MATHEMATICA Policy Research

First Interim Evaluation Report of the Medicare Prior Authorization Model for Repetitive Scheduled Non-Emergent Ambulance Transport (RSNAT)

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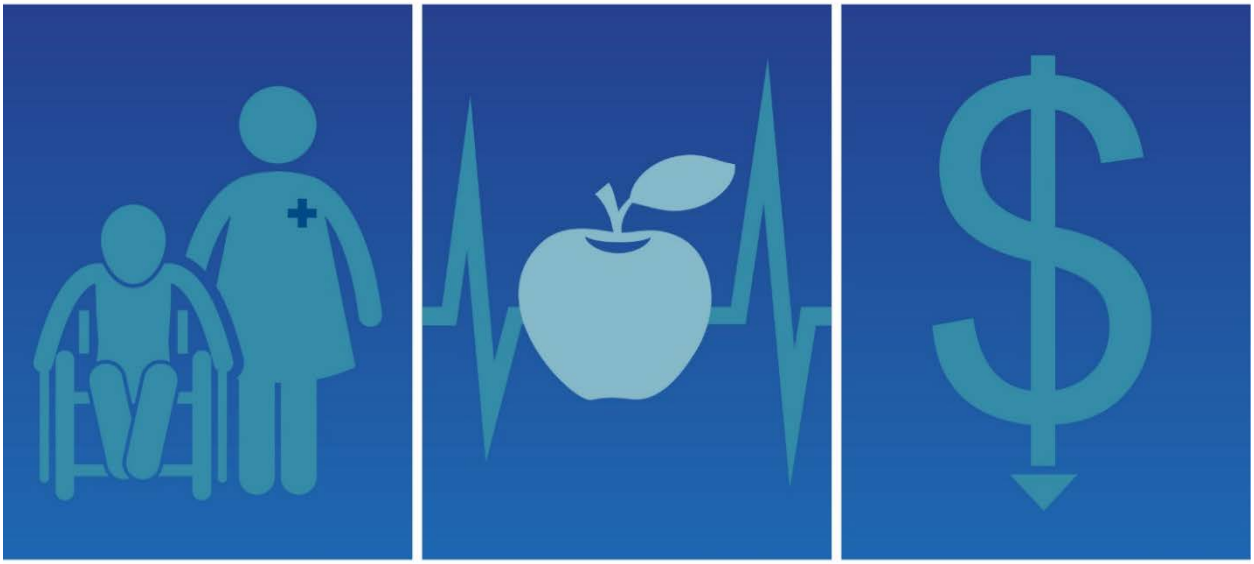

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Overview

In December 2014, the Centers for Medicare & Medicaid Services (CMS) launched a three-year Medicare Prior Authorization model for repetitive, scheduled, non-emergent ambulance transport (RSNAT) in select states where utilization for these services had been high compared to utilization in other states. The purpose of the model is to test whether prior authorization can reduce Medicare expenditures by reducing the provision of non-covered ambulance transports that do not meet Medicare coverage standards without adversely affecting access to or quality of care for beneficiaries. Implementation of the model began in December 2014 in New Jersey, Pennsylvania, and South Carolina (hereafter, we refer to them as the Year 1 states). In January 2016, Phase II expanded the RSNAT prior authorization model to six additional states: Delaware, the District of Columbia, Maryland, North Carolina, Virginia, and West Virginia (hereafter, we refer to them as the Year 2 states.)

RSNAT services are medically necessary, scheduled, non-emergency ambulance transportation for three or more round trips in a 10-day period or at least once a week for three weeks or more. Medicare Part B covers such ambulance transportation, provided that certain medical necessity criteria are met as defined in the Code of Federal Regulations (42 CFR §410.40(d)): "[T]he 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." Under the model, ambulance suppliers[1] submit a prior authorization request (PAR) for the beneficiary that includes a physician certification statement (PCS) documenting medical necessity to their Medicare administrative contractors (MACs). After reviewing the PCS and accompanying documentation, medically trained MAC reviewers then determine if the beneficiary qualifies for RSNAT.

The prior authorization process is intended to reduce improper utilization and payments by subjecting requests for RSNAT services to MAC review to ensure that they comply with documentation and coverage rules (including medical necessity) before claims for services provided are submitted for payment. The RSNAT prior authorization model requires suppliers with ambulances garaged in the participating states to obtain prior authorization for RSNAT services from their MAC or be subject to prepayment review.

This evaluation examines the impact of the RSNAT model on Medicare payments, utilization, and quality of care. Although recognizing that it is in accordance with Medicare rules to not approve coverage of RSNAT services to beneficiaries who do not meet medical necessity criteria, the evaluation seeks to examine whether increased enforcement of the existing RSNAT eligibility rules resulted in quality of care concerns. Adverse effects may arise if beneficiaries who do not meet the definition of medical necessity for Medicare ambulance transportation have difficulty finding appropriate and reliable alternative transportation that may result in missing or

[1] Under Medicare, the term "ambulance suppliers" refers to independent ambulance transportation companies. "Ambulance providers" refers to institutionally based ambulance services; these services are not subject to the RSNAT prior authorization model.

delaying scheduled treatments. Adverse effects may also arise if beneficiaries who qualify for ambulance transportation are unable to get to scheduled treatments because of suppliers' delays in obtaining prior authorization documentation or in receiving affirmation from the MAC administering the model.[2]

The evaluation

In May 2015, CMS contracted with Mathematica Policy Research to perform a five-year evaluation of the impact of the RSNAT prior authorization model. The goal of the evaluation is to assess the impact of the RSNAT prior authorization model on Medicare utilization, cost, quality, and access and on major stakeholders, including ambulance suppliers, service providers, MACs, and beneficiaries. We are measuring the effects of the model at different points in time over a four-year period to examine early impacts and the implementation process as well as later impacts and lessons learned. The results of the evaluation will help CMS determine whether the model should be extended to additional states or expanded nationwide and decide what, if any, changes to the program may be warranted. Guiding research questions for the evaluation were organized around five domains:

- **Domain 1. Cost savings.** How does the prior authorization model affect Medicare service use and cost? Did the model realize savings for the Medicare program?
- **Domain 2. Quality and access.** How does the prior authorization model affect the quality of and access to care for Medicare beneficiaries?
- **Domain 3. Program operations.** How does the prior authorization model affect Medicare program operations? What was the impact of the model on MAC operations?
- **Domain 4. Suppliers and providers.** How does the prior authorization model affect non-emergent ambulance suppliers' and destination health care service providers' (for example, dialysis) behavior and satisfaction? What was the impact of the model on suppliers' and destination service providers' operations, such as dialysis providers? Did suppliers and destination service providers change practices in response to the model and, if so, how?
- **Domain 5. Improper payment rates.** Does prior authorization impact improper payment rates, the number of fraud referrals made, or the rate at which claims are denied?

In addition, this report discusses the implications of the findings, including the major lessons learned.

The evaluation uses a mixed-methods approach, combining quantitative and qualitative data analysis to measure overall cost, service utilization, quality, and access impacts, and understand how the implementation process is affecting stakeholders. The quantitative analysis uses both descriptive and multivariate methods. For this report, we analyze data from January 2012 through June 2016 for beneficiaries and for suppliers. We estimate program effects by comparing (1) the change over time in key outcomes between the pre-model periods (2012–2014 for Year 1 model states and 2012–2015 for Year 2 states) and model periods (2015–2016 for Year 1 model

[2] One other possible effect is the shifting of transportation costs from Medicare to state Medicaid programs, for dually-eligible beneficiaries. This cost-shifting is outside the scope of this evaluation and was not examined.

states and 2016 for Year 2 states) in the nine model states to (2) the change over those periods for a matched set of comparison states. The comparison states were chosen based on their similarity in a variety of factors, including RSNAT utilization, the change in utilization since 2012, of the availability of ambulance suppliers, and the percent of beneficiaries living in rural areas. However, the average probability of receiving a RSNAT service in the treatment states was approximately 50 percent higher than that of the comparison states before the prior authorization requirement took effect. This difference reflects the choice of states, because CMS selected the states with the highest rates of usage and claims error rates for the Year 1 model states.[3] For this reason, the focus of the evaluation is on relative change between the two groups rather than on direct comparisons of utilization and cost. The qualitative analysis relies on focus groups, interviews, site visits, and an online survey with a range of stakeholder groups across the model states conducted from March 2016 to February 2017. Together, the analyses are intended to provide CMS with an overview of prior authorization's ability to reduce improper utilization, and thereby costs, while maintaining quality and access to care.

Findings

RSNAT use is uncommon among Medicare beneficiaries. To be able to detect the impact of this demonstration, we focused on a subset of patients who had the high RSNAT use rather than examining the whole RSNAT population. We identified beneficiaries with ESRD, who account for over 75 percent of all RSNAT claims. Even within this group, the average probability of receiving a RSNAT service in a calendar quarter is only 5 percent (8.8 percent in Year 1 model states and 2.7 percent in Year 2 states).

Our findings for the effects of prior authorization for RSNAT services in the model suggest that it successfully reduced RSNAT service utilization, RSNAT expenditures, and total Medicare FFS expenditures for beneficiaries with ESRD. There is relatively little quantitative evidence at this stage to suggest a negative impact on quality of care or access to treatment; however, in focus groups, online surveys, and interviews, stakeholders expressed some concerns about the model's potential and perceived effects on quality and access.

In Table ES.A, we present findings for the core questions assessed with data from Year 1 and Year 2 states. In the body of the report, we discuss the findings and the supporting data and analyses in detail.

[3] The Year 2 states added to the model were selected because they were in the regions serviced by the two MACs that serviced the Year 1 states.

Table ES.A. Year 1 findings

Domain 1: Cost savings **Prior authorization reduced RSNAT service use and expenditures, all ambulance service use and expenditures, and total Medicare expenditures among beneficiaries with ESRD**
• Both quantitative and qualitative evidence suggest a reduction in RSNAT service utilization and costs in model states for ESRD beneficiaries, with decreases of at least 80 percent in both outcomes observed in the nine model states combined. • The model is associated with an approximately $171 million reduction in RSNAT service expenditures for ESRD beneficiaries. • We found a corresponding decrease in total Medicare fee-for service expenditures for ESRD beneficiaries. • Stakeholders perceive that prior authorization is successfully addressing some transportation providers' fraudulent and questionable practices, and that enforcement of the existing RSNAT medical necessity guidelines has resulted in significantly fewer RSNAT services being provided and fewer inappropriate PAR requests.
Domain 2: Quality and access **Evidence was mixed on the effects of prior authorization on quality of and access to care for ESRD beneficiaries**
• Quantitative analysis suggests little or no impact on quality and adverse outcomes for ESRD beneficiaries (as measured by emergency department visits, emergency ambulance utilization, unplanned inpatient admissions, and death) or access (as measured by use of services such as dialysis, for which beneficiaries may rely on ambulance transportation). We did, however, observe a 15 percent increase in emergency dialysis use, suggesting the possibility that prior authorization may have resulted in some delay in ESRD treatment. • Qualitative analysis suggests the following: - Some beneficiaries who qualify under the medical necessity definition may be experiencing 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. - Some beneficiaries who do not qualify for ambulance transport under the medical necessity definition may require some form of transportation assistance for critical treatment, but they may have trouble finding alternative means of transportation that are reliable, affordable, and appropriate to their physical condition. • Stakeholders, including MACs, beneficiaries, ambulance suppliers, and dialysis facility staff, report that some improper utilization of RSNAT services before prior authorization reflected a lack of availability of reliable, affordable, and condition-appropriate transportation options. Some ESRD beneficiaries who may not meet the RSNAT medical necessity definition may have health problems that make it difficult to find transportation to dialysis. • Stakeholders perceive that some beneficiaries may have turned to other services—such as emergency ambulance transport and emergency department services—in response to non-affirmation of RSNAT prior authorization.
Domain 3: Program operations MACs report success
• MACs report successful implementation and adequate staffing to meet PAR turnaround times. • MACs report that, in Year 1 states, because of greater need for training than expected at program outset, MACs increased efforts to teach stakeholders about the medical necessity requirements and required documentation; in Year 2 states, MACs increased attention to stakeholder education and outreach. • MACs report a smoother implementation process with the Year 2 states, given the many lessons learned early on.

Domain 4: Suppliers and providers
Suppliers and providers report significant challenges and impacts

- We found a 15 percent decrease in the number of ambulance suppliers per 100,000 beneficiaries in the model states after the model was implemented.
- Suppliers who left the program were generally smaller and highly dependent on providing RSNAT services for their Medicare revenue.
- Prior authorization imposes time and cost burdens on ambulance suppliers.
- Some companies report that they reduced or eliminated service to Medicare beneficiaries and/or increased the volume or cost of other services they provide. Some suppliers also report that they are no longer transporting patients to scheduled services during the period of time while waiting for prior authorization.
- Some stakeholders, particularly physicians, report receiving little to no advance notice or educational material about prior authorization before implementation. For Year 2 states, stakeholders report similar problems, despite MAC efforts to improve education and outreach.
- With the exception of MAC staff, stakeholders we spoke with often believed that RSNAT coverage and medical necessity determinations were too strict.
- These RSNAT Medical necessity guidelines are unclear to some stakeholders, primarily physicians.

Domain 5: Improper payments and denied claims
The impact on improper payments is difficult to determine; the model appeared to drive an initial increase in denied claims

- Data challenges make it difficult to determine whether the model had an impact on improper payments.
- Rates of improperly paid claims for all Medicare ambulance services appeared to increase for both the model and comparison states throughout the analysis period for which data were available (from 2012 through 2015).
- Multivariate analysis of denied claims suggests that prior authorization was associated with in an initial spike in denied RSNAT claims in the model states. Claims denials appear to have declined toward the baseline rate over time, which may indicate increased vigilance by the MACs during the model rollout.

Discussion, conclusions, and implications of the findings

In Year 1 and Year 2 states, CMS and the MACs successfully implemented the core elements of the model. Their experience in implementing prior authorization in Year 1 offered insights into the opportunities for improving the model's rollout and modification, some of which were employed in Year 2 states.

The model has had a dramatic initial impact on RSNAT service use and cost for beneficiaries with ESRD, and on total Medicare cost of care for this group. We have not found clear, quantitative impacts on quality, adverse outcomes, or access to care. Despite the lack of quantitative findings supporting negative impacts on quality of care and access to care, many dialysis facility staff, ambulance suppliers, beneficiaries, and physicians believe that the program could have a negative quality impact from curtailing RSNAT use.

A key goal of the model was to use prior authorization to enforce existing coverage and medical necessity requirements. While some stakeholders were concerned about aspects of the administration of prior authorization by the MACs, many strongly disagreed with the appropriateness of the current RSNAT coverage and medical necessity requirements,[4] seeing them as too limited in scope.

[4] This evaluation does not address the appropriateness of the medical necessity guidelines.

One important finding is that although Medicare utilization and expenditures for RSNAT and Medicare ambulance services declined in both Year 1 and Year 2 states, the impacts were considerably smaller for the Year 2 states. The latter had not been selected based on prior use patterns. This finding is not surprising, given the higher baseline rates of RSNAT use in the Year 1 states before implementation of the model. It seems likely that the potential for cost savings would be especially high for the Year 1 states, consistent with CMS's reasoning in selecting them. One would expect that the model holds some promise for RSNAT and Medicare ambulance cost savings if implemented nationally, but these savings would be expected to be less than those observed in this evaluation.

Participating states had a small decline in the number of ambulance suppliers. It appears that affected suppliers were primarily small operations that specialized in providing RSNAT services. It also appears that MACs—although continuing to learn and experience challenges— were more successful in implementing the model in the Year 2 states. This finding suggests that a national program may have fewer implementation challenges if attention is paid to the lessons learned so far.

This evaluation has important limitations. First, given CMS's choice of model states with particularly high rates of historical RSNAT service utilization, the evaluation had to rely on a quasi-experimental design with comparison states rather than on the gold standard of random assignment, which limits the external validity of the findings and renders conclusions about causality less definitive. Second, most of the primary data collection for the evaluation relies on nonprobability samples of several stakeholder groups (ambulance suppliers, dialysis facilities, skilled nursing facilities, and physicians). Focus group participants were recruited by telephone until each focus group was full. In addition, beneficiaries who participated in interviews were selected through a sample of convenience and identified and recruited with the help of dialysis facility staff as part of site visits. Here, stakeholders with a greater stake in model impacts or particularly impactful experiences may be more likely than others to participate, and their views may not represent the experiences and perceptions of the full stakeholder population in Year 1 and Year 2 states.

I. INTRODUCTION

On November 14, 2014, the Centers for Medicare & Medicaid Services (CMS) announced the implementation of a three-year Medicare prior authorization model for repetitive scheduled non-emergent ambulance transports (RSNAT) in select states with a high incidence of improper payments for these services to ambulance suppliers.[5] Phase I of the model began in December 2014 in New Jersey, Pennsylvania, and South Carolina. In January 2016, Phase II expanded the RSNAT prior authorization model to six additional states: Delaware, the District of Columbia, Maryland, North Carolina, Virginia, and West Virginia. 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 Year 1 annual report, we present findings from analyses of quantitative and qualitative data from all nine model states to provide estimates of selected impacts of the RSNAT prior authorization model during its implementation—particularly RSNAT expenditures and service utilization. We also present stakeholder perceptions and experiences about program operation, impacts on service provision, and effects on access to and quality of care for beneficiaries in the early implementation of the RSNAT prior authorization model.

Model background

RSNAT is defined as medically necessary transportation by ambulance that occurs three times or more during a single 10-day period or at least once per week for three weeks or longer. A common destination for Medicare beneficiaries requiring RSNAT is dialysis treatment. RSNAT is a covered service under Medicare Part B, provided that the recipient beneficiary meets certain criteria—most notably that the beneficiary must be confined to bed or otherwise medically require the level of service provided by an ambulance (CMS 2014c).

Audits of Medicare claims and medical records have revealed large numbers of improper payments for RSNAT services. A 2015 report issued by the U.S. Department of Health and Human Services' Office of the Inspector General (OIG) 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 origin or destination (DHHS 2015). The 2015 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 which represented erroneous 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 2014c; CMS 2014b). Also, ground ambulance transport service utilization grew by 33 percent from 2004 to 2010 (GAO 2012).

[5] Under Medicare, ambulance *suppliers* are independent entities. Institutionally-based ambulance service entities (or *providers*) are exempt from prior authorization model requirements.

In July 2013, concerns regarding high risk of fraud, waste, or abuse associated with RSNAT claims in certain parts of the country led CMS to exercise its authority under 42 CFR §424.570(c) to impose a moratorium on new ambulance suppliers in several areas (CMS 2016c). The moratorium prohibited new ambulance suppliers in Harris County and surrounding counties in Texas, as well as in Philadelphia, Pennsylvania, and surrounding counties (including the New Jersey counties of Burlington, Camden, and Gloucester) 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 RSNAT prior authorization model

Prior authorization requirements are a utilization management strategy intended to reduce improper payments by requiring requests for services to be reviewed by the health care payer for compliance with coding, billing, and coverage rules (including medical necessity) before claims are submitted for payment. Prior authorization is designed to achieve increased compliance with coverage rules, general cost containment and the reduction of waste, fraud, and abuse. Prior authorization practices are already in use by private sector health care payers (TRICARE 2016; AMA 2013), and other government health care payers, including Medicare Part D pharmaceutical plans (DHHS 2015). Research indicates that such programs can be effective in reducing expenditures on the service or benefit covered by the prior authorization requirement (MacKinnon 2001). A CMS model involving prior authorization for power mobility devices has shown a large decrease in monthly expenditures for included devices (CMS 2014a). By ensuring appropriateness of services for payment beforehand, prior authorization may lower Medicare fee-for-service (FFS) spending while maintaining quality of care. The model aims to achieve these goals by curtailing proposed RSNAT use that is insufficiently documented and reinforcing the RSNAT medical necessity requirement, which has been in place prior to the start of the model but is often misunderstood and misapplied by non-fraudulent suppliers. However, the risk remains that the prior authorization requirement may result in some beneficiaries experiencing a delay in the receipt of needed care (Bergeson 2013).

In December 2014, CMS began requiring providers with ambulances garaged in New Jersey, Pennsylvania, and South Carolina to obtain prior authorization for RSNAT from their Medicare Administrative Contractor (MAC). CMS based its selection of these states on high rates of utilization and improper payment. Pursuant to Section 515 of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA), CMS expanded the model to Delaware, the District of Columbia, Maryland, North Carolina, Virginia, and West Virginia in January 2016. The model is scheduled to run until December 1, 2017 in all participating states. Under the prior authorization model, any ambulance suppliers that fail to seek prior authorization for billed services will have the claim subject to automatic prepayment review, which is ordinarily reserved for a small proportion of claims that stand out to reviewers because of the provider/suppliers' history or other irregularities. Because of this *automatic* prepayment review process in model states, suppliers that do not request prior authorization for RSNAT services cannot evade scrutiny for medical necessity and appropriate use.

In preparation for implementing the model in the Year 1 and Year 2 states, CMS engaged in a series of outreach efforts, including posting a fact sheet and downloadable guide on its website, hosting open-door forums and webinars for providers and suppliers, communications with relevant industry groups, and posting on its website a letter for ambulance suppliers to distribute to physicians and other entities to help obtain the needed documentation for RSNAT prior authorization requests (PARs). CMS also instructed the MACs to engage in outreach and education programs of their own.

The evaluation

The evaluation assesses the impact of the RSNAT prior authorization model on the Medicare program, suppliers, and beneficiaries. The evaluation's six primary objectives are:

1. To estimate the impact of the prior authorization requirements on the volume of RSNAT services delivered as well as on Medicare expenditures and administrative burden
2. To assess whether and how the prior authorization requirement affects beneficiaries' quality of care
3. To evaluate the effect of the model on Medicare (specifically MAC) program operations
4. To evaluate the effect of the model on supplier practices, organizational structure, and economic outcomes, particularly case volumes and Medicare payments, and to examine the burden imposed on suppliers and other health care providers in complying with the requirement
5. To assess whether the prior authorization requirements have an impact on the extent of improper payments or denied claims
6. To enable CMS to judge the adequacy of the current model for national implementation, including the identification of possible changes to criteria, processes, and procedures

The sixth objective is critical in that it will help CMS assess the feasibility and utility of expanding prior authorization nationally. The Medicare Access and CHIP Reauthorization Act of 2015 (P.L. 114-10) stipulates that, if the prior authorization model improves the cost and quality profile of RSNAT services under Medicare, it can be expanded to all states no earlier than January 2017. Even if the model meets these strict cost and quality criteria, it may still warrant improvement in implementing the operational aspects of prior authorization. Identifying features of the model that can be adjusted to improve its cost effectiveness or impact on quality of patient care is an important goal of the evaluation.

In this Year 1 annual report, we provide findings for each of the objectives detailed above in both Year 1 and Year 2 states, in which CMS operated the RSNAT model in January 2016.

Data sources and outcome measures

In this evaluation, Mathematica and its partner, Provider Resources, Inc. (PRI), employed a mixed-methods evaluation design comprising both quantitative data analysis and qualitative data collection to respond to CMS's overarching research questions and probe findings particularly valuable in understanding the full impact of prior authorization in the model states. The quantitative analysis relies primarily on Medicare claims data and other Medicare administrative

records provided by CMS. Information gathered in the first year of the evaluation focused on the perceptions and experiences of a variety of stakeholder groups (beneficiaries, transportation suppliers, treatment providers, practitioners, and MACs) during the introduction of the model. Together, the quantitative and qualitative analyses address high-level model impacts such as changes in claims volume and cost savings, along with impacts perceived "on the ground" by those administering the program, using RSNAT services, or treating beneficiaries who use the services.

For this report, we conducted both descriptive and multivariate analyses of key quantitative indicators for the model and comparison group states. We constructed treatment and comparison groups and performed the analysis at both the beneficiary and supplier levels. We examined both intended consequence outcomes, such as changes in the volume of RSNAT services and total ambulance utilization and cost. We also examined unintended outcomes, including impacts on quality and access reflected in measures such as changes in unplanned hospitalizations, utilization of dialysis, and the number of days between beneficiary dialysis visits—a measure we constructed to identify whether beneficiaries are experiencing reduced access to these services.

In addition, we carried out qualitative data collection in the Year 1 and Year 2 states to provide a 360-degree view of how key stakeholders perceive prior authorization. We conducted an online survey with census samples of ambulance suppliers, dialysis and skilled nursing facility providers, and physicians[6] constructed from claims data matched to weekly prior authorization reports, and 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 PARs. We also conducted site visits to dialysis facilities and observed transportation use, 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, along with protocols and survey instruments, are included in the appendices accompanying this report.

In Table I.1, we present each research question addressed by the evaluation and indicate which questions this report addresses based on either the quantitative or qualitative analysis.

[6] 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, the PCS is signed by an ordering physician (typically the case for dialysis patients requesting RSNAT to and from dialysis from their homes). For beneficiaries residing in Skilled Nursing Facilities (SNFs), the PCS is typically signed by the SNF attending physician. Throughout the report, "physicians" includes both ordering and attending physicians.

