analysis of administrative data showed that both utilization and expenditures decreased by more than 70 percent. The model also reduced total Medicare ambulance use and expenditures for Medicare ambulance services. We found that RSNAT-PA produced total Medicare savings of about $1 billion during the five years we studied. Non-RSNAT expenditures and service use

was relatively unaffected. Stakeholders perceived that reduced utilization came from two primary sources: reduced fraud and reduced use of non-authorized RSNAT services.

Estimated impacts on RSNAT use and expenditures were similar in both direction and level of statistical significance for the states that began in Year 1 and those that began in Year 2. The absolute magnitudes of impacts were generally much larger for the Year 1 model states. This result is not surprising, given that RSNAT use was much higher in Year 1 states than in Year 2 states before the model was implemented. The impacts measured as a percentage of the baseline means were also larger for Year 1 states, but less so.

Quality of care and access to care

Overall, the findings suggest that the model had few to no adverse effects on quality of care or access to care. Some stakeholders reported anecdotal evidence of some beneficiaries experiencing delayed or missed treatments, as well as emotional distress from the need to find alternative transportation.[70] However, analysis of claims data revealed no increases in emergency department use, hospitalization, or death among model state beneficiaries relative to comparison state beneficiaries. While we saw some small changes in dialysis use among beneficiaries with ESRD, we found no evidence of reduced access to care resulting in increased hospitalization for complications of ESRD.

Program operations

MACs reported successful model rollout and operation, particularly in Year 2 states, where they were able to apply operational lessons learned in the Year 1 model states and utilize staff already experienced in processing PARs and communicating with stakeholders. MACs reported having adequate staffing to meet the required PAR turnaround times, although they felt they would have benefitted from more time at the beginning of the program to educate stakeholders about the medical necessity requirements and required documentation, particularly in Year 1. This observation led MACs to focus more on advance stakeholder notification and communications in Year 2 states. Ambulance suppliers reported mixed results when they reached out for clarification on PARs.

Provider and supplier exit and operations

RSNAT-PA did affect suppliers, although the results above indicate that the market retained sufficient capacity to meet RSNAT needs for eligible beneficiaries. We found a 50 percent reduction in the number of RSNAT suppliers per 100,000 beneficiaries in the model states upon implementation. The decrease was especially pronounced in the Year 1 states, with the Year 2 states seeing a much smaller reduction. The number of RSNAT suppliers in Year 1 states was much higher than the numbers in Year 2 and comparison states at the start of the study period, but by 2017 it had declined to levels that were comparable to those of Year 2 and comparison states.

RSNAT suppliers that stopped billing Medicare for ambulance transportation before RSNAT-PA went into effect in model states (leavers) were smaller; served beneficiary populations that were sicker, less white, and less rural; and depended much more heavily on payments for RSNAT services than suppliers that continued to bill Medicare after implementation of the model. Suppliers that continued to supply

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[70] CMS provides beneficiaries who receive non-affirmed RSNAT decisions information on alternative transportation options in their area.

ambulance services to Medicare beneficiaries in the first year after model implementation, but not after that (triers), also relied more heavily on RSNAT than suppliers that stayed in the Medicare program long term (stayers). Triers tended to be larger than leavers, and they may have expected that they could absorb reduced payments under the model, but ultimately chose to exit the Medicare program once RSNAT-PA was implemented.

Ambulance suppliers reported an increase in administrative burden and impacts on their day-to-day operations. Many ambulance suppliers and providers felt that the medical necessity criteria were too narrow given the range of conditions that leave beneficiaries in need of transportation to medical care. Some also interpreted them incorrectly or confused medical necessity for Medicare non-emergency ambulance transport with medical necessity for the treatment to which the patient was being transported. In addition, some ambulance suppliers and physicians believed that MACs applied the medical necessity criteria too rigidly, using a "black and white" definition of medical necessity.

Physicians reported a lack of awareness of the program before launch, noting they first learned about prior authorization when they received requests for documentation from beneficiaries or transportation suppliers.

Claims denials and PAR non-affirmation

Eventually the model resulted in improved conformity with claims and PAR requirements. While the rate of claims denials and PAR non-affirmation rose after the model began, they fell back to the baseline rate over time. This trend could be attributed to suppliers learning how to submit compliant claims that were less likely to be denied. Alternatively, the trend could reflect fewer submissions by non-compliant suppliers, who may have been more likely to exit Medicare in the model states over time.

