

## Centers for Medicare & Medicaid Services

**CMS Alliance to Modernize Healthcare (The Health FFRDC)  
A Federally Funded Research and Development Center**

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# Medicare's Ground Ambulance Data Collection System: Sampling and Instrument Considerations and Recommendations

**Final**

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## Acronyms

<b>Acronym</b>	<b>Definition</b>
<b>AAA</b>	America Ambulance Association
<b>ACS</b>	American Community Survey
<b>AFS</b>	Ambulance Fee Schedule
<b>ALS</b>	Advanced Life Support
<b>BBA</b>	Bipartisan Budget Act of 2018
<b>BLS</b>	Basic Life Support
<b>CAH</b>	Critical Access Hospital
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CES</b>	Cost Element Structure
<b>CMS</b>	Centers for Medicare & Medicaid Services
<b>EMR</b>	Emergency Medical Responder
<b>EMS</b>	Emergency Medical Services
<b>EMSCAP</b>	Emergency Medical Services Cost Analysis Project
<b>ESRD</b>	End-Stage Renal Disease
<b>FDA</b>	Food and Drug Administration
<b>FFRDC</b>	Federally Funded Research and Development Center
<b>FTE</b>	Full-Time Equivalent
<b>GAO</b>	Government Accountability Office
<b>GEMT</b>	Ground Emergency Medical Transportation
<b>HCPCS</b>	Healthcare Common Procedure Coding System
<b>HCRIS</b>	Healthcare Cost Report Information System
<b>HHS</b>	Department of Health and Human Services
<b>HIPAA</b>	Health Insurance Portability and Accountability Act
<b>HRSA</b>	Health Resources and Services Administration
<b>IAFC</b>	International Association of Fire Chiefs
<b>IAFF</b>	International Association of Fire Fighters
<b>IDR</b>	Integrated Data Repository
<b>IOM</b>	Institute of Medicine
<b>MedPAC</b>	Medicare Payment and Advisory Commission
<b>NAEMT</b>	National Association of Emergency Medical Technicians

<b>Acronym</b>	<b>Definition</b>
<b>NASEMSO</b>	National Association of State EMS Officials
<b>NHSTA</b>	National Highway Transportation Safety Administration
<b>NPI</b>	National Provider Identifier
<b>NPPES</b>	National Plan and Provider Enumeration System
<b>NRHA</b>	National Rural Health Association
<b>NVFC</b>	National Volunteer Fire Council
<b>ONC</b>	Office of the National Coordinator for Health Information Technology
<b>PDF</b>	Portable Document Format
<b>PECOS</b>	Provider Enrollment, Chain and Ownership System
<b>RVU</b>	Relative Value Unit
<b>SNF</b>	Skilled Nursing Facility
<b>SUV</b>	Sport Utility Vehicle

# Executive Summary

## Introduction

The Bipartisan Budget Act of 2018 (BBA of 2018); Public Law 115-123, Section 50203(b) requires the Secretary of the Department of Health and Human Services (HHS) to develop a data collection system to collect data on costs, revenue, and utilization, and other information deemed appropriate by the Secretary, from a representative sample of entities that furnish ground (i.e., land and water) ambulance services. The BBA of 2018 specifies that the data collection system applies to Medicare ambulance “providers”—hospitals and other facilities that are Medicare “providers of service”—and Medicare ambulance “suppliers”—all other organizations that enroll in Medicare specifically to furnish and bill for ground ambulance services. The BBA of 2018 further requires the Medicare Payment Advisory Commission (MedPAC) to use the collected data to assess the relationship between Medicare’s payment rates and the cost of providing ground ambulance services.

The Center for Medicare and Medicaid Services (CMS) commissioned support from the CMS Alliance for Modernizing Health Care Federally Funded Research and Development Center (the Health FFRDC) in developing the data collection instrument and sampling plan to meet these requirements. This report summarizes the Health FFRDC’s work under this effort, including:

- An overview of the ground ambulance industry (Chapter 2)
- A summary and comparison of existing tools to collect information related to ground ambulance costs, revenue, and volume (Chapter 3)
- Findings from discussions with ground ambulance providers and suppliers (collectively, “ground ambulance organizations”<sup>1</sup>) and industry groups (Chapter 4)
- Analysis of ground ambulance organization characteristics and Medicare ground ambulance service volume and mix using available Medicare data (Chapter 5)

The final chapters of the report present the Health FFRDC’s recommendations to CMS regarding the development of a sampling plan (Chapter 6) and an instrument to collect data (Chapter 7) to meet the requirements specified in the BBA of 2018. We include a data collection instrument consistent with our design recommendations in an appendix to this report (Appendix E).

The findings in Chapters 2 through 5 describe our work to arrive at our recommendations and offer support for specific recommendations. Readers primarily interested in the Health FFRDC’s recommendations are directed to Chapters 6 and 7 and the instrument in Appendix E.

## Ground Ambulance Services in Medicare

Medicare covers medically necessary ground ambulance services meeting certain conditions.<sup>2</sup> These services are provided by a diverse set of organizations enrolled in Medicare as providers or suppliers, including fire departments, hospitals, stand-alone government agencies, non-profit

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<sup>1</sup> Air ambulance organizations and services are out of scope for both CMS’s ground ambulance data collection system and for this report.

<sup>2</sup> In addition to medical necessity, Medicare requires that (a) transports are to the nearest appropriate facility given the patient’s condition, and (b) all other forms of transportation are contraindicated.

organizations, and private for-profit companies. While most Medicare transports are covered by the Medicare Part B medical benefit, transports involving inpatients at a hospital or other facility fall under the Part A hospital benefit.

Medicare pays ambulance organizations<sup>3</sup> for Part B-covered transports using the Ambulance Fee Schedule (AFS). The AFS establishes a base rate that varies by the level of transport provided (e.g., basic life support vs. advanced life support). The AFS also includes a per-mile rate applied to the distance traveled with the patient. The AFS incorporates a permanent add-on payment of a 50 percent increase in the standard mileage rate for ground ambulance transports that originate in rural areas where the travel distance is between 1 and 17 miles. Both base and mileage payments are only made when a patient is transported—in other words, Medicare does not pay for ambulance responses to calls for service that do not result in a patient transport.

Since the inception of the AFS in 2002, the base and mileage payment rates have been modified by three temporary “add-on” payments that are higher for transports originating in rural areas. These add-ons have been extended several times, most recently by the BBA of 2018.

## Challenges in Comparing Payment Rates to Costs

Assessing how Medicare payment rates are related to costs is complicated by the significant variation in ambulance organizations and by differences in how ambulance services are delivered and financed across communities. Ambulance organizations vary in the mix of services they provide, including the share of responses resulting in transport, the blend of emergency and non-emergency transports, and, even within emergency and non-emergency transport categories, the level of transport.<sup>4</sup> Different types of services require different capabilities and inputs and therefore contribute differentially to organizations’ costs. Furthermore, many ambulance organizations share personnel, facilities, and vehicles with other services such as fire departments or hospitals. Determining the specific share of costs that should be allocated to their ambulance services for the purposes of comparing payments to costs is challenging.

Furthermore, many ambulance organizations receive significant revenue from communities to support emergency medical services (EMS) systems with varying capabilities. It is not clear how Medicare and other healthcare payers’ rates should align with costs in this case. Neither is it clear whether payments should cover the total costs involved in furnishing ambulance services, including the costs of responses that do not result in billable transports, or only the costs associated with patient transports.

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<sup>3</sup> The BBA of 2018 and this report focus on ground ambulance organizations and ground ambulance services (as opposed to air ambulance organizations and air ambulance services). Air ambulance organizations and services are out of scope for this report. For the remainder of the Executive Summary, we use “ambulance organization” and “ambulance service” to refer to “ground ambulance organization” and “ground ambulance service,” respectively.

<sup>4</sup> Transports are provided and billed to Medicare as either Advanced Life Support (ALS) or Basic Life Support (BLS) based on the staff and resources involved in the response. There is further differentiation in the AFS between levels of ALS transports, Specialty Care transport, and Paramedic Intercept, which is an ALS level of service that CMS defines as: a rural area transport furnished by a volunteer ambulance company which is prohibited by state law from billing third party payers where services are provided by an entity that is under contract with the volunteer ambulance company that does not provide the transport but is paid for their paramedic intercept service. (State of NY only meets these requirements).

Little data exists to evaluate the relationship between Medicare payments and the costs borne by ambulance organizations, and the data that does exist is limited to certain types of ambulance organizations. A 2012 report by the Government Accountability Office (GAO) measured ambulance costs per transport relative to Medicare payments using survey data, but this data was limited in sample size and only included ambulance services that were not delivered by organizations based at hospitals or fire departments.<sup>5</sup> The CMS Healthcare Cost Report Information System (HCRIS) contains information on overall hospital costs, including data related to ambulance services, but this data is only available for ambulance services that are owned and operated by hospitals and other healthcare institutions. A 2015 U.S. Department of Health and Human Services (HHS) report addressing the extent to which cost reporting data accessed via HCRIS could be used for comparisons to Medicare payment rates was therefore limited to ambulance providers.<sup>6</sup> The data collection required by the BBA of 2018 will fill these gaps by assembling timely and comprehensive information on ambulance costs, revenue, and services from a representative sample of all ambulance organizations.

## Key Assumptions

We assumed that the use of “cost” in the BBA of 2018 referred primarily to accounting costs, including operating and capital costs. We also assumed that the intent of the data collection system required by the BBA of 2018 was to capture an organization’s total ground ambulance costs and revenue rather than the share of costs and revenue associated with providing services to Medicare beneficiaries.

Through initial discussions with CMS, the Health FFRDC focused on developing recommendations for a survey-based instrument. Together with CMS, we considered other formats for data collection, including Medicare cost reporting.<sup>7</sup> Survey instruments allow more flexibility than cost reporting, which, in the context of diverse ambulance organizations, is critical. Furthermore, cost reporting typically requires significant accounting and data systems and expertise that not all ambulance organizations currently have in place.

While we describe the data collection instrument as a survey, there are three key characteristics of the instrument described in this report that differentiate the instrument from some other provider and supplier surveys. First, the instrument requests detailed financial information, similar to what would be collected via a Medicare Cost Report. Second, CMS intends to allow sampled ambulance organizations a full year to collect the requested information prior to reporting. Third, a 10 percent reduction to Medicare payments for a period of one year will be applied for failure to report the required information under the ground ambulance data collection system.

The Health FFRDC made several additional assumptions in consultation with CMS on aspects of the broader ambulance data collection system and process (as opposed to the instrument and

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<sup>5</sup> GAO (2012) “Ambulance Providers: Costs and Medicare Margins Varied Widely; Transports of Beneficiaries Have Increased.”

<sup>6</sup> “HHS (2015) “Report to Congress Evaluations of Hospitals’ Ambulance Data on Medicare Cost Reports and Feasibility of Obtaining Cost Data from All Ambulance Providers and Suppliers.”

<sup>7</sup> Medicare providers, including hospitals, are required to report financial information annually as part of cost reporting. Cost reporting is a requirement for participation in the Medicare program. Information submitted via cost reports is used for a variety of purposes including updating prospective payment rates.

sampling plan more narrowly, which are the focus of this report), particularly related to timing. For example, we assumed that CMS will allow sampled ambulance organizations a full year to collect the requested data prior to reporting. If ambulance organizations are sampled in late 2019, we assume they would collect data through 2020 and report data in early 2021. This process would repeat for a minimum of three additional years of data collection. This timeline provides at least one and possibly two full years of collected data for analysis before MedPAC's report is due to Congress not later than March 15, 2023. These details regarding timing were not finalized when we developed our recommendations and may change. CMS's final decisions regarding the data collection system, including the timing of data collection, will be made through the rulemaking process that will occur over the summer of 2019. Finally, we assume that the instrument will be programmed and fielded to facilitate sophisticated functionality in terms of skip patterns and supplemental schedules.

## Aims Guiding the Sampling Plan and Instrument Development

Our recommendations for the design of the sampling plan and instrument align with our aims to:

1. Balance respondent burden against the need to collect the data required by the BBA of 2018.
2. Provide flexibility to collect data from diverse ambulance organizations.
3. Enable the calculation of per-transport costs for comparison to Medicare payment rates.
4. Leave open as many avenues for analysis as possible, for example comparisons of per-transport costs across subgroups of ambulance organizations and analyses estimating the marginal cost of a particular type of transport, while remaining consistent with the BBA of 2018 specifications for data collection and while balancing respondent burden against the potential utility of collected data.

With respect to the last two aims, we note that the BBA of 2018 does not specify the methods or approach that MedPAC should use to compare reported costs and Medicare payment rates. Similarly, it is not clear how Congress might ultimately direct CMS to use the collected data. We assume that MedPAC will, like the earlier analyses from GAO and HHS described above, calculate costs per transport. We also assume that MedPAC will explore methods to estimate the cost associated with individual Medicare ground ambulance services, for example models using current relative value unit (RVU) weights to calculate a per-RVU cost or regression models expressing total costs as a function of observable characteristics of the ambulance organization and information on service mix. We assume that MedPAC will combine the data reported via the data collection system with Medicare fee-for-service claims data to further their analysis.