Table I.1. Evaluation research questions and data source(s)

Research and analysis questions	Quantitative analysis	Qualitative analysis
Domain 1. Cost savings **How does the prior authorization model affect Medicare service use and cost? Was the model cost-effective for the Medicare program?**		
How does prior authorization affect:		
1. RSNAT service and total ambulance service use?	X	X
2. Total payments for RSNAT services and total Medicare ambulance service use?	X	
3. Total Medicare expenditures?	X	
How did medically unnecessary ambulance use change?		X
Domain 2. Quality and access **How does the prior authorization model affect the quality of and access to care?**		
Does prior authorization affect:		
1. Unplanned inpatient hospitalizations?	X	X
2. Emergency ambulance use?	X	X
Did beneficiaries experience a delay in services?	X	X
Did beneficiaries experience lower use of dialysis?	X	X
Domain 3. Program operations **How does the prior authorization model affect Medicare (MAC) program operations?**		
What was the impact of the model MAC operations?		
1. How was prior authorization implemented by each MAC?		X
2. How were MAC staff who were assigned to prior authorization activities selected/hired and trained?		X
3. How long did it take prior authorization staff to process decisions?		X
4. How much of a time and cost burden does prior authorization impose on MACs?		X
Domain 4. Suppliers **How does the prior authorization model affect supplier behavior and satisfaction?**		
What was the impact of the model on ambulance suppliers' operations? Did suppliers consciously change practices in response to the model and, if so, how?		
1. Were there changes in suppliers' management practices?		X
2. Have suppliers received appropriate information from MACs and other sources to submit PARs correctly?		X
3. Were patient services delayed because of approval delays?	X	X
4. Does prior authorization reduce suppliers' uncertainty regarding claim approval?		X
5. Does prior authorization reduce suppliers' burden related to appealing denied claims?		X

Research and analysis questions	Quantitative analysis	Qualitative analysis
6. Did ambulance suppliers move their vehicles to neighboring states?		X
7. Does the number of suppliers operating in the market change in response to prior authorization?	X	X
8. Do suppliers compensate for reduced billing for prior-authorized services by increasing their billing for other services?		
Domain 5. Improper payment and denials		
How does the prior authorization model affect error rates for payments or claims?[7]		
Does prior authorization affect improper payment rates?	X	
Does prior authorization affect claims denial rates?	X	
Domain 6. Scalability/implications from findings		
How feasible is expanded/national prior authorization for RSNAT?		
What are the major lessons learned for improvements to the prior authorization model?	X	X
Is the set of prior authorization processes and procedures adequate to allow efficient national implementation? If not, should elements be changed before considering national implementation?		X
What external factors, circumstances, or aspects of the model might limit its ability to realize savings in the case of national implementation?	X	X
What would enhance the model's ability to realize savings?	X	X

[7]See Appendix A for a discussion of the data used in the quantitative analysis of the impact of prior authorization on the improper payment rate.

II. QUANTITATIVE DATA ANALYSIS METHODS

Data and population

We used final action claims for FFS Medicare beneficiaries for dates of service from January 2012 through June 2016.[8] The treatment group comprised beneficiaries and ambulance suppliers in the Year 1 states (New Jersey, Pennsylvania, and South Carolina) and Year 2 states (District of Columbia, Delaware, Maryland, North Carolina, Virginia, and West Virginia). The set of states selected by CMS for inclusion in the first year of the model was chosen for their high utilization of ambulance services and high improper claims error rates for claims for these services. It was therefore important to ensure that comparison groups comprised states with similar utilization patterns, if possible.

To select the most appropriate comparison group, we conducted state-level matching, minimizing the Mahalanobis distance between treatment and comparison states on several measures: (1) number of ambulance trips meeting the RSNAT definition per 100,000 Medicare FFS beneficiary months, (2) change in RSNAT use between 2012 and 2013, (3) number of ambulance suppliers who bill Medicare for any ambulance services per 100,000 FFS beneficiaries, and (4) percentage of FFS beneficiaries who live in a rural area. We included the first three measures because selection of the Year 1 model states was based on their high utilization of ambulance services, and we wanted to ensure that the comparison states were as similar as possible to model states on that variable. Matching on rural residence was important because the prior authorization requirement is expected to affect urban and rural areas differently due to a more limited ambulance supply and the lack of transportation alternatives in rural areas. Through this process, we selected a comparison group comprised of beneficiaries and suppliers in Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington State. In Appendix B, we provide additional information on the state-level matching process.

Because non-emergency ambulance service utilization is relatively rare in the Medicare population, we considered for our beneficiary analysis the subset of beneficiaries with end-stage renal disease (ESRD), which accounts for more than 75 percent of RSNAT claims. This enables us to examine RSNAT use among beneficiaries who are the most likely RSNAT users. This approach improved our ability to detect the impacts on the beneficiaries whose transportation use, and subsequent access to current care providers, may be most affected by the prior authorization requirement. We used this approach in the beneficiary analyses but did not the limit the beneficiary population in the supplier analyses.

Despite being a high-use group, the group of beneficiaries with ESRD necessarily includes some beneficiaries who use RSNAT services and others who do not. To understand how our study group compares to the group of beneficiaries who did use RSNAT services in the baseline period, we performed a series of descriptive analyses.[9] We examine unweighted baseline data

[8] We excluded duplicate and denied claims.

[9] We considered RSNAT users among a group of beneficiaries that was responsible for 97% of the RSNAT use – those with ESRD, cancer, or skin ulcers – instead of all Medicare beneficiaries. Early in the research design we considered this as an alternative analysis group before selecting the ESRD analysis group.

(data for the first three years of the study period and before the program was implemented, calendar years 2012-2015) comparing baseline RSNAT users in the treatment and comparison states and ESRD beneficiaries in the treatment and comparison states on several demographic characteristics as well as measures of clinical severity, service utilization, and expenditures. The differences in demographic characteristics and clinical severity are presented below in Table II.1 and the differences in service utilization and expenditures are presented in Table II.2.

These analysis indicate that are there are important differences between baseline RSNAT users and ESRD beneficiaries that suggest that baseline RSNAT users are sicker and use health care services more intensively. More critically, though, the analyses also point to important differences between beneficiaries in the treatment and comparison states that suggest that baseline RSNAT users in treatment states may be less severely ill than baseline RSNAT users in comparison states. In contrast, the differences between treatment and comparison beneficiaries in the ESRD group at baseline are not as pronounced.

Table II.1 identifies some demographic differences between baseline RSNAT users and beneficiaries with ESRD; baseline RSNAT users were on average slightly older (reflecting a smaller percentage of beneficiaries under age 65[10] and a larger percentage of beneficiaries age 80 or over), more likely to be female and black, and more likely to be dually eligible for Medicaid and Medicare than ESRD beneficiaries. Not surprisingly, baseline RSNAT users were on average sicker than beneficiaries with ESRD, with higher average HCC scores as well as a greater proportion of beneficiaries with very high HCC scores. They also had a higher baseline mortality rate.

We note some key differences in health status between treatment and comparison group among baseline RSNAT users, with comparison group beneficiaries being sicker than treatment group beneficiaries. This pattern is effectively not present among the ESRD beneficiaries. Together, these findings suggest that the beneficiaries diagnosed with ESRD at baseline are similar across treatment and comparison states, but that beneficiaries who use RSNAT in comparison states are likely more severely ill, whereas in treatment states beneficiaries with less severe conditions receive RSNAT services at higher rates. Not surprisingly, baseline RSNAT utilization and expenditures are higher among the RSNAT user group than among beneficiaries with ESRD (Table II.2). This follows logically—by definition, every beneficiary in the baseline RSNAT user group used RSNAT services at some point. By contrast, less than ten percent of ESRD beneficiaries used RSNAT in the baseline period. We further note that RSNAT use rates and expenditures are higher in treatment states than in comparison states, although total Medicare expenditures, as well as inpatient and outpatient expenditures, are comparable. These data could suggest a pattern of excess RSNAT use in treatment states prior to the model start date.

[10] ESRD is a condition that qualifies individuals for Medicaid regardless of age.

Table II.1. Baseline demographic characteristics and measures of clinical severity for RSNAT users and beneficiaries with ESRD, by treatment group (unweighted)

	RSNAT USERS				ESRD			
.	Treatment (N=21,827)	Comparison (N=29,801)	Difference	Percent difference	Treatment (N=172,042)	Comparison (N=343,393)	Difference	Percent difference
Average age (St. Dev.)	68.97 (12.67)	68.08 (12.73)	0.89***	1.29	65.45 (14.91)	64.40 (15.30)	1.05***	1.61
Under age 65 (%)	32.56	35.08	-2.52***	-7.75	41.63	44.80	-3.17***	-7.61
Age 80 or over (%)	21.96	19.51	2.45***	11.16	17.86	16.65	1.21***	6.77
Female (%)	50.09	51.34	-1.25**	-2.49	46.60	47.11	-0.50***	-1.08
White (%)	50.86	60.41	-9.55***	-18.77	54.14	61.41	-7.27***	-13.43
Black (%)	44.99	33.41	11.58***	25.74	40.92	29.62	11.30***	27.62
Other race (%)	4.16	6.18	-2.03***	-48.83	4.94	8.97	-4.03***	-81.72
Rural (%)	22.37	24.07	-1.70***	-7.59	21.47	21.49	-0.02	-0.08
Dual eligible (%)	39.90	47.20	-7.30***	-18.28	31.01	36.60	-5.60***	-18.05
Average HCC score (St. Dev.)	3.55 (2.29)	3.66 (2.37)	-0.10***	-2.88	2.39 (1.80)	2.39 (1.79)	0.00	0.08
HCC score > 4 (%)	35.15	37.18	-2.03***	-5.78	15.75	15.71	0.04	0.23
Death	55.73	59.50	-3.77***	-6.77	29.30	30.15	-0.85***	-2.89
Average no. of quarters	8.37	8.65	--	--	8.25	8.38	--	--

Table II.2. Baseline utilization and expenditures for RSNAT users and beneficiaries with ESRD, by treatment group

	RSNAT USERS				ESRD			
	Treatment (N=21,827)	Comparison (N=29,801)	Difference	Percent difference	Treatment (N=172,042)	Comparison (N=343,393)	Difference	Percent difference
Utilization and expenditures								
Any RSNAT use	100.00	100.00	0.00	0.00	10.60	7.16	3.44***	32.47
Number of RSNAT trips per quarter (St. Dev.)	22.81 (24.21)	17.12 (20.98)	5.69***	24.94	2.69 (11.30)	1.36 (7.69)	1.33***	49.42
RSNAT payments per quarter (St. Dev.)	3,922.59 (4,219.44)	2,777.49 (3,423.23)	1145.10***	29.19	462.45 (1958.59)	220.35 (1250.68)	242.10***	52.35
Total Medicare payments per quarter (St. Dev.)	31,502.99 (18,432.63)	30,847.65 (17,637.76)	655.33***	2.08	14,420.70 (16,653.00)	13,742.10 (15,354.34)	678.60***	4.71
Medicare outpatient payments per quarter (St. Dev.)	6,165.16 (3,572.40)	5,815.29 (3,247.09)	349.87***	5.68	4,171.42 (4,155.62)	4,040.27 (4,068.62)	131.16***	3.14
Medicare inpatient payments per quarter (St. Dev.)	11,676.31 (12,642.57)	12,629.07 (12,821.96)	-952.76***	-8.16	5,733.27 (10,971.90)	5,521.10 (10,314.90)	212.17***	3.7

The pattern we describe above highlights one important reason why we cannot limit the analysis just to RSNAT users: beneficiaries in the treatment and comparison states had dramatically different levels of utilization prior to the model, with sizeable health differences as well, suggesting potentially significant differential selection into user status. A second, perhaps more crucial, reason is that limiting the analysis to users omits from the analysis group individuals who would receive RSNAT absent the demonstration but who are prevented from doing so by the prior authorization requirement.

Analytic approach

We used a combination of descriptive and multivariate analyses to address the research questions in Chapter I. We relied on SAS Enterprise Guide 7.12 for data processing, with all regressions conducted in Stata 14.1.

Descriptive analysis

We conducted descriptive analyses to obtain an understanding of how ambulance utilization and payments changed after the model start date. These analyses do not adjust for potentially confounding factors and should not be used to support causal inference about the prior authorization model; however, they can provide information on high-level changes in utilization and expenditures, setting the stage for more in-depth analyses. We considered two ambulance utilization and payment measures (Domain 1):

- The quarterly probability of a beneficiary with ESRD having a service that meets the RSNAT definition; a trip meets the RSNAT definition if it uses one of the non-emergency ambulance codes (A0426 or A0428) and occurs as part of a sequence of trips that meets the frequency requirements specified in the model
- Average payments to suppliers for RSNAT ambulance services per beneficiary per quarter

We also conducted descriptive analyses of the experience of suppliers with the model (Domain 4). Because of limitations on both the availability and quality of the supplier data available to us,[11] we relied on descriptive data analysis to address the question of whether the model affected supplier exit. We first measured the number of Part B ambulance suppliers per 100,000 FFS beneficiaries. This outcome enabled us to observe market-level changes. We then considered the subset of suppliers who billed Medicare Part B in the final year before model implementation. We divided the subset into two groups: "stayers," who also billed Medicare after the prior authorization requirement was in effect, and "leavers," who did not bill Medicare at any point after model implementation. We compared stayers and leavers on both the characteristics of their customer bases and utilization and payment measures in the year before implementation. The comparisons enabled us to comment on which suppliers may be more likely to leave the market after the prior authorization requirement took effect.

[11] 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 the data in the analysis. We did use contact and location information to contact selected suppliers to participate in focus groups, which enriched our qualitative analyses.

Finally, we conducted a descriptive analysis to assess the potential impact of the model on improper payments (Domain 5). This analysis is described in the Domain 5: Improper payment and denials section of Chapter IV.

Multivariate analyses

Our multivariate models allowed us to estimate the impacts of the model by controlling statistically for any observed confounding factors and netting out from the pre-post changes in key outcomes the trend in the comparison states. We estimated the model's effects on utilization, expenditures, quality of care, and access to treatment by conducting a beneficiary-level analysis (Domains 1 and 2), and the model's effects on suppliers by conducting a supplier-level analysis (Domain 4). We also estimated the model's effects on denied claims (Domain 5). Given that suppliers are effectively required to seek prior authorization, we then assessed how the requirement affected outcomes related to the supplier experience, including the number of beneficiaries served by suppliers and the type and number of services they provided.

For both sets of analyses, we considered several outcomes. In the subsections below, we discuss our analytic approach in more detail for both suppliers and beneficiaries. The multivariate methods used are the same across research questions.

Beneficiaries

Beneficiary sample

For the beneficiary analysis, we restricted our analysis group to beneficiaries in FFS for at least part of a given quarter, and who were living in one of the included states (Year 1, Year 2, or comparison states) and identified as having ESRD. In any given quarter (for example, April–June 2015), the eligible sample included individuals designated as having ESRD based on their claims from the previous calendar year (for example, 2014). Beneficiaries with this condition were most likely to be affected by the prior authorization requirement in both their ambulance utilization and possibility of any adverse consequences. Repeated non-emergency ambulance transportation is relatively uncommon among Medicare beneficiaries; however, over 75 percent of RSNAT claims in our treatment and comparison states from January 2012 through June 2016 were for individuals with ESRD. Thus, we could capture a substantial portion of the effect of the model while improving our likelihood of detecting an impact. In Appendix C, we provide information on how we selected beneficiaries with ESRD as our study group of interest.

We used the Hierarchical Condition Category (HCC) software to identify individuals with ESRD. The software analyzed a full year of claims for an individual, applying an algorithm that identified diagnosis or procedure codes associated with this condition (CMS 2016). To identify additional beneficiaries with ESRD, we used two variables from the Medicare denominator file: "original reason for entitlement" and "current reason for entitlement". If either variable indicated ESRD, we classified that beneficiary as having ESRD for that year.

The HCC software also produced a set of overall HCC scores for each beneficiary; it estimated the degree to which expected Medicare expenditures for a beneficiary would differ from the average in the next year. We used the HCC scores as a proxy for overall health status, assuming that the expected cost of care increases as beneficiaries' health declines.

We conducted a repeated cross-sectional analysis. Beneficiaries are in the sample in quarters during which they are FFS Medicare beneficiaries and are designated as having ESRD based on their claim history in the previous year. For example, a beneficiary whose 2012 claim history designates him or her as having ESRD is included in the sample in all 2013 quarters in which he or she was enrolled in FFS Medicare. That person's 2013 claim history then determines whether he or she appears in the sample in 2014. With application of these restrictions, our study group consisted of a total of 233,017 beneficiaries who resided exclusively in treatment states; 452,198 beneficiaries who resided exclusively in comparison states; and 4,227 beneficiaries who moved between treatment and comparison states during the study period, residing in a treatment state in at least one quarter and in a comparison state in at least one quarter.[12] The length of time that each beneficiary was part of our sample ranged from one to 18 quarters, with a mean duration of 8.4 quarters for treatment-only beneficiaries, 8.3 quarters for comparison-only beneficiaries, and 11.8 quarters for beneficiaries who moved between states, for a total of 5,766,202 beneficiary-quarters. Only 40,258 treatment-only beneficiaries (17 percent), 74,200 comparison-only beneficiaries (17 percent), and 1,194 movers were included in all 18 quarters.

Beneficiary outcomes

We examined several quarterly outcomes related to utilization and cost (Domain 1), quality of care and access to treatment (Domain 2), and denied claims (Domain 5) (Table II.3). We generated utilization outcomes by identifying claim lines that met the specified criteria and then aggregating each beneficiary's claim lines up to the quarter level. Outcomes related to ambulance utilization and cost fall into the following two categories:

1. RSNAT service utilization: Claim lines for ambulance transportation using codes A0426 or A0428 and occurring as part of a sequence of trips that meets the frequency requirements specified in the model.
2. Any Medicare-covered utilization of a ground ambulance: Claim lines for any ground ambulance transportation, with RSNAT claim lines (above) as a subset of these claim lines.

We calculated total Medicare health care expenditures as the sum of claim line payment amounts across all claim types, including carrier, outpatient, inpatient, skilled nursing facility, home health, hospice, and durable medical equipment.

To assess whether there was evidence that the model resulted in unintended consequences, we examined impacts on quality and adverse outcomes and access to care. Quality and adverse outcome measures included emergency department visits, emergency ambulance utilization, unplanned inpatient admissions, and death. We defined unplanned inpatient hospital admissions according to the specifications set forth by the Yale New Haven Health Services Corporation and the Center for Outcomes Research & Evaluation in their *2016 All-Cause Hospital-Wide Measure Updates and Specifications Report* (CMS 2016a). This includes hospital admissions for acute

[12] Our analyses were cross-sectional and conducted at the beneficiary-quarter level. Beneficiaries who moved (0.6 percent of the sample) were counted as treatment beneficiaries in those quarters when they resided in treatment states and as comparison beneficiaries in quarters when they resided in comparison states. Because the analysis was performed at the beneficiary-quarter level, we assigned beneficiaries to treatment or comparison states by quarter based on their state of residence in that quarter.

conditions or for procedures that are not typically scheduled in advance. Admissions for planned procedures with no accompanying acute diagnosis are not included in the measure.

To study access to care, we examined the utilization of dialysis, as well as quality outcomes related to failure to receive timely dialysis—emergency dialysis and hospitalization for exacerbations of ESRD.[13]

For all utilization measures, we considered both the likelihood of receiving any services in the quarter and the number of services received. The likelihood of receiving any services was represented as a binary variable equal to one if the beneficiary received at least one service in the category during the quarter. This approach allowed us to explore the degree to which the model influences the number of individuals who receive services, the average number of services received by individuals, or both. For ambulance trips and unplanned hospitalizations, the total number of trips or visits was of interest. For dialysis, we counted the number of days in the quarter in which an individual received the service. Given that beneficiaries required dialysis on a regularly scheduled basis, we also measured the average number of days between dialysis services. The recommended delivery schedule for dialysis usually does not vary for a given patient, thereby suggesting that an increase in the average number of days between treatments could indicate a delay in receiving needed care.

Table II.3. Beneficiary quarterly outcome measures

Domain	Research question	Quarterly measures
Domain 1	How does prior authorization affect total ambulance service use?	• Probability of RSNAT ambulance service utilization • Number of RSNAT ambulance trips • Probability of any Medicare ambulance utilization • Total number of Medicare ambulance trips
	How does prior authorization affect Medicare expenditures for beneficiaries?	• RSNAT service expenditures • All Medicare ambulance expenditures • Total Medicare FFS expenditures
Domain 2	How does prior authorization affect the volume of services expected to be affected by access to RSNAT services? How does it impact quality and adverse outcomes?	• Probability of emergency department utilization • Number of emergency department visits • Probability of emergency ambulance utilization • Number of emergency ambulance trips • Probability of unplanned inpatient admission • Number of unplanned inpatient admissions • Probability of death

[13] We consider these to be both access and quality measures. We present findings for them here along with the other access measures because they provide information on whether and to what extent beneficiaries can receive timely access to dialysis services.

Domain	Research question	Quarterly measures
	Did beneficiaries experience lower use of dialysis services? Did beneficiaries experience a delay in services?	• Probability of dialysis use • Number of days of dialysis use • Average number of days between dialysis services • Probability of emergency dialysis • Number of emergency dialysis treatments • Probability of hospitalizations for ESRD complications • Number of hospitalizations for ESRD complications
Domain 5	Does prior authorization impact claims denial rates?	• Number of denied non-emergency ambulance claims • Proportion of non-emergency ambulance claims denied • Number of denied Medicare ambulance claims • Proportion of Medicare ambulance claims denied

Beneficiary analysis

Beneficiaries in the treatment and comparison states exhibited some moderate differences in their demographic and health characteristics that might be associated with our outcomes of interest (Table II.4). To improve the comparability of the two groups on demographic and health characteristics, we generated propensity score weights for each beneficiary based on his or her age, sex, race, and whether the beneficiary lived in a rural area. To generate the weights, we used logistic regression analysis, predicting whether a beneficiary lived in a model or comparison state by using the set of characteristics above. This regression produced estimated propensity scores, which we used to calculate weights to balance equally the model and comparison beneficiaries. In Appendix D, we provide more information on the beneficiary weights.

Table II.4. Demographic and health characteristics of beneficiaries with ESRD in model and comparison groups

	2012		2013		2014		2015		2016	
	Model	Compar-ison	Model	Compar-ison	Model	Compar-ison	Model	Compar-ison	Model	Compar-ison
Living in rural area (percent)	21.2	22.0	21.4	20.7	21.7	20.7	20.1	21.6	20.3	20.1
Female (percent)	45.4	46.2	47.5	44.9	45.8	47.0	44.2	45.4	46.4	43.9
White (percent)	51.0	53.8	50.4	50.0	53.2	49.5	49.3	52.4	48.2	48.8
Black (percent)	43.4	36.1	43.2	44.0	36.3	43.7	44.3	36.6	44.4	44.5

Note: The table presents mean characteristics of beneficiaries in model (Year 1 and Year 2) states and in comparison states. The model states included Delaware; Maryland; New Jersey; North Carolina;

Pennsylvania; South Carolina; Virginia; Washington, DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

We generated weighted summary statistics of demographic and health characteristics for the treatment and comparison groups as well as their baseline levels of the outcome measures. We then used generalized difference-in-difference (DID) models to estimate the impact of the prior authorization requirement on each outcome. For binary variables, we used logistic regression; for continuous variables, we used ordinary least squares (OLS). We weighted observations and adjusted standard errors to account for the effects of weighting and the non-independence of observations on the same individual in several quarters. The model follows:

Equation 1

$$E\left[Y_{ist}\right] = F\left(\alpha + \sum_{s \in S_{-1}} \rho_s I_s + \sum_{t \in T_{-1}} \gamma_t I_t + \beta * Post_{st} + \boldsymbol{\delta X_{ist}}\right)$$

where Y_{ist} is the outcome for beneficiary i in state s in quarter t. I_s and I_t are state and quarter fixed effects, respectively (omitting one indicator from each group). $Post_{st}$ takes value 1 in states and quarters when the model was in effect, and 0 otherwise. $\boldsymbol{X_{ist}}$ is a set of beneficiary-quarter– level control variables. Controls include age, age squared, the natural logarithm of the HCC score based on claims in the calendar year before the year in which quarter t falls (to account for the skewed distribution of expected cost for the beneficiaries), length of time the beneficiary's county has been subject to a moratorium on new Medicare suppliers,[14] and indicators for race (white, black, or other), sex, rural residence, dual eligibility for Medicare and Medicaid, having a claim for a hospital bed for home use before or in quarter t, and residing in a county with a moratorium on new Medicare suppliers. The coefficient of interest is β, which gives the estimated per beneficiary per quarter impact of residing in a treatment state after the prior authorization requirement has taken effect. $F(x)$ is the cumulative logistic distribution for binary outcomes and the identity function for continuous outcomes. For ease of interpretation, we converted logistic regression coefficients into average marginal effects.

We estimated each regression on the full set of beneficiaries with ESRD, and then stratified by rural residence and by dual eligibility for Medicare and Medicaid, as these characteristics are likely to affect need for, access to, and utilization of ambulance services, and the impact of the control variables may differ among these groups as well. We also estimated the regressions on the subsample of beneficiaries who had a claim for a hospital bed for home use, which we used as a proxy for mobility issues (Table II.5).

[14] As of July 30, 2013, the Texas counties of Harris, Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, and Waller were subject to a moratorium on enrollment of ambulance suppliers. As of January 30, 2014, several counties around Philadelphia, Pennsylvania were added to the moratorium. The counties include Bucks, Delaware, Montgomery, and Philadelphia counties in Pennsylvania, and Burlington, Camden, and Gloucester counties in New Jersey.

Table II.5. Model variants used in quantitative analysis of beneficiary outcomes

Model variant	Subgroups	Included beneficiaries
Full sample	None	All FFS beneficiaries with ESRD
Rural stratification	Rural	All FFS beneficiaries with ESRD and residing in a ZIP code not included in a metropolitan statistical area
	Not rural	All FFS beneficiaries with ESRD and residing in a ZIP code included in a metropolitan statistical area
Dual eligible stratification	Dual eligible	All FFS beneficiaries with ESRD and dually eligible for Medicare and Medicaid
	Not dual eligible	All FFS beneficiaries with ESRD eligible for Medicare only
Hospital bed subsample	Hospital bed claim	All FFS beneficiaries with ESRD who had a claim for a hospital bed

We analyzed some alternative regression model specifications. For continuous and count outcomes (such as payments or number of trips), we conducted analyses on just the subset of beneficiaries with non-zero outcomes to assess the effects on these outcomes among users. We also analyzed Year 1 and Year 2 states separately, which allows us to see if results differ between the initially targeted states and the expansion states.