Feasibility and Implications

Our findings suggest that scaling up the model nationally, as CMS plans to do,[71] could produce savings for Medicare and reduce unnecessary utilization of RSNAT. That said, those savings would likely be smaller than what was observed under the model. Although utilization and expenditures for RSNAT declined dramatically in both Year 1 and 2 states among beneficiaries with ESRD and/or pressure ulcers, the magnitude of these impacts was smaller for the Year 2 states. The impacts expressed as a percentage of baseline mean were also smaller, but less so. This finding is not surprising, given how unusual the Year 1 states were in their RSNAT use before implementing the model. The potential for RSNAT cost savings was especially high for the Year 1 states, which is why CMS selected them. If the model were implemented nationally, savings would likely be more similar to what we found for the Year 2 states rather than to the overall results for the two cohorts of states combined. Early stakeholder engagement and education, especially on the current medical necessity criteria, are important to the successful national implementation of the model. Continued guidance for non-affirmed beneficiaries on alternative

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[71] A *Federal Register* notice was published on November 23, 2020 to announce the national expansion of RSNAT-PA model to all states under section 1834(l)(16) of the Act, as added by section 515(b) of MACRA. CMS is delaying implementation of the expansion to all additional states, however, until the COVID-19 public health emergency has ended. CMS will publish another *Federal Register* notice in the future to announce the implementation dates for the remaining states.

transportation options could also help to alleviate the inconveniences faced by this group as a result of losing RSNAT services that they do not qualify for.

In addition, our supplier analysis suggests that ambulance suppliers in the model states might have depended more on RSNAT for their revenue than suppliers in other states. As a result, the impacts and experiences in these states might not be generalizable to other states or the rest of the Medicare program. The findings for the Year 2 states could provide a more reliable guide to what might occur if CMS extended prior authorization to more states.

Glossary of Terms

Baseline. The period of time immediately before the implementation of a policy or treatment. In this case, the baseline is the time period from 2012 to the implementation of the RSNAT-PA model.

Beneficiary. An individual enrolled in and able to receive services from Medicare.

Centers for Medicare & Medicaid Services (CMS). The federal agency that runs the Medicare program. In addition, CMS works with the states to run the Medicaid program.

Claim. Request for payment from a provider to CMS for a Medicare-covered service.

Claims data. Data on the claims submitted to CMS for Medicare-covered services. Claims data provide detailed information on procedures performed by providers.

Cohort. A population group that shares a common property, characteristic, or event, such as a year of birth or year of marriage. In this instance, a cohort refers to the beneficiaries residing in a group of states for which the prior authorization model went into effect at the same time.

Comparison group. A group or population not affected by a policy change or intervention, sometimes called a control group. In this case, the comparison group is the beneficiaries residing in a group of states where RSNAT-PA has not been implemented. The comparison group is used to measure the impact of RSNAT-PA on the beneficiaries residing in the states where RSNAT-PA was implemented.

Compliance. Adhering to an expectation, usually a rule or law. Something is said to be compliant or in compliance if it adheres to an established set of standards.

Computer-assisted interviewing. A system used to run cross-tabulations and summary statistics for online surveys.

Confounding factor. A confounding factor is an effect that alters the outcomes measured in a study that is not known or accounted for in the analysis and that affects the intervention and comparison groups differently. Confounding factors can result in incorrect estimates of the intervention effect. For example, if some of the model states passed legislation that lowered the cost of RSNAT services after RSNAT-PA was implemented, that would be a potential confounding factor.

Counterfactual. An expectation of what would have happened in the intervention group in absence of a policy change or intervention. In this case, the counterfactual is the outcomes we would expect to see in the RSNAT-PA states during the study period if the model had not been implemented.

Descriptive analysis. An examination intended to provide a basic description of data. It forms the basis of more complicated analyses, including analyses intended to assess whether a policy is responsible for changing outcomes for beneficiaries.

Difference-in-differences. A quasi-experimental technique that evaluates the differences in a comparison group and an intervention group following an intervention or policy change. This approach adjusts for expected differences between the two groups as observed before the intervention.

End-stage renal disease. A medical condition in which a person's kidneys cease functioning on a permanent basis leading to the need for a regular course of long-term dialysis or a kidney transplant to maintain life.

Expenditure. The issuance of checks, disbursement of cash, or electronic transfer of funds made to settle an expense regardless of the fiscal year the service was provided or the expense was incurred.

Fee-for-service. A health care payment model in which providers are reimbursed for individual services provided to a beneficiary.