## Approach Overview

In order to develop our recommendations to CMS, we conducted an initial literature review and environmental scan of the ambulance industry and past ambulance data collection efforts, sought the perspectives of ground ambulance organizations and industry groups, and analyzed available Medicare data relevant to ambulance organizations and services. Specifically, we:

- **Reviewed peer-reviewed literature, government and association reports, and existing ambulance data collection tools** to collect information on costs and revenues of



ambulance organizations and to identify background information regarding the variability among ambulance organizations, state and local requirements that may impact the costs of providing ambulance services, and financial challenges facing ambulance organizations. We summarized and compared five previously developed ambulance data collection tools, including a mix of surveys and cost report-based tools developed and fielded by different organizations.

- **Collected information from ground ambulance organization key informants and industry groups through discussions** to identify key ambulance organization characteristics, identify cost and revenue components, and understand differences in these components across types of ambulance organizations. These discussions provided valuable information on the process for collecting data, including how best to elicit valid responses, how to limit burden on respondents, and the extent to which the required data is already collected by ambulance organizations.
- **Conducted a small number of cognitive interviews** after developing a draft instrument to assess respondents' understanding of instructions, definitions, and draft questions and to assess whether information required to complete the instrument is readily available.
- **Analyzed Medicare claims and enrollment data**, including all fee-for-service Medicare claims with 2016 service dates for ambulance services and the enrollment data for the ground ambulance organizations that billed for these services. We calculated organization-level ambulance service Medicare volume and payments and explored how available Medicare data can be used to describe and categorize ambulance organizations.

We relied on the inputs from these channels to inform the development of our final recommendations on the sampling plan and instrument design (including the design of the instrument itself).

## Key Findings from Initial Research

The literature review and environmental scan, key informant discussions and other stakeholder engagement, and analyses of Medicare data yielded important information that informed our recommendations for the data collection instrument and sampling plan. Our findings from this initial research are summarized below and presented in more detail in Chapters 2 through 5.

### Ambulance Organizations and Other Stakeholders

Ambulance organizations operate within the context of the broader healthcare system and labor market, which necessarily involves many interconnected stakeholder groups, including public and private insurance payers, government at various levels, individuals and communities, paid and volunteer labor, and vendors (e.g., drug and medical supply manufacturers and wholesalers). There are some commonalities in the relationships between ambulance organizations and other stakeholder groups. For example, most ambulance organizations bill Medicare and other healthcare payers for services. There are also, however, important differences, particularly with regard to the mix of paid and volunteer labor that ambulance organizations utilize to provide ambulance services meeting federal, state, local, and other requirements.

Ambulance organizations are diverse and vary considerably in size and organizational makeup, activities beyond ground ambulance transport (if any), approaches to respond to communities'

demands for services, and sources of revenue. Community expectations of service area, level of service, and response time vary and have important implications for their costs.

Even with these variations, several key characteristics of ambulance organizations emerged from the literature review, key informant interviews, and other stakeholder engagement that are related to ground ambulance costs and revenue:

- Medicare provider versus supplier status
- Transport volume
- Service area population density
- Ownership (for-profit, government, or non-profit)
- Service mix
- Staffing models (e.g., use of volunteer labor)
- Response times

We explore the first five of these characteristics in detail using available Medicare data in analyses described below. We return to these characteristics in our sampling plan as a way to assess whether our recommendations will yield a representative sample.

## Ambulance Cost and Revenue Frameworks

We developed an initial hierarchical cost and revenue framework to help organize cost and revenue components identified in our background research and to help ensure that all relevant components were considered. We then identified, reviewed, and compared five existing tools that have been proposed or used to collect information related to ground ambulance costs and revenue. We compared the information collected via these tools to the initial cost and revenue framework that we developed in order to revise and refine the framework.

We organized both the initial and revised frameworks using these highest level domains, each of which was comprised of multiple individual elements:

- Labor costs
- Facilities costs
- Vehicle costs
- Equipment and supply costs
- Miscellaneous costs
- Revenue

All the tools that we reviewed covered each of these higher level domains (e.g., labor costs, facilities, vehicles); however, no single tool covered all cost elements at the more detailed level in our framework (e.g., salaries of all labor categories, or breakdown of durable medical equipment versus non-durable medical equipment). The five tools also differed in terms of their instructions, format, approach for handling allocation, and reporting time frame. We found that none of the five existing tools would collect all of the data needed to meet the requirements of the BBA of 2018.

## Discussions with Stakeholders

Our individual and group-based discussions with stakeholders early in our study highlighted the significant variation in organizational structure, services provided, and personnel involved in providing ambulance services. This variation is an important consideration in determining how instructions and questions should be framed and the ease with which organizations may be able to report certain data. Some ambulance organizations, for instance, use sophisticated ground ambulance service, labor, and supply tracking systems. Other ambulance organizations may lack these systems and not be able to answer questions as easily. Organizations vary in the reports and analysis related to ground ambulance costs, revenue, and volume that they produce on a regular basis. They also vary on whether existing data and analysis align with the calendar year rather than the organization's fiscal year (when different than the calendar year).

Our discussions with stakeholders highlighted the need to tailor instrument instructions and questions to particular circumstances, including:

- Organizations relying primarily or exclusively on volunteer labor
- Organizations with fire response, police response, air ambulance services, or other activities and responsibilities in addition to ground ambulance operations
- Organizations that rely on other entities to cover certain costs such as benefits, rent, or supplies
- Broad parent organizations (such as large corporations) billing for ground ambulance services under different subsidiary organizations

Later in our study, we used a small number of cognitive interviews with ambulance organizations to elicit feedback on draft instrument items and instructions. These interviews highlighted the complexity of the draft instrument, the need for explicit instructions and definitions that are clear to respondents of different types, and the burden involved in collecting and reporting the requested data. All interviewees indicated that they would be able to collect and report the data requested given sufficient time. We revised the instructions and items in the recommended data collection instrument based on the feedback we received through the cognitive interviews.

## Analyses of Medicare Data

We used 2016 Medicare claims and enrollment information to summarize Medicare volume and payment for ground ambulance services and to describe how ambulance organizations vary on key dimensions identified in our literature review and qualitative research:

- Medicare provider versus supplier status
- Ownership (for-profit, government, or non-profit)
- Medicare billed transport volume
- Service area population density
- Service mix

In terms of Medicare volume and payment, we found that in 2016 ambulance organizations billed Medicare for a total of 14.8 million Part B ground ambulance transports corresponding

with \$6.1 billion in Medicare fee-for-service payments. Approximately 40 percent of all transports were non-emergency. The rate of non-emergency transports per beneficiary is more variable across geography than the rate of emergency transports.

In terms of ambulance organizations' characteristics, only 6 percent of ambulance organizations were providers, including critical access hospitals and other hospitals. We found that over half of the organizations operate primarily in urban areas and that nearly half are government owned. Transport volume is highly skewed. The bottom 50 percent of organizations in terms of volume accounted for just 3 percent of total Medicare billed transports. In comparison, the top 5 percent of organizations by volume accounted for 51 percent of total Medicare volume.

There were important relationships between the characteristics. Government organizations tended to be smaller in terms of transport volume and were more likely to serve rural areas, while for-profit organizations tended to be larger and serve urban areas. We identified a subset of organizations that specialize in non-emergency, scheduled transports, such as trips to dialysis facilities. These organizations tended to be for-profit, operate in urban areas, and have high transport volumes.

We present CMS with two approaches to categorize ground ambulance organizations for the purposes of sampling and analysis. The first is based on combinations of the first four characteristics listed above, and the second is based on grouping ambulance suppliers via a cluster analysis. The first approach results in 36 "cells" differentiating ambulance organizations based on their characteristics. Alternatively, the cluster analysis yielded nine groups of ambulance organizations. The nine groups do not differentiate organizations based on volume but do differentiate between urban ground ambulance organizations providing primarily emergency and non-emergency transports.

## Sampling and Instrument Recommendations

We developed a set of recommendations related to the sampling plan and data collection instrument based on findings from our initial research and analysis. We originally planned to refine our recommendations and the instrument after testing a draft instrument with a large sample of ambulance organizations. The planned testing component of the project was not feasible due to timing constraints related to CMS's rulemaking schedule. . Testing is particularly important for complex instruments and highly diverse respondent populations.

Our understanding is that further testing or a pilot is not feasible given CMS's timetable for implementing the data collection system and instrument and for collecting data. Given our experience with the data collection instrument to date, we are concerned that the first year of data collection may result in data of variable quality and consistency. In response to these significant concerns, we recommend that Medicare:

1. Assess the quality and consistency of submitted data throughout the first year of data reporting.
2. Consider the possibility of revisions to the data collection instrument either during or after the first year of data collection to address any issues that are identified.
3. Conduct stakeholder outreach and education prior to and during the first year of data reporting to help respondents report accurate information as intended.

Our specific recommendations for the data collection instrument and sampling plan follow.

## Sampling Recommendations

Our detailed sampling recommendations are in Chapter 6. We recommend that CMS sample ambulance organizations at the National Provider Identifier (NPI) level and pull a stratified random sample of ground ambulance organization NPIs each year. In our recommended stratification approach, NPIs are stratified based on combinations of the four key characteristics described below:

- Medicare provider versus supplier status
- Ownership (for-profit, government, or non-profit)
- Medicare billed transport volume
- Service area population density

Using the 2016 claims data, we found that ground ambulance organizations are relatively well distributed across the resulting “cells.” For the purposes of the sampling plan, we made two adjustments to account for low counts. First, we collapse the two highest volume categories for for-profit organizations operating in super rural areas. Second, we treated providers differently than suppliers, stratifying only by service area population density.

Our decision to recommend stratifying based on these characteristics rather than on the basis of the clusters emerging from our analysis of Medicare data hinges on the requirement in the BBA of 2018 that the sample be representative of specific organizational types and service area population densities. For the purposes of the sampling chapter, we proceed with the assumption that Medicare will opt to stratify the sample using the four characteristics as described above.

We used historical (2016) data to assess the implications of different sampling approaches, including sampling rates varying from 5 to 50 percent.<sup>8</sup> We recommend a 25 percent sampling rate (i.e., 25 percent of NPIs from each stratum will be sampled in a given year) because lower sampling rates will result in less-precise for estimates of costs and revenue for a number of subgroups that may be of interest to MedPAC and CMS. Furthermore, our analyses illustrated that a 50 percent sampling rate would likely yield only marginal gains over a 25 percent sampling rate in terms of precision. In our view, these gains are not sufficient to merit the increased burden that would be imposed by implementing a higher sampling rate.

Longer gaps between the year of data used for sampling and data collection jeopardize the representativeness of the sample, as some NPIs will start or stop operations over time. We recommend developing sampling files using the most recent complete year of data available, which will likely be 2017 or 2018 if the sample for the first year of data collection is pulled in late 2019.

We recommend sampling 25 percent from each stratum and across all ground ambulance organizations active during the calendar year used by CMS to generate the sampling file, with one exception: NPIs that enroll in Medicare or start billing Medicare for ground ambulance services mid-year will not be eligible for sampling in that year but will be eligible in the next

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<sup>8</sup> The BBA of 2018 prohibits sampling the same organization in consecutive years “to the extent practicable.” As a result, the maximum sampling rate that we considered was 50 percent.

year. To minimize the reporting burden on individual organizations, we recommend sampling in each of the first four years of reporting without replacement (i.e., if an organization is sampled in Year 1, it will not be eligible for sampling again in the subsequent three years of data collection).

While we recommend sampling from all ground ambulance organizations, CMS may choose to exempt certain ground ambulance organizations from the 10 percent reduction to payments for failure to report the required information under the ground ambulance data collection system. If such an exemption is implemented, our approach remains viable so long as exempted NPIs are still included in the sample; in such cases, exempted NPIs could be sampled at higher rates or more often to offset anticipated lower response rates.

We recommend using statistical weighting to address concerns regarding generalizability resulting from the sampled organizations or from differential non-response rates. We advise CMS to revisit the sampling plan after the first year of data collection if significant and/or differential non-response is observed between strata. While our sampling recommendations for the first year include a constant response rate across strata, the stratified sampling framework can accommodate higher sampling rates for certain strata where response rates are lower or where MedPAC or CMS may have interest in subgroup analyses or comparisons in the future.

## Instrument Scope, Design, and Content Recommendations

Our detailed instrument design recommendations are in Chapter 7 and our proposed instrument is in Appendix E. The following sections describe our main recommendations related to the instrument scope, design, and content.