For the Domain 5 outcomes, we estimated a variation of the regression model that included separate indicator variables for each quarter after model implementation in the treatment states. That version of the regression analysis enables us to assess whether the impact of the model differs over time. Specifically, we are interested in determining whether claim denial increases immediately following implementation but reverts to baseline levels as patients and suppliers acclimate to the new prior authorization system.[15] The equation for this model variation is as follows:

Equation 2

$$E\left[Y_{ist}\right] = F\left(\alpha + \sum_{s \in S-1} p_s I_{s+} \sum_{t \in T-1} \gamma_t I_t + \sum_{\tau=1}^{6} \beta_\tau I_\tau + \delta \mathrm{X}_{ist}\right)$$

Where all terms are as in Equation 1, and τ indexes quarters post-implementation in the model states (six quarters for Year 1 states and two quarters for Year 2 states). The coefficients of interest here are the six β terms, which give the impact of the model in each post-implementation quarter.

[15] For the November 2016 draft report, we ran a similar version of the model for all other outcomes, finding no evidence of a lag in impact on utilization, expenditures, quality, or access.

Suppliers

Supplier sample

We identified suppliers from carrier claims based on National Provider Identifier (NPI) and provider state codes.[16] Our study population consists of all non institutionally-based ambulance suppliers garaged in any of the treatment or comparison states that billed Medicare for ambulance services in any quarter of our study period. The population included 2,914 treatment suppliers and 4,716 comparison suppliers. Suppliers appear in our population for durations ranging from 2 to 18 quarters (mean of 14.6 quarters for both groups), for a total of 111,508 supplier quarters. A total of 1,785 treatment suppliers and 3,059 comparison suppliers were included in all 16 quarters.

Supplier outcomes

The supplier analysis addresses research questions concerning the impact of the prior authorization requirement on suppliers (Domain 4), as well as the impact on denied claims (Domain 5). For each supplier, we identified all claims for services rendered by the supplier and classified them by type of service. We did not limit to beneficiaries for ESRD, instead including all services rendered to Medicare beneficiaries. We then aggregated utilization and payments to the supplier-quarter level. We included the same ambulance service categories as in the beneficiary analyses but added an additional category for payments to suppliers:

- Total Medicare FFS payments: payments to suppliers for any services[17]. Recognizing that suppliers may provide services to beneficiaries living in states other than the state in which they are garaged, we did not restrict the analysis to claims for services rendered to beneficiaries in these states. The supplier analysis therefore included in the calculation of outcome measures any services delivered to beneficiaries residing in states that border the treatment and comparison states (although we do exclude a small number of claims for beneficiaries residing in states that do not border treatment or comparison states).[18] In Table II.6, we present the full set of measures.

[16] If the provider state code indicated any of the treatment or comparison states, we matched the corresponding NPI with the NPPES file to verify the location of the supplier. We excluded a small number (fewer than 31) of suppliers whose NPI numbers were invalid or who, when matched to the NPPES file, we determined not to be garaged in a treatment or comparison state.

[17] Payment for items and services is included in the ambulance fee schedule payment. Such items and services include but are not limited to oxygen, drugs, extra attendants, and EKG testing (e.g., ancillary services) - but only when such items and services are both medically necessary and covered by Medicare under the ambulance benefit.

[18] Almost all supplier claims (95.1 percent) meeting our definitions pertained to beneficiaries in the same state as the supplier, whereas 3 percent of claims were linked to beneficiaries in bordering states and 1.9 percent to beneficiaries in other states. We excluded the last group because they are unlikely to represent potential regular customers for the providers.

Table II.6. Supplier quarterly outcome measures

Domain	Research question	Quarterly measures
Domain 1	How does prior authorization affect providers' average number of ambulance services provided?	• Number of beneficiaries served (RSNAT) • Number of beneficiaries served (any Medicare ambulance) • Number of RSNAT ambulance trips provided • Total number of Medicare ambulance trips provided • Average number of RSNAT trips per beneficiary served
	How does prior authorization affect average payments to ambulance suppliers?	• RSNAT ambulance payments received • All Medicare ambulance payments • Total Medicare payments received
Domain 5	Does prior authorization impact claims denial rates?	• Number of denied non-emergency ambulance claims • Proportion of non-emergency ambulance claims denied • Number of denied Medicare ambulance claims • Proportion of Medicare ambulance claims denied

Key outcomes for Domain 4 include the total number of trips provided in the quarter for RSNAT services and all Medicare ground ambulance services, as well as the average number of trips provided per beneficiary and the number of beneficiaries who receive at least one ground ambulance service from the supplier in a given quarter. Payment outcomes include the total Medicare payments received by the supplier for the provision of ambulance services (for RSNAT and ground ambulance services) and for all services. For Domain 5, key outcomes include the improper payment rate and the number and proportion of claims submitted that are denied.

Supplier analysis

Because the demand for supplier services varies with the demographic and health characteristics of the beneficiaries served by suppliers, we identified a catchment area for each supplier. The catchment area consists of the set of ZIP codes in the supplier's state and bordering states from which at least one beneficiary received a service from the supplier. We reasoned that, if at least one beneficiary in a ZIP code received a service from the supplier, then other beneficiaries in that ZIP code could also hire the supplier if they needed or wanted ambulance transportation. Note that beneficiaries could be counted in more than one supplier's catchment area. We then calculated the average characteristics of all beneficiaries residing in the catchment area to create aggregate measures of the demographic and health characteristics of the supplier's customer base for use in constructing supplier weights, and as controls in regression analysis. The characteristics include average age, percentage female, percentage white, percentage black, percentage other race, percentage residing in a rural area, percentage dually eligible for Medicare and Medicaid, average HCC score, and percentage with each of three conditions that are associated with high rates of RSNAT use: ESRD, active cancer, and chronic skin ulcers. More information about the HCC score appears in the beneficiary analysis section.

Suppliers in the treatment and comparison states differed in the demographic and health composition of their customer bases. To improve the comparability of the two groups on demographic and health characteristics, we used a statistical technique called optimal matching (Hansen and Klopfer 2006) to form matched sets of suppliers from the model and comparison

states and then generated weights for comparison suppliers to create balance on important characteristics within each matched set. The goal was to minimize the difference between the aggregate characteristics of beneficiaries served by model and comparison suppliers, particularly the percentage of beneficiaries living in rural areas. We used the weights to construct descriptive statistics and conduct weighted regression analysis. In Appendix E, we provide more information on the construction of the supplier weights.

We generated weighted summary statistics of the aggregate beneficiary demographic and health characteristics for the treatment and comparison groups as well as of the baseline levels of the supplier outcome measures. We then used a generalized DID model with OLS regression to estimate the impact of the prior authorization requirement on suppliers' provision of services and payments received. We weighted the observations and estimated standard errors that accounted for the weighting and the non-independence of observations on the same supplier in several quarters. We used the same model for suppliers as for beneficiaries (see above). Controls included the aggregate beneficiary demographic and health characteristics described above, an indicator for operating in a county with a moratorium on new Medicare suppliers, and the length of time since the county moratorium took effect. The coefficient of interest is again β, which provides the estimated per supplier per quarter impact of being in a treatment state after the prior authorization requirement has taken effect in that state. We estimated each regression on the full supplier population and on subsets stratified by whether the majority of beneficiaries in the supplier's catchment area resided in rural or urban areas. For the Domain 5 denied claims outcomes, we estimated a model variation that allows for differential impacts over time during the post-implementation period.

III. QUALITATIVE DATA COLLECTION METHODS

Overview

The RSNAT prior authorization process affects several stakeholder groups in the Medicare program, including but not limited to beneficiaries, physicians, treatment providers at dialysis and skilled nursing facilities, ambulance suppliers, and the MACs responsible for processing prior authorization requests (PARs). The qualitative data collection for the evaluation included various data sources and methodologies needed to gather insights from these groups to inform CMS of the nature and extent of the model's effect on major stakeholders at different time points.

In the first 18 months of the evaluation, Mathematica, in partnership with Provider Resources, Inc. (PRI), conducted several rounds of qualitative data collection in the Year 1 states (New Jersey, Pennsylvania, South Carolina) and the Year 2 states (Delaware, District of Columbia, Maryland, North Carolina, Virginia, West Virginia) for the RSNAT prior authorization model. The data collection activities included in-depth telephone interviews with personnel from the two MACs administering the model in these states (Novitas and Palmetto GBA); online focus groups with suppliers, providers, and physicians; site visits to dialysis facilities that included face-to-face interviews with beneficiaries and staff; telephone interviews with beneficiaries; and an online survey of stakeholders in each state.

Across all data collection activities, we explored similar research questions central to the goals of the evaluation. Mathematica and PRI developed all protocols and supporting materials (such as discussion and interview guides, the online survey, and advance letters and reminders), performed an independent Mathematica quality assurance review on each, and then submitted the materials to the CMS Contracting Officer's Representative (COR) for approval. Thereafter, staff from the Mathematica and PRI evaluation team conducted all interviews, focus groups, and site visits. Before each data collection activity, we informed respondents that their participation was completely voluntary, that they could skip questions they did not wish to answer, and that no identifying information about them would be revealed in data analysis or reporting. The evaluation team also fully described note-taking and recording procedures before each activity.

The qualitative data collection protocols and materials appear in Appendices F, G, and H, with additional information on coding and data collection presented in Appendix I. Detailed research questions, stakeholder sample recruitment strategies, and data collection methods appear in Appendix I, Table I.1.

MAC 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. PRI conducted semi-structured, in-depth telephone interviews with PAR reviewers, supervisors, and managers from Novitas and Palmetto to collect a baseline 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 provider billing behavior and (5) preliminary lessons learned and best practices. PRI developed a semi-structured

interview guide for Novitas and Palmetto staff, including 26 questions organized by a focus on operations, supplier behavior, or processes. After sending a letter to the model project management teams at both MACs about their participation in this CMS-sponsored evaluation of the model, PRI worked with the MACs to schedule interviews. PRI distributed the interview guide to the MACs in advance, allowing staff to reflect on the questions before the interview. In Table III.1, we detail the interview schedule and personnel interviewed at each MAC.

Table III.1. MAC interview schedule and details

RSNAT MAC name	Jurisdiction	Personnel	Number of interviews	Time frame
Year 1 states:				
Novitas	New Jersey, Pennsylvania	Supervisory and reviewer staff	5	March 22–24, 2016
Palmetto GBA	South Carolina	Supervisory/management medical reviewer staff, outreach educators, and appeals supervisor	8	March 15–21, 2016
Year 2 states:				
Novitas	Delaware, Maryland, District of Columbia	Supervisory and reviewer staff	4	June 10–14, 2016
Palmetto GBA	North Carolina, Virginia, and West Virginia	Supervisory/management medical reviewer staff, outreach educators, and appeals supervisor	2	June 13, 2016

Focus groups

We conducted online focus groups with ambulance suppliers, dialysis providers, skilled nursing facility (SNF) staff, and physicians. The evaluation team used the QualBoard online focus group platform, which allows researchers to host virtual, asynchronous discussions with up to 30 participants over the course of one week. During each group's scheduled week, participants may log in and out of the discussion when it is most convenient for them—a critical factor in gaining cooperation among business and professional staff. Further, given that the prior authorization model is taking place across several states, online focus groups allowed us to include participants in several locations at one time.

Recruiting ambulance suppliers, dialysis providers, and SNF staff. The evaluation team relied on weekly Center for Program Integrity (CPI) prior authorization reports 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. It is important to note that this sampling approach does not guarantee that all potentially affected stakeholders in the model states were identified and included in the sample.

Given that ambulance suppliers' national provider identifiers (NPIs) appear on the CPI reports of RSNAT claims, we merged the NPIs with the National Plan and Provider Enumeration System (NPPES) and Medicare Provider Enrollment, Chain, and Ownership System (PECOS) data to obtain supplier contact information. To identify dialysis facilities, SNFs, and physicians whose patients used RSNAT after model implementation, we pulled beneficiary Health

Insurance Claim Numbers (HICN) from the CPI weekly reports and then extracted Medicare Carrier claims records for the period from December 2014 through April 2016, limiting the subset of beneficiaries just to those beneficiaries included in the CPI reports. If the origin or destination points on these RSNAT claims was a non-hospital-based dialysis facility or a SNF, we pulled the provider IDs and matched them to either the CMS Provider of Services File (POS) or NPPES or PECOS data to obtain contact information for SNFs and dialysis facilities involved in RSNAT claims during the model.

Using approved recruiting scripts, staff at the Mathematica Survey Operations Center (SOC) contacted stakeholders by telephone to request their participation in the focus groups. The recruiting protocols established stakeholders' eligibility (experience with prior authorization) before SOC staff invited suppliers and providers to participate in the appropriate online focus group. The project did not offer incentives to ambulance suppliers, dialysis providers, or SNF staff to participate in the first round of these focus groups. Focus groups were recruited on a first-come, first-served basis until each focus group was full; therefore not all sample members had the opportunity to participate in this activity.

Recruiting physicians. We used a process similar to that described above to recruit physicians with prior authorization experience, pulling physician NPIs from RSNAT claims originating or ending at a SNF or dialysis facility during the model period. When recruiting physicians by telephone, SOC 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 group administration. At the start of each focus group's seven-day "open window," the evaluation team sent an introductory email to participants with information about the evaluation, the link to the online discussion board, and login instructions. Separate focus groups were conducted by the evaluation team with each stakeholder group—ambulance suppliers, dialysis facility staff, SNF staff, physicians—with content and questions geared toward their given role in the prior authorization process. To maintain anonymity during focus group discussions, stakeholders identified themselves only by first name and last initial upon entering the discussion board. An evaluation team member monitored the discussion throughout the week, posted follow-up questions as appropriate, and emailed participation reminders on the third, fifth, and final days of each week-long focus group. In Table III.2, we detail the focus group timeline and participation rate for each stakeholder group.

Table III.2. Focus group timeline and participant count

Group	Date	Number recruited	Number of participants
Year 1 states:			
Ambulance suppliers	March 10–16, 2016	23	10
Dialysis providers	March 10–16, 2016	27	10
SNFs	April 28–May 4, 2016	15	7

Group	Date	Number recruited	Number of participants
Physicians	May 19–25, 2016	20	17
Year 2 states:			
Ambulance suppliers	July 14–20, 2016	28	13
Dialysis providers	July 14–20, 2016	18	9
SNFs	July 28–August 3, 2016	10	3*
Physicians	July 28–August 3, 2016	13	12

* The participation rate of SNF staff in Year 2 states was unusually low compared to that of all other stakeholder groups, despite using the same recruitment protocols. The relatively small number of SNF staff participating in the Year 2 focus group should be considered when interpreting findings.

Site visits and beneficiary interviews

The evaluation team conducted site visits in Year 1 states to outpatient dialysis facilities to explore beneficiaries' experiences with the model. During the site visits, the evaluation team conducted brief in-person interviews. The team also conducted telephone interviews with Year 1 state beneficiaries who requested to be interviewed over the phone. Although we conducted no site visits in Year 2 states, we conducted beneficiary interviews by telephone.

Site visit sample selection. Year 1 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. All facilities required corporate executive approval to participate in any aspect of the evaluation; in the initial round of site visits, Fresenius Medical Care North America (Fresenius) was the only corporation that agreed to permit its local facilities to participate in the recruitment of beneficiaries for on-site interviews. Across the Year 1 model states, we initially selected 10 Fresenius facilities that appeared, based on claims data, to serve multiple beneficiaries using RSNAT services. We then worked closely with designated points of contact to confirm that the facilities met the key site visit criterion—beneficiaries' reliance on RSNAT services— and finalize site visit logistics. We did not include 4 of the 10 Fresenius dialysis facilities in the final sample because beneficiaries using RSNAT were not receiving treatment during the data collection period.

Beneficiary interview sample selection. Both in-person and telephone interviews in Year 1 and 2 states focused on medical necessity, transportation utilization, health care utilization, beneficiary access to and quality of care, and beneficiaries' overall experiences and satisfaction. The evaluation team decided that in-person and telephone interviews were preferable to on-site focus groups in view of concerns about conducting focus groups with frail beneficiaries. Facility staff and social workers at approved facilities identified beneficiaries for interviews. Participating beneficiaries received a $20 Walmart debit card as a thank you for talking about their experiences.

We designed the on-site beneficiary interview approach to minimize the burden on patients' privacy and time, limit intrusion into staff and facility operations, and comply with Fresenius

corporate requests. The evaluation team developed posters and postcards to promote patient awareness of and interest in the evaluation before the site visits and then used color-coded response cards while on site to record patient experiences. The response cards included closed-ended questions as well as open-ended questions that allowed beneficiaries to describe their experiences in their own words.

In Table III.3, we present information on the completed on-site beneficiary and staff interviews at six participating Fresenius dialysis facilities, as well as the 22 telephone interviews with beneficiaries in Year 2 states.

Table III.3. Beneficiary and dialysis staff interviews, by state

State	Community type	Number of staff interviews	Number of beneficiary/caregiver interviews	Dates(s)
On-site and telephone interviews, Year 1 states				
NJ	Urban	4	5	July 2016
PA	Urban	4	5	July 2016
SC	Urban	2	5	July 2016
SC	Rural	2	11	July 2016
Telephone interviews, Year 2 states				
MD	Urban	1	2	Sept–Nov 2016
NC	Urban		3	Sept–Nov 2016
NC	Rural		1	Nov 2016
NC	Unknown	1	1	Sept–Nov 2016
VA	Urban		5	Sept–Nov 2016
VA	Rural		5	Sept–Dec 2016
WV	Rural		3	Nov–Dec 2016
Totals		**14**	**46**	

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.

These queries pulled coded comments on different topics from across stakeholder groups, each comment labeled with the stakeholder and state from which the comment came. For example, to analyze how the prior authorization model has impacted access to and quality of care, we ran a query that included all codes related to potential access to care effects (that is, "effects on beneficiaries and caregivers" and "effects on timeliness and quality of services").

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. We reviewed interviewer notes for findings related to each coding node in NVivo and added that content, as appropriate, to the material related to each research

question. We reviewed material for each research question from across all stakeholder groups at one time, together, to identify frequently occurring themes, areas of disagreement across different stakeholder groups, and inconsistent findings.

Online survey

After completing online focus groups and interviews with suppliers, 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 qualitative data collection. 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 sets of questions specific to each stakeholder group. We revised the survey instrument slightly before fielding it in Year 2 states. Beneficiaries were not included in the online survey due to the absence of a defined population frame from which to sample and contact this group. 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. Table III.4 provides final response rates by stakeholder group.

Ambulance suppliers, dialysis providers, and SNFs. The same sample file used to recruit ambulance suppliers, dialysis providers, and SNF staff for the online focus groups (described above) was used for the online survey of stakeholders. In both Year 1 and Year 2 states, survey invitations went to the full samples of ambulance suppliers, dialysis facilities and SNFs. We sent invitation packets containing a letter from CMS and instructions for completing the survey online during the week of July 25, 2016, for Year 1 states and December 12, 2016, for Year 2 states, one week before the start of the survey for each group. We sent three reminder postcards to non-responding sample members at regular intervals during the field periods. We mailed respondents from these stakeholder groups a $30 incentive check upon completion of the online survey.

Physicians. The same sample file used to recruit physicians for the online focus groups (described above) was used for the online survey. In Year 1 states, the physician sample file, at 1,140 physicians, was large, and it was not feasible to sample all physicians. As a result, 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). We sent invitation packets containing a letter from CMS and instructions for completing the survey online to physicians during the week of July 25, 2016, for Year 1 states and December 12, 2016, for Year 2 states, one week before the start of the survey for each group. 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. The AMA list contains “preferred addresses” for physicians as well as email addresses for a portion of the 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.

Table III.4. Online survey response rates

	Total sample	Ineligible*	Undeliverable	Nonresponse	Completes by sample type**	Response rate
Year 1 model states:						
Physicians	450	45	16	330	109	28%
Dialysis staff	402	7	38	276	52	24%
SNF staff	480	0	4	382	72	20%
Ambulance suppliers	443	1	95	255	93	27%
TOTAL	1,775	53	153	1243	326	24%
Year 2 states:						
Physicians	522	31	16	378	97	20%
Dialysis staff	200	0	9	157	34	18%
SNF staff	273	0	2	237	34	13%
Ambulance suppliers	151	0	28	85	38	31%
TOTAL	1,146	31	55	857	203	19%

*Respondents were ineligible if they told us they were not in one of the target stakeholder groups (ambulance supplier, dialysis staff, SNF staff, physician), if they did not work for a facility located in one of the model states, or if that facility did not serve Medicare beneficiaries within the model time frame.

**Completes are shown according to the sample file from which each respondent originated. In the survey analyses, some respondents were moved to other subgroup categories based on their responses to survey questions about their role at their current facility or organization. For example, respondents originally pulled from the physician sample who told us in the survey they were medical directors at dialysis facilities were moved to the dialysis staff subgroup in survey analyses.

Online survey analysis. Survey data were analyzed 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. Because the survey was administered to samples of stakeholders constructed by matching claims data with CPI reports of prior authorization submissions, we do not consider it a probability or census sample of all affected stakeholders in the model states. Therefore, we did not run inferential statistics on the survey data and did not test for statistically significant changes between Year 1 and Year 2 states.

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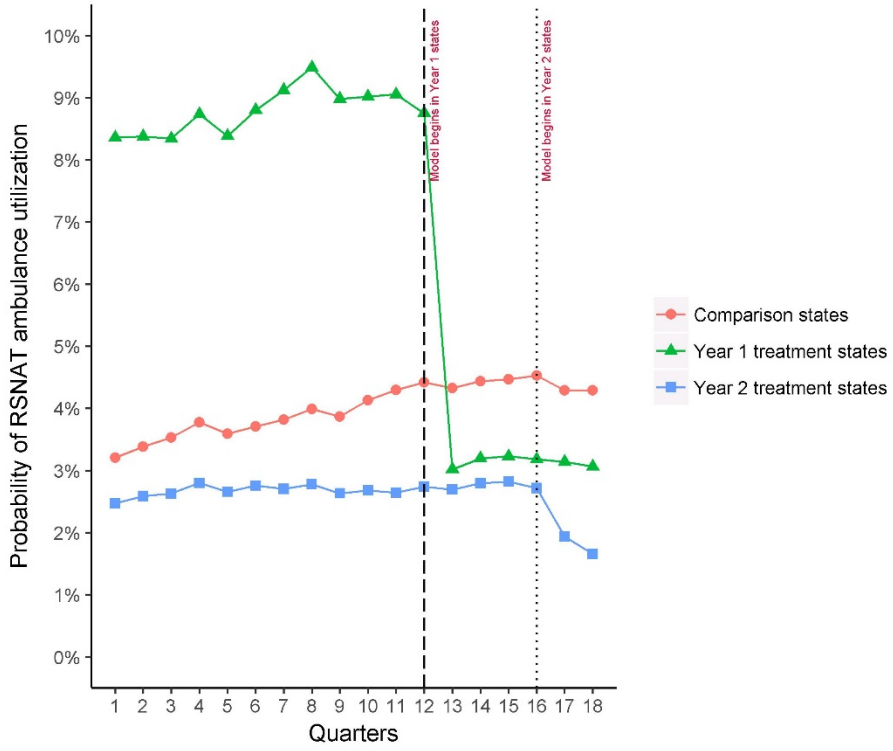
In this chapter, we present and discuss the quantitative research findings covering the first 18 months of the program for ESRD beneficiaries. We organize the chapter by research domain.

Domain 1: Utilization and expenditures

Descriptive analysis

Our descriptive analysis shows a nearly 70 percent decrease in RSNAT utilization and payment among beneficiaries with ESRD following the introduction of the prior authorization requirement. Figures IV.1 and IV.2 present weighted unadjusted beneficiary-level RSNAT utilization and payment outcomes. For both outcomes, we observe a more than 65 percent drop in RSNAT utilization and payment for Year 1 treatment states immediately following model implementation in December 2014. We see a smaller but still noticeable (and similar in percentage terms) decrease immediately following implementation in the Year 2 treatment states (which had started from a much lower utilization level) in 2016, although the follow-up period for Year 2 states is only two quarters.

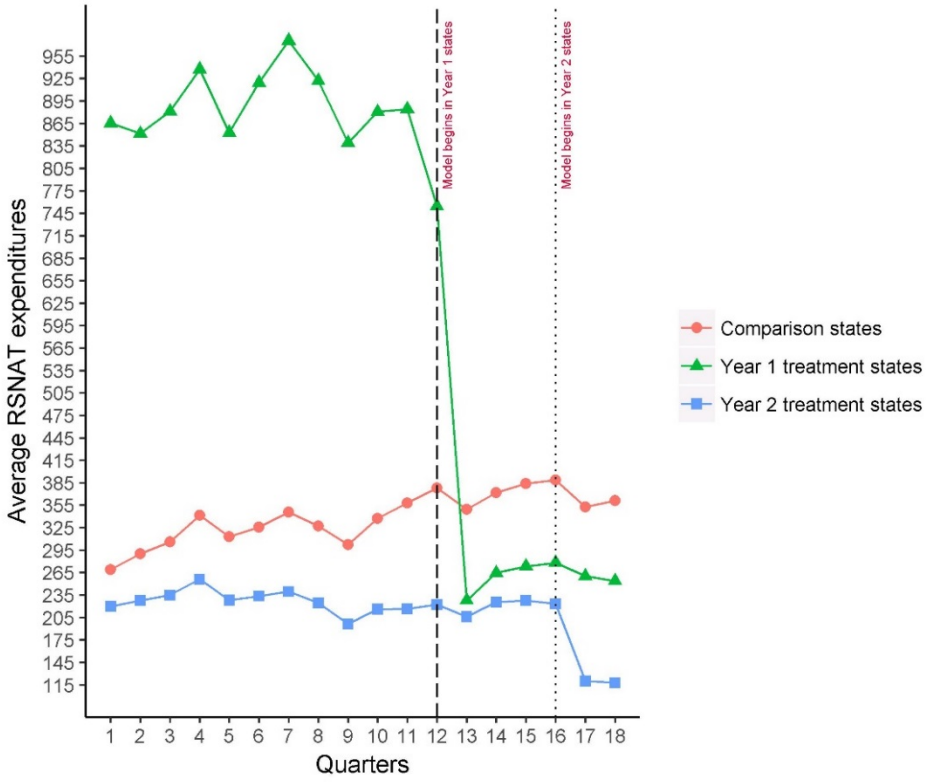
Figure IV.1. Probability of RSNAT utilization among beneficiaries with ESRD, by quarter



Source: Medicare FFS claims January–Mar 2012 (Q1) through Apr–June 2016 (Q18).