Generalizability. The extent to which the results obtained from one sample can be applied to a more widespread population.

Hierarchical condition category. A risk adjustment model originally developed to estimate future health care costs for beneficiaries based on demographic characteristics, past diagnoses, and past utilization. The HCC score is a single measure that serves as a proxy for a beneficiary's health status, accounting for the presence and severity of health conditions.

Improper payments. Payments for services that did not occur or that do not meet Medicare requirements for a particular service. In the case of RSNAT-PA, an improper payment is a payment made for RSNAT service that did not occur, does not meet the requirements for medical necessity, or was not properly documented.

Matching. A statistical technique employed to select a comparison group from some larger population. Matching is often used to minimize baseline differences in characteristics between an intervention group and a comparison group.

Mean. A measure of the average value of a sample. The mean is calculated by adding all data points in a sample and then dividing the sum by the number of data points in the sample.

Measure. A standardized way to assess an outcome of interest.

Medical necessity. Medicare defines medical necessity for non-emergency ambulance use as one of the following: (1) the beneficiary is bed-confined and it is documented that the beneficiary's condition is such that other methods of transportation are contraindicated, or (2) the beneficiary's medical condition, regardless of bed confinement, is such that transportation by ambulance is medically required.

Moratorium. A declared suspension of an activity for some period of time.

Multiple regression analysis. Statistical analysis that estimates the relationships between an outcome of interest and more than one variable. This study employs multiple regression analysis to assess the impact of RSNAT-PA on several outcomes of interest, such as RSNAT utilization, Medicare expenditures, and probability of death, while controlling for other variables.

Outcome. A measurable or observable product of a particular process.

Prior authorization. The requirement that a service receive approval from health care payers to bill for services before the service is provided.

Prior authorization requests non-affirmation. Approval to bill for services is denied.

Probability. The likelihood of something occurring.

Proxy. An observable outcome used in place of an outcome that cannot be measured. The proxy outcome is known or thought to be similar to the unmeasured outcome.

Public health emergency. The Secretary of the Department of Health and Human Services may determine that: (a) a disease or disorder presents a public health emergency, or (b) a public health emergency, including significant outbreaks of infectious disease or bioterrorist attacks, otherwise exists. A public health emergency declaration allows the Secretary to take certain actions in response to the public health emergency.

Qualitative. Describing characteristics or measuring effects with little or no quantitative data.

Repetitive scheduled non-emergent ambulance transport. Medically necessary, non-emergent transportation by ambulance that occurs three times or more during a 10-day period or at least once per week for three weeks or longer.

Statistically significant. A difference in outcomes between two groups is said to be statistically significant if it is unlikely to have occurred due to chance.

Utilization. Making use of a particular service.

Validity. The extent to which a measurement of some characteristic actually corresponds with that characteristic.

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References

American Medical Association. "2013 National Health Insurer Report Card." Chicago, IL: American Medical Association, 2013.

Austin, P. C. "Optimal Caliper Widths for Propensity-Score Matching When Estimating Differences in Means and Differences in Proportions in Observational Studies." *Pharmaceutical Statistics*, vol. 10, no. 2, 2011, pp. 150–161.

Asher, A., K. Contreary, J. Coopersmith, G. Haile, and T. Chen. "Evaluation of the Medicare Prior Authorization Model for Non-emergent Hyperbaric Oxygen (HBO): Final Report." Washington, DC: Mathematica, May 2019.

Bergeson, J., K. Worley, A. Louder, M. Ward, and J. Graham. "Retrospective Database Analysis of the Impact of Prior Authorization for Type 2 Diabetes Medications on Health Care Costs in a Medicare Advantage Prescription Drug Plan Population." *Journal of Managed Care Pharmacy*, vol. 19, no. 5, 2013, pp. 374–384.

Centers for Medicare and Medicaid Services (CMS). "Measure Methodology." September 2016a. Available at https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/Measure-Methodology.html. Accessed November 9, 2016.

Centers for Medicare and Medicaid Services. "Medicare, Medicaid, and Children's Health Insurance Programs: Announcement of the Implementation and Extension of Temporary Moratoria on Enrollment of Part B Non-Emergency Ground Ambulance Suppliers and Home Health Agencies in Designated Geographic Locations and Lifting of the Temporary Moratoria on Enrollment of Part B Emergency Ground Ambulance Suppliers in All Geographic Locations." Baltimore, MD: Centers for Medicare and Medicaid Services, July 2016b. Available at https://www.federalregister.gov/a/2016-18383. Accessed November 10, 2016.