Scope. We recommend that the instrument:

1. Be limited to costs and revenue related to ground ambulance services
2. Collect data on *total* ground ambulance costs (i.e., without respect to):
  - a. Whether the costs were associated with transports or other ground ambulance activities (such as responses that did not result in a transport)
  - b. Whether the costs were associated with services provided to Medicare beneficiaries.
3. Collect data on total ground ambulance revenue

The main motivation for our recommendation to focus on total ground ambulance costs and revenue is the lack of a practical alternative whereby respondents could report costs or revenue in a more specific way without significant additional burden and the need for potentially unfounded assumptions. For ambulance organizations that are fire departments or that provide services other than ground ambulance services, we recommend that respondents report information that will allow those analyzing the data to allocate a share of certain costs and revenues as being relevant to ground ambulance services. Relatedly, some organizations operate multiple subsidiaries that may appear as distinct organizations at the NPI level in Medicare data. We recommend asking respondents to report data at the NPI level, rather than at a broader organizational level, because Medicare utilization data is most easily aggregated and analyzed at the NPI level. Each of the larger organizations that we talked to during this study indicated that reporting at this level was feasible.

Design. To account for diversity in organizational models across NPIs, the need for comparability/ease of analysis and accuracy of data, and the need to minimize respondent burden, we recommend presenting all organizations with a single instrument that utilizes skip

patterns to tailor the content presented to each respondent to reduce burden. We recommend that the data collection instrument use an online platform to facilitate the tailoring of content based on organizational characteristics as well as the availability and type of data tracking. For example, the instrument should ask follow-up questions related to volunteer labor only of respondents that indicate that they use volunteer labor. We also recommend flexibility in response options, to the extent possible. We recommend presenting a preferred reporting approach, and then allowing respondents to opt for another response approach when appropriate. This is most relevant for reporting period, where respondents might choose to report over a fiscal year versus a calendar year if their organization collects information on a fiscal year basis that does not coincide with the calendar year.

Content. Our assessment of extant Medicare data suggests that the data is sufficient to use for the purposes of pulling samples for data collection as described above. However, in the course of outreach efforts, some stakeholder groups expressed concern about the accuracy of existing Medicare enrollment data on organizational characteristics (e.g., service area population density and ownership type), and articulated their expectation that this effort would collect these data anew. For these reasons, we recommend asking respondents to report characteristics of their organization, even if some of this information is currently available to CMS. This will also allow the end user of the data to compare the information in CMS's administrative records with the reported information. We recommend that the instrument collect information on the following characteristics of ambulance organizations:

- Basic organizational characteristics such as ownership type, whether they have shared services, or operate multiple NPIs
- Primary and secondary service areas
- Response and transport times
- Ground ambulance service volume at a variety of levels, including total responses, ground ambulance responses, responses not resulting in a transport, total transports, and total paid transports
- Mix of paid transports by service type

In addition to collecting information on the organization, we also recommend collecting costs and revenue organized by domain as follows:

- Costs associated with broad labor categories (including fully burdened labor costs if possible) related to ground ambulance services for paid and volunteer labor
- Rent, mortgage, or annual depreciation for each facility and aggregate totals for facility insurance, maintenance, utilities, and taxes for all facilities
- Depreciated cost or lease amount for each vehicle related to ground ambulance services and aggregate totals for vehicle insurance, maintenance, and fuel
- Costs for capital medical equipment, other medical equipment and supplies (including medications), capital non-medical equipment, and other non-medical equipment and supplies
- Miscellaenous costs, such as local jurisdiction fees and waste disposal fees
- Granular and comprehensive revenue data including revenue from healthcare payers such as Medicare and other sources

Each section of the instrument includes detailed instructions to respondents on how to tally and report costs and revenue of different types. The instructions detail how respondents with costs shared between ground ambulance and other activities (e.g., fire departments) should report data to allow analysts flexibility in the approach used to allocate a share of these costs to ground ambulance services. We suggest that CMS make supplemental schedules available to respondents as a tool to collect the required information related to labor, facilities, and vehicle cost information.

## Looking Ahead

The recommendations in this report are specific to developing a system to collect complex and granular data from vastly different ambulance organizations that currently do not systematically collect all of the desired data. The instrument and sampling approach could potentially evolve after the first year of data collection as CMS and ambulance organizations gain experience in the initial reporting year. We expect that some changes will be necessary due to the lack of formal testing of the instrument and the complexity of the data required for reporting. The recommendations are also based on a set of assumptions about how CMS will implement the data collection system, specifically that respondents will have at least a year to prepare for data reporting and that the programmed instrument will have sophisticated functionality in terms of skip patterns and supplemental schedules.

We expect that MedPAC will use the data collected through this system to assess how ground ambulance costs relate to current Medicare payment and how they vary across ambulance organizations. At this time, we do not know how MedPAC or others will want to analyze the data collected through this system. Our approach to instrument design and sampling was to leave open as many analytic avenues as possible.



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# 1. Introduction

Medicare covers ground ambulance transports if (a) the transport is reasonable and medically necessary, (b) the transport is to the nearest appropriate facility given the patient’s condition, and (c) all other forms of transportation are contraindicated. [1] Most Medicare transports fall under the Medicare Part B medical benefit; most transports involving inpatients at a hospital or other facility fall under the Part A hospital benefit.

Effective for dates of service on or after April 1, 2002, CMS established the Ambulance Fee Schedule (AFS) [1] to pay for Part B ground ambulance services. Importantly, Medicare (and many other payers) pay organizations providing ground ambulance services only if a patient is transported. In other words, if an ambulance responds to the scene of an accident but medical personnel determine that no further care is needed or the patient refuses transport, Medicare does not pay for that response.

The AFS provides per-transport rates that vary by the level of transport and per-mile rates that are applied to the distance between the point of ambulance pickup and drop-off locations. In addition, the AFS includes three temporary “add-on” payments. Some of these were originally intended to aid in the transition to the AFS; others were intended to better align Medicare payments to the cost of furnishing ground ambulance services in areas with very low population density. [2] While some of these add-on payments were designed to be temporary, all of the add-ons, including a 22.6 percent add-on for ground ambulance transports originating in “super rural” ZIP codes with very low population density,<sup>9</sup> have been extended by Congress several times, most recently through December 31, 2022 by the Bipartisan Budget Act (BBA) of 2018.

Assessing how payments relate to costs, and by extension whether further adjustments to the Medicare payment rates need to be made, is a complicated task because many factors affect the cost of providing ground ambulance services. Not only does the population density of the area served by ambulance organizations vary, but so do organizations’ staff mix, including paid and sometimes volunteer labor, integration with fire departments and other types of entities, type(s) of ambulance transports provided, responsibilities related to the emergency medical response system in their communities, and many other factors. Each of these factors directly affects the cost of providing ground ambulance services.

In the past, the Government Accountability Office (GAO) and the U.S. Department of Health and Human Services (HHS) have studied the extent to which payments were related to costs for specific categories of ground ambulance organizations.<sup>10</sup> These studies cannot provide a holistic view across all ground ambulance organizations, and there is no nationwide source of information on how much it costs to provide ground ambulance services.

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<sup>9</sup> Super rural ZIP codes are the lowest quartile of ZIP codes by population density among ZIP codes that are either (a) outside of a core-based statistical area (CBSA), or (b) inside a (CBSA) but geographically isolated (identified by the Goldsmith modification).

<sup>10</sup> The relevant GAO and HHS studies are described in detail below. In brief, GAO limited their study to ground ambulance organizations that did not share costs with fire departments, hospitals, or any other entity. HHS’s study was limited to ground ambulance organizations that are also Medicare providers of services such as hospitals.



To help improve the availability of information for analysis, the Bipartisan Budget Act (BBA) of 2018 (Public Law 115-123, Section 50203(b)) requires the Secretary of HHS to develop a data collection system (which may include use of a cost survey) to collect data on costs, revenue, utilization, and other information deemed appropriate by the Secretary from entities that furnish ground ambulance services.<sup>11</sup> The law specifies that data collected via this system will be used by the Medicare Payment and Advisory Commission (MedPAC) to assess how ground ambulance costs relate to current Medicare payments and how those costs vary across different types of ambulance organizations, the results of which will be submitted to Congress in a report.<sup>12</sup>

CMS commissioned support from the Centers for Medicare & Medicaid Services (CMS) Alliance for Modernizing Health Care Federally Funded Research and Development Center (the Health FFRDC) in developing the data collection system. The Health FFRDC conducted research and analysis to develop recommendations to Medicare regarding a sampling plan and instrument consistent with the requirements laid out in the BBA of 2018.

Although the immediate need specified in the BBA of 2018 is to develop a sampling plan and instrument to collect the data needed for MedPAC's analysis, it is important to base that development on a deep understanding of the ground ambulance industry and associated costs, sources of revenue, and measures of utilization. The remainder of this chapter provides background information on ground ambulance organizations, briefly summarizes the data currently available on them, reviews the methods used in this study, and gives an overview of the report structure.

## 1.1 Ground Ambulance Organizations

The businesses, government entities, and other organizations providing ground ambulance services to patients (collectively “ambulance organizations”) vary significantly in terms of the communities they serve, business models, and the local and state requirements they face. A small share of ambulance organizations consists of hospitals, skilled nursing facilities (SNFs), and other types of facilities considered by Medicare to be “providers of services.” Many ambulance organizations are run and financed by local governments (such as county or other municipal governments) to provide emergency medical services, either as part of a combined fire and emergency medical service (EMS) agency or as a stand-alone EMS agency. Other ambulance organizations are private for-profit or not-for-profit companies that may contract with local governments to provide EMS. Some ambulance organizations specialize in providing non-emergency services such as scheduled and inter-facility transports.

Ambulance organizations can vary substantially in size and service area. Some, typically for-profit organizations focusing on urban areas, are very large, operating in multiple states and providing tens of thousands of transports per year. Others, often in rural areas, are very small and

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<sup>11</sup> Ground ambulance services include land and water ambulance services. Air ambulance services is not included in the BBA of 2018 requirement for a data collection system.

<sup>12</sup> The law also includes two other provisions. One provision extends the three temporary add-on payments, first instituted in 2004, for ground ambulance services. The other provisions increase the reduction in payments for certain non-emergency basic life support (BLS) transports of beneficiaries with end-stage renal disease (ESRD) for renal dialysis.

provide only a handful of transports each year. These differences have important implications for total costs and costs on per-transport basis.

Ambulance organizations also vary in the extent to which they must maintain resource-intensive emergency response capabilities, including in many cases fire as well as ambulance response capabilities, in the communities that they service. Many ambulance organizations responsible for emergency responses in a community are financed by taxpayers—directly or under contract—to provide a certain level of response. For these ambulance organizations, the total payment from health insurers, including Medicare, is often dwarfed by financing from communities. In contrast, for-profit ambulance organizations that provide mostly or entirely scheduled, non-emergency transport typically count on payments from health insurers as their primary source of revenue.

## 1.2 Ground Ambulance Services Under Medicare Part B

CMS categorizes organizations that bill for ambulance services into two groups: ambulance *providers* and ambulance *suppliers*. This distinction reflects an organization’s relationship with Medicare. Medicare providers, including hospitals, SNFs, and other facilities, can bill Medicare for Part B ambulance services as well as other types of healthcare services (e.g., inpatient hospital stays). Ambulance suppliers, on the other hand, can only bill for ambulance services under the AFS. In both cases, Medicare coverage for ground ambulance services in specific circumstances is governed by Medicare coverage and payment policy. Medicare’s coverage policies and the AFS are described in more detail in Chapter 2.

Over time, the number of Medicare Part B ambulance transports has increased, and Part B ambulance payments have increased at a rate faster than overall Medicare Part B spending. Between 2002 and 2011, the total volume of transports increased 69 percent, from 8.7 million to 14.8 million, and the total Part B ambulance payments increased 130 percent, from \$2.0 billion to \$4.5 billion, compared to an increase of 74 percent in total Part B payments. [3] One explanation for the increase in ambulance transports is an increase in the number of beneficiaries. The trend toward greater utilization of ambulance services, however, exceeds the growth in the number of beneficiaries. The number of Part B beneficiaries who received an ambulance transport increased 34 percent between 2002 and 2011, while the number of fee-for-service beneficiaries increased by only 7 percent. In addition, the intensity of use has increased. Among beneficiaries who received a transport, the average number of transports received in a year increased from 2.4 in 2002 to 3.1 in 2011.[3]

## 1.3 Challenges in Aligning Medicare Ground Ambulance Costs and Payments

We assumed that the use of “cost” in the BBA of 2018 referred primarily to accounting costs, including operating and capital costs. We also assumed that the intent of the data collection system required by the BBA of 2018 was to capture an organizations’ total ground ambulance costs rather than the share of costs associated with providing services to Medicare beneficiaries.