Note: Year 1 treatment states included New Jersey, Pennsylvania, and South Carolina. Year 2 treatment states included Delaware; Maryland; North Carolina; Virginia; Washington, DC; and West Virginia.

Figure IV.2. Average RSNAT expenditures among beneficiaries with ESRD, by quarter



Source: Medicare FFS claims January–Mar 2012 (Q1) through Apr–June 2016 (Q18).

Note: Year 1 treatment states included New Jersey, Pennsylvania, and South Carolina. Year 2 treatment states included Delaware; Maryland; North Carolina; Virginia; Washington, DC; and West Virginia.

In the next subsection, we use multivariate analysis to build on these aggregate descriptive analyses to examine utilization and cost to arrive at a more complete assessment of the impacts of the prior authorization requirement on RSNAT utilization and cost. Appendices J and K describe the precision of the analysis. We estimated the impact of the model at the level of the beneficiary-quarter by including FFS beneficiaries with a claims history indicating ESRD. Use of RSNAT services is not common among Medicare beneficiaries; however, beneficiaries with ESRD have a higher likelihood of reliance on RSNAT services, making it easier to detect any impacts of the prior authorization model. Over the study period, over 75 percent of RSNAT claims were for beneficiaries with ESRD. By examining FFS beneficiaries with ESRD, we therefore captured a substantial amount of the impact of the model on RSNAT use.[19]

Beneficiary analysis

Before weighting, beneficiary demographic and health characteristics by treatment and comparison group differed somewhat, but after weighting they were similar on most measures (Table L.1 in Appendix L). By design, before implementation of the model, FFS beneficiaries in

[19] If the remaining 25 percent of beneficiaries have markedly different characteristics or a dramatically different response to the model, the estimated impacts will be somewhat biased.

treatment states with ESRD had higher quarterly utilization of and expenditures for RSNAT services and total ambulance services, with RSNAT utilization and expenditures 13-20 percent higher (Table L.2 in Appendix L presents baseline levels of utilization and expenditure).

Controlling for beneficiary demographic and health characteristics in the multivariate analysis, we found that both RSNAT and all Medicare ambulance utilization declined for beneficiaries with ESRD. In Table IV.1, we show the estimated average marginal effects of the prior authorization requirement—the change in the probability and number of trips, and in payments attributable to the model. For ambulance services meeting the RSNAT definition, the impacts were dramatic. The quarterly probability that beneficiaries with ESRD received an ambulance service meeting the definition of RSNAT declined by 4.06 percentage points from a baseline mean of 5.09 percent (column I, $p < 0.001$), for an 80 percent decrease; in addition, the average number of RSNAT trips declined by 2.47, for an 87 percent decrease (column II, $p < 0.001$).[20] We also found a statistically significant but less dramatic decrease in any Medicare ambulance use. In fact, the magnitudes of the decreases in numbers of RSNAT trips and all Medicare ambulance trips were very similar, suggesting that most of the reduction in Medicare ambulance use may be attributable to the reduction in RSNAT use.

Table IV.1. Impact of prior authorization on quarterly utilization and cost for ESRD beneficiaries

	Probability of RSNAT ambulance service utilization (percentage points) (I)	Number of RSNAT ambulance trips (II)	Probability of any Medicare ambulance utilization (percentage points) (III)	Total number of Medicare ambulance trips (IV)	RSNAT service expenditures ($) (V)	All Medicare ambulance expenditures ($) (VI)	Total Medicare FFS expenditures ($) (VII)
Average marginal effect	-4.06***	-2.47***	-2.33***	-2.49***	-432.22***	-522.85***	-529.96***
(standard error)	(0.09)	(0.05)	(0.11)	(0.05)	(8.56)	(11.06)	(60.49)
Baseline mean	5.09	2.83	19.62	3.21	482.38	727.41	14426.63
Change from baseline (percent)	-79.73	-87.23	-11.87	-77.52	-89.60	-71.88	-3.67
R^2	0.23	0.08	0.13	0.09	0.08	0.09	0.10

Note: The table presents average marginal effects and (standard errors) from weighted logistic (I and III) and OLS (II, IV, V, VI, VII) regression analyses using 5,337,655 beneficiary-quarters from dates of service from January 2012 through June 2016 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, log of HCC score, and length of time since the county moratorium took effect. Errors are clustered at the beneficiary level. Coefficients from logistic regressions have been transformed into average marginal effects. The model states included Delaware; Maryland; New Jersey; North Carolina; Pennsylvania; South Carolina; Virginia; Washington, DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

$^{\dagger}p < 0.20$, $*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

[20] Results pertain to the full ESRD analysis group, including observations with zero outcomes. For all continuous and count outcomes, we also conducted analyses on just the subset of beneficiaries with non-zero outcomes to assess the impact on beneficiaries with positive use. The results were similar in direction and significance, indicating that the model affected utilization and payments both by reducing the probability of receiving any services and also the number of services delivered to users.

We also found that expenditures for ambulance services declined as a result of prior authorization. Average quarterly expenditures on RSNAT services per beneficiary decreased by $432, for a 90 percent decrease (column V, $p < 0.001$). The decrease translates into an estimated savings to Medicare of $171 million for RSNAT services for ESRD beneficiaries. In addition, average quarterly expenditures on all Medicare ambulance services per beneficiary with ESRD declined by $523, for a 72 percent decrease (column VI, $p < 0.001$). Total Medicare health care expenditures for this group declined by a similar amount ($530, column VII, $p < 0.001$), suggesting there were not countervailing increases in other types of health care costs.

We also ran separate models for the Year 1 and Year 2 states. Results were similar in sign and significance across the two groups, but the magnitudes of impacts were much larger for the Year 1 model states, with Year 2 states experiencing about 75 percent smaller impacts. This result is not surprising, however, given the substantially greater baseline utilization rates in the Year 1 states. The percentage declines relative to baseline were similar for the two groups of states. Table IV.2 presents the results by model cohort.[21]

Table IV.2. Impact of prior authorization on quarterly ESRD beneficiary utilization and cost, by year of model implementation

	Probability of RSNAT ambulance service utilization (percentage points) (I)	Number of RSNAT ambulance trips (II)	Probability of any Medicare ambulance utilization (percentage points) (III)	Total number of Medicare ambulance trips (IV)	RSNAT service expenditures ($) (V)	All Medicare ambulance expenditures ($) (VI)	Total Medicare FFS expenditures ($) (VII)
Year 1 model states:							
Average marginal effect	-5.46***	-3.31***	-3.38***	-3.35***	-586.98***	-708.53***	-658.64***
(standard error)	(0.143)	(0.07)	(0.15)	(0.07)	(12.41)	(15.93)	(76.07)
Baseline mean	8.78	5.04	21.66	5.43	879.85	1187.56	15189.82
Change from baseline (%)	-62.21	-65.78	-15.59	-61.66	-66.71	-59.66	-4.34
R^2	0.22	0.08	0.13	0.09	0.08	0.09	0.10
Year 2 states:							
Average marginal effect	-1.27***	-0.93***	-0.24	-0.93***	-143.29***	-185.63***	-259.87**
(standard error)	(0.07)	(0.05)	(0.16)	(0.05)	(7.11)	(10.14)	(89.77)
Baseline mean	2.69	1.40	18.30	1.77	224.62	429.00	13931.70

[21] Our comparison group strategy optimized for balance between the full treatment and comparison groups. Our balance was therefore slightly worse when removing one of the expansion cohorts to run these separate Year 1 and Year 2 analyses. However, in all cases, balance remained within generally accepted bounds (less than 0.25 standard deviations).

	Probability of RSNAT ambulance service utilization (percentage points) (I)	Number of RSNAT ambulance trips (II)	Probability of any Medicare ambulance utilization (percentage points) (III)	Total number of Medicare ambulance trips (IV)	RSNAT service expenditures ($) (V)	All Medicare ambulance expenditures ($) (VI)	Total Medicare FFS expenditures ($) (VII)
Change from baseline (%)	-47.23	-66.87	-1.31	-52.49	-63.79	-43.27	-1.87
R^2	0.22	0.07	0.12	0.08	0.06	0.08	0.09

Note: Table presents average marginal effects and (standard errors) from weighted logistic (I and III) and OLS (II, IV, V, VI, VII) regression analyses using 4,349,587 beneficiary-quarters (Year 1 model states) and 4,481,017beneficiary-quarters (Year 2 states) from dates of service January 2012 through June 2016. Control variables include age, age squared, sex, race, rural residence, dual eligibility for Medicare and Medicaid, hospital bed, an indicator for residing in a county with a moratorium on new Medicare suppliers, log of HCC score, and length of time since the county moratorium went into effect. Errors are clustered at the individual level. Coefficients from logistic regressions have been transformed into average marginal effects. The Year 1 model states included New Jersey, Pennsylvania, and South Carolina. The Year 2 model states included Delaware, Maryland, North Carolina, Virginia, Washington, DC, and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

$^{\dagger}p < 0.20$, $*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

We repeated the analyses, stratifying by rural residence and dual eligibility for Medicare and Medicaid. The results were consistent across all subgroups, but the effect sizes and percentage change from baseline were much larger for urban than for rural residents. Estimated impacts for dual eligible beneficiaries were larger in magnitude than for non-dual eligible beneficiaries, but in percentage they were similar. We present the stratified results in Table L.3 in Appendix L.

We also conducted this same set of analyses on the subgroup of ESRD beneficiaries who had a claim for a hospital bed, which potentially indicates mobility limitations. The results were similar but larger in magnitude than those for the full set of ESRD beneficiaries. See Table L.4 in Appendix L for the hospital bed subgroup results.

Domain 2: Quality of care and access to treatment for ESRD beneficiaries

Beneficiary analysis

The quantitative analysis for Domain 2 addresses ESRD beneficiary outcomes related to quality, adverse outcomes, and access to treatment. For quality of care and access to treatment, we focused on whether prior authorization has an impact on the beneficiaries' overall health and well-being—but not specifically on whether the transportation suppliers are providing quality service. For quality and adverse outcomes, we focused on emergency department utilization, emergency ambulance use, unplanned hospital admissions, and death. To assess access, we considered the utilization of dialysis—the key destination service for beneficiaries with ESRD. We estimated the probability of receiving dialysis treatment, the number of days on which dialysis was performed, and the average number of days between treatments.[22] We also included

[22] Given that several services may be delivered on a single day but dialysis services must be delivered regularly, we used the number of days of service receipt rather than the total volume of dialysis services provided to measure

some additional measures of ESRD quality of care. In particular, we examined dialysis administered in a hospital outpatient department on an emergency basis and hospitalization for conditions related to inadequate ESRD management. Before prior authorization was required, ESRD beneficiaries in treatment and comparison states were comparable in their levels on these quality-of-care and access-to-treatment measures (Tables L.5 and L.6 in Appendix L list baseline measures).

We did not find that the model was associated with greater emergency department use, emergency ambulance utilization, unplanned hospital admissions, or death for beneficiaries with ESRD. Table IV.4 presents our findings from the multivariate analysis of the impact of the model on beneficiary quality and adverse outcomes. In fact, the model was weakly associated with reduced incidence of emergency department use, unplanned admissions, and death, although the estimated effects were very small in both magnitude and percentage terms.

In general, we did not find that the model resulted in changes in access to treatment among beneficiaries with ESRD (Table IV.5). We found no effects on dialysis use, but we did find an increase in the probability of emergency dialysis treatment (0.36 percentage points for a 14.79 percent increase, $p < 0.001$) and a corresponding increase in the number of emergency dialysis treatments (0.003 additional treatments per beneficiary per quarter, for an 8.23 percent increase, $p < 0.01$). This finding could be a result of beneficiaries turning to emergency department treatment because of difficulties in accessing their regularly scheduled treatments. However, we did not see an increase in hospitalizations for ESRD-related complications; in fact, we saw a slight decrease. Thus, there were small to no effects on beneficiaries' rates of emergency department utilization or inpatient hospital admissions as a result of the model.

We also ran separate models for the Year 1 and Year 2 states. Neither of these groups experienced notable impacts on quality or access, with the exception of higher emergency ambulance use among the Year 2 states following the implementation of the prior authorization requirement, and lower emergency ambulance use among the Year 1 states. In both cases however, the percent change from baseline was small. Year 2 states also so a small decrease in unplanned hospital admissions, but as we observe only two quarters post-implementation for the Year 2 states, it is unclear how to interpret this small downturn. Table IV.6 presents the results by model expansion cohort.

access to treatment. 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.

Table IV.4. Impact of prior authorization on quarterly ESRD beneficiary care quality

	Probability of emergency department utilization (percentage points) (I)	Number of emergency department visits (II)	Probability of emergency ambulance utilization (percentage points) (III)	Number of emergency ambulance trips (IV)	Probability of unplanned admission (percentage points) (V)	Number of unplanned admissions (VI)	Probability of death (percentage points) (VII)
All ESRD beneficiaries							
Average marginal effect	-0.24*	-0.01**	-0.09	-0.01*	-0.23*	-0.01**	-0.10*
(standard error)	(0.12)	(0.004)	(0.09)	(0.002)	(0.11)	(0.002)	(0.04)
Baseline mean	32.62	0.60	14.92	0.24	22.44	0.32	3.59
Change from baseline (percent)	-0.73	-1.63	-0.61	-2.53	-1.02	-1.93	-2.68
R^2	0.07	0.08	0.10	0.06	0.07	0.07	0.10

Note: The table presents average marginal effects and (standard errors) from weighted logistic (I, III, V, and VII) and OLS (II, IV, VI) regression analyses using 5,337,655 beneficiary-quarters from dates of service from January 2012 through June 2016. Control variables include age, age squared, sex, race, rural residence, dual eligibility for Medicare and Medicaid, hospital bed, an indicator for residing in a county with a moratorium on new Medicare suppliers, log of HCC score, and length of time since the county moratorium went into effect. Errors are clustered at the individual level. Coefficients from logistic regressions have been transformed into average marginal effects. The model states included Delaware; Maryland; New Jersey; North Carolina; Pennsylvania; South Carolina; Virginia; Washington, DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

†$p < 0.20$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Table IV.5. Impact of prior authorization on quarterly ESRD beneficiary access to treatment

	Probability of dialysis use (percentage points) (I)	Number of days of dialysis use (II)	Average number of days between dialysis use (III)	Probability of emergency dialysis (percentage points) (IV)	Number of emergency dialysis treatments (V)	Probability of hospitalization due to ESRD complications (percentage points) (VI)	Number of hospitalizations due to ESRD complications (VII)
All ESRD beneficiaries							
Average marginal effect	-0.36*	-0.10	-0.001	0.36***	0.003**	-0.14***	-0.002***
(standard error)	(0.15)	(0.07)	(0.004)	(0.04)	(0.001)	(0.04)	(0.0004)
Baseline mean	55.04	21.81	2.41	2.40	0.04	1.86	0.02
Change from baseline (percent)	-0.66	-0.48	-0.03	14.79	8.23	-7.68	-7.85
R^2	0.13	0.10	0.01	0.07	0.01	0.05	0.01
Number of observations	5,337,655	5,337,655	2,950,759	5,337,655	5,337,655	5,337,655	5,337,655

Note: The table presents average marginal effects and (standard errors) from weighted logistic (I, IV, and VI) and OLS (II, III, VII) regression analyses from dates of service from January 2012 through June 2016. Control variables include age, age squared, sex, race, rural residence, dual eligibility for Medicare and Medicaid, hospital bed, an indicator for residing in a county with a moratorium on new Medicare suppliers, log of HCC score, and length of time since the county moratorium went into effect. Errors are clustered at the individual level. Coefficients from logistic regressions have been transformed into average marginal effects. The model states included Delaware; Maryland; New Jersey; North Carolina; Pennsylvania; South Carolina; Virginia; Washington, DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

†$p < 0.20$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Table IV.6. Impact of prior authorization on quarterly ESRD beneficiary care quality and access, by year of model implementation

	Probability of emergency department utilization (percentage points) (I)	Number of emergency department visits (II)	Probability of emergency ambulance utilization (percentage points) (III)	Number of emergency ambulance trips (IV)	Probability of unplanned admission (percentage points) (V)	Number of unplanned admissions (VI)	Probability of death (percentage points) (VII)	Probability of dialysis service use (percentage points) (VIII)	Number of days of dialysis service use (IX)
Year 1 states									
Average marginal effect	-0.16	-0.01*	-0.32**	-0.01***	-0.11	-0.004†	-0.13*	-0.50**	-0.15†
(standard error)	(0.15)	(0.005)	(0.12)	(0.003)	(0.14)	(0.002)	(0.05)	(0.19)	(0.10)
Baseline mean	31.58	0.56	15.01	0.24	22.71	0.33	3.70	60.38	22.89
Change from baseline (%)	-0.50	-1.81	-2.12	-4.40	-0.48	-1.22	-3.40	-0.82	-0.65
R^2	0.07	0.08	0.10	0.06	0.07	0.07	0.10	0.13	0.11
Year 2 states									
Average marginal effect	-0.32	-0.01*	0.58***	0.01†	-0.59***	-0.02***	-0.07	-0.19	0.15†
(standard error)	(0.19)	(0.006)	(0.14)	(0.004)	(0.17)	(0.003)	(0.07)	(0.19)	(0.10)
Baseline mean	33.29	0.62	14.85	0.24	22.27	0.32	3.52	61.35	23.81
Change from baseline (%)	-0.97	-2.10	3.91	2.39	-2.63	-4.64	-2.06	-0.31	0.63
R^2	0.07	0.08	0.10	0.06	0.07	0.07	0.09	0.12	0.11

Note: Table presents average marginal effects and (standard errors) from weighted logistic (I, III, V, VII, and VIII) and OLS (II, IV, VI, and IX) regression analyses using 4,349,587 beneficiary-quarters (Year 1 states) and 4,481,017 beneficiary-quarters (Year 2 states) from dates of service January 2012 through June 2016. Control variables include age, age squared, sex, race, rural residence, dual eligibility for Medicare and Medicaid, hospital bed, an indicator for residing in a county with a moratorium on new Medicare suppliers, log of HCC score, and length of time since the county moratorium went into effect. Errors are clustered at the individual level. Coefficients from logistic regressions have been transformed into average marginal effects. The Year 1 states included New Jersey, Pennsylvania, and South Carolina. The Year 2 states included Delaware; Maryland; North Carolina; Virginia; Washington, DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

†$p < 0.20$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

In Table L.7 in Appendix L, we present results for ESRD beneficiaries stratified by rural residence and dual eligibility for Medicare and Medicaid. We find no sizeable impacts for any of these subgroups. We also examine outcomes for ESRD beneficiaries with a hospital bed claim and find no significant or sizeable impacts on care quality or access. Results for the hospital bed subgroup are in Table L.8 in Appendix L.

We did not find robust evidence of an impact on quality or access, but such impacts may nevertheless exist; the qualitative findings suggest that some beneficiaries were experiencing significant difficulty in accessing reliable alternative transportation (Section V). It is possible that impacts on care could be delayed for several quarters as beneficiaries seek transportation from successive suppliers or utilize stopgap transportation options, in which case it would be difficult to gauge the impact quantitatively with only six quarters of post-implementation observations for Year 1 states and two quarters of such observations for Year 2 states.

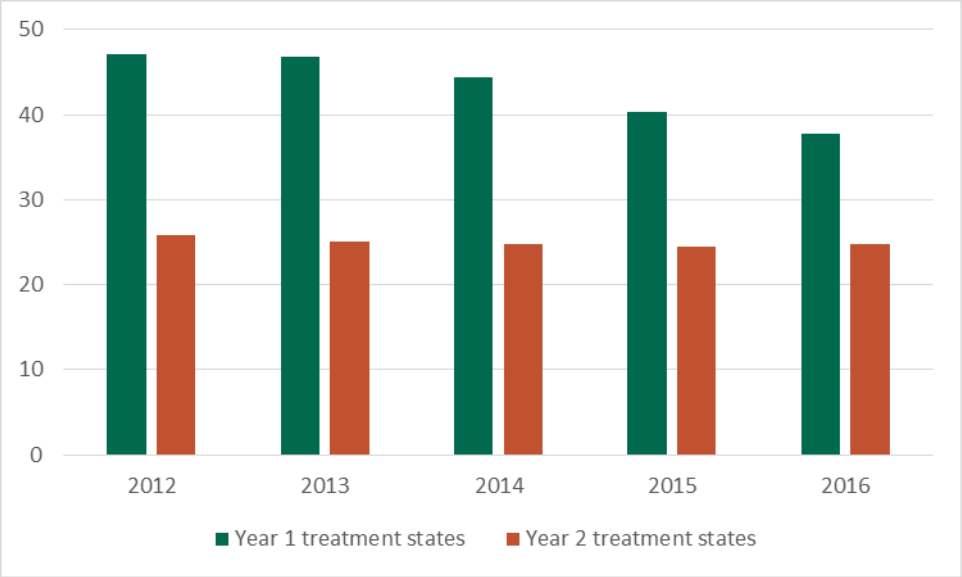
Domain 4: Suppliers and providers

In this section, we focus on how the prior authorization model affected suppliers, including their levels of service provision and payments, and whether the model is associated with suppliers exiting the program.

Aggregate analysis

The number of suppliers per 100,000 FFS beneficiaries decreased by about 15 percent in the Year 1 states from before to after model implementation, from 46 in 2012 to 38 in the first half of 2016 (Figure IV.3). The decrease could reflect a combination of two important factors—supplier exits from the market in response to the prior authorization requirement and the impact of the moratorium on new providers in some Pennsylvania and New Jersey counties. The change in the ratio of suppliers to FFS beneficiaries was much smaller in the comparison and the Year 2 states, remaining at approximately 30 and 25 suppliers, respectively, per 100,000 FFS beneficiaries for the duration of the study period, which includes only two quarters of post-implementation data for the Year 2 states.

Figure IV.3. Ambulance suppliers per 100,000 FFS beneficiaries in Year 1 and Year 2 treatment states



Source: Medicare FFS claims January 2012 through June 2016.

Note: Year 1 treatment states included New Jersey, Pennsylvania, and South Carolina. Year 2 treatment states included Delaware; Maryland; North Carolina; Virginia; Washington, DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington. Comparison states were matched to the full set of treatment states, and comparison beneficiaries were weighted to resemble the combined group of three Year 1 states and six Year 2 states.

Supplier analysis

Before weighting, treatment and comparison group suppliers differed substantially on all characteristics used in the matching process. The supplier weighting process reduced the differences between treatment and comparison group suppliers for most beneficiary demographic and health characteristics. Appendix L discusses supplier descriptive statistics. However, sizeable differences remain in the proportion of rural beneficiaries in suppliers' catchment areas as well as in the racial and chronic-condition composition of suppliers' customer bases.

Before model implementation, on average, suppliers in treatment states served fewer beneficiaries but made more trips meeting the RSNAT definition and more trips per beneficiary served. They received more in RSNAT service payments but less in payments for all Medicare ambulance services, and less in total Medicare payments. Appendix L provides baseline utilization and cost levels.

In Table IV.7, we present the results of our multivariate supplier analysis. Controlling for the demographic and health characteristics of beneficiaries in suppliers' customer bases, prior authorization significantly reduced the number of trips per quarter provided to Medicare beneficiaries by the average supplier in the treatment states. The average number of quarterly trips that met the RSNAT definition made by suppliers declined by 90, for a 64 percent decrease (column II, $p < 0.001$). The average number of all Medicare ground ambulance trips by quarter

also declined, although by a smaller amount—53 trips, for a 14 percent decrease (column III, $p < 0.01$).

Table IV.7. Impact of prior authorization on supplier quarterly utilization and payments

	Number of beneficiaries served (any Medicare ambulance) (I)	Number of RSNAT trips (II)	Number of Medicare ambulance trips (III)	Number of Medicare ambulance trips per beneficiary (IV)	RSNAT payments ($) (VI)	Total Medicare ambulance payments ($) (V)	Total Medicare FFS payments ($) (VII)
Average marginal effect	27.09**	-89.80***	-53.14**	-1.82***	-15,921.76***	-5,464.71	-7,365.65†
(standard error)	(9.30)	(11.77)	(19.81)	(0.22)	(2005.29)	(4,416.88)	(5,322.06)
Change from baseline (percent)	14.52	-64.39	-13.67	-37.35	-66.73	-6.11	-6.49
R^2	0.06	0.06	0.05	0.30	0.06	0.06	0.06
Number of observations	111,508	111,508	111,508	103,526	111,508	111,508	111,508

Note: The table presents coefficients and (standard errors) from weighted OLS regression analyses using claims from dates of service January 2012 through June 2016. Control variables include the following beneficiary characteristics calculated at the supplier level: average beneficiary age, percentage female, percentage race categories, percentage rural, percentage dually eligible for Medicare and Medicaid, average HCC score, percentage with three higher-RSNAT-use conditions (ESRD, cancer, and chronic skin ulcers), an indicator for residing in a county with a moratorium on new Medicare suppliers, and length of time since the county moratorium took effect. Errors are clustered at supplier level. The model states included Delaware; Maryland; New Jersey; North Carolina; Pennsylvania; South Carolina; Virginia; Washington, DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

†$p < 0.20$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

The reduction in RSNAT trips translated into a statistically significant reduction in payments, with average quarterly payments to suppliers for RSNAT services decreasing by nearly $16,000, for a 67 percent decline (column VI, $p < 0.001$); however, the 6.1 percent decline in payments to suppliers for all Medicare ground ambulance transport was not statistically significant (column V). In addition, the change in total Medicare FFS payments per supplier, which includes payments for ancillary services such as supplemental oxygen during transport (column VII), was not statistically significant.