Centers for Medicare and Medicaid Services (CMS). "Medicare, Medicaid, and Children's Health Insurance Programs: Announcement of Temporary Moratoria on Enrollment of Ambulance Suppliers and Providers and Home Health Agencies in Designated Geographic Areas." Baltimore, MD: Centers for Medicare and Medicaid Services, July 2016c. Available at https://federalregister.gov/a/2013-18394. Accessed November 10, 2016.

Centers for Medicare and Medicaid Services (CMS). "Medicare Prior Authorization of Power Mobility Devices Model Status Update." Baltimore, MD: Centers for Medicare and Medicaid Services, December 2014a. Available at https://www.cms.gov/Research-Statistics-Data-and-Systems/Monitoring-Programs/Medicare-FFS-Compliance-Programs/Medical-Review/Downloads/PMDDemoDecemberStatusupdate12302014.pdf. Accessed May 1, 2015.

Centers for Medicare and Medicaid Services (CMS). "Medicare Program: Prior Authorization of Non-Emergent Hyperbaric Oxygen (HBO) Therapy." Baltimore, MD: Centers for Medicare and Medicaid Services, 2014b.

Centers for Medicare and Medicaid Services (CMS). "Medicare Program: Prior Authorization of Repetitive Scheduled Non-Emergent Ambulance Transport." Baltimore, MD: Centers for Medicare and Medicaid Services, 2014c.

Code of Federal Regulations. "Moratoria on Newly Enrolling Medicare Providers and Suppliers." 42 CFR §424.570(c). October 1, 2011.

Department of Health and Human Services (DHHS). "Medicare Payments for Ambulance Transports. OEI 05-02-00590." Washington, DC: Office of the Inspector General, January 2006.

Department of Health and Human Services (DHHS). "Medicare Program: Contract Year 2016 Policy and Technical Changes to the Medicare Advantage and the Medicare Prescription Drug Benefit Programs." *Federal Register*, vol. 80, no. 29, 2015, pp. 7912–7966.

Government Accountability Office (GAO). "Ambulance Providers: Costs and Medicare Margins Varied Widely; Transports of Beneficiaries Have Increased." Washington, DC: Government Accountability Office, October 2012.

Guo, S., and M. W. Fraser. "Propensity Score Analysis: Statistical Methods and Applications." *Advanced Quantitative Techniques in the Social Sciences,* vol. 12. Sage Publications, 2009.

Hansen, B., and S. O. Klopfer. "Optimal Full Matching and Related Designs Via Network Flows." *Journey of Computational and Graphical Statistics*, vol. 15, no. 3, 2006, pp. 609–627.

MacKinnon, N., and R. Kumar. "Prior Authorization Programs: A Critical Review of the Literature." *Journal of Managed Care Pharmacy*, vol. 7, no. 4, 2001, pp. 297–302.

Posner, M. A., and A. S. Ash. "Comparing Weighting Methods in Propensity Score Analysis." Villanova, PA: Villanova University and Boston, MA: Boston Medical Center, forthcoming.

Rosenbaum, P. R., and D. B. Rubin. "The Central Role of the Propensity Score in Observational Studies for Causal Effects." *Biometrika*, vol. 70, no. 1, 1983, pp. 41–55.

Shrank, W. H., T. L. Rogstad, and N. Parekh. "Waste in the US Health Care System: Estimated Costs and Potential for Savings." *JAMA*, vol. 322, no. 15, 2019, pp. 1501–1509.

TRICARE. "Prior Authorization." March 2016. Available at http://www.tricare.mil/pharmacy/priorauth. Accessed November 10, 2016.

U.S. Congress. "Medicare Access and Chip Reauthorization Act of 2015." Pub. L. No. 114-10, 129 Stat. 88. April 16, 2015.

Wang, W., D. Rothschild, S. Goel, and A. Gelman. "Forecasting Elections with Non-Representative Polls." *International Journal of Forecasting*, vol. 31, no. 3, 2014, pp. 980–991.

Werfel, B. "CMS Extends Moratorium on Non-Emergency Ground Services." July 31, 2018. Available at https://ambulance.org/2018/07/31/cms-extends-moratorium-on-non-emergency-ground-services/. Accessed December 4, 2020.

Werfel, B. "CMS Declines to Extend Temporary Moratorium." January 30, 2019. Available at https://ambulance.org/2019/01/30/cms-declines-to-extends-temporary-moratorium-on-non-emergency-services/. Accessed December 4, 2020.

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