MedPAC’s charge under the BBA of 2018 is to compare the costs involved in furnishing ground ambulance services with current payment rates under the AFS. While it is not clear which methods MedPAC will use in their analysis, they will face four main conceptual and practical challenges in the course of their analysis:

1. Many organizations that operate ground ambulances are also fire departments, police departments, hospitals, or other entities. Methods are needed in these cases to identify which portion of organizations' total costs should be considered ground ambulance costs.
2. While Medicare and most other healthcare payers only pay for ground ambulance services when a patient is transported, ground ambulance organizations, and particularly those responding to emergencies, invest significant effort in activities that do not result in transport. As a result, either the total ground ambulance costs of an organization must be considered, including costs driven by activities that do not result in a transport, or additional methods are needed to identify the share of ground ambulance costs that are related to transports.
3. Fee schedules, such as the AFS, are intrinsically limited in their flexibility in matching payment rates to idiosyncratic costs. The main advantage of a fee schedule approach to payment (as opposed to cost-based or charge-based payment) is that fee schedules put incentives in place for efficiency on a per-service basis.<sup>13</sup>
4. Some ground ambulance organizations receive significant revenue from their communities, primarily when the organization serves a primary EMS role. How this revenue should be considered alongside payments from healthcare payers is unclear.

As the largest public payer for healthcare in the United States, CMS's decisions regarding coverage and payment often have important implications for the broader U.S. healthcare system. CMS's policy to pay ambulance organizations only when a beneficiary is transported raises an important policy question of whether Medicare payments are intended to cover a portion of ambulance organizations' costs or whether Medicare payments should also help cover the costs associated with responses that do not result in a transport. Another important policy question is whether CMS should consider the level of emergency response service it expects when setting its payment rates. The per-transport costs associated with a joint fire/ambulance emergency response organization in a rural area are likely to be significantly higher than in communities with shorter distances to cover, and rural communities often fund such systems in part through tax revenue. It is not clear whether CMS should consider the total costs of such ambulance organizations or whether it should account for funding from communities when comparing costs to payment rates. Conversely, the per-transport costs are likely much lower for an urban ambulance organization providing only scheduled inter-facility transports, and the revenue for such an organization comes primarily from Medicare and other payers. Gathering more information on the granular details of how various cost drivers play out in various communities will help CMS, MedPAC, and Congress grapple with some of these important policy issues.

## 1.4 Available Data on Ambulance Organization Costs and Margins

Reports from the GAO [4] and HHS [5] provide some empirical information on ambulance organization costs and margins. The GAO study used a combination of survey data from 153 respondents and 2010 Medicare claims data to estimate transport costs and profit margins with the three temporary add-on payments. To streamline data collection and analysis, the GAO study was limited to ambulance organizations that do not have costs shared with a hospital, fire

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<sup>13</sup> At the same time, fee-for-service payment based on fee schedules or any other rates can create incentives for the overprovision of care.

department, or other organizations—ambulance suppliers. The HHS study examined ambulance cost and utilization data furnished by hospitals and critical access hospitals (CAHs)—ambulance providers—through CMS’s existing Healthcare Cost Report Information System (HCRIS) for the period 2007 to 2011 and Medicare claims data for the period 2010 to 2012. Ambulance suppliers that shared costs with a fire department or other entity were not included in either study.

Average costs per transport were approximately five times higher for ambulance providers in the HHS study than for ambulance suppliers in the GAO study. The large difference in cost per transport is striking, but it is unclear what conclusions can be drawn, given the substantial differences in the samples and modes of data collection.<sup>14</sup> Both studies found that ambulance costs vary widely among their respective ambulance provider and supplier organizations. The GAO could not determine whether ambulance supplier margins were positive or negative due to their small sample size.

The GAO study found that, on average, the largest share (about 61%) of total costs involved personnel-related expenses in 2010. GAO’s examination of labor cost data from other national data sources was consistent with this finding. The HHS study also discussed ambulance costs based on other industry cost information sources. For example, a 2014 analysis by IBISWorld shows that labor expenses accounted for approximately 40 percent of total ambulance industry costs. Similarly, using the Census Bureau’s 2012 Economic Census results showing ambulance services payroll accounting for 41 percent of total industry revenue, combined with IBISWorld’s estimated average profit margin of 8.2 percent, HHS estimated labor costs to be 45 percent of total costs.

Other significant cost components were overhead and administrative costs (11%), supplies and equipment (7%), vehicles excluding fuel (7%), facilities (5%), and fuel (4%). Personnel and fuel costs contributed the most to cost increases between 2009 and 2010. Increases in personnel expenses were mainly driven by non-wage components (e.g., increases in the cost of health insurance and workers’ compensation insurance, and increases in education and training requirements).<sup>15</sup>

Both studies found evidence of economies of scale. The GAO study found that cost per transport declined as volume increased until an organization’s total transport volume reached 600 per year. The HHS study found that a 10 percent increase in trip volume was associated with a 3 percent decrease in cost per trip.

Both studies also found that costs were statistically associated with ambulance organization characteristics. Specifically:

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<sup>14</sup> It is possible that the difference in the sample is driving the differences in per-transport costs, but it is also possible that the different data collection methods capture costs differently (e.g., overhead costs) and thus are not really comparable.

<sup>15</sup> According to the data from the Bureau of Labor Statistics, hourly wages for the ambulance industry remained stable between 2009 and 2010. Observations regarding increases in providers’/suppliers’ health insurance costs, education and training costs, and fuel costs were consistent with information found from other national data sources that GAO examined. For example, data from the Kaiser Family Foundation showed a 3 percent increase in the average annual health insurance premium for family coverage between 2009 and 2010. Data from the Department of Energy showed an increase of average fuel costs from \$2.50 a gallon to \$3.00 a gallon between 2009 and 2010 respectively. However, contrary to provider/supplier cost reports, data from the Bureau of Labor Statistics showed a reduction in workers’ compensation insurance from \$0.44 to \$0.43 per hour worked by an employee between 2009 and 2010.

- GAO found that a 7 percent decrease in average share of Medicare non-emergency transport (versus emergency transport) led to a 3 percent increase in cost per transport. This is intuitive, since a decrease in the share of non-emergency transports implies an increase in the share of costlier emergency transport volume.
- GAO found that a decrease in the average level of government subsidy of 2 percent was associated with a decrease in cost per transport of 2 percent, indicating that providers/suppliers with more limited government support have more incentive to keep costs lower.
- The GAO found that “super rural” providers/suppliers (those servicing the least densely populated rural areas) incurred much higher median cost per transport than urban ones. Specifically, the sample median cost per transport for urban and rural providers/suppliers were \$397 and \$469, respectively, while that of super rural providers was \$545. However, after accounting for provider/supplier characteristics, cost differentials by service area were not significant, suggesting that characteristics other than service area drive cost variations.
- The HHS study found that the median cost per trip for hospital ambulance entities in urban areas was significantly higher than in rural areas. Between 2007 and 2011, the median cost per trip for hospital ambulance services ranged between \$2,000 and \$2,500 in urban areas and hovered around \$1,500 for rural areas. Since urban hospitals are likely to have greater transport volume, this finding seems at odds with the earlier observation that higher transport volumes are associated with lower cost per transport. However, like the findings of the GAO’s study, this urban-rural cost difference could be driven by provider characteristics other than service area that need to be accounted for (e.g., level of service provided). A detailed explanation of these differences, however, is not discussed in the report.

## 1.5 Limitations of the Available Data

Updating or refining estimates of per-transport costs or ambulance organization margins is challenging due to the lack of available data on costs, revenue, and utilization of ambulance services. There is no national repository for these data, and existing analyses are often based on data collected from specific organization types. For example, CMS’s HCRIS contains information on overall hospital costs, including data related to ambulance services, but is only available for ambulance services that are owned and operated by hospitals and other healthcare institutions (i.e., ambulance providers). The GAO surveys excluded ambulance organizations that shared operational costs with non-ambulance services (e.g., hospitals and fire departments) and provided snapshots of costs and margins at only two points in time (2004 and 2010). No existing national data source collects information on ambulance costs in organizations that also provide fire, police, or other services.<sup>16</sup>

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<sup>16</sup> While the Moran Company (Moran) completed a beta test of a survey sponsored by the American Ambulance Association (AAA), Moran experienced a very low response rate and made recommendations to AAA regarding revisions to a survey instrument. The data collected by Moran are not available for analysis.

## 1.6 Purpose and Approach Overview

Through the data collection system mandated by the BBA of 2018, samples “representative of the different types of providers and suppliers of ground ambulance services” will report data annually beginning on or after January 1, 2020 through 2024. Individual providers or suppliers cannot be required to submit data two years in a row. The law stipulates that ground ambulance organizations may be subject to a 10 percent reduction in Medicare payments if they fail to report required information, although the Secretary of HHS may exclude some ground ambulance organizations from this reduction to payment through a hardship exemption.

The Health FFRDC conducted a series of tasks to develop recommendations to CMS on a sampling approach consistent with the BBA of 2018 requirements and an instrument to collect the information required by the BBA of 2018. Our recommendations reflect several assumptions that we made in consultation with CMS on aspects of the broader ambulance data collection system and process (as opposed to the instrument and sampling plan more narrowly that are the focus of this report), particularly related to timing. For example, we assumed that CMS will allow sampled ambulance organizations a full year to collect the requested data prior to reporting. If ambulance organizations are sampled in late 2019, we assume they would collect data through 2020 and report data in early 2021. This process would repeat for a minimum of three additional years of data collection. This timeline provides MedPAC with at least one and possibly two full years of collected data for analysis before its report is due to Congress not later than March 15, 2023. These details regarding timing were not finalized when we developed our recommendations and may change. CMS’s final decisions regarding the data collection system, including the timing of data collection, will be made through the rulemaking process that will occur over the summer of 2019. Finally, we assume that the instrument will be programmed and fielded to facilitate sophisticated functionality in terms of skip patterns and supplemental schedules.

Our recommendations draw on four sources:

1. An environmental scan, including review of the peer-reviewed literature, government and association reports, targeted web searches, and existing ambulance data collection tools
2. Discussions with ground ambulance organization key informants and industry groups
3. A small number of cognitive interviews relating to a draft instrument
4. Analyses of Medicare claims and enrollment data

The following sections provide an overview of our methodological approach for each of these activities. Later chapters include detailed descriptions.

### 1.6.1 Environmental Scan

Our literature review and broader environmental scan sought to identify previous efforts to collect information on costs and revenues of ground ambulance transportation services. We identified peer-reviewed articles through searches of PubMed and other National Center for Biotechnology Information databases. We also identified relevant government and association reports and websites of interest through targeted web searching. We excluded sources that dealt entirely with air ambulance services, as these are out of scope for our project. We reviewed 26 relevant results and identified five sources that specifically presented frameworks,

recommendations, or instruments for collecting information on ambulance costs. We also drew extensively on the HHS and GAO studies described above and a 2007 Institute of Medicine (IOM) report focused on emergency medical services. [6] These reports and selected articles from the literature review were used to inform Chapter 2, Overview of U.S. Ground Ambulance Stakeholders. We summarize the five ambulance data collection tools in Chapter 3, Ambulance Cost and Revenue Frameworks.

## 1.6.2 Discussions with Ground Ambulance Organizations and Industry Groups

The methods underlying the discussions with individual ground ambulance organizations and industry groups are described in detail in Appendix B. In brief, we conducted one-hour phone discussions with 31 randomly sampled provider and supplier organizations that varied by transport volume, population density, and ownership types. The purpose of these discussions was to better understand whether we have accounted for all major cost, revenue, and utilization components; how best to elicit valid responses on particular items; which state and local requirements might affect responses to questions; and how to limit the burden on respondents. Additionally, we gathered information on the process for fielding the instrument, such as whether there are certain times of the year to avoid data collection and the length of time respondents might need to gather information to answer the questions.

We separately held introductory discussions with several key national organizations whose input is key for both informing the technical aspects of instrument design and raising awareness among member organizations regarding our qualitative data collection effort. Organizations included the American Ambulance Association (AAA), the International Association of Fire Chiefs (IAFC), the National Volunteer Fire Council (NVFC), the International Association of Fire Fighters (IAFF), the National Association of Emergency Medical Technicians (NAEMT), the National Association of State EMS Officials (NASEMSO), the National Association of EMS Physicians (NAEMSP), and the National Rural Health Association (NRHA). These discussions helped us identify the previous major cost collection efforts and provided feedback on our initial approach to the sampling design and the instrument domains. We held 13 additional group discussions over the course of the project to gather input on the sampling design, instrument domains, and other topics.

## 1.6.3 Cognitive Interviews

We conducted nine cognitive interviews with representative ground ambulance suppliers. We sent them a draft instrument, asked them to complete it with the data that they were able to assemble over the span of one week,<sup>17</sup> then spoke with them to assess their understanding of the instructions, definitions, and the draft questions; to assess whether information required is readily available; to assess respondent burden; and to collect feedback on aspects of our draft instrument. The methods underlying the cognitive interviews are described in detail in Appendix B.

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<sup>17</sup> Our request of interviewees differed significantly from the experience that we expect respondents will have for CMS's full data collection. Specifically, we anticipate that ambulance organizations sampled in a given data reporting year will have a full calendar year to collect data prior to reporting.