We conducted the same set of analyses, stratifying according to whether the majority of a supplier's customer base resides in a rural or urban area. The results show that our overall findings of reduced service provision were driven by suppliers who serve mostly urban beneficiaries. The effects for rural suppliers also declined, although the estimated impacts were smaller and, for the most part, not statistically significant (Table L.11 in Appendix L).

The decline in the number of suppliers operating in Year 1 treatment states after the prior authorization requirement took effect may at least partially explain why average supplier payments did not decrease even though the provision of services decreased. It is likely that, as suppliers leave the market, beneficiaries may seek out new suppliers from among those remaining, which increases their volumes and lowers the risk of any possible reduction in

Medicare payments for surviving suppliers. In column 1 of Table IV.7, we present further evidence in support of this explanation, where we point to a sizeable and significant increase in the average number of beneficiaries served by a supplier.

To shed light on which suppliers were more likely to leave the market after the prior authorization requirement took effect, we descriptively examined the subset of suppliers who were actively billing Medicare in the last year before model implementation in their state.[23] We divided the subset into two groups: stayers, who also billed Medicare after the prior authorization requirement went into effect, and leavers, who did not bill Medicare at any point after prior authorization became mandatory. We compared stayers and leavers on both the characteristics of their customer bases and their utilization and payment measures in the year before implementation. We found several dramatic differences between leavers and stayers in the treatment states that were not present in the comparison states.

A higher percentage of suppliers exited treatment states (9.2 percent) than exited comparison states (5.7 percent). Leavers in comparison states tended to be smaller and more rural than stayers, providing fewer quarterly trips for a smaller number of beneficiaries and receiving lower quarterly payments (Table IV.8). Similarly, they provided fewer RSNAT trips and received less in RSNAT payments than stayers. In contrast, stayers and leavers in model states exhibited the opposite pattern of utilization and payment before the prior authorization requirement. Compared to stayers, leavers provided 48 percent more RSNAT trips per quarter and received 50 percent higher quarterly payments for RSNAT services. Whereas stayers received only 11 percent of their total Medicare payments from RSNAT services, leavers received 57 percent of their total Medicare payments from RSNAT services. Finally, stayers in treatment states provided an average of 4 trips per RSNAT beneficiary per quarter, a figure comparable to both stayers and leavers in comparison states. By comparison, leavers in treatment states provided an average of 23 trips per RSNAT beneficiary per quarter in the baseline period. In the demographic characteristics of their customer bases, leavers in treatment states served customer bases that were less white and less rural than the bases of stayers in treatment states (Table L.12 in Appendix L).

The observed pattern suggests that suppliers in treatment states did not exit the market randomly during this period. Suppliers that left the market tended to be heavily dependent on payments for RSNAT services; any reductions in those payments that occurred as a result of stricter enforcement of coverage rules under prior authorization may have made continued operation untenable and influenced their decision to close operations before the model's start.

[23] At this point, we have no information about suppliers who stopped billing Medicare after the RSNAT model began in their state.

Table IV.8. Pre-implementation quarterly supplier utilization and payments, by post-implementation operation status

	Treatment				Comparison			
	Stayers—weighted mean (SD)	Leavers—weighted mean (SD)	Difference	Percent difference	Stayers—weighted mean (SD)	Leavers—weighted mean (SD)	Difference	Percent difference
Number of beneficiaries served (any Medicare ambulance)	199.80 (489.06)	49.29 (212.92)	150.52***	305.38	231.54 (629.45)	50.01 (205.28)	181.53***	362.99
Number of RSNAT trips	138.61 (466.66)	265.86 (577.43)	-127.25***	-47.86	137.94 (735.25)	51.18 (197.48)	86.77***	169.54
Number of Medicare ambulance trips	403.46 (885.79)	325.63 (674.14)	77.83**	23.90	451.82 (1343.62)	118.19 (378.42)	333.63***	282.28
Number of Medicare ambulance trips per beneficiary	4.11 (9.99)	23.31 (22.72)	-19.20***	-82.37	3.52 (8.99)	4.65 (10.35)	-1.13	-24.30
RSNAT payments ($)	22573.96 (76504.78)	45248.59 (99438.68)	-22674.63***	-50.11	21461.95 (112866.31)	7776.70 (29637.83)	13,685.25***	175.98
Total Medicare ambulance payments ($)	93,338.32 (204,392.64)	58,925.36 (124,639.94)	34,412.96***	58.40	106,748.96 (293,246.71)	24,447.87 (80,104.11)	82,301.09***	336.64
Total Medicare FFS payments ($)	117,473.65 (246,887.20)	70,601.92 (14,8220.49)	46,871.73***	66.39	135,264.01 (364,240.91)	51,690.34 (133,827.57)	83,573.67***	161.68
Percentage of payments from RSNAT	11 (24)	57 (39)	-46.00***	-80.70	8 (20)	13 (25)	-5.00**	-38.46
Number of suppliers	2,157	219			3,562	215		

Note: Table presents weighted means and (standard deviations) of supplier characteristics from the year before model implementation. Stayers are suppliers active both before and after implementation; leavers are suppliers active before, but not after, implementation. Comparison group suppliers are weighted to resemble treatment group suppliers in the demographic and health characteristics of their customer base. The model states included Delaware; Maryland; New Jersey; North Carolina; Pennsylvania; South Carolina; Virginia; Washington, DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

$^{\dagger}p < 0.20$, $*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

Domain 5: Improper payment and denials

The quantitative analysis for Domain 5 addresses the questions of whether prior authorization impacted rates of improper payments or claims denials. We discuss these questions in the subsections that follow.

Improper payment

To the extent feasible, we examined the Medicare FFS improperly paid services in the model and comparison states. For this analysis, we used the Comprehensive Error Rate Testing (CERT) data for Part B services. CERT collects a service-level stratified random sample of claims on an annual basis to estimate the national improper payment rate for the Medicare FFS program. Although the Part B CERT samples contain approximately 17,000 claims annually, the resulting sample size for ambulance claims is modest, with only between 209 and 333 observations each year of the study period for all model states. The number of such records for RSNAT services is particularly small—often only a few claims in each year—thus causing us to limit the analysis to improperly paid claims for all Medicare ambulance claims. This group of claims includes a diverse set of services in addition to RSNAT claims, which presents a challenge for determining the impact of the RSNAT model on accuracy of payments for RSNAT services.

Because the sample sizes are modest and payment rates vary considerably more than service error rates, we focused this analysis on the service error rate for all Medicare ambulance claims. We calculated the service error rates for ambulance service separately for model and comparison states for each year of the study period. We used the final recalibrated sample weights when generating these estimates, producing estimates for 2011 through 2015 separately for these two groups of states. Because of the modest sample sizes, we estimated these rates with considerable imprecision. The CERT sample is not designed to develop estimates for specific states or the combinations of states selected for inclusion in this study's treatment or comparison groups. In addition, the sample weights are not designed for state-level inference, and it is unclear how well our weighted estimates accurately reflect the distribution of Medicare ambulance claims within these sets of states. The sample designs may vary across years, which could also impact changes in state-level estimates over time. Finally, it is important to note that the data used in this analysis, although weighted using the CERT sample weights, are not weighted in the same manner as our claims analysis records. As a result, this analysis is not comparable to the other analyses we performed and described throughout this report.

Despite these important caveats, we observed that the service error rate for Medicare ambulance services for both model and comparison states appears to generally increase through the study period. Although a review of the point estimates for the rates calculated in the analysis suggests that the comparison state rates may have been higher in 2015 than the rate for the model states, the service error rates for both groups are within both the 95 percent and 80 percent confidence intervals. The differences across the full study period are inconsistent, suggesting that these rates are not significantly different from each other. Overall, these findings and the data available for this analysis do not provide compelling evidence that the RSNAT model had a measurable impact on the Medicare ambulance service error rate.

Denied claims

The purpose of the denied claims analysis was to determine whether prior authorization impacted the extent to which claims were denied by the Medicare program. We examined the outcomes of the proportion of submitted claims denied per beneficiary (or supplier) per quarter for Medicare *non-emergency* ambulance services at both the beneficiary and supplier levels. At both the beneficiary and supplier levels, we performed multivariate analysis on the following four measures (1) the number of claims denied per beneficiary (or supplier) per quarter for *non-emergency* ambulance services, (2) the proportion of submitted claims denied per beneficiary (or supplier) per quarter for *non-emergency* ambulance services, (3) the number of claims denied per beneficiary (or supplier) per quarter for *all* Medicare ambulance services, and (4) the proportion of submitted claims denied per beneficiary (or supplier) per quarter for *all* Medicare ambulance services.

Beneficiary analysis

Claim denials are uncommon at the beneficiary level. Before the prior authorization model took effect, the average number of Medicare non-emergency ambulance claims denied per beneficiary per quarter was 0.06 (about 2.2 percent of claims). Table IV.9 shows the results of the quantitative analysis using a regression model that allows for differential impacts over time. We present the average marginal effects of the model in each quarter after implementation. Year 1 states have six quarters of experience in our study sample; Year 2 states have only two quarters of post-implementation experience. We find that the number of Medicare non-emergency ambulance claims denied per beneficiary per quarter increased by 114 percent after prior authorization went into effect (column I, $p < 0.001$), and the proportion of claims denied increased by 139 percent (column II, $p < 0.001$). However, this effect attenuated over time and, by six quarters after implementation, the number of claims denied was statistically indistinguishable from baseline and the rate of denied claims was only 32 percent higher than baseline. A similar pattern held for denied claims for all Medicare ambulance services (columns III and IV). This pattern may reflect (1) learning on the part of ambulance suppliers about the appropriate documentation for prior authorization requests and (2) increased vigilance among MACs in reviewing RSNAT claims at the start of the prior authorization model.

Table IV.9. Impact of prior authorization on quarterly beneficiary claims denials, by quarter after model implementation

	Number of denied non-emergency ambulance claims (I)	Proportion of non-emergency ambulance claims denied (II)	Number of denied Medicare ambulance claims (III)	Proportion of Medicare ambulance claims denied (IV)
Q1 average marginal effect	**0.07*** **	**0.04*** **	**0.07*** **	**0.02*** **
(standard error)	(0.006)	(0.002)	(0.01)	(0.001)
Change from baseline (percent)	114.13	138.85	105.12	66.80
Q2 average marginal effect	**0.04*** **	**0.03*** **	**0.04*** **	**0.01*** **
(standard error)	(0.012)	(0.002)	(0.01)	(0.001)
Change from baseline (percent)	60.00	104.73	60.18	58.80
Q3 average marginal effect	**0.01***	**0.02*** **	**0.01***	**0.01*** **
(standard error)	(0.01)	(0.003)	(0.01)	(0.001)
Change from baseline (percent)	22.06	83.11	18.74	38.80
Q4 average marginal effect	**0.01~**	**0.02*** **	**0.004**	**0.01*** **
(standard error)	(0.01)	(0.002)	(0.01)	(0.001)
Change from baseline (percent)	12.06	52.03	5.42	32.00
Q5 average marginal effect	**0.01~**	**0.01*** **	**0.01~**	**0.012***
(standard error)	(0.01)	(0.002)	(0.01)	(0.0015)
Change from baseline (percent)	16.51	48.99	12.59	33.60
Q6 average marginal effect	**0.003**	**0.01** **	**0.004**	**0.01*** **
(standard error)	(0.01)	(0.002)	(0.01)	(0.002)
Change from baseline (percent)	5.40	32.43	6.00	35.20
R^2	0.01	0.03	0.01	0.01
Number of observations	5,337,655	474,043	5,337,655	1,005,417

Note: Table presents average marginal effects and standard errors from weighted OLS regression analyses using claims representing dates of service from January 2012 through June 2016 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, log of HCC score, and length of time since the county moratorium took effect. Errors are clustered at the individual level. The model states included Delaware; Maryland; New Jersey; North Carolina; Pennsylvania; South Carolina; Virginia; Washington, DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

†p < 0.20, *p < 0.05, **p < 0.01, ***p < 0.001.

Supplier analysis

Before model implementation, about 4.6 percent of Medicare non-emergency ambulance claims were denied per supplier per quarter (an average of 8.8 denied non-emergency ambulance claims per supplier per quarter). Table IV.10 shows the impact estimates for claims denials at the supplier level. The number of denied claims for non-emergency ambulance services increased by almost 73 percent after the prior authorization requirement went into effect, for an additional 6.4 denied claims per supplier per quarter (column I, $p < 0.001$), and the proportion of non-emergency claims denied increased by nearly 45 percent (column II, $p < 0.001$). Similar increases were seen in denials for all Medicare ambulance services (columns III and IV). In all

cases, the effect appears to attenuate for several quarters before ticking up again slightly in the fifth and sixth post- implementation quarters. The increase in denials occurring shortly after implementation is consistent with the findings from the qualitative and beneficiary analyses. The cause of the later rise in denials after declining is uncertain but may reflect compositional changes in the supplier population. As with other supplier outcomes, the results were driven by suppliers serving mostly urban beneficiaries.

Table IV.10. Impact of prior authorization on quarterly supplier claims denials

	Number of denied non-emergency ambulance claims (I)	Proportion of non-emergency ambulance claims denied (II)	Number of denied Medicare ambulance claims (III)	Proportion of Medicare ambulance claims denied (IV)
Q1 average marginal effect	**6.39*** **	**0.02*** **	**7.91*** **	**0.01*** **
(standard error)	(1.51)	(0.005)	(1.61)	(0.002)
Change from baseline (percent)	72.66	44.66	65.80	52.23
Q2 average marginal effect	**4.08** **	**0.03*** **	**6.06*** **	**0.01*** **
(standard error)	(1.46)	(0.01)	(1.64)	(0.002)
Change from baseline (percent)	46.42	56.21	50.40	43.75
Q3 average marginal effect	**1.51**†**	**0.01** **	**2.96** **	**0.02*** **
(standard error)	(0.83)	(0.01)	(1.09)	(0.002)
Change from baseline (percent)	17.22	31.37	24.60	43.30
Q4 average marginal effect	**1.56**†**	**0.004**	**2.26**†**	**0.01** **
(standard error)	(0.82)	(0.01)	(1.27)	(0.002)
Change from baseline (percent)	17.71	9.15	18.79	22.32
Q5 average marginal effect	**2.81***	**0.01**†**	**4.89*** **	**0.01*** **
(standard error)	(1.12)	(0.01)	(1.35)	(0.003)
Change from baseline (percent)	31.99	26.58	40.62	54.46
Q6 average marginal effect	**2.55***	**0.01***	**4.86*** **	**0.01*** **
(standard error)	(1.06)	(0.01)	(1.24)	(0.002)
Change from baseline (percent)	28.96	31.81	40.42	37.05
R^2	0.03	0.11	0.04	0.05
Number of observations	111,508	46,050	111,508	103,788

Note: Table presents coefficients and standard errors from weighted OLS regression analyses using claims from dates of service from January 2012 through June 2016. Control variables include the following beneficiary characteristics, calculated at the supplier level: average beneficiary age, percentage female, percentage race categories, percentage rural, percentage dual eligible for Medicare and Medicaid, average HCC score, percentage with three higher-RSNAT-use conditions (ESRD, cancer, and chronic skin ulcers), an indicator for residing in a county with a moratorium on new Medicare suppliers, and length of time since the county moratorium took effect. Errors are clustered at the supplier level. The model states included Delaware; Maryland; New Jersey; North Carolina; Pennsylvania; South Carolina; Virginia; Washington; DC; and West Virginia. The comparison states included Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Massachusetts, Montana, Nebraska, Ohio, Tennessee, Texas, and Washington.

†p < 0.20, *p < 0.05, **p < 0.01, ***p < 0.001.

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V. QUALITATIVE ANALYSIS RESULTS

As described in Chapter III: Qualitative Data Collection Methods, we conducted interviews, focus groups, and online surveys with multiple stakeholder groups[24] in the states that participated in the RSNAT prior authorization model to explore perceptions of (1) the effect of the model on use of RSNAT services,[25] (2) effects on access to and quality of care, (3) overall program operations and impacts on provider and supplier practices, and (4) specific ways the model could be improved. In this chapter, we report key findings based on beneficiary interviews; interviews with MAC personnel; and focus groups and online surveys with dialysis facility staff, SNF staff, ambulance suppliers, and physicians. We report stakeholders' perceptions here that should be interpreted with caution since some of their perceptions reflect the early implementation phase of the model and have become less of a concern as the model has developed.

We present findings, by research domain, drawn from qualitative data from both Year 1 and Year 2 states. The reader should be aware that these qualitative analyses supplement the quantitative analysis, and focus on the non-empirical questions that cannot be answered easily with quantitative analysis. It is also important to note that because the primary data collection in this evaluation relies on nonprobability and convenience sampling, the findings may not represent the experiences and attitudes of all stakeholders in Year 1 and Year 2 states and may disproportionately reflect the views of those with a greater stake in model impacts. This is particularly true for focus group and interview findings, which are based on a relatively small number of respondents. While the online surveys were administered to larger samples, response rates were low at 24 percent among stakeholders in Year 1 states and 19 percent among stakeholders in Year 2 states.

[24] As noted in Chapter III, stakeholders participating in focus groups and the online surveys include ambulance suppliers, dialysis providers, SNF staff, and physicians. We also conducted site visits at dialysis facilities in Year 1 states and conducted in-person and telephone interviews with beneficiaries and their caregivers in Year 1 and Year 2 states. The results reported here include findings from all of these stakeholder groups.

[25] We examined these questions in the qualitative research effort, but this study relies primarily on the quantitative analysis to identify the effect of the model on utilization and cost.

Domain 1: Utilization and expenditures

Key findings

Stakeholders report prior authorization is successfully addressing fraudulent and questionable practices that some transportation providers were using.

Enforcement of the pre-existing RSNAT medical necessity guidelines through prior authorization has resulted in fewer beneficiaries being approved for RSNAT. This finding supports quantitative descriptive analysis that shows a decrease in RSNAT utilization.

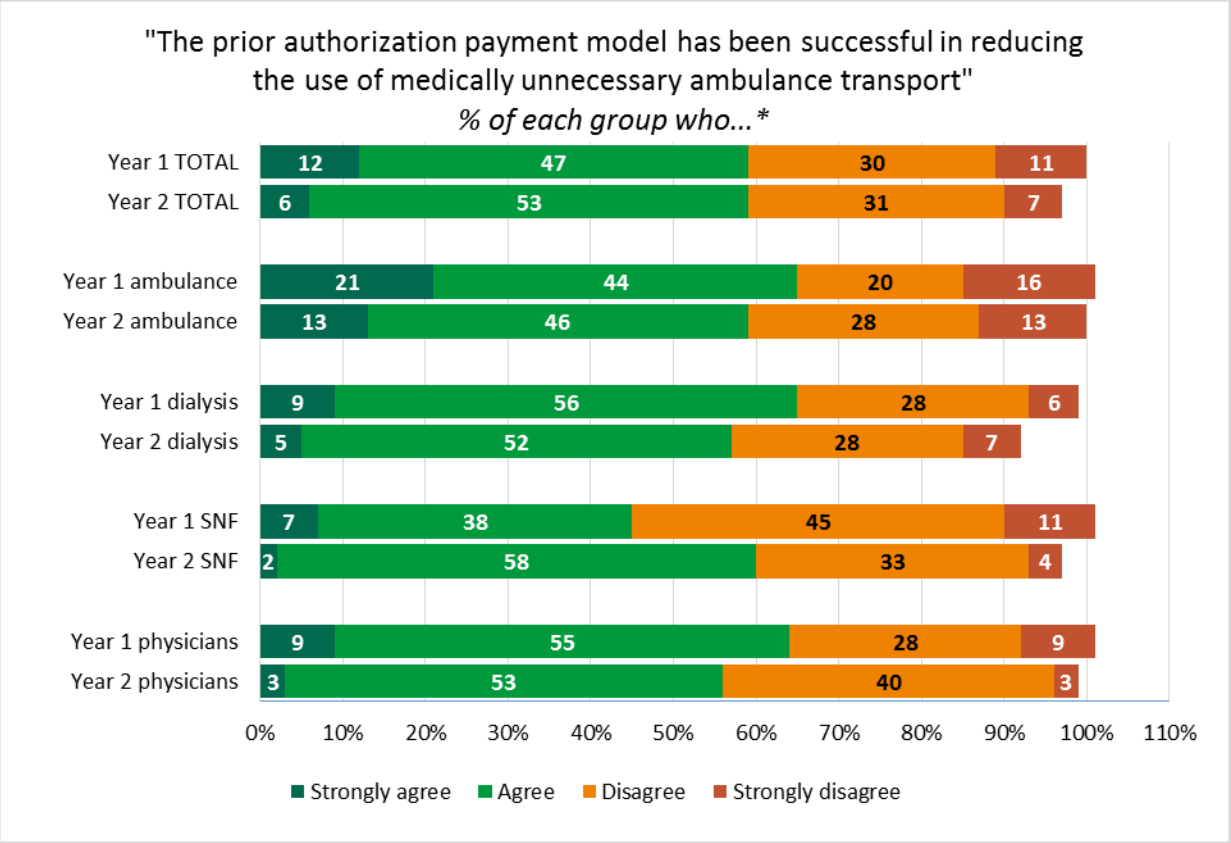
Overall effectiveness in reducing medically unnecessary RSNAT use

Stakeholder groups across both sets of states reported that prior authorization has had a significant impact on RSNAT utilization; they perceived a notable decline in the number of beneficiaries approved for ambulance transport. According to MAC personnel interviewed, in the first several months after implementation, a large portion of PARs were non-affirmed for either technical reasons (inadequate documentation, missing signatures, or incorrect dates) or because the beneficiary did not meet the medical necessity criteria. MAC personnel also reported a sizeable decrease over time in the number of non-affirmed PARs,[26] along with improving documentation for all submitted PARs, as ambulance suppliers developed better understanding of medical necessity guidelines and required documentation. As a result, there was (1) a significant decrease in the volume of RSNAT PARs for beneficiaries not meeting medical necessity guidelines and (2) a significant decrease in the number of PARs with insufficient or questionable documentation. MAC personnel overseeing the RSNAT model reported no difficulty in keeping up with the volume of PAR requests or turning them around in the required time frame, particularly since the volume decreased over the course of the first year, and suppliers and providers became more knowledgeable about appropriate documentation.

As shown in Figure V.1, in the online surveys (which included providers, suppliers, SNFs, and physicians), a majority of stakeholders 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 Year 1 states, 59 percent Year 2 states). In both sets of states, ambulance suppliers were the most likely stakeholder subgroup to agree strongly that the model is having this effect.

[26] Below, we include specific quotes from the stakeholders who sometimes refer to non-affirmed PARs as "denied" PARs.

Figure V.1. Stakeholder perceptions of the model's effect on reducing medically unnecessary ambulance transport



*Percentages may not add to 100 percent due to respondent non-response on some items.
SNF = skilled nursing facility.

Stakeholders' perceptions of the model's effects on RSNAT utilization

Across stakeholder groups, respondents reported that prior authorization has reduced RSNAT utilization in three fundamental ways:

- **Effect #1: Reduced fraud**. Reducing the fraudulent or questionable practices of some RSNAT providers before model implementation.
- **Effect #2: Reduced use of non-authorized RSNAT services by patients needing stretcher transport**. Reducing the use of RSNAT services for patients that the stakeholders feel have need for stretcher transport but who did not meet RSNAT requirements.
- **Effect #3: Reduced use of non-authorized RSNAT services by other patients (those <u>not</u> needing stretcher transport)**. Reducing the use of RSNAT services by patients that the stakeholders agree do not meet RSNAT requirements but who lack other means of getting to and from treatment.

Effect #1. Reduced fraud

Ambulance suppliers 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" for ambulance transport beneficiaries who clearly did not require it. In the online surveys, majorities of stakeholders in both Year 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 a slightly lower percentage of stakeholders in Year 2 states felt this was the case (62 percent 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, though again ambulance suppliers in Year 2 states were less likely to agree this was the case (83 percent in Year 1 states, 67 percent in Year 2 states). Detailed survey results for these and other questions can be found in Appendix M.

Effect #2. Reduced use of non-covered services by patients needing stretcher transport

A second common assertion among suppliers, destination service providers, and physicians was that prior authorization was reducing RSNAT utilization by non-affirming RSNAT for beneficiaries whom they felt needed specialized transport. In some cases, stakeholders mistakenly perceived stretcher transport as functionally equivalent to ambulance-level transport, despite the higher level of clinical expertise provided by ambulance personnel. In other cases, stakeholders cited beneficiaries' physical condition and mobility limitations as the reason they felt patients required RSNAT even if they did not meet the RSNAT medical necessity requirements.

Asked in the survey if "Some beneficiaries who 'truly' need ambulance transportation are now being non-affirmed for RSNAT because of the prior authorization model," majorities of destination service providers and suppliers in both Year 1 and Year 2 states agreed or strongly agreed this was the case (see Appendix M). Our interviews with the MACs suggested that non-affirmation of PARs typically resulted from beneficiaries not meeting CMS's existing (pre-model) medical necessity requirements, which are defined in the Code of Federal Regulations, Title 42, Chapter IV, Part 410.40.[27] Stakeholders participating in interviews and focus groups often noted that the medical necessity requirement is the source of many of what they view as "incorrect" PAR determinations. These points are discussed further in Domain 4: Suppliers and Providers.

[27] 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."

Effect #3. Reduced use of non-covered services by patients not needing stretcher transport

The third common perceived effect of the model on RSNAT utilization that emerged in the qualitative data was the belief among stakeholders that some beneficiaries who do not need stretcher transport relied on RSNAT because it was their only affordable, reliable transportation option. This is also discussed in Domain 2: Quality of Care and Access to Treatment.

Domain 2: Quality of care and access to treatment

Key Findings

Dialysis facilities report some instances of delayed and missed treatments due to loss of transportation and delays in gathering PAR documentation, a finding supported by quantitative analysis.

Some stakeholders believe that possible adverse impacts on health outcomes stem from transportation issues.

Beneficiaries who are not affirmed for RSNAT were perceived to rely most commonly on family members, taxis, public transportation, and (for dual eligibles) Medicaid-covered transportation options.