## 1.6.4 Analyses of Medicare Claims and Enrollment Data

Our methods for analyzing Medicare claims and enrollment data and the results of these analyses are described in detail in Appendix D. In brief, our analyses draw primarily on two sources of Medicare data: extracts of enrollment data from the Medicare Provider Enrollment, Chain and Ownership System (PECOS) data system and fee-for-service claims data accessed via the CMS Integrated Data Repository (IDR). We use both enrollment and claims data from calendar year 2016 to create a single, integrated analytic file with complete data for our analysis conducted in 2018.<sup>18</sup> We combined data on individual ground ambulance organizations from both sources and created a single analytic file at the NPI level.

We limited our extracts of enrollment and claims data to calendar year 2016 to ensure that the resulting analytic file represented a full year of data from both sources.<sup>19</sup> The analysis population is limited to ground ambulance organizations that billed Medicare for ground ambulance services in 2016. Ambulance suppliers that were enrolled but did not bill for ground ambulance services were considered out of scope.

We used the integrated analysis file to:

- Calculate the number of ground ambulance providers and suppliers in 2016
- Tally total volume of and payments for Medicare ground ambulance transports in 2016 overall and for subgroups of ambulance organizations by category
- Summarize the distribution of ambulance organizations, volume, and payments across ambulance organizations with different characteristics individually

We also calculated and summarized the distribution of ambulance organizations, volume, and payments across combinations of the four key characteristics (provider vs. supplier status, ownership category, Medicare transport volume, and service area population density). We suggest using these four characteristics to group ambulance organizations as one of two approaches that Medicare can consider for the purposes of analysis and stratification for sampling. As a second approach, we performed a cluster analysis to empirically assess whether there are groups (or “clusters”) of ambulance suppliers with similar characteristics. The methods are described in detail in Appendix D.4. In brief, we used a clustering algorithm and eight input variables to identify clusters of related suppliers, each of which is described in this chapter. We excluded ambulance providers from the cluster analysis as (1) we expect that they have systematically different costs than ambulance suppliers, and (2) a cluster analysis with providers included did not result in a separate cluster containing primarily providers.

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<sup>18</sup> The claims data are for fee-for-service (FFS), or traditional Medicare. Ambulance transports for Medicare Advantage beneficiaries are not included in the counts of Medicare paid transports. Not all Medicare FFS claims for 2017 service dates will be submitted until the end of 2018. Analyses in late 2018 using 2017 claims data may therefore underestimate transport volume.

<sup>19</sup> While more recent claims data is available via the IDR, we were concerned about the completeness of calendar year 2017 claims data because ground ambulance organizations have a full year after the date of service to submit bills to Medicare. We anticipate that CMS will replicate some of the analyses described in this report with more recent claims and enrollment data (for example, data from calendar year 2017 or 2018) prior to drawing the initial survey sample.



## 1.7 Report Structure

Chapter 2 provides an overview of ambulance organizations in the United States, including a discussion of key stakeholders, their relationships to one another, and incentives that drive industry trends. Chapter 3 introduces an ambulance cost and revenue framework and assesses five existing data collection tools against the framework as a common point of comparison. Chapter 4 presents findings from our key informant discussions, discussions with industry groups, and cognitive interviews as they relate to the development of a data collection tool and sampling. Chapter 5 describes a set of analyses of Medicare claims and enrollment data that we use to further characterize ground ambulance organizations to inform sampling.

The findings in Chapters 2 through 5 describe our work to arrive at our recommendations and offer support for specific recommendations but need not be read in detail. Readers primarily interested in the Health FFRDC's recommendations can focus on Chapters 6 and 7, which lay out our recommendations to CMS related to a sampling plan and data collection instrument, respectively, and the instrument itself in Appendix E. These components of the report are written to stand on their own.

## 2. Overview of the U.S. Ground Ambulance Industry

Individuals and communities rely on the availability of ambulance services for pre-hospital care and transport to hospitals following emergencies. Counties and municipalities typically make decisions regarding the structure of their EMS systems, the financing mechanisms to use, and response time requirements, [6] and ambulance organizations adapt to their community context. While the demand for ground ambulance emergency response and the resulting transports are relatively constant across communities, demand for non-emergency transport (e.g., scheduled inter-facility transfers) may vary considerably, depending on payer and delivery system arrangements with ambulance organizations. Therefore, the mix of organizations (e.g., non-profit, for-profit, fire-based, government contractor) operating in a specific area or “market” (such as a municipality) to meet demand for emergency and non-emergency ground ambulance services varies.

Ambulance organizations are diverse and vary across characteristics that are likely related to costs and revenue, as described below. Despite this variation, all ambulance organizations share three common characteristics:

1. They provide ground ambulance services that meet federal, state, and local requirements.
2. They incur labor, vehicle, facility, and other costs in doing so.
3. They rely on revenue from one or more sources to support their operation.

Figure 2-1 is a graphical representation of the typical relationships between ground ambulance organizations and other groups in the U.S. ambulance industry. This figure does not necessarily represent all the intricacies of ambulance services and relationships with other groups in every community. We found a wide range of models across communities to provide ambulance services and an equally wide range of ambulance organizations, which complicates attempts to develop a framework that describes the relationships among all groups. Most communities, however, have some of each of the major components shown in the figure.

At the center, the figure shows the ground ambulance organizations, which include stand-alone organizations, fire-based organizations, and myriad other ground ambulance organization types. The groups that define the demand for services in communities and also provide revenue include:

- Public and private healthcare payers including Medicare, Medicaid, and commercial insurers
- Government stakeholders, including local and municipal governments that sometimes finance, operate, or contract for ambulance services, and the federal government
- Individuals and communities served by ground ambulance organizations

Other groups provide inputs to ambulance organizations. These groups include:

- Labor categories, including emergency medical technicians (EMTs), paramedics, administrators, and medical directors
- Vendors that provide inputs into ambulance services, including equipment and supplies

The remainder of this chapter summarizes key elements of the ambulance services landscape by describing and defining groups and the connections between them.

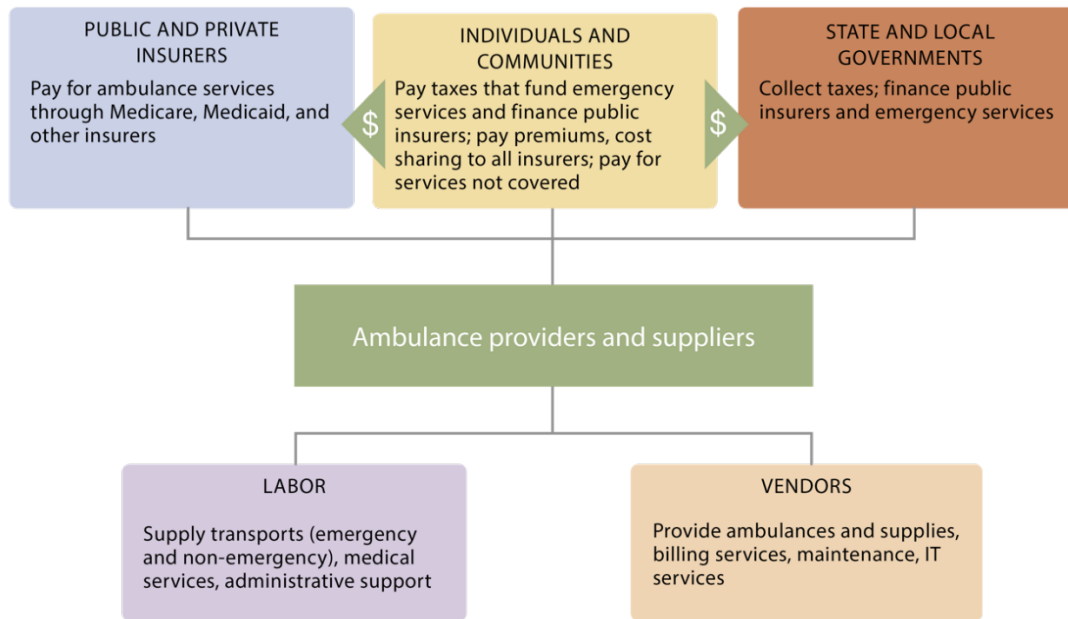


Figure 2-1. Overview of Supply and Demand for Ambulance Services

## 2.1 Ground Ambulance Organizations

Ground ambulance organizations are a diverse group of organizations working in diverse communities and facing various financial and other incentives. They differ on many dimensions, including the characteristics of their business (e.g., ownership and organizational structure) and the levels of services they provide (e.g., primarily emergency versus non-emergency scheduled transports, or basic life support [BLS] versus advanced life support [ALS]). All these characteristics have important implications for the costs and revenues associated with providing ambulance services.

### 2.1.1 Ground Ambulance Organization Taxonomy

To characterize organizations delivering ambulance services, we developed a taxonomy of ownership and institutional relationships relevant to the Medicare program in Figure 2-2. The distinction between providers and suppliers reflects an organization's relationship with Medicare in terms of enrollment. Providers—including hospitals, SNFs, and other facilities—that enroll with Medicare can bill the program for ambulance services in addition to other types of medical services. Suppliers may bill Medicare only for ambulance services in specific circumstances, as governed by Medicare coverage and payment policy. The distinction CMS makes between Medicare providers and suppliers does not necessarily reflect differences in the types of ambulance services delivered. In 2012, approximately 11,000 organizations delivered ambulance services to Medicare fee-for-service beneficiaries, 94 percent of which were delivered by ambulance suppliers.<sup>20</sup>

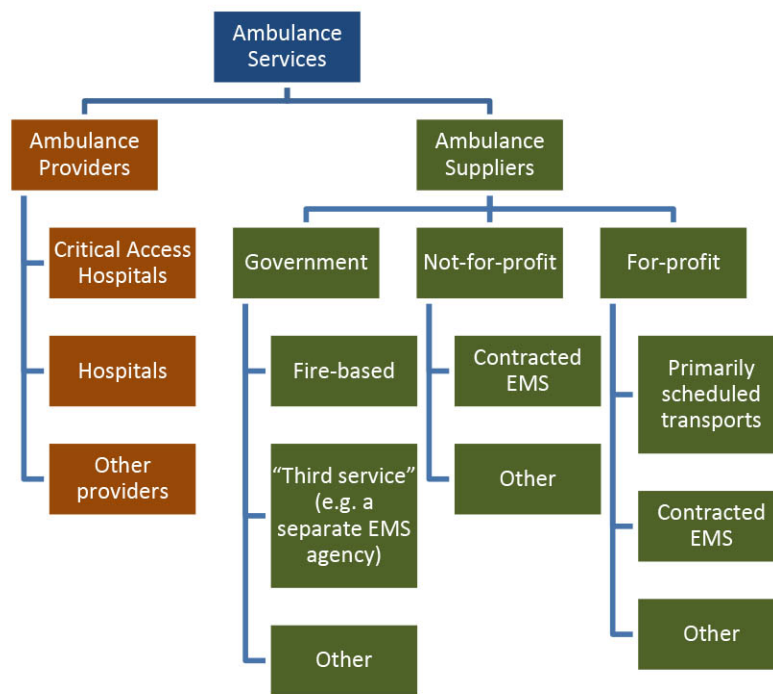


Figure 2-2. Taxonomy of Medicare Ground Ambulance Organizations

### 2.1.1.1 Ambulance Providers

The type of healthcare institution that ambulance providers are associated with can affect the types of services they provide and the setting in which they operate. Most ambulance providers are enrolled in Medicare as acute care hospitals and critical access hospitals (CAHs). [5] A small number of ambulance providers are associated with other types of healthcare facilities, such as dialysis facilities and SNFs. Because ambulance providers are primarily hospital-based, they are a relatively homogeneous group. Most provide a mix of both emergency and non-emergency transports, though the latter are less common. There is, however, some variability among ambulance providers in terms of the ownership status of the healthcare institution (i.e., government owned, not-for-profit, for-profit), the volume of ambulance transports provided, and the level of service typically provided (i.e., ALS, BLS, specialty care transport). In addition, CAHs are different than most acute care hospitals; they are typically small (fewer than 25 inpatient beds) and serve primarily rural areas.

### 2.1.1.2 Ambulance Suppliers

Ownership status has important implications for how ambulance suppliers are organized, the costs they incur, and the revenue streams available to them. Ambulance suppliers can be government entities or for-profit or not-for-profit private organizations.

Government-based ambulance suppliers are typically part of the emergency medical system. As such, they are expected to be ready to provide the public with EMS at any time of day or night. Most often, the ambulance supplier is housed within the fire department. These fire-based organizations make up 40 percent of all ambulance organizations. [8] In other communities,

government ambulance services are set up as a separate, or “third service,” EMS agency that works alongside the police and the fire department; this arrangement accounts for 21 percent of all ambulance organizations. [8] Less common models include organizing ambulance services as a local public utility or as a public-private partnership. [9]

Private, not-for-profit, and for-profit ambulance suppliers deliver a mix of ambulance services. Some contract with local governments to provide ambulance services to the community and are responsible for emergency medical transports. Others, typically for-profit suppliers, focus on non-emergency (scheduled or unscheduled) transports, such as transports to and from dialysis treatment or from a hospital to a SNF. Suppliers focusing on scheduled transports are financed primarily through payments for services from insurers or patients; they do not incur the same readiness costs as those providing on-call emergency medical services.

## 2.1.2 Key Ambulance Provider and Supplier Characteristics

Within each of the components of the taxonomy, several important characteristics vary among ambulance organizations that have implications for their costs and revenues. Below we highlight some of these key characteristics.

- **Population density of service area:** Ambulance organizations operate in urban, rural, or super rural settings. Rural and super rural organizations tend to be smaller, transport patients greater distances, and are more likely to be government owned and rely more heavily on volunteer labor.
- **Volume of transports:** The size of ambulance organizations’ operations varies, ranging from providing only a small number of Medicare transports (e.g., fewer than 10) per year to providing over 100,000 per year. Economies of scale are thought to lower the per-transport cost as the size of the operation increases. Suppliers providing a large volume of transports are more likely to be for-profit organizations.
- **Types of services provided:** One key distinction in the types of services provided is between emergency transports and non-emergency (e.g., scheduled or inter-facility) transports. For-profit suppliers are more likely than others to specialize in non-emergency scheduled transports. Another key distinction is between the level of service provided (e.g., BLS versus ALS).
- **Staffing:** The level of staff training (e.g., EMTs versus paramedics) and the number of staff deployed are driven in part by the type and volume of calls, the availability and proximity of the nearest providers, and resources available in the community. [10] Some suppliers use static staffing models that use set staff schedules, whereas others use a dynamic, or flexible, staffing model that calls upon staff if there is a surge in demand.
- **Use of volunteer labor:** Volunteer labor tends to be more common among small, government-based ambulance suppliers operating in rural and super rural settings.
- **Response times:** In many cases, response times are related to the population density of the area, with rural areas having response times more than double those of urban areas.[11] Ground ambulance organizations serving primarily rural and super rural areas generally travel greater distances to get to patients and transport them to a hospital or the nearest appropriate facility. Variation in response times within urban areas might also occur, for example if there is significant emergency department crowding, or in extreme

cases diversion that requires the ambulance staff to travel farther to another hospital or wait with the patient until a bed is available. This extra time affects the availability of the ambulance and the staff for subsequent trips, potentially increasing response times.

### 2.1.3 Links Between Ambulance Organizations and the Broader Healthcare System

The healthcare delivery system in which ambulance organizations operate is built from a wide array of facility-based providers, including hospitals and SNFs, physician practices, clinics and other outpatient facilities, and other suppliers. Hospitals and dialysis facilities are the most common destinations for emergency and non-emergency transport of Medicare beneficiaries, respectively. Like ground ambulance providers and suppliers, healthcare providers and suppliers bill Medicare, other payers, and patients for the services they furnish to patients.

Ground ambulance organizations not only transport patients, they also coordinate with emergency medicine physicians and nurses at hospitals for triage and routing. Some emergency medicine physicians also serve as medical directors for ground ambulance organizations. All ground ambulance services that provide ALS services are required to have a medical director, whereas medical director requirements for organizations that provide only BLS services vary by state. The specific duties and training requirements of medical directors differ by state, but in general they oversee training and the protocols and policies of the organization, and they serve as a liaison with the local medical community.

## 2.2 Sources of Revenue

Ground ambulance organizations typically draw revenue from multiple sources. There is no comprehensive data source on all revenue streams for ambulance organizations. Here we describe public and private insurance payers, government-based revenue streams, and payments from individuals and communities, as well as each entity's respective role in regulation and oversight of ambulance organizations.

### 2.2.1 Healthcare Payers

Medicare, Medicaid, and other payers—including commercial insurers covering patients through employer-sponsored insurance, individual, or small group plans; Medicare Advantage plans; and Medicaid managed care plans—typically cover medically necessary ambulance services. Ground ambulance organizations bill these insurers for covered services; insurers then pay ground ambulance organizations for covered services, typically using a fee schedule like the AFS with payments determined by the level of ambulance service furnished and mileage. Patients often shoulder a share of the total payment through cost-sharing.

Revenue from healthcare payers represents a variable portion of total revenue for ground ambulance organizations. The portion depends on whether ambulance organizations try to bill for services, how aggressively they try to collect those bills, and most important, on the amount of funding received from other sources, including support from local governments and fundraising.

### 2.2.1.1 Medicare

The fee-for-service Medicare program covers ambulance services under the Medicare Part A hospital benefit and the Part B medical benefit. Medicare covers Part B ambulance services when:

- Actual transport of the beneficiary occurs
- The beneficiary is transported to the nearest appropriate facility that can treat the patient's condition
- The transport is reasonable and medically necessary
- The ambulance provider or supplier meets all applicable vehicle, staffing, billing, and reporting requirements
- The transport is not part of a Part A service<sup>21</sup>

An ambulance transport when a patient is an inpatient at a hospital or other facility is generally covered as part of the inpatient Medicare severity diagnostic-related group payment under Part A. If a patient needs supplemental care and is then transported back to the same facility, whether the ambulance transport is covered under Part A or B depends on the exact circumstances related to three factors: whether the two provider numbers are the same, whether the two providers are on the same campus, and whether the patient status is inpatient or outpatient. If a patient is discharged from the hospital and transported elsewhere, the ambulance transport is billed under Part B.

Appropriate destinations include hospital, CAH; SNF; from a SNF to the nearest supplier of medically necessary services not available at the SNF where the beneficiary is a resident and not in a covered Part A stay, including the return trip; beneficiary's home; and dialysis facility for an end-stage renal disease (ESRD) patient who requires dialysis.

Under the AFS, Medicare Part B base payments for ambulance transports vary by the level of transport, with distinctions for BLS versus ALS transports, emergency versus non-emergency transports, and other factors.<sup>22</sup> The AFS allows a separate mileage payment for the distance traveled with the patient loaded in the ambulance from the point of ambulance pickup to the nearest appropriate destination. Both base and mileage payments are updated annually to account for inflation. The total payment for a transport is the sum of the base and mileage rates modified by add-on payments as appropriate.<sup>23</sup>

- A 50 percent increase in the standard mileage rate for ground ambulance transports that originate in rural areas where the travel distance is between one and 17 miles.

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<sup>21</sup> Medicare Benefit Policy Manual Chapter 10 - Ambulance Services.

<sup>22</sup> More specifically, the AFS lists relative value unit (RVU) values for each level of transport, which are then modified by a geographic adjustment factor and multiplied by a conversion factor to arrive at a base payment amount in dollars.

<sup>23</sup> According to GAO (2012), "The add-on payments increase payments for urban and rural transports by 2 and 3 percent, respectively. There is also an add-on payment applicable to super rural transports, consisting of the 3 percent rural amount and an additional increase of 22.6 percent for a portion of the super rural payment." See section 1834(l)(12) and (l)(13) of the Act, 42 CFR §414.610(c)(1)(ii) and §414.610(c)(5)(ii).

- A 3 percent increase to the base and mileage rate for transports that originate in rural areas.
- A 2 percent increase to the base and mileage rate for transports that originate in urban areas.
- A 22.6 percent increase in the base rate for transports that originate in “super rural” areas.
- For services furnished on or after October 1, 2018, the AFS also includes a 23 percent reduction in payments for certain non-emergency BLS transports of beneficiaries with ESRD for renal dialysis services.<sup>24</sup>

### 2.2.1.2 Medicaid

The way in which state Medicaid agencies pay ground ambulance organizations varies, though most use a fee-for-service system and a mileage rate, and rates are generally low relative to Medicare and commercial payment. [6] As an example of variation in state payment, Idaho Medicaid pays a flat rate for “respond and evaluate” calls that do not result in transport to the ED, whereas Virginia pays a flat rate for transporting a patient to a hospital within five miles regardless of whether it is a BLS or ALS transport. [13]

### 2.2.1.3 Other Payers

Other payers, including commercial health plans, typically use a fee-for-service or discounted fee-for-service arrangement to pay for ambulance services. [14] Some insurers are experimenting with different types of payment for ambulance services, such as capitation, and are providing payment for alternative services such as payment for treatment at the scene. Ambulance suppliers that focus on scheduled transports are financed primarily through payments for services from insurers or patients; they do not incur the same readiness costs as those providing on-call emergency medical services.

## 2.2.2 Government

### 2.2.2.1 Local Government

Government-based ambulance suppliers are often funded in part through local taxes or other public funds. Some government-based ambulance suppliers choose not to bill patients for services because they are funded by the community. Over time, as EMS funding has shrunk, a growing number of government ambulance suppliers have started billing Medicare and other insurers for transports, but collection rates still vary. [6] Local and municipal governments tax citizens and may finance municipal ground ambulance organizations directly through special tax set-asides, general city revenue, and fees for service. [6] The extent to which suppliers rely on local government funding varies. Local governments make decisions whether to operate an EMS unit themselves or to contract with ambulance suppliers to provide services to the community. In another model, a quasi-governmental organization may own the ambulance equipment but contract with a private supplier for labor. [6] Local governments and their communities may also

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<sup>24</sup> See section 1834(l)(15) of the Act, 42 C.F.R. § 414.610(c)(8).



set performance metrics (e.g., target average response times) for their EMS system or contracted suppliers.

### 2.2.2.2 State and Federal Governments

Government entities contribute to ground ambulance organization revenue through payment for transports and grant programs. State and federal governments jointly finance state Medicaid programs, which pay for medically necessary ambulance transports to the nearest appropriate facility. As previously mentioned, the federal government also pays for other ambulance transports through the Medicare program. A relatively small amount of federal government funding is provided by the Health Resources and Services Administration (HRSA), the National Highway Transportation Safety Administration (NHSTA), the Centers for Disease Control and Prevention (CDC), the Department of Homeland Security (DHS), and other agencies. [6] This funding typically takes the shape of formula or block grants, such as the Emergency Management Performance Grants and the Homeland Security Grant Program (HSGP), but direct federal grants are also available. [15] Some states also provide direct funding through special-purpose grants, matching grants, low-interest loans, or technical assistance that is financed through insurance surcharges or driving-related fees and fines. [15]

Local, state, and federal governments also regulate ambulance organizations and collect data. While federal laws such as the Emergency Medical Treatment and Active Labor Act and the Health Insurance Portability and Accountability Act (HIPAA) both affect how ambulance organizations operate, states are the primary regulators of local EMS systems and determine the scope of practice of state-licensed EMS personnel. [6] Many state agencies also collect data from ground ambulance organizations through dedicated reporting systems. Further, most states report incident data to the federal National Emergency Medical Services Information System, operated by NHSTA.

In addition, states and localities often have other laws and regulations in force, addressing staffing requirements, equipment requirements, and response times. For example, Oklahoma requires ambulance drivers to be, at a minimum, certified Emergency Medical Responders (EMRs) [16], and the City of Philadelphia requires a paramedic and a second person with at least EMT certification on ALS ambulance transports. [17] Both of these requirements go beyond CMS's minimum staffing requirements. The City of San Francisco requires specific equipment on all ambulances, such as automated external defibrillators, [18] that is not specified in CMS's equipment requirements.<sup>25</sup> San Francisco also has specific required response times for BLS and ALS transports. [18]

## 2.2.3 Individuals and Communities

Individuals finance ambulance services in their communities through a variety of mechanisms, including state and local taxes; taxes that fund Medicaid and Medicare; and through premiums, cost-sharing, and direct payment for non-covered transports. For transports covered under Medicare Part B, for example, beneficiaries are responsible for paying 20 percent of the Medicare-approved fee, although many beneficiaries have supplemental insurance that covers this cost-sharing amount. [19] Individuals need to pay out of pocket for part or all of the billed

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<sup>25</sup> 42 CFR §410.41(a)(4): Be equipped with a stretcher, linens, emergency medical supplies, oxygen equipment, and other lifesaving emergency medical equipment as required by state or local laws.

amount for an ambulance service if it is not covered by their plan or if they do not have insurance. According to a 2014 study of ambulance transports of individuals with commercial insurance, 26 percent of the transports were billed at an out-of-network rate. [20] This is substantially higher than the proportion of other services billed as out-of-network over the same period: 20 percent of hospital inpatient admissions from the emergency department (ED), 14 percent of outpatient visits to the ED, and 9 percent of elective inpatient admissions. [20]

## 2.3 Costs

Ground ambulance organizations incur various costs to deliver EMS and non-emergency services. Here we describe costs associated with medical and non-medical labor, as well as the types of vendors that ambulance organizations may need to pay.