Prior authorization was perceived to result in significant out-of-pocket costs for beneficiaries who do not qualify for RSNAT services.

Although quantitative analysis revealed no impacts on quality of care, some stakeholders believe that some possible adverse impacts on health outcomes stemming from transportation issues.

Effects on dialysis service use due to prior authorization

The evaluation examined whether and how prior authorization may affect beneficiary access to treatment and quality of care. As previously noted, some beneficiaries do not qualify for RSNAT because they do not meet medical necessity guidelines, including some who had used the service previously. This group accounted for many PARs non-affirmed early in implementation, after which suppliers stopped submitting PARs on their behalf understanding they did not qualify for RSNAT and would not be affirmed.

The quantitative analysis showed that beneficiaries were less likely to have emergency department visits or unscheduled hospitalization under the RSNAT model. Also, use of dialysis services showed no decline overall. The model was not associated with impacts on emergency ambulance utilization, or death.

Although some physicians, dialysis providers, and SNF staff reported little or no evidence of delayed or missed treatments due to loss of RSNAT, others said it was a significant problem for some patients. Some physicians also believed that the two- or three-day time period during which PARs are documented, signed, and submitted by ambulance suppliers can interrupt a patient's treatment schedule despite the ability of ambulance suppliers to transport patients prior to PAR affirmation. As one explained, prior authorization "makes it difficult to schedule tests or appointments within the two- to three-day window. If I feel that a patient needs a test or follow-up appointment soon, the family will usually have to delay due to transport issues."

Compared with dialysis facility staff, SNFs reported fewer instances of delayed or missed destination services because the burden of patient transportation falls to the facility rather than the beneficiaries and their caregivers. It was difficult for stakeholders to quantify the extent of missed or delayed services. Some provided examples of one or two patients who had rescheduled or missed a treatment. When pressed to describe how often they felt treatment was delayed or missed, responses included "maybe at least one time per treatment plan" and "one out of 10 times." As one physician indicated, "Maybe (it) happens once a week. We have a system to call patients the day before and if their transport is not set up, then they reschedule and the appointment is canceled."

Beneficiaries and caregivers noted in interviews that they were sometimes notified right before a scheduled appointment that RSNAT prior authorization was being non-affirmed, requiring them to cancel appointments or try to find an alternative means of transportation on very short notice:

> "Ever since she couldn't walk, I had an ambulance service come take her back and forth. Then this particular morning, we get up at 5 o'clock to get ready waiting on them and nobody shows up. It was like 7 o'clock and I call to see if somebody got in an accident or they were running late or whatever and they said they weren't coming to pick her up because Medicare was not paying her fee." – Caregiver

In online surveys, most stakeholders reported prior authorization has had mostly or completely negative effects on beneficiaries' ability to get to and from treatment (66 percent Year 1, 51 percent Year 2) and on beneficiary access to timely care (59 percent Year 1, 53 percent Year 2). To further probe the potential effect of prior authorization on access to care, stakeholders in Year 2 states were asked if their patients had delayed or canceled scheduled treatments because their RSNAT PAR was non-affirmed. Overall, 64 percent of stakeholders said yes (see Appendix M). This finding is consistent with the quantitative finding that emergency dialysis may have increased for some beneficiaries.

Effects on dialysis service use may not be immediately apparent

The impact of prior authorization on delayed or interrupted care may not be fully evident until the program has been in place for many months. Multiple stakeholder reports indicate that ambulance suppliers transported beneficiaries without prior authorization in the early weeks and months of the model, assuming the PARs would eventually be affirmed. If PARs are non-affirmed, suppliers eventually stop transporting the beneficiary. In some cases, beneficiaries then find another ambulance supplier to transport them without prior authorization until PARs are affirmed or non-affirmed.

> "I have seen [that] if a company refuses, I have seen that beneficiaries have switched to other companies or if the company is no longer transporting at all, I have seen beneficiaries go to another company and obtain an affirm decision." – MAC personnel

> "Most ambulance companies will transport the patient prior to the authorization being received because they know dialysis is a life-sustaining treatment. Often [the ambulance suppliers] have to eat the cost. I have seen patients go from one company to another hoping to get the authorization and no one gets paid. Most of the ambulance companies tend to transport knowing that the prior authorization process takes time and some are able to eat some of the costs. So initially, patients do not suffer from the process. However, when it takes a long time, families often switch to

> another company, as eventually the ambulance company wants to get paid." – Dialysis facility staff

MAC personnel also noted in interviews that because beneficiaries can be transported without receiving prior authorization, the model should not result in delayed care:

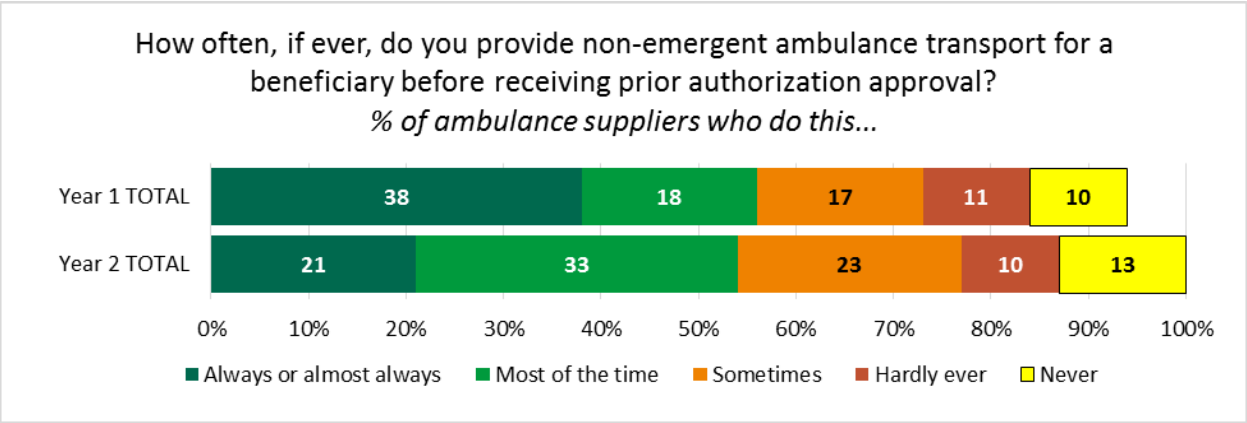
> "[Ambulance suppliers] are well aware that they can continue to transport the beneficiary if needed despite whether they have their prior authorization or not, because they can continue to re- submit for their prior authorization or they can use their trip sheets after the services are rendered and do it through a pre-payment review. So, I really don't think it is affecting the beneficiaries' transport." – MAC personnel

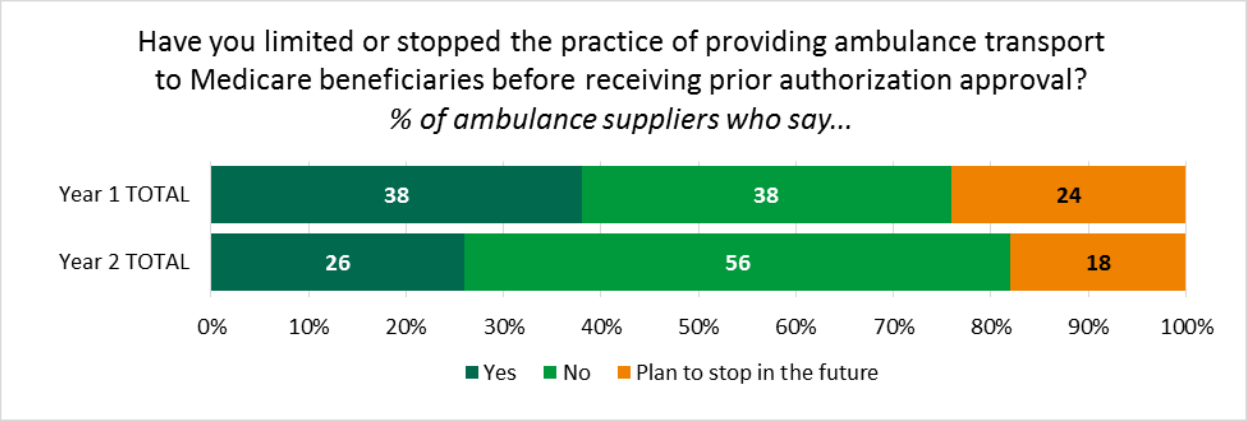
Yet some ambulance suppliers described having to stop transporting patients in a few cases when PARs were non-affirmed or when the documentation to establish medical necessity was not available:

> "My policy is that if an [authorization] number is given and approved we will continue transporting as long as needed, however if it's non-affirmed we will no longer transport after the week is up. It is a sad way to do business but we were going down if we kept providing free trips." – Ambulance supplier

Survey results in both Year 1 and Year 2 states align with these accounts (Figure V.2). A large majority of ambulance suppliers in both sets of states reported providing transport for a beneficiary before a PAR is affirmed, with some also reporting they have limited or stopped this practice. In Year 2 states, fewer ambulance suppliers reported that they have stopped transporting patients without affirmed PARs. This, of course, becomes less of an issue as PAR affirmation rates increase over time, due in part to fewer PARs being submitted for beneficiaries that suppliers understand are not eligible.

Figure V.2. Ambulance suppliers' practices related to prior authorization





Beneficiary use of alternative transportation options

In many cases, RSNAT services were used prior to the RSNAT model by beneficiaries who did not meet the medical necessity requirement but either were not able to find alternative means of transportation or needed a form of transportation assistance (such as a wheelchair van) that is not a Medicare covered service.[28] This suggests RSNAT overutilization may have been masking the unavailability of transportation options for Medicare-only beneficiaries who require some form of affordable, reliable, accessible transportation.

> "One of the things that we heard when we first started was that they couldn't get the person down the stairs, or they didn't have any means to get there. There is obviously a need in the community for some kind of assistance with transportation outside of stretcher ambulance. I think finance does come into play for a lot of these, because most of these Medicare beneficiaries are normally elderly in age or they are dependent upon somebody else's care so they need somebody else's assistance. And there may not be the funds for any other transportation, or they may not own a car, or they may not have any family at all that can get them to and from their medical appointments. They may have to pay for that, if they are a dialysis patient, three times a week, and if they are on a limited income it

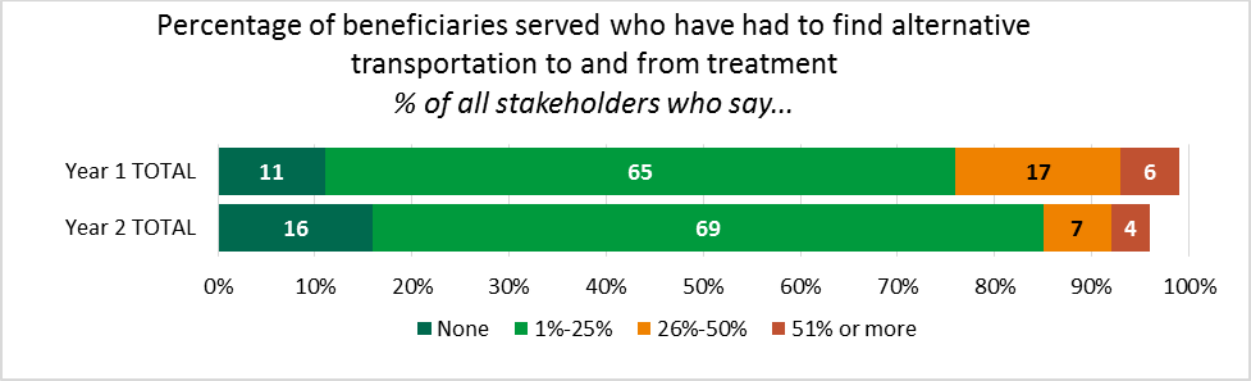
[28] This may be common among elderly and low-income beneficiaries without Medicaid coverage who lacked other means of reliable, affordable transportation. We did not empirically assess how common this was in either the treatment or comparison states.

> has become something that is hard for them to afford and they have to seek assistance for." – MAC personnel

Stakeholders, particularly dialysis providers, believe that missed or delayed treatment can result from a lack of affordable and reliable transportation alternatives for beneficiaries not eligible for RSNAT. 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 expressed concern that even when alternatives are available, they may not be reliable, affordable, or appropriate for the patient's condition and mobility needs, and might affect their access to timely care. These non-emergency transportation services are not a covered benefit under the Medicare program.

In the online surveys, we asked stakeholders to estimate what percentage of their beneficiaries they believe have had to find alternative forms of transportation since prior authorization implementation (see Figure V.3). 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 percent of Year 2 respondents said that more than half of their beneficiaries have had to find alternative transportation.

Figure V.3. Stakeholder perceptions of beneficiaries' use of alternative transportation



Stakeholders in Year 1 and Year 2 surveys 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 M). In Year 1 states, 22 percent of survey respondents also chose "CMS-paid transportation programs" as a commonly used alternative, reflecting the use of Medicaid transportation benefits among dual-eligible beneficiaries. In addition, when asked if "prior authorization is resulting in significant out-of-pocket transportation costs for some beneficiaries," a majority of stakeholders in both sets of states agreed or strongly agreed that this was the case (79 percent Year 1, 66 percent Year 2).

Beneficiaries relying on transportation options that require out-of-pocket payments described the financial impact:

> "Well, I had to pay. When I've had to pay, I don't have the $7 all the time to go to all my doctor's appointments, so I have to rely on other people, like my deacon picks me up on Saturdays after my treatment. I don't have the funds to pay them, pay that. Now, Tuesday and Thursday, I pay

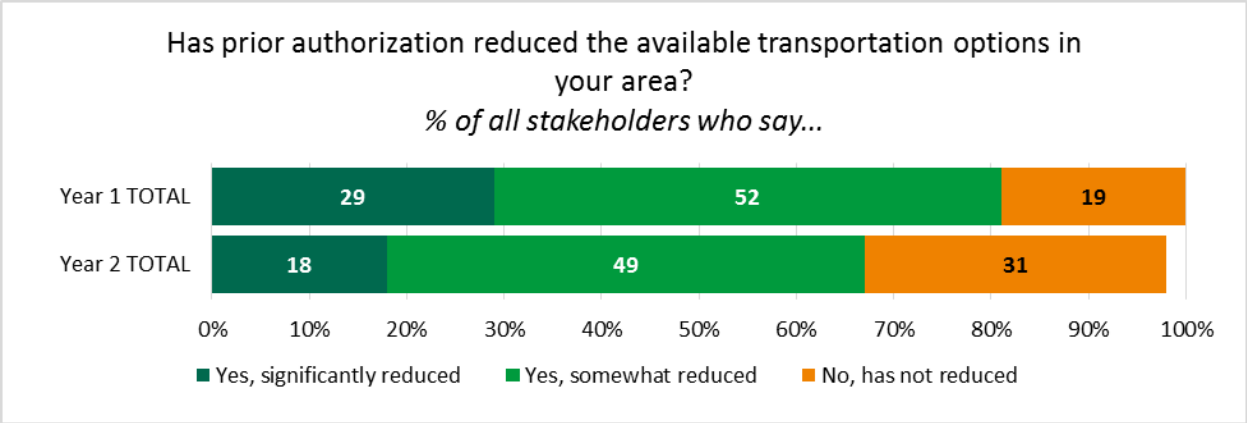
> both ways for Tuesday, one way for Thursday, sometimes two times like if my daughter can't pick me up. We'll scrape up $7 to give them to bring me back. On Saturday, I pay one way because she don't [sic] work on Saturday but when she has to work, my deacon picks me up. I have to rely on different people going to different appointments. I can't afford that $7 both ways. That's $14 both ways, take me there, pick me back up, it's hard. I don't have it. It's like $180 a month just for dialysis." – Beneficiary

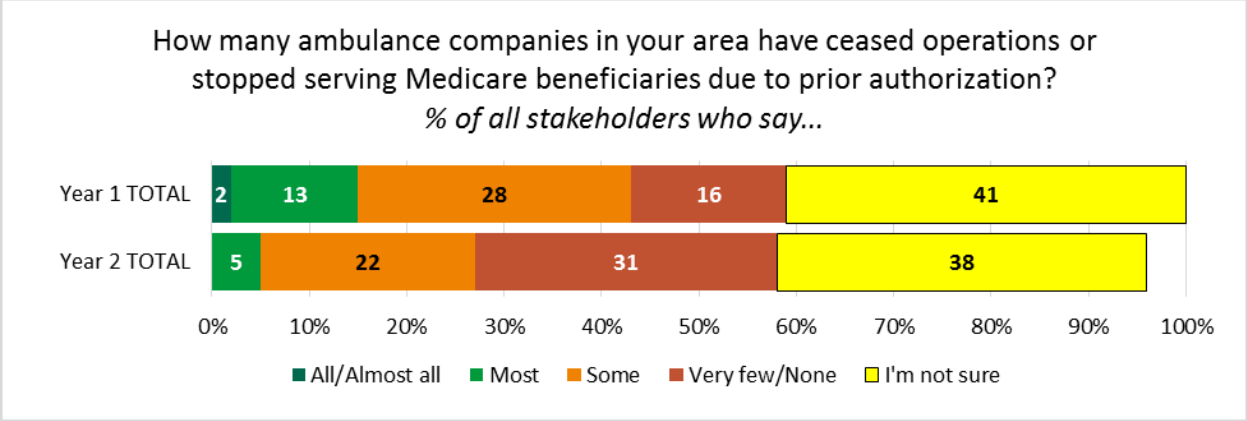
> "It was a Friday and I had to go to dialysis the next day. I called the Trust Ambulance. I said, "We have got to get some other way. I can't get on the wheelchair. What am I going to do?" [I] called Trust Ambulance and asked if they would come and pick me up so I could go to dialysis, because it was about five days, I had to get [t]here. He said he would, but he said, 'You have to pay right away. One thousand and…" I have the bills. It was over a thousand." – Beneficiary

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 ride share options often cost less than private ambulance services for beneficiaries (anywhere from $2 to $20, round trip, for various ride share or county transportation options, compared with significantly higher costs for ambulance services paid for out of pocket), many beneficiaries report it as an uncomfortable and less convenient option.

Even for those eligible to use RSNAT, there are indications that transportation options may be more limited due to perceived effects of prior authorization on the local market, as shown in Figure V.4. A majority of stakeholders in both Year 1 and Year 2 states reported seeing at least some reduction in transportation options due to prior authorization, though when asked specifically about ambulance companies closing or no longer serving Medicare beneficiaries, many were unsure if there was a RSNAT effect.

Figure V.4. Stakeholder perceptions of model impacts on transportation markets

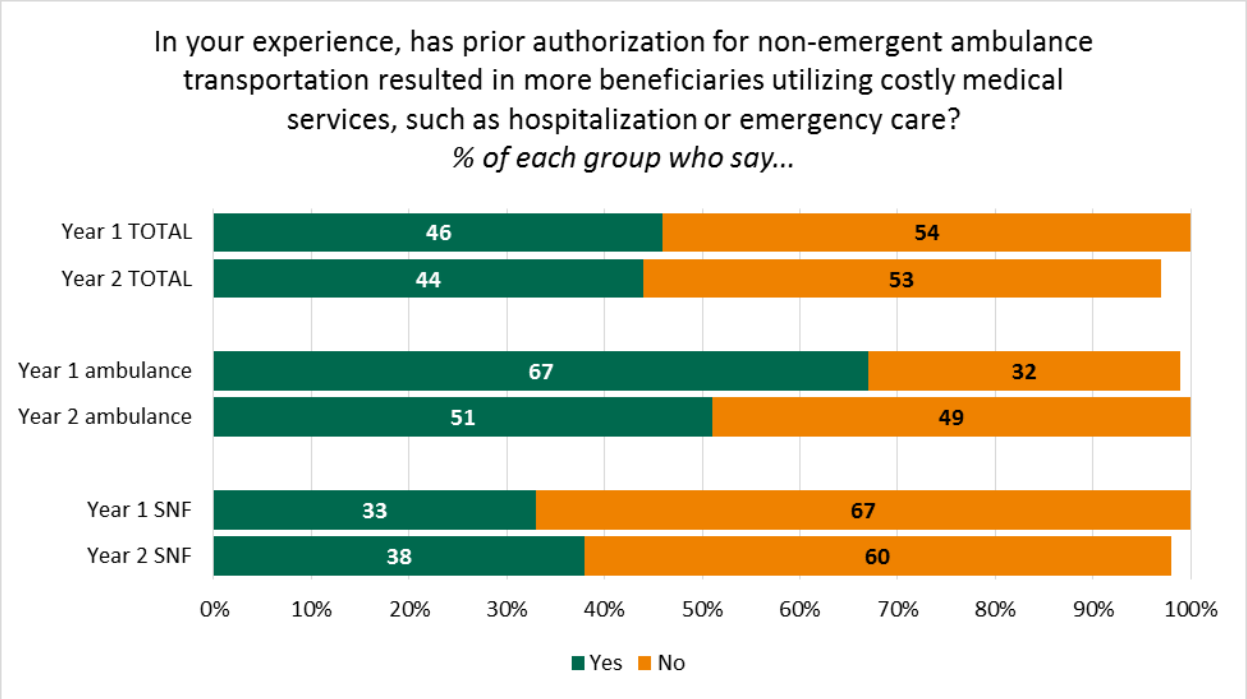


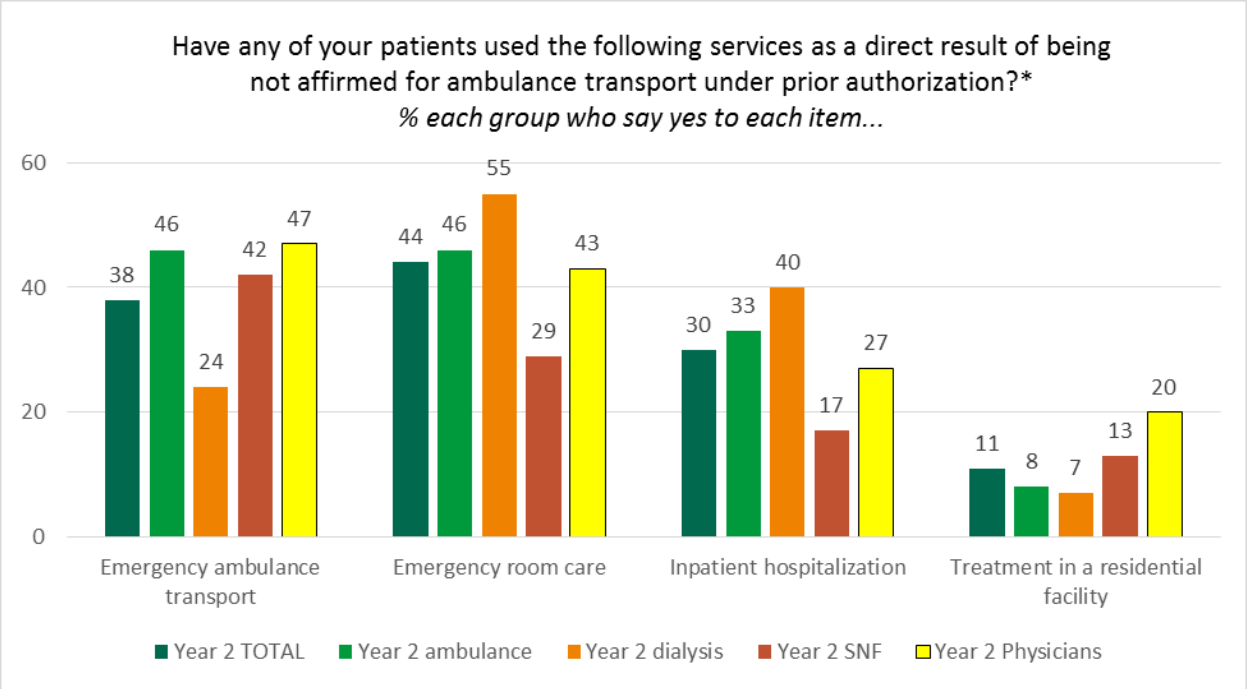


Perceived health impacts of delayed or missed services; use of alternative services

Stakeholders surveyed in Year 1 and Year 2 states are divided on whether prior authorization is resulting in greater use of other medical services, with a slight majority in each set of states saying it is not the case (Figure V.5). Looking just at 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, a follow-up question asked which, if any, medical services patients were using as a direct result of being unable to use RSNAT. Stakeholders in these states believed that emergency department and emergency ambulance transport were the most common services being used as a direct result of having RSNAT prior authorization non-affirmed. It should be noted that the quantitative analysis showed little evidence of delayed or missed services (Section IV).