### 2.3.1 Labor

Ground ambulance organizations rely on a range of personnel such as EMTs and paramedics, ambulance drivers, ambulance dispatchers, Registered Nurses, billing clerks, general and operations managers, office managers and clerks, and medical directors. [5] Among EMS personnel, there is a range of skill and compensation levels. In an attempt to increase the consistency of personnel licensure laws across states, NHTSA established a national scope of practice model that includes four levels of licensure for EMS personnel: EMR, EMT, Advanced EMT, and Paramedic, with suggested guidelines for the scope of practice for each. [21] Each level of EMS personnel has additional training requirements and is qualified to provide successively more advanced levels of care. Table 2-1 shows the number of nationally certified personnel within each category; recertification is required every two years. Importantly, many states require only state certification, so not all EMS personnel seek national certification.

Table 2-1. Nationally Certified EMS Personnel, 2018

EMR	EMT	Advanced EMT	Paramedic	Total
12,358	259,197	15,195	100,752	387,502

Source: National Registry of Emergency Medical Technicians

Note: Does not include personnel who are not nationally certified. EMR is Emergency Medical Responder. EMT is Emergency Medical Technician.

The type of ambulance personnel staffing transports is also subject to CMS's requirements and state or local laws. [22] CMS has minimum staffing requirements for BLS and ALS transport, including the number and type of staff (e.g., must be staffed by at least two people and at least one must be certified, at a minimum, as an EMT-Basic for a BLS ambulance vehicle; must be staffed by at least two people and at least one must be certified as an EMT-Intermediate or an EMT-Paramedic for an ALS ambulance vehicle).<sup>26</sup>

<sup>26</sup> 42 CFR §410.41 (b) and Medicare Benefit Policy Manual, Chapter 10, section 10.1.2. We note that while the National Registry of Emergency Medical Technicians has moved to four categories of staff: EMR, EMT, A-EMT

EMS labor may be salaried or volunteer, contracted, or a combination thereof. Several studies and trade group surveys indicate that wages for EMS workers are low and stagnating, particularly among private sector EMS workers. [23] In California, for example, one-third of private sector EMTs and paramedics are considered low-wage workers, earning two-thirds of the California median wage. [23] A 2015 national study of EMS salaries indicated that an EMT-Basic working for a municipal agency made \$13,549 more per year than one working for a private sector organization (\$43,939 versus \$34,431). [24] Organizations responding to the survey also reported that 74 percent of their staff had second jobs. [24] NTHSA, IOM, and surveys of EMS organizations all cite recruitment and retention of EMS staff as a major challenge. [23]

In 2003, 36.5 percent of the national EMS labor force was volunteer; this percentage reached as high as 50 percent in some states. [6] In rural areas, volunteers make up 75 percent of the EMS workforce, compared to 7.5 percent in large cities. [6] EMS labor may be paid or volunteer at any of the four licensure levels, but EMRs and EMTs are more likely to be volunteer than are Advanced EMTs or Paramedics. [21] Paid EMS labor with higher licensure levels also tend to have higher salaries than those at lower licensure levels. EMS personnel are predominantly located in rural areas (21.6 percent) and small towns (32.5 percent) compared to medium-sized towns (16.4 percent) and large cities (9.9 percent). [6] A 2010 survey of rural EMS directors in 23 states reported that 69 percent revealed difficulty recruiting and retaining volunteers. [25]

Medical director staffing arrangements vary widely; they may be salaried (at full or part time), contracted, or volunteer. In a 2017 survey of EMS agencies, 62 percent reported that their medical directors work fewer than 20 hours per week in the position. [26] Recruitment of qualified medical directors is particularly challenging in rural areas, and the position may be filled with primary care physicians with little emergency medicine training. [6]

A number of different labor organizations represent EMS professionals. These include the International Association of Fire Fighters [27] (IAFF), which is a labor union representing full-time paid firefighters and EMS workers; NVFC [28], which is a non-profit association representing volunteer fire, EMS, and rescue services; and The National Association of Emergency Medical Technicians (NAEMT), which is a professional association representing all EMTs and Paramedics. [29]

### 2.3.2 Vendors

Ground ambulance organizations require a range of inputs to serve patients. Vendors play various roles depending on the services they sell, which include but are not limited to ground ambulance vehicles; ambulance accessories and equipment; medical supplies; drugs; durable medical equipment; communications and technology hardware and software (e.g., electronic patient care reporting software, billing software, employee scheduling); insurance (e.g., general, liability, workers compensation); and contract services such as billing and training. [30] Vendors can help ground ambulance organizations adhere to government requirements for equipment. For example, CMS has specific requirements for ground ambulance vehicles that include complying with state and local laws for licensing and certification, as well as being equipped with certain

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and Paramedic, the Medicare Benefit Policy Manual still uses the terms EMT-Basic (generally equivalent to EMT) and EMT-Intermediate (generally equivalent to Advanced EMT) but defers to state law on the actual certification requirements.

types of medical equipment, supplies, and telecommunication systems. [22] By understanding the requirements to which ground ambulance organizations must adhere, vendors can ensure that the equipment that they sell meets or exceeds government specifications.

Because ground ambulance organizations often bill multiple payers for services, navigate differences in coverage policies and billing requirements, and receive different rates from each payer, many use third-party vendors to manage billing and payment. A 2016 survey of 100 EMS agencies indicated that half were using these external vendors. [26] Other ambulance organizations keep their billing management in house, an advantage of which is that staff have a relationship with the customers and understand local billing regulations for their particular area. [31] Conversely, by keeping the billing function in house, organizations need to establish and maintain an information technology infrastructure that includes security and firewall protections and the staff to manage the systems. [31] In-house billing management also requires staff with expertise in coding and claims submission. [31]

## 2.4 Summary

The diversity in ambulance organizations and multiple key stakeholder groups related to the costs and revenue realized by ambulance organizations are important to bear in mind when analyzing ground ambulance services. Despite the importance of ground ambulance services to communities and to the healthcare system, there is little existing data or empirical analysis that can be used to describe the full breadth of ambulance organizations. In the next chapter, we use available Medicare data to describe ambulance organizations in more detail with a focus on identifying key organizational characteristics with the potential to systematically affect costs and revenue. In later chapters, we look at existing frameworks that cover the full range of stakeholders, costs, and sources of revenue described in this chapter, and we subsequently develop our own framework and instrument to collect this information.

### 3. Ambulance Cost and Revenue Frameworks

As described in Chapters 1 and 2, the diversity of ground ambulance organizations introduces challenges for efforts to collect data related to ambulance costs, revenue, utilization, and other factors. We developed a conceptual framework of costs and revenue to provide a systematic way to organize information and ensure that all relevant components are considered and ultimately collected via the instrument. Moreover, a framework facilitates both the use of a common language and an illustration of the interactions between ambulance organization characteristics, the populations served, and cost and revenue components. A framework also allows for the evaluation of existing frameworks to determine their relevance and utility.

In the sections below, we discuss the foundation for our conceptual framework, assessment of existing tools to collect ambulance cost and revenue data, and comparison of those tools to our cost framework. It is important to note that ground ambulance organizations incur a range of costs, some of which may not be directly related to ambulance services (e.g., homeland security training, labor to support fire-based services). These costs, while a burden to ground ambulance organizations, are outside the scope of this work and are not represented in our conceptual framework.

#### 3.1 Conceptual Foundation for a Cost Framework

Ground ambulance organizations, like other organizations, incur a combination of fixed and variable costs in running their operations. Fixed costs include the costs of buildings and some labor categories, such as the cost of a medical director or administrators, that do not scale with the volume of services provided in the short-term.<sup>27</sup> Variable costs (e.g., EMTs, medical supplies, and fuel) scale with the volume of services provided. Total ambulance costs, for costs categories  $c=1$  through  $C$  and for services  $s=1$  through  $s=S$ , are therefore:

$$\text{Total Costs} = \text{Fixed Costs} * \text{Allocation Factor} + \sum_{s=1}^{s=S} \sum_{c=1}^{c=C} \text{Volume}_s * \text{Variable Costs}_{sc}$$

##### 3.1.1 Fixed Costs and Allocation Factor

Although ground ambulance organizations have fixed costs that do not scale with the volume of services provided, they may also realize economies of scale (i.e., a decreasing cost per service as the volume of services increases for fixed costs). Larger ground ambulance organizations, for example, may achieve lower per-service costs by spreading fixed costs over a larger service volume base. Ground ambulance organizations that provide other services in addition to ambulance services may have larger fixed costs than those that furnish only ambulance services. For example, a hospital may have significant fixed costs related to facilities or staffing hospital departments, and fire-based ambulance suppliers may have facility and vehicle fixed costs related to fire and rescue response. In such cases, only a fraction of total fixed costs may be relevant to the provision of ambulance services. An allocation factor—such as the square footage

<sup>27</sup> In the long run, the number of vehicles or management staff may scale with the volume of services provided. In the short term, however, these are assumed to be fixed costs.

of a hospital related to ground ambulance services—can be applied to total fixed costs to calculate the share of costs that are relevant to ground ambulance services.

### 3.1.2 Service Volume

Ground ambulance organizations furnish a range of services, including those that are typically billed to healthcare payers and patients (e.g., BLS and ALS transports), those that are not typically billed to patients (e.g., calls that do not result in a transport), and other services (e.g., providing a staffed and equipped ambulance to be ready to respond to calls in the community or at a public event). Ground ambulance organizations may tally the volume of different service categories in different ways, or in some cases not at all.

### 3.1.3 Variable Costs

In contrast to fixed costs, variable costs scale with the volume of services provided and include costs such as EMT labor, drugs and medical supplies, and fuel. Because these costs are directly relevant to the ambulance services being offered, they should be allocated exclusively to ambulance services and therefore do not require a distinct allocation factor in the conceptual framework where we include only ambulance service categories. In practice, however, some variable cost categories such as fuel or dispatch center labor may need to be allocated to ambulance and non-ambulance portions if total fuel cost or total dispatch center labor costs are collected for some organizations such as fire-based ambulance suppliers.

Most variable costs are positively related to the volume of services provided. An exception may come into play when larger ground ambulance organizations have more purchasing power (e.g., economies of scale in buying supplies) than smaller ground ambulance organizations; in such cases, the larger organizations would have lower variable costs in some categories. The variable cost components involved in each type of service can differ (e.g., paramedic labor is required for ALS transports but not always for BLS transports). It is important to note that the variable costs associated with services other than ambulance services are not included in the scope of our cost framework.

## 3.2 Cost Framework

Pulling from standard frameworks in the cost analysis field, we developed the following cost-element structure (CES) framework for the ambulance industry (Table 3-1). The notional cost equation presented in the table represents the units of measurement needed to estimate the cost elements. Cost domains include both fixed and variable costs. The framework organizes costs around two primary domains: 1) labor costs, including salaries, wages, benefits, taxes, etc., and 2) non-labor costs.

Table 3-1. Proposed Ambulance Cost Framework

CES Level	Cost Element Structure (CES)	Notional Cost Equation
<b>1</b>	<b>Operating Costs</b>	
1.1	Labor Costs	Summation of 1.1.x
1.1.1	Administrative Staff	Full Time Equivalent Staff x Burdened Labor Rate*

<b>CES Level</b>	<b>Cost Element Structure (CES)</b>	<b>Notional Cost Equation</b>
1.1.2	Management Staff	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.3	Dispatch/Call Center Staff	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.4	EMT Staff	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.5	Vehicle Maintenance Staff	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.6	Facilities Maintenance Staff	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.7	Volunteer Labor	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.8	Training Staff	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.9	Nursing Staff	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.10	Paramedics Staff	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.11	Medical Control Staff	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.12	Medical Director	Full Time Equivalent Staff x Burdened Labor Rate*
1.1.13	Other Labor	Full Time Equivalent Staff x Burdened Labor Rate*
1.2	Non-Labor Costs	Summation of 1.2.x
1.2.1	Facilities Costs	Summation of 1.2.1.x
1.2.1.1	Rent or Imputed Rent or Mortgage	Annual Rent or Imputed Rent or Mortgage for all Facilities
1.2.1.2	Property Taxes	Annual Property Taxes for all Facilities
1.2.1.3	Utilities	Annual Utilities for all Facilities
1.2.1.4	Insurance	Annual Insurance for all Facilities
1.2.1.5	Facilities Maintenance	Annual Maintenance (non-labor) for all Facilities
1.2.1.6	Other facilities costs	Annual costs for other miscellaneous facilities categories
1.2.2	Vehicle Costs	Summation of 1.2.2.x
1.2.2.1	Lease/Purchase Payments	Annual Lease/Purchase Payment
1.2.2.2	Vehicle Depreciation	$\sum (\text{Vehicle Cost } x - \text{Residual Value } x) / \text{Useful Life of Vehicle (Years)} \times$
1.2.2.3	Registration Fees	Number of Vehicles x Registration Cost per Vehicle
1.2.2.4	License Costs	Number of Vehicles x License Cost per Vehicle
1.2.2.5	Insurance	Number of Vehicles x Average Insurance Cost per Vehicle
1.2.2.6	Vehicle Maintenance	Number of Vehicles x Average Maintenance Cost per Vehicle
1.2.2.7	Fuel	Number of Vehicles x Mileage per Vehicle x Vehicle Miles per Gallon x Average Cost per Gallon
1.2.2.8	Other vehicle costs	Number of Vehicles x Average Costs per Vehicle
1.2.3	Equipment Costs	Summation of 1.2.3.x