Figure V.5. Stakeholder perceptions of RSNAT impact on use of alternative services





***** Question asked in Year 2 states only.

In focus groups, several stakeholders who perceived a RSNAT impact on access believed that increased utilization of 911 transports, emergency room visits, hospitalizations, and extended stays in rehabilitation or nursing facilities for patients ineligible for RSNAT under prior

authorization occurred. Ancillary health impacts mentioned included 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 not affirmed for RSNAT to dialysis, though this observation does not appear to be supported by the quantitative analysis:

> "The prior auth[orization] process for the ambulance transport has immensely affected patients' treatment to receive dialysis. I have one patient in particular who is quadriplegic, over 400 [pounds] and has no way of transportation other than his ambu[lance] service. The patient had to stay in the hospital for almost 3 weeks until prior auth[orization] was approved...CMS prior auth[orization] is a lengthy process, and I truly do not understand why we have to do this monthly. This truly affects someone's life who is already depressed, have multiple diagnosis that will never change. The last thing I want my patients to worry about is his transportation... NO ONE SHOULD EVER HAVE TO STAY AT A HOSPITAL TO GET DIALYSIS BECAUSE WE ARE WAITING FOR A PRIOR AUTH[ORIZATION] that was already approved, and that nothing will change in their diagnosis per their doctors. – Dialysis facility staff [respondent emphasis]

Several stakeholders reported that these impacts are particularly acute immediately after implementation but may level out over time:

> "In the beginning, when the patient had no options, we had a LOT [respondent emphasis] of patients call 911 and go to the hospital to receive dialysis. Now, it's sort of leveled out. Most patients have some form of transportation. Dial-a-ride for some trips, family members for others, and some of my patients do use taxis a lot." – Dialysis facility staff

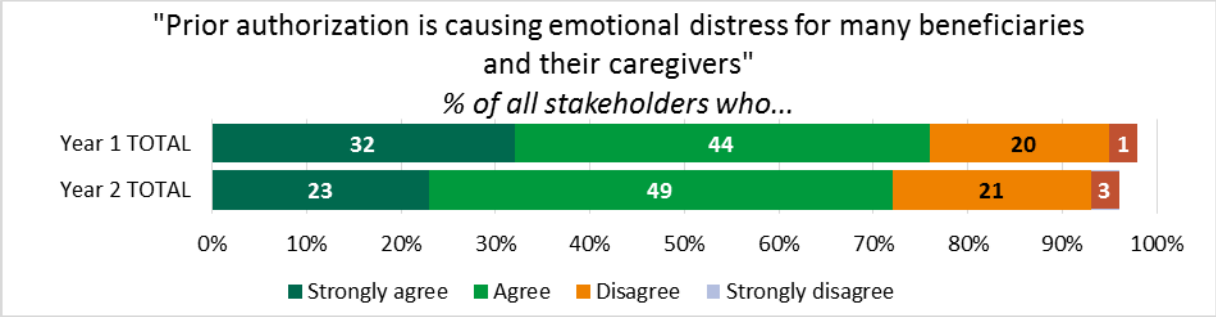
Perceived impacts on quality of and patient responsiveness to care

In addition to potential effects on access to care, stakeholders believed there were a variety of ways in which they see prior authorization as affecting overall quality of care for beneficiaries. In rough order of frequency, those most often cited were:

- Patient stress and anxiety about their ability to get to and from treatment, how they will pay for it, or how it will burden their family members
- The physical impact on beneficiaries who may have formerly used RSNAT before prior authorization implementation but do not meet medical necessity guidelines and are now transported by wheelchair and lifted into dialysis chairs
- Pain and injury caused when family members transport beneficiaries with mobility issues who 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 in both Year 1 and Year 2 states agreed with the statement that "prior authorization is causing emotional distress for many beneficiaries and their caregivers" (Figure V.6).

Figure V.6. Stakeholder perceptions of impacts of prior authorization on beneficiaries



Perceptions of disproportionate impacts on some beneficiaries

Some stakeholders perceived disproportionate impacts on particular groups of beneficiaries, due in part to the interaction of the model with local transportation availability issues. Groups they felt were disproportionately impacted include:

- Elderly beneficiaries who lack the financial resources or social support system to find alternative transportation and cannot drive themselves
- Medicare beneficiaries who, unlike dual eligible beneficiaries, have no covered transportation alternatives
- Those who do not meet the guideline for bed confinement but who cannot go up or down steps or need a lift to move into and out of 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 specific groups, several stakeholders suggested that dialysis patients who require ongoing, scheduled care, may be more affected by prior authorization than those utilizing RSNAT for more episodic treatment, such as chemotherapy or wound care.

Domain 3: Program (MAC) operations

Key Findings

MACs report successful implementation and adequate staffing to meet PAR turnaround times, despite spending more time than expected at program outset teaching stakeholders about medical necessity requirements and required documentation.

MACs report slightly smoother implementation in Year 2 states due to lessons learned in Year 1 states.

The PAR review process and outcomes

MACs reported employing a two-tiered review system in which PARs are first assessed for technical completeness (completed forms, signatures, correct dates, and so on) and only then reviewed for medical necessity. If technical issues are found, a PAR is returned to the ambulance supplier who submitted it, or the MAC calls the supplier to say the PAR cannot be processed because of missing or incomplete information. In the early stages of implementation, MACs reported that most PARs were not processed or were non-affirmed because of technical issues. Over time, as suppliers learned the technical completion requirements, PARs were more often able to pass this initial screening and were then assessed on the adequacy of the documentation of medical necessity. Many suppliers experienced challenges providing adequate documentation and working with the tiered MAC review/response system. MACs, in contrast, felt this approach—in which PARs are moved to clinical reviewers only after a technical review confirms that all documentation is complete—ensures 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." Another noted that although "there are still those select few [ambulance] providers that still kind of don't grasp it or don't care enough to grasp it…but, for the most part, yes, the quality of the medical documentation has improved."

In line with feedback received from MACs, about half of ambulance suppliers responding to the online survey in both 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 report that this response time lowered as stakeholders gained experience with the model; the improvement in response time was due to suppliers submitting better documentation over time, and fewer PARs being submitted for beneficiaries who clearly did not meet medical necessity guidelines. As one MAC reviewer noted, "Our workload is lower than anticipated because of how effective the program has been. So our goal is basically, once the submission comes in, to do a thorough review, take the whole patient into consideration, make the decision, send that letter out as soon as we can. And oftentimes that is well before the 10- or 20-day mark."

An additional challenge of the review process that some ambulance suppliers noted is not being able to speak directly with the reviewer who non-affirmed a PAR. MACs report using standardized communications to let suppliers know why a PAR has not been affirmed and what must be included in a resubmission, and the suppliers are referred to a help center if they have any follow-up questions. PAR reviewers are medical staff (nurses), but the help center is staffed by individuals without medical training who 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 participating in focus groups reported getting "vague" feedback and being unsure about what the MAC required to affirm a PAR.

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

Domain 4: Suppliers and providers

Key Findings

Ambulance companies perceived that prior authorization initially imposes time and cost burdens on them. Some dialysis facilities also report an impact on their day-to-day operations.

Physicians have mixed perceptions of the time burden imposed by prior authorization. Some report little impact; others report a significant burden.

Some stakeholders, especially physicians, perceive receiving little or no advance notification or educational material about prior authorization before implementation.

Provider and supplier perceptions and experiences of early implementation

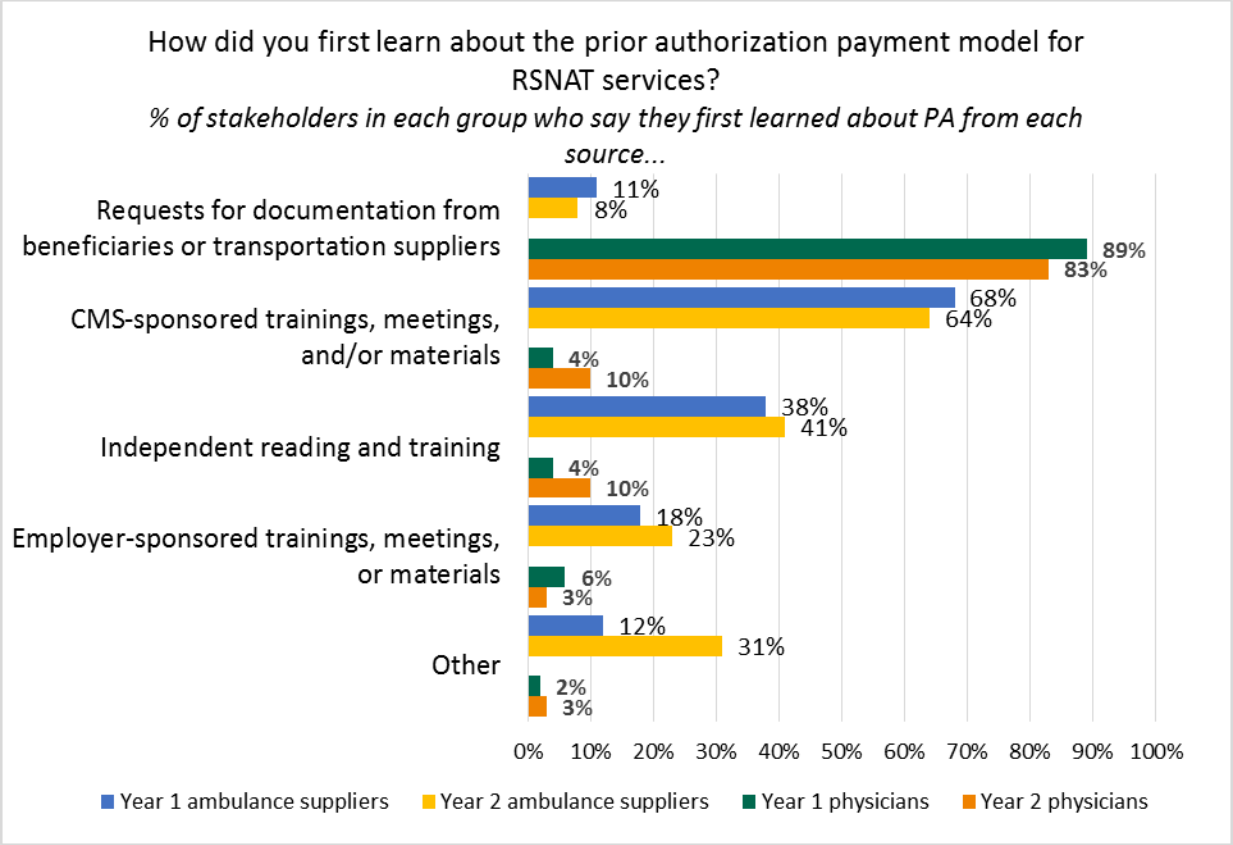
Suppliers and providers indicate the prior authorization model introduced some operational challenges for stakeholders, with a central challenge in both sets of states being a lack of awareness of the program before launch. Most physicians report first learning about prior authorization when they received requests for documentation from beneficiaries or transportation suppliers (Figure V.7). 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.

> "I was made aware of the basics of the prior authorization process by the ambulance companies and my patients. I was made aware of the requirements for approval of ambulance transport by a professional organization I belong to and then later received several emails sent to me by my employer. I also researched it myself after receiving the information." – Dialysis facility staff

Although some respondents feel there was a lack of outreach and education, 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 trainings gave them mixed reviews. Some said they were very helpful, whereas others described them as "vague" and "worthless."

Figure V.7. Where ambulance suppliers and physicians first learned about prior authorization (PA)



Asked how well informed they felt about the model at the start of implementation compared with at the time of the survey, providers and suppliers in both Year 1 and Year 2 states revealed a significant learning curve after model launch. In both sets of states, stakeholders felt much better informed about the model at the time of the survey than they recalled feeling at model launch.[29]

In both Year 1 and Year 2 states, physicians felt particularly uninformed about the model at launch 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, 14–20 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 being aware of prior authorization at model launch. In Year 1 states, 57 percent recall that they felt at least somewhat well informed at launch; in Year 2 states, that figure was 64

[29] The Year 1 survey took place approximately 20 months into implementation, whereas the Year 2 state survey took place about 14 months after launch.

percent. This indicates that communication and education efforts for this stakeholder group were reaching their target.

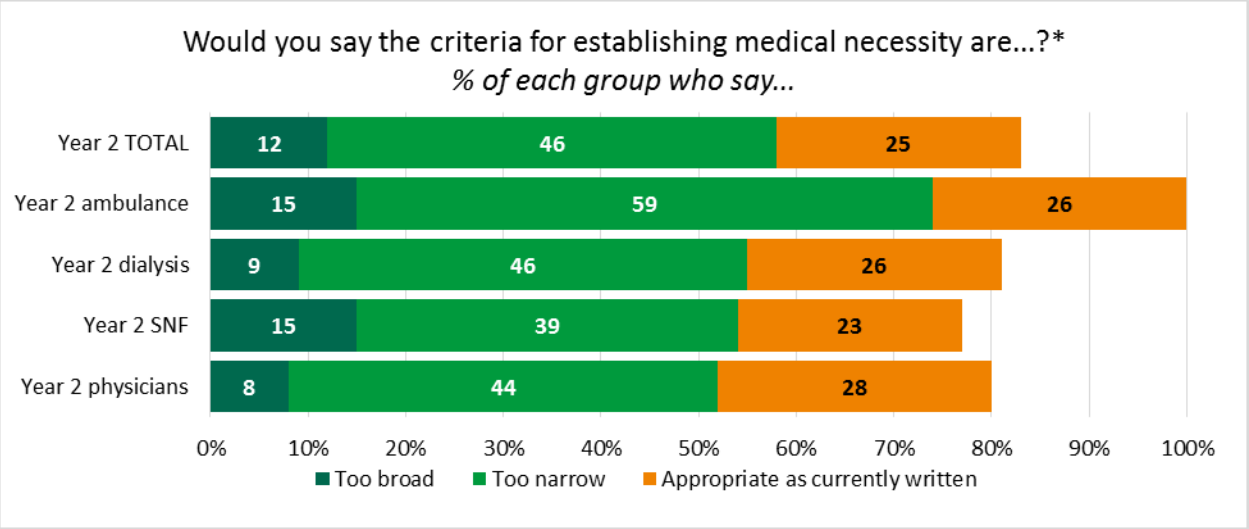
Medical necessity and other service eligibility issues

A common assertion among suppliers, dialysis service providers, and physicians was that prior authorization was reducing RSNAT utilization by non-affirming RSNAT for beneficiaries whom they felt needed specialized transport. This was in part due to lack of knowledge concerning the specific criteria of RSNAT eligibility. Similarly, stakeholders participating in interviews and focus groups noted that the medical necessity requirement is the source of many of what they view as "incorrect" PAR determinations. These stakeholders believe that current medical necessity criteria (1) are too narrow, (2) are unclear and not well understood by some stakeholders, and (3) are 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.[30] 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 ambulance service because they were deemed able to use wheelchair transportation instead.

To probe stakeholder perceptions around the scope of 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. As Figure V.8 shows, 46 percent of stakeholders in Year 2 states viewed medical necessity criteria as too narrow, whereas only 12 percent described them as too broad, and 25 percent said they were appropriate as currently written.

Figure V.8. Stakeholder perceptions of medical necessity requirement scope



***** Question asked only in Year 2 states.

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

2. Current medical necessity criteria are unclear or misunderstood by certain stakeholders. MAC personnel reported applying two specific criteria to determine medical necessity: bed confinement and risk to the patient's health if he or she was 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 any of these specific requirements. Asked how they interpreted CMS's definition of medical necessity, physician responses indicated that some incorrectly either believed medical necessity was tied to specific diagnostic codes or 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."
>
> "I interpret it as a medically necessary procedure like dialysis or chemotherapy. The patient must be infirm enough that they can't drive or take public transportation. If a taxi is sufficient, it should be required instead of an ambulance."

Some ambulance suppliers are also at times confused about medical necessity criteria, especially in situations where the criteria may be applied inconsistently. In one case, an ambulance supplier described his experiences with inconsistencies that sometimes occur in the prior authorization process, referring to a patient who was previously affirmed then was subsequently non-affirmed without experiencing 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 was 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 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 was focused on communicating to ambulance suppliers the *specific* criteria for medical necessity, which is 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 "middle man," 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." Or as another noted, "The gap resides with the understanding of the Medicare guidelines by the various referral sources. CMS-directed education to referral sources on the documentation requirements is needed." 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 (Figure V.3).

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:

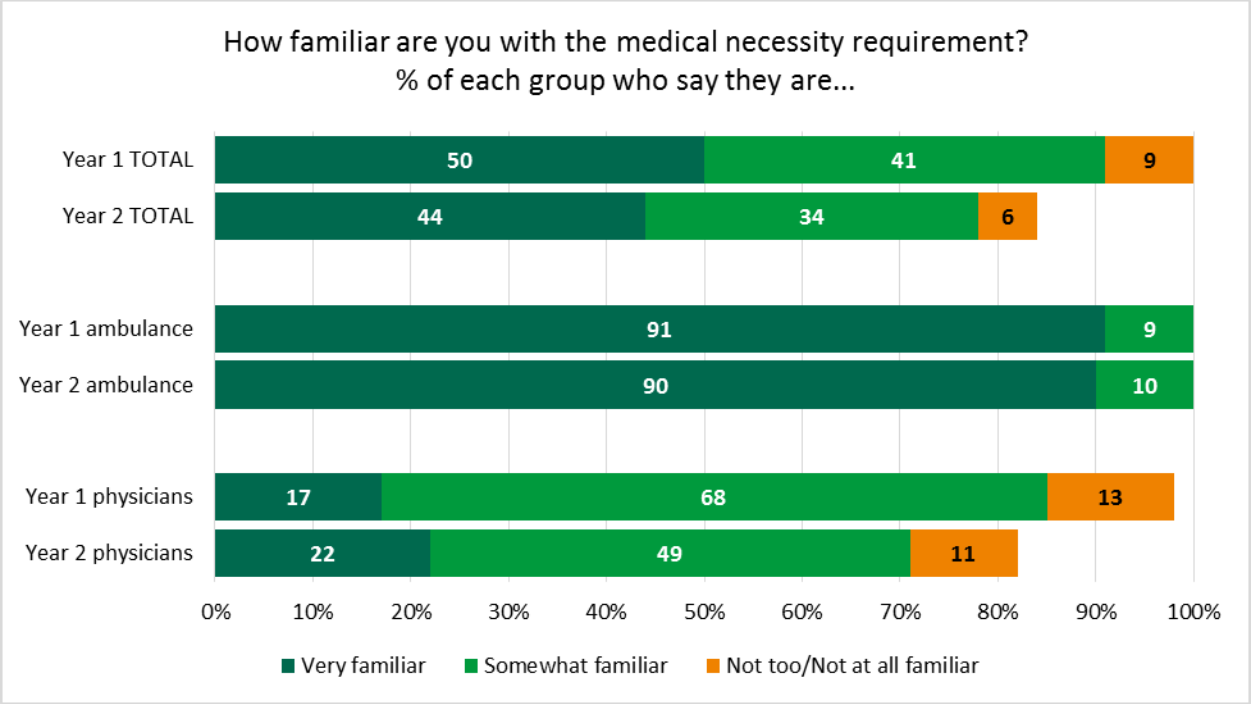
> "So with the expansion states [Year 2 states] we said okay, we need to sell—send out education letters. We sent them to the beneficiaries twice. We sent them to the ambulance suppliers twice and then we tried to identify as many physicians as we could. Also, we sent them to things such as different medical associations, nursing home associations, things like that, to try and get them to disseminate it among health care providers as much as possible through those memberships that those associations have." – MAC personnel

> "It's all about education, making sure that the people out there understand, because the families have a lot more power and that's why I think when we sent—we sent out two letters to the beneficiaries when we did the expansion [Year 2 states] and I think that that definitely helped, as well as the letters to the providers and all." – MAC personnel

Interviews indicated, however, 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, as shown in Figure V.9. 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.

Figure V.9. Stakeholder familiarity with the medical necessity requirement



3. The perception 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 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 that have been in effect prior to the PA model. Yet they often questioned[31] how medical necessity criteria were being applied by MACs and believed that this judgment should be left to physician discretion. One physician asserted that he would prefer "a checklist of conditions or medical probabilities which would establish prima facie necessity." One should note that the MACs use trained reviewers often with nursing or other clinical experience and are backed up by MAC physicians.

Survey results echo concerns about how MACs make RSNAT prior authorization determinations. Very 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 (see Appendix M).

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

Documentation challenges for ambulance suppliers

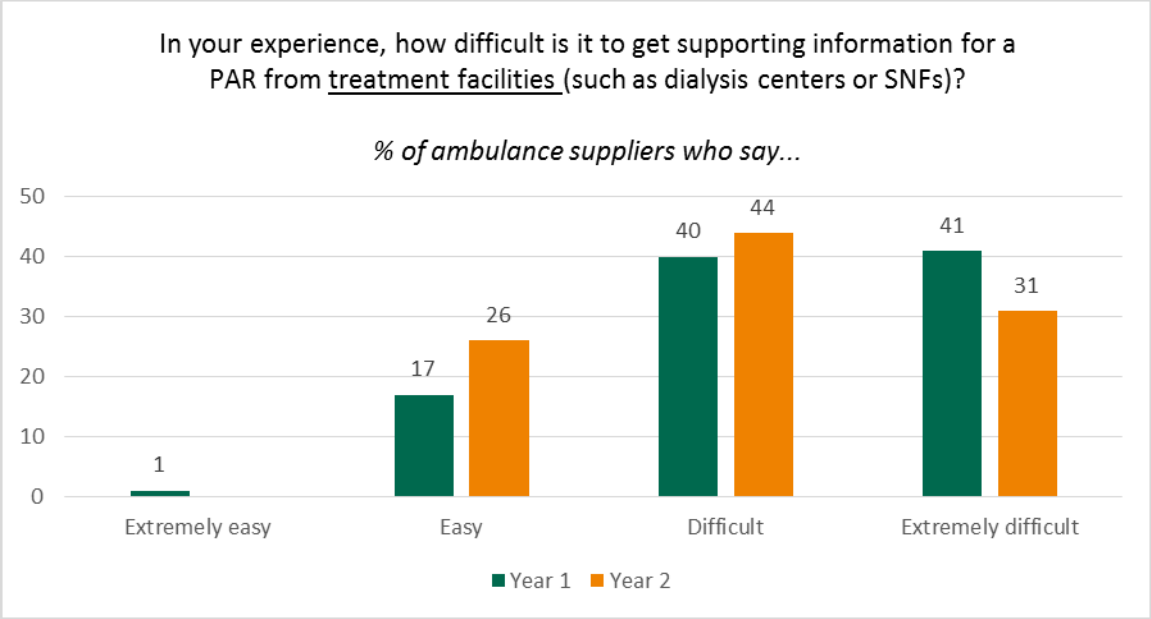
A significant challenge cited by ambulance suppliers was working with physicians to obtain the correct documentation. From the perspective of many stakeholders, getting appropriate documentation and signatures from physicians and other staff is often a struggle. As one MAC reviewer described it, physicians have "no skin in the game" because their reimbursement is not contingent on a RSNAT PAR being affirmed. A 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

When physicians were asked in focus groups about the process of completing the PCS to document medical necessity, responses were mixed. Generally, focus group responses indicate that nursing staff fill out the forms, which are then signed by a physician. Some said it was a simple five-minute process, but others said it was tedious and time-consuming and that the required information was 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 both physicians and treatment facilities (Figure V.10). In the Year 2 survey, a question was included to probe the relative frequency of challenges ambulance suppliers might face in gathering this documentation (Figure V.11). The two most commonly cited challenges were inadequate or missing documentation (87 percent experienced this) and slow response time (85 percent experienced this).

Figure V.10. Ambulance suppliers' reported level of difficulty in obtaining information for PARs



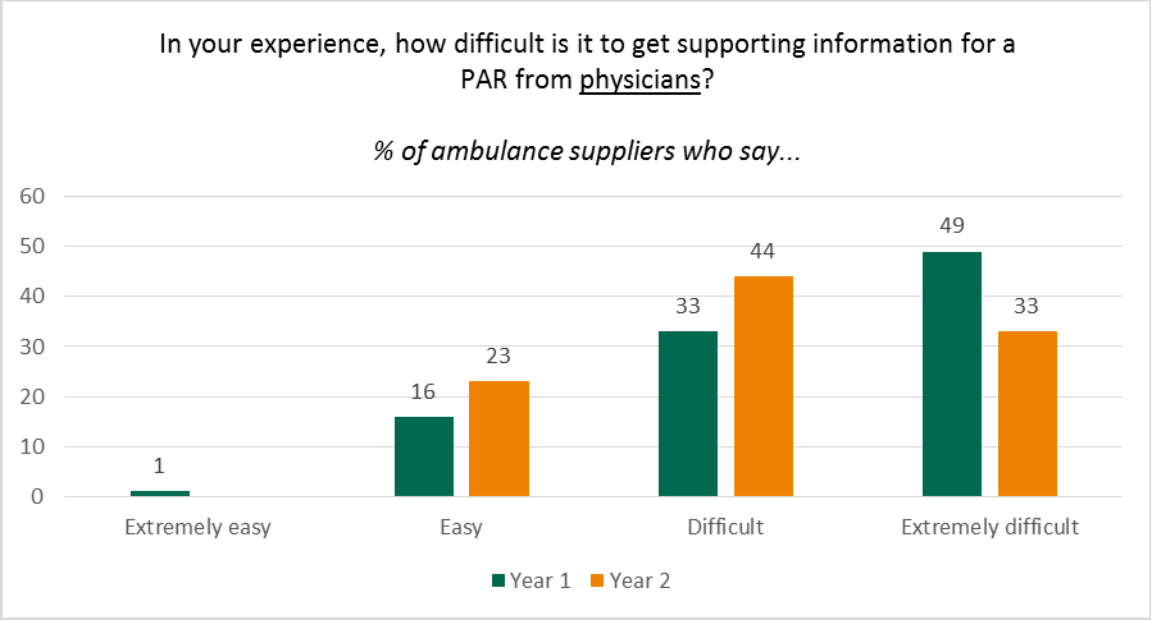
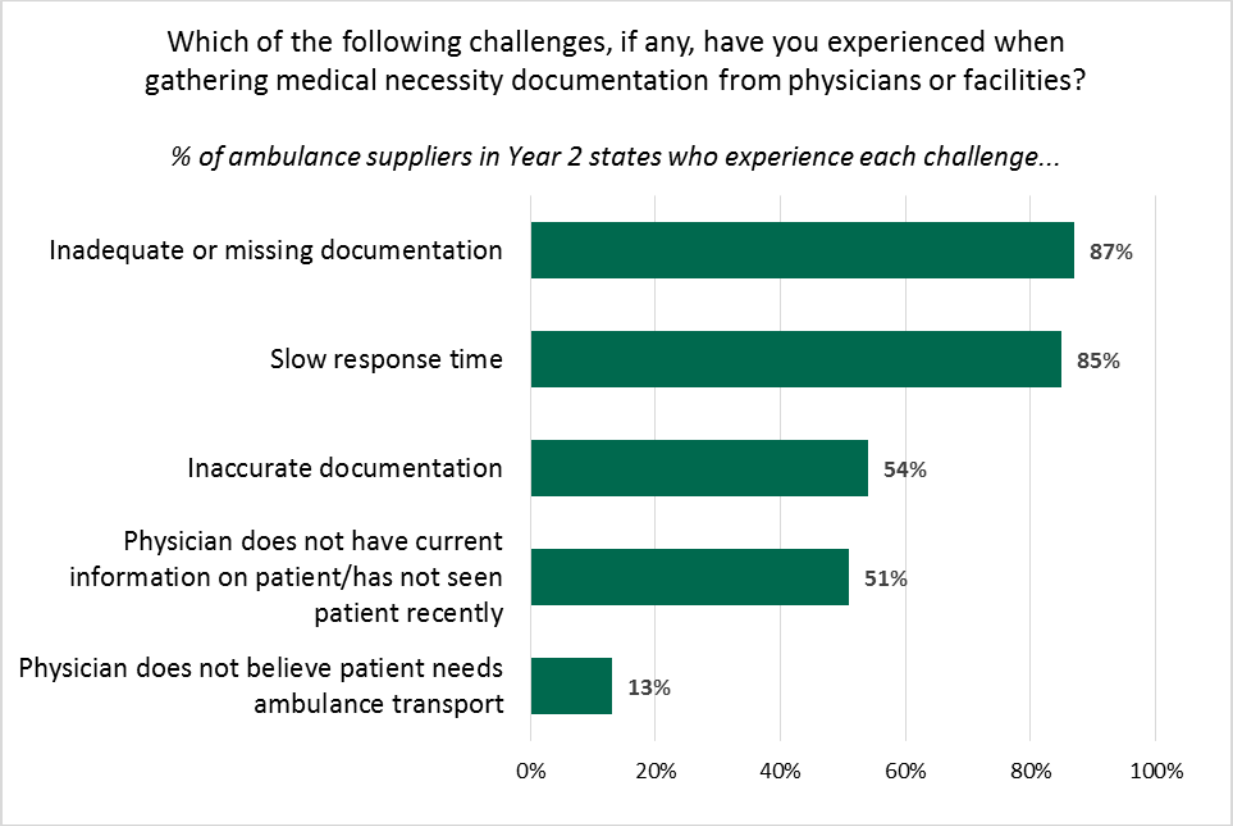


Figure V.11. Challenges ambulance suppliers encounter when gathering medical necessity documentation



Ambulance suppliers in focus groups often reported having the same PAR returned repeatedly for different reasons. Suppliers 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 (Figure V.12), 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, aligning 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 are affirmed upon resubmission, with Year 2 suppliers reporting an average of 28 percent being affirmed 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; affirmation rates have increased over time as fewer PARs are submitted for beneficiaries suppliers know are not eligible and as the quality of documentation has improved.

Figure V.12. Outcomes of PARs

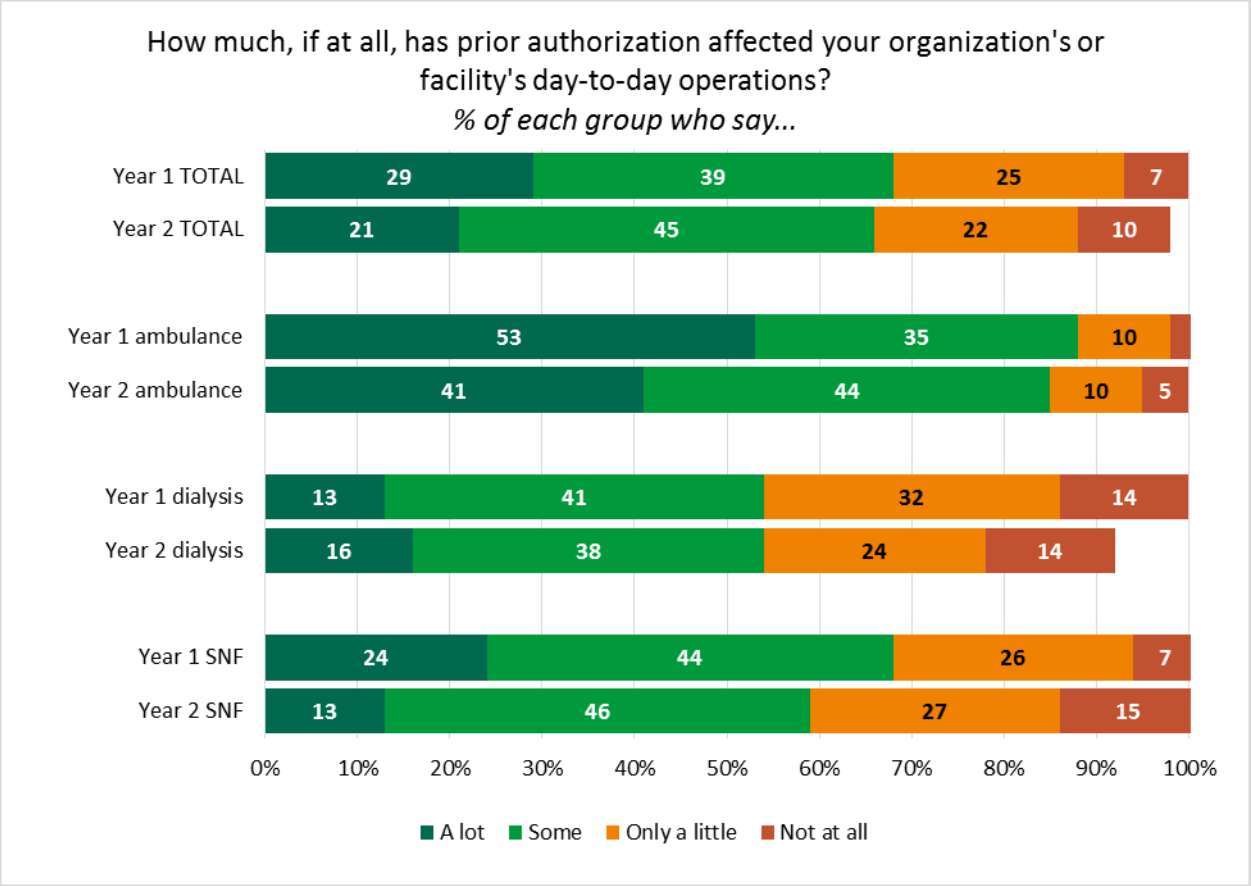
What percentage of the PARs your organization has submitted have resulted in each outcome?					
Based on ambulance suppliers					
		Year 1 states	Year 1 states	Year 2 states	Year 2 states
		Mean	Median	Mean	Median
PAR outcomes	*Affirmed upon initial submission*	35.88%	30%	45.38%	50%
	Affirmed after one or more resubmissions	30.74	25	28.08	20
	Other[1]	3.78	0	--	--
	In process/no outcome to date	1.42	0	2.92	0
	Never approved	29.42	10	24.51	5

1 We did not include this response option in the Year 2 online survey.

Effects on supplier and destination service provider operations

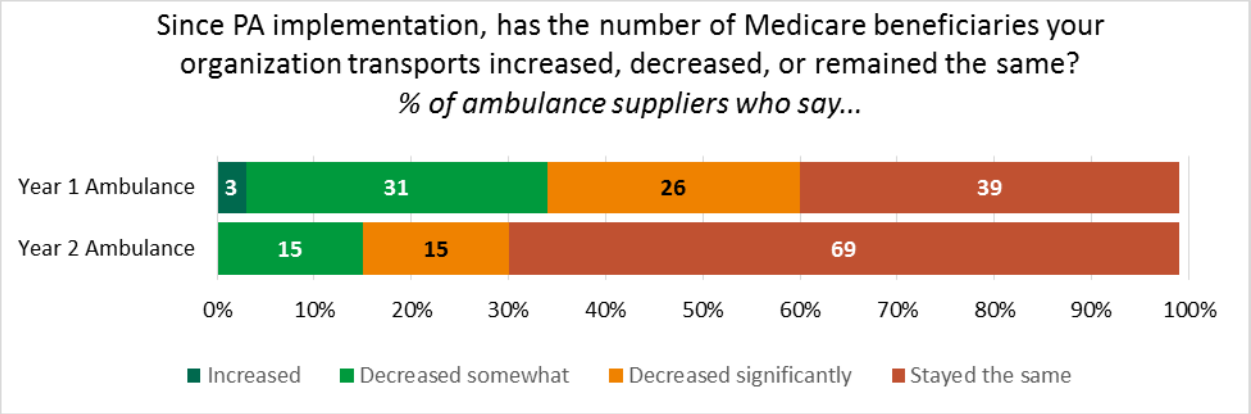
In both Year 1 and Year 2 states, a majority of survey respondents reported that prior authorization has affected their organization or facility's day-to-day operations at least somewhat. These responses varied considerably across ambulance suppliers, dialysis facilities, and SNFs (Figure V.13). In addition, slightly more than half of Year 1 stakeholders overall reported a negative effect on their organization's or facility's financial condition. In Year 2 states, that number dropped to 36 percent.

Figure V.13. Reported impact of prior authorization on daily operations



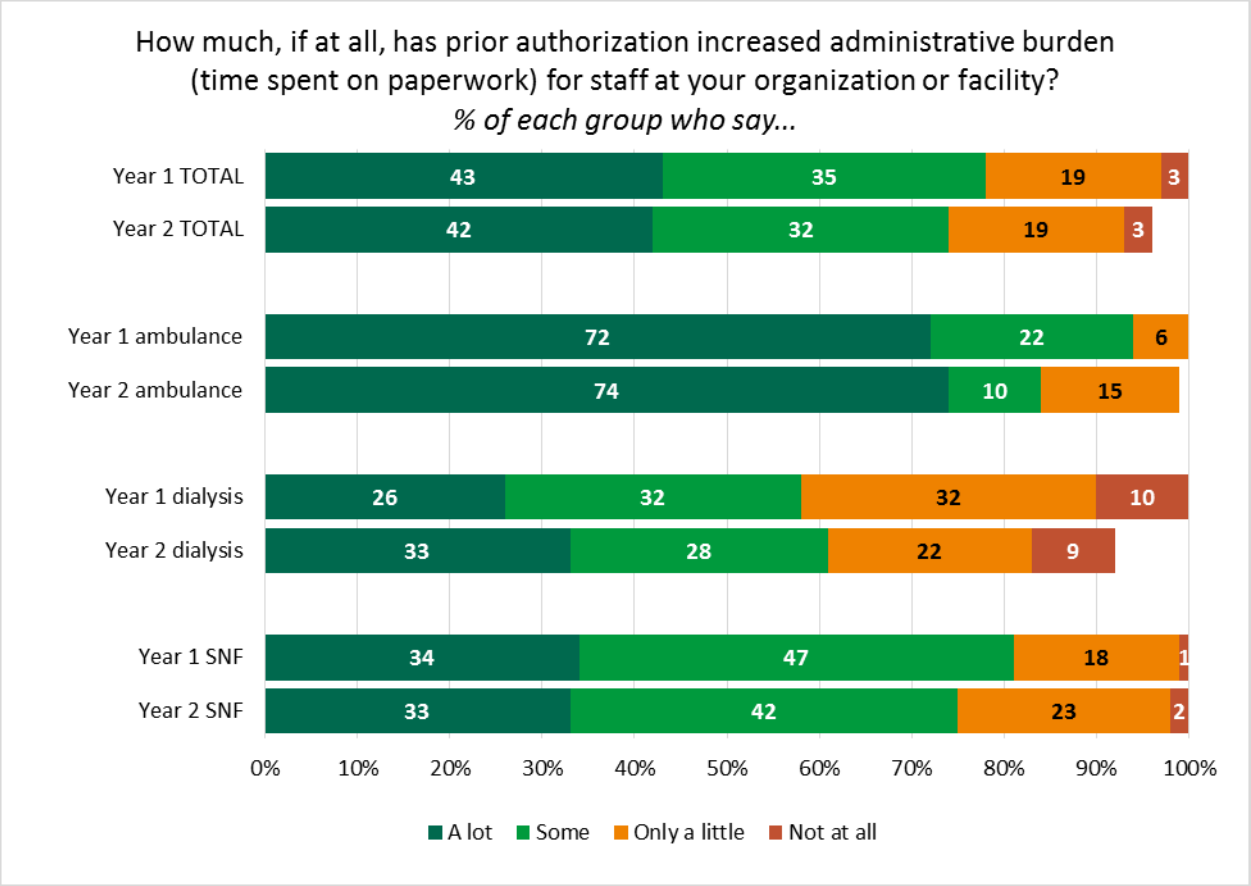
In Year 1 states, 39 percent of ambulance suppliers reported no change in the number of beneficiaries they transported; that figure rose to 69 percent in Year 2 states (Figure V.14). Most ambulance suppliers in Year 1 (57 percent) reported that the number of Medicare beneficiaries transported by their organization *decreased* after model implementation. In Year 2 states, just 30 percent reported a decrease. (Please refer to Chapter IV for quantitative information on the change in the number of beneficiaries served.)

Figure V.14. Reported impact of prior authorization on number of beneficiaries transported



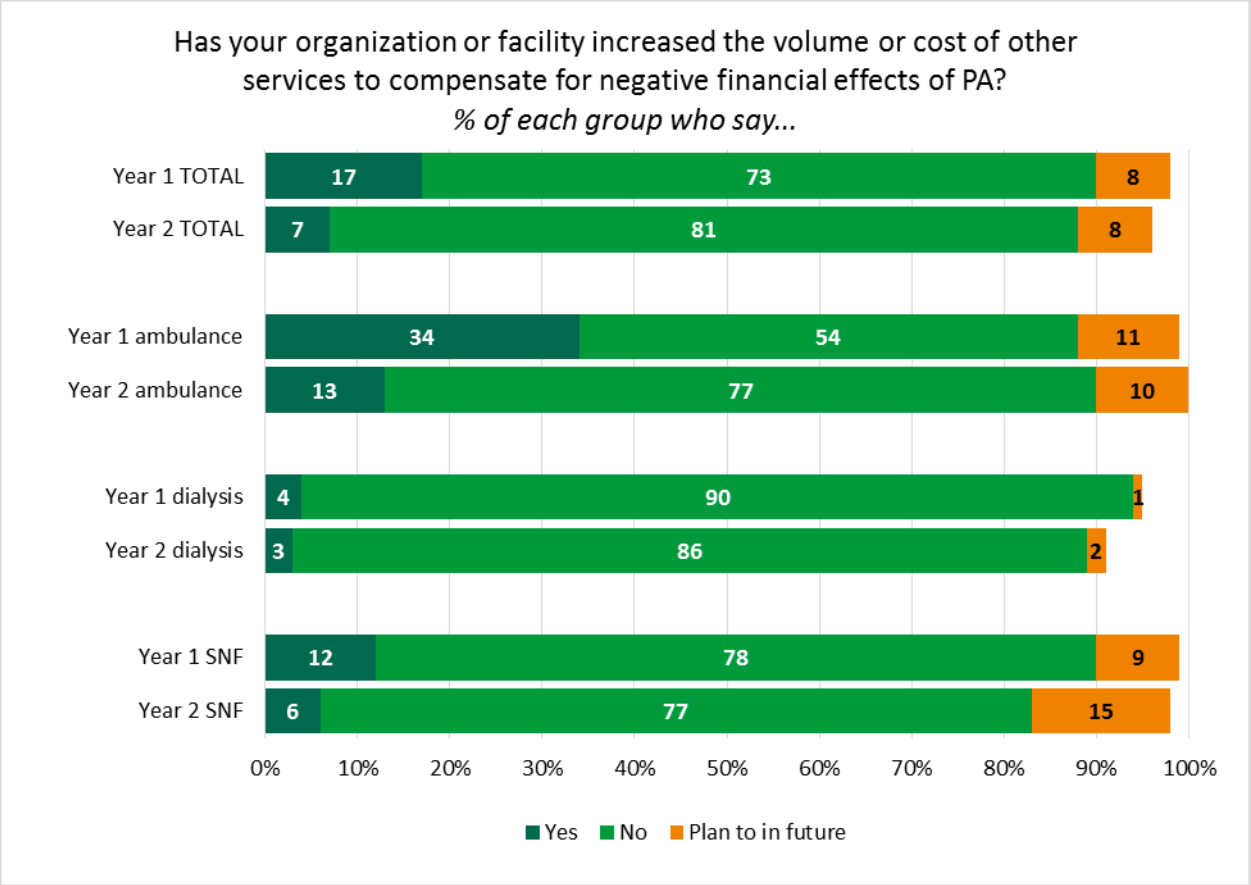
Other impacts reported by ambulance suppliers in focus groups and in surveys included losing staff, being unable to upgrade vehicles, and going out of business. Of all stakeholder groups, ambulance suppliers in both sets of states reported the greatest impact on staff administrative burden (Figure V.15). In Year 1 states, 72 percent 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.

Figure V.15. Reported impact of prior authorization on administrative tasks



In response to the effects felt by ambulance suppliers, dialysis facilities, and SNFs, some of these organizations have made or plan to make significant changes to their operating procedures (Figure V.16). In addition to no longer transporting Medicare beneficiaries at all (13 percent of ambulance suppliers in each Year) or no longer transporting them before receiving authorization (38 percent of ambulance suppliers in Year 1 states, 26 percent in Year 2 states), a majority of suppliers in both sets of states (60 percent in Year 1, 54 percent in Year 2) reported that they provide beneficiaries with an advance notice of non-coverage to make them aware that non-emergent ambulance transport might not be covered by Medicare.

Figure V.16. Reported approaches taken in response to prior authorization requirements



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. The quantitative analysis includes a descriptive analysis indicating that some ambulance suppliers exited the program after implementation, but the vast majority were still billing Medicare for RSNAT services. Survey results also indicate that a small percentage of suppliers have ceased operations in model state markets.

VI. DISCUSSION

Our analysis of the effects of prior authorization on RSNAT services suggests that the model successfully reduced medically unnecessary service utilization. At this point, there is relatively little quantitative evidence to support a negative impact on quality of care or access to treatment, although the qualitative data suggest some perceptions of potential effects in this area. At the same time, there is no consistent evidence of an impact on total Medicare costs across all groups. It is important to note, however, that our analysis has several limitations. We describe these limitations below and then discuss our conclusions.

Limitations

This analysis has a number of important strengths and limitations. Below, we discuss several limitations that qualify our findings and need to be carefully considered:

- **Use of a quasi-experimental evaluation design.** The gold standard for evaluations—random assignment—was not possible for this study because CMS selected states that had particularly high rates of raw RSNAT service utilization. As a result, we used a quasi-experimental design. Although we carefully constructed a comparison group, weighted comparison observations to improve comparability, and performed a multivariate DID analysis to both adjust for and difference out potentially confounding factors, a number of important threats to the validity of the quantitative analysis remain—as there are in any quasi-experimental evaluation. Because CMS selected Year 1 treatment states with very high levels of utilization, there is more potential to realize savings in the treatment states than in other states. In addition, some data suggest that the ambulance suppliers in these states may have depended more on RSNAT for their revenue than in other states. As a result, the impacts and experiences in these states may not be generalizable to other states or the rest of the Medicare program.
- **Reliance on nonprobability and convenience samples for the qualitative analysis**. Without clearly defined stakeholder population sample frames, the qualitative analysis 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. Focus groups and interviews reflect insights from a small number of stakeholders, and response rates to the online survey were low (see Section III). 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.
- **Limited evidence from the post-implementation period**. The quantitative analysis includes data for only a limited amount of time after model implementation, particularly for the Year 2 states. Although savings are realized immediately, the full impacts of the model on quality of care and access to treatment may not be evident until later. Indeed, stakeholders describing their experience with the model more than a year into implementation reported considerable impacts on quality and access. Other outcomes are expected to occur over time, and thus conclusions based on the limited time window available may not provide a current indication of how the program is performing.

Conclusions

The conclusions in this report are based on the quantitative and qualitative analyses of data from both Year 1 and Year 2 model states. In drawing these conclusions, we considered not only the direction and strength of the findings but the quality of the evidence, given the limitations of the study. We present our conclusions for each domain and for the key research questions within these domains.

Domain 1: Utilization and expenditures

The model was highly effective in reducing RSNAT service utilization and cost for beneficiaries with ESRD. It appeared to do so, in part, by reducing the extent to which medically unnecessary RSNAT trips were provided. Reductions for total Medicare ambulance utilization and cost of Medicare ambulance services were also demonstrated, but they were less dramatic. We also found that among beneficiaries with ESRD, the RSNAT model produced total cost of care savings for the Medicare program.

We ran separate utilization and expenditure analyses for the Year 1 and Year 2 states. Results were similar in sign and significance across the two groups, but the magnitudes of impacts were much larger for the Year 1 model states, with Year 2 states experiencing about 75 percent smaller impacts. This finding implies that the large reductions in RSNAT utilization and cost observed in the Year 1 states, which were selected for their high utilization of RSNAT services, may not be as sizeable in other states should the model be expanded.

Domain 2: Quality of care and access to treatment

Evidence of model effects for this domain were mixed. The quantitative analysis showed that beneficiaries were less likely to have emergency department visits or unscheduled hospitalization under the RSNAT model. The estimated effect on dialysis use was negative, but very small in both magnitude and percentage terms. The model was not associated with impacts on emergency ambulance utilization, or death.

We included measures of dialysis administered in a hospital outpatient department on an emergency basis and hospitalization for conditions related to inadequate ESRD management. Beneficiaries with ESRD had an increase in the probability of emergency dialysis treatment and a corresponding (but far smaller) increase in the number of emergency dialysis treatments. Beneficiaries may have turned to emergency department treatment possibly because of difficulties in accessing their regularly scheduled treatment provider as suggested by the observed negative impact on dialysis use. In contrast, the effects on hospitalizations for ESRD-related complications show a slight decrease. Therefore, there is no evidence that beneficiaries are experiencing higher rates of emergency department or inpatient hospital admissions as a result of the prior authorization model.

In interviews, focus groups, and the online surveys, stakeholders expressed concern about the potential impacts of the model on quality and access. Some of these concerns were focused on the early implementation period of the model and have become less of a concern over time. Some stakeholders perceived instances of poor outcomes based on their experience; the outcomes they mentioned included hospitalizations, emergency ambulance usage, service delays, and less use of dialysis services, though our quantitative analysis does not support this. This

subset of stakeholders believed that some beneficiaries who may not meet the RSNAT medical necessity definition have health problems that make it difficult to find other safe and affordable means of conveyance to dialysis services.

Stakeholders also provided insight into how some beneficiaries may be affected by suppliers' responses to prior authorization. Risk to access and quality may increase as ambulance suppliers apply more stringent business practices. In addition, for those beneficiaries who qualify for RSNAT, stakeholders worried that the prior authorization requirement may introduce delays in access to care as necessary documentation is gathered and suppliers and physicians become familiar with medical necessity requirements. However, we generally did not observe evidence of delays in treatment in the quantitative analysis.

Many ambulance suppliers continued to transport patients without prior authorization for several weeks or even months early in the model. Some ceased doing so only when a beneficiary's PARs would not be affirmed and suppliers would not be reimbursed for those services.

Domain 3: Program operations

From the vantage point of the MACs, both the rollout and operation of the model were successful, particularly in Year 2 states, where MACs 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 more time than expected was needed at the outset of the program to educate stakeholders about the medical necessity requirements and required documentation, particularly in Year 1. This observation led to greater MAC focus on advanced stakeholder notification and communications in Year 2 states. In both Year 1 and Year 2 states, MACs noted significant improvements in the quality of documentation submitted with PARs as the program progressed.

There appeared to be a consensus among all stakeholders on the challenges of educating them about the model and its requirements. Some stakeholders, particularly physicians, reported receiving little to no advance notification or educational materials about prior authorization before the program began; most stakeholders reported first learning about the model from other providers. Beneficiaries and caregivers also reported minimal comprehension of the prior authorization process, generally relying on ambulance suppliers to understand the medical necessity requirement and what documentation is required to have PARs affirmed. These observations were focused on in the early implementation period and have become less of a concern over time for ambulance suppliers as they learn specific medical necessity guidelines and PAR documentation requirements.

Together, these findings suggest that education and communication, particularly before implementation, are areas where particular focus is needed. MACs reported focusing additional attention on these areas in Year 2 states.

Domain 4: Suppliers and providers

Suppliers have been impacted by the prior authorization model. Quantitative analysis indicates that there was a 15% decrease in the number of ambulance suppliers per 100,000 beneficiaries in the model states between 2014 and mid-year 2016. Prior authorization also appears to have reduced the number of trips per quarter provided to Medicare beneficiaries (RSNAT and Total Medicare) and reduced payments for RSNAT and total Medicare ambulance payments for suppliers in treatment states.

Qualitative results suggest that some suppliers who stayed in the program adopted the strategies of either requiring approval or payment in advance or notifying beneficiaries of their potential liability in the event of non-coverage. They had to adapt to the MAC's documentation requirements, obtain approvals, and in many cases failed to understand why approvals would or would not be granted. Suppliers also reported an increase in administrative burden, and impacts on their day-to-day operations.

Domain 5: Improper payments and denied claims

The model's impact on improper payments is difficult to determine due to data challenges. Rates of improperly paid claims appeared to increase for both the model and comparison states throughout the analysis period for which data were available (from 2012 through 2015); we were unable to determine whether there was an impact of the model on this rate.

The model does appear to impact denied claims. Multivariate analyses suggest the model appeared to drive an initial increase in denied claims, with a decline back toward the baseline rate over time.

Implications

One important finding is that while utilization and expenditures for RSNAT and ambulance services were reduced in both Year 1 and 2 states among beneficiaries with ESRD, these impacts were considerably less for the Year 2 states. This finding is not surprising, given how unusual the Year 1 states were in their raw rates of RSNAT use before implementation of the model. The potential for cost savings was especially high for the Year 1 states, consistent with CMS's reasoning in selecting them. One would expect that the model holds promise for RSNAT and Medicare ambulance cost savings if implemented nationally, but that these savings would be of a lower magnitude than observed in this evaluation. Although the quality and access analyses do not point to changes in quality measures attributable to the RSNAT model, findings from the qualitative analysis suggest that some groups may have experienced adverse impacts. It also appears that MACs—although continuing to learn and experience challenges—perceived that they were more successful in implementing the model in the Year 2 expansion states. At implementation in both Year 1 and Year 2 states, stakeholders perceived that they lacked sufficient information to fully understand the prior authorization model.

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