<b>CES Level</b>	<b>Cost Element Structure (CES)</b>	<b>Notional Cost Equation</b>
1.2.3.1	Medical Equipment	$\sum (\text{Medical Equipment} \times \text{Quantity}) \times (\text{Medical Equipment} \times \text{Price})$
1.2.3.1.1	Equipment Depreciation	$\sum (\text{Equipment Cost} \times - \text{Residual Value} \times) / \text{Useful Life of Equipment (Years)} \times$
1.2.3.1.2	Equipment Maintenance	Average Annual Equipment Maintenance Cost
1.2.3.2	Non-Medical Equipment	$\sum (\text{Non-Medical Equipment} \times \text{Quantity}) \times (\text{Non-Medical Equipment} \times \text{Price})$
1.2.3.2.1	Equipment Depreciation	$\sum (\text{Equipment Cost} \times - \text{Residual Value} \times) / \text{Useful Life of Equipment (Years)} \times$
1.2.3.2.2	Equipment Maintenance	Average Annual Equipment Maintenance Cost
1.2.3.3	Uniforms	Number of Uniforms $\times$ Cost per Uniform
1.2.4	Consumables	Summation of 1.2.4.x
1.2.4.1	Medication	Annual Medication Costs
1.2.4.2	Medical Supplies	Annual Medical Supplies Costs
1.2.4.3	Non-Medical Supplies	Annual Non-Medical Supplies Costs
1.2.5	Other Miscellaneous Costs/Fees	Summation of 1.2.5.x
1.2.5.1	911 Service Fees	Annual 911 Service Fees
1.2.5.2	Regulatory or Compliance Fees	Annual Regulatory or Compliance Fees
1.2.5.3	Other Local Jurisdiction Fees	Annual Local Jurisdiction Fees
1.2.5.4	Training Costs	Annual Training Costs
1.2.7.5	Other fees	Other miscellaneous fees

\* Burdened labor rate = total compensation including salary, benefits, bonuses, taxes, etc.

### 3.3 Revenue Framework

Payments from Medicare and other healthcare payers are important components of total revenue for some ground ambulance organizations. In most cases, revenue over a given time span is calculated as the product of some unit of volume over the period, represented by billed Healthcare Common Procedure Coding System (HCPCS) codes or miles, and a payment rate per unit. For a given ambulance provider or supplier, revenue from an individual payer is the sum of the products of volume and per-unit payments for all billed services  $s=1$  through  $s=S$ . Total payments from all payers are a second summation over all payers  $p=1$  through  $p=P$ .

$$\text{Revenue from All Payers} = \sum_{p=1}^{p=P} \sum_{s=1}^{s=S} \text{Units}_{sp} * \frac{\text{Payment}_{sp}}{\text{Units}_{sp}}$$

In other cases, ground ambulance organizations may receive a capitated payment per enrolled beneficiary in a service area. Capitation arrangements also fit within the payer revenue framework above, where the unit is an enrollee and the payment is the capitation amount. Most ground ambulance organizations have sources of revenue other than payments for billed services.



Our environmental scan, literature review, [15] and stakeholder discussions revealed several key sources of revenue. These include but are not limited to:

1. Patient out-of-pocket payments including cost-sharing
2. Direct public financing of fire, EMS, or other agencies
3. Subsidies, grants, and other revenue from local, state, or federal government sources
4. Revenue from providing services under contract
5. Fundraising and donations

We view total revenue as the sum of payments from healthcare payers (described above) and each of the other sources of revenue listed above.

### 3.4 Using the Cost and Revenue Frameworks to Compare Existing Ambulance Data Collection Tools

Over the past decade, other organizations have developed cost frameworks or conducted data collection efforts to gather and analyze information related to ambulance service costs and revenue. To inform our proposed instrument and evaluate challenges of past data collection efforts, we identified and summarized five existing data collection instruments and tools (hereinafter referred to as the “tools”):

1. The Moran Company Statistical and Financial Data Survey (the “Moran survey”), and the American Ambulance Association (AAA) recommended framework for data collection (the “AAA recommendations”) [32, 33]
2. Ground Emergency Medical Transportation (GEMT) Cost Report form and instructions from California’s Medicaid program, Medi-Cal [34]
3. The Emergency Medical Services Cost Analysis Project (EMSCAP) framework [35]
4. A 2012 GAO ambulance survey [4]
5. The Rural Ambulance Service Budget Model [36]

Next, we describe and analyze these five tools across the cost and revenue domains from the frameworks described above as follows:

1. Labor costs
2. Facility costs
3. Vehicle costs
4. Equipment, supplies, and consumables (e.g., medications and certain medical supplies)
5. Miscellaneous costs
6. Revenue

As a final step, we compare the design features and approach for these five tools.

## 3.5 Description of Existing Tools

### 3.5.1 The Moran Survey

In 2013, AAA commissioned the Moran Company to develop recommendations for collecting data to determine the costs of delivering ground ambulance services to fee-for-service Medicare beneficiaries. Moran developed, tested, and recommended a two-step data collection method in which all ground ambulance organizations would complete a short survey with basic descriptive information, which could be updated annually. Moran recommended excluding ground ambulance organizations with low administrative capacity and heavy reliance upon volunteers. From the remaining ground ambulance organizations, Medicare would then draw a stratified random sample to complete the statistical and financial survey.

Following the enactment of the BBA of 2018 mandating that CMS collect cost, revenue, utilization, and other relevant information on ground ambulance services, AAA compiled a series of recommendations to CMS, building on Moran's prior reports related to data standardization and survey design and testing. In addition to costs and revenue, the AAA recommendations address data related to characteristics of ground ambulance organizations and to the volume of ground ambulance services.

### 3.5.2 GEMT Cost Report

The GEMT Cost Report is used in some states to determine whether ground ambulance organizations should receive supplemental payments from state Medicaid programs to cover shortfalls between revenue and costs. Qualifying entities that provide GEMT services to Medicaid recipients may complete this survey to receive supplemental payments. The survey is geared toward government entities, as private ground ambulance organizations do not qualify for the supplemental payments.

### 3.5.3 EMSCAP

The National Highway Traffic Safety Administration (NHTSA) funded EMSCAP in 2007 to develop a framework for determining the cost for an EMS system at the community level. Subsequently, EMSCAP researchers used this framework to develop a cost workbook and pilot test the instrument on three communities representing rural, urban, and suburban areas. EMS services within the three communities included volunteer, paid, and combination EMS agencies, both fire department and third service-based.

### 3.5.4 Government Accountability Office Survey

To examine ground ambulance providers' costs for transports, in 2012 GAO fielded a web-based survey to a random sample of 294 eligible ambulance suppliers. GAO collected data on their costs, revenues, transports, and organizational characteristics in 2010. Although the GAO survey collected data for each domain at the summary level, it also prompted respondents to take into account multiple factors when calculating their summary costs.

### 3.5.5 Rural Ambulance Service Budget Model

This tool was developed by a task force of the Rural EMS and Trauma Technical Assistance Center within HRSA in the early 2000s. The purpose was to provide assistance to rural ambulance entities in establishing an annual budget and to calculate the value of services donated by other entities as well as services donated by the ambulance entity's staff to the community. The tool was last updated in 2010 [36] and has been cited as a resource for rural ambulance organizations by state and national government agencies. [37] However, none of these agencies require use of the tool.

## 3.6 Comparison of Tools Using the Cost Element Structure Framework

To compare the tools, we overlaid each item from the five ambulance tools with the initial cost framework. This helped identify gaps and overlap across tools both in content and language. As indicated in Table 3-2, we found that no single tool covers all cost elements at the lower levels; however, they cover aspects of all domains (noted in the grey bars). In addition, when reviewing all the tools together, almost all cost elements are covered, as well as some additional elements not outlined originally in our CES framework. Those additional cost elements are included as additional rows in the table. The three proposed cost elements not captured by one of the five tools are medical control staff, equipment maintenance, and 911 service fees.

In addition to content, we examined characteristics of the instrument structure and design across all five tools. As indicated in Table 3-3, the primary differences related to how they gathered information on costs associated with labor; facilities; vehicles; and equipment and supplies. Overall, there was a large amount of variability as to whether the tools allowed for detailed accounting of costs in these higher-level categories and whether they used respondent-defined or survey-defined categories. In general, some tools, most notably the GAO survey, do not provide detailed subcategories of reporting while others, most notably Moran, requested very detailed subcategories of reporting. Below, we provide a more in-depth comparison of tool structure and design, focusing on the higher-level cost elements outlined in the CES framework. In addition, we highlight differences and similarities across the surveys to inform design of the survey for this project. Differences between content and structure are summarized in Tables 3–2 and 3–3, respectively, and additional details are provided in Appendix A.

Table 3-2. Proposed Cost Element Structure and Coverage across Existing Ambulance Cost Tools

CES Level	Cost Element Structure (CES)	EMSCAP	GAO	GEMT	Moran	Rural Ambulance Service Budget Model
<b>1</b>	<b>Operating Costs</b>					
1.1	Labor Costs	X	X	X	X	X
1.1.1	Administrative Staff	X		X	X	X
1.1.2	Management Staff				X	
1.1.3	Dispatch/Call Center Staff			X		X
1.1.4	EMT Staff				X	X
1.1.5	Vehicle Maintenance Staff					
1.1.6	Facilities Maintenance Staff					

CES Level	Cost Element Structure (CES)	EMSCAP	GAO	GEMT	Moran	Rural Ambulance Service Budget Model
1.1.7	Volunteer Labor		X		X	
1.1.8	Training Staff	X		X	X	X
1.1.9	Nursing Staff					
1.1.10	Paramedic Staff					
1.1.11	Medical Control Staff*					
1.1.12	Medical Director					X
1.1.13	Other Labor			X	X	X
1.2	Non-Labor Costs	X	X	X	X	X
1.2.1	Facilities Costs	X	X	X	X	X
1.2.1.1	Rent or Imputed Rent	X		X	X	X
1.2.1.2	Property Taxes			X		X
1.2.1.3	Utilities	X		X	X	X
1.2.1.4	Insurance	X		X	X	X
1.2.1.5	Facilities Maintenance	X		X		X
1.2.1.6	Dispatch/Call Center					
1.2.1.7	Other Facilities Costs	X		X		X
1.2.1.8	General Facilities Costs		X			
1.2.2	Vehicle Costs	X	X	X	X	X
1.2.2.1	Vehicle Count	X				
1.2.2.2	Lease/Purchase Payments	X				X
1.2.2.3	Vehicle Depreciation	X	X			
1.2.2.4	Registration Fees					X
1.2.2.5	License Costs					X
1.2.2.6	Insurance	X			X	X
1.2.2.7	Vehicle Maintenance	X		X	X	X
1.2.2.8	Fuel	X	X		X	
1.2.2.9	Other vehicle costs					X
1.2.3	Equipment Costs	X		X		X
1.2.3.1	Medical Equipment	X		X		X
1.2.3.1.1	Equipment Depreciation	X		X		
1.2.3.1.2	Equipment Maintenance	X				
1.2.3.2	Non-Medical Equipment					X
1.2.3.2.1	Equipment Depreciation				X	
1.2.3.2.2	Equipment Maintenance*					
1.2.3.3	Uniforms					

CES Level	Cost Element Structure (CES)	EMSCAP	GAO	GEMT	Moran	Rural Ambulance Service Budget Model
1.2.4	Consumables			X	X	X
1.2.4.1	Medication				X	
1.2.4.2	Medical Supplies			X	X	X
1.2.4.3	Non-Medical Supplies					
1.2.5	General Supplies and Equipment		X			
1.2.6	Other Miscellaneous Costs/Fees	X				X
1.2.6.1	911 Service Fees*					
1.2.6.2	Regulatory or Compliance Fees	X				
1.2.6.3	Other Local Jurisdiction Fees					
1.2.6.4	In-Kind Donations	X				X
1.2.6.5	Other Fees	X				

\*Proposed cost element not captured in at least one of the five tools

Table 3-3. Structural Comparisons across Existing Ambulance Cost Tools

	EMSCAP	GEMT	GAO	Moran	Rural Ambulance Service Budget Model
<b>1. Labor</b>					
1.1. Provided Subcategories of Labor Costs	Yes	Yes	No	Yes	Yes
1.2. Tool-Defined Labor Subcategories (versus respondent defined)	No	Yes	No	No	Yes
1.3. Respondent Provided Labor Subcategories	Yes	Yes	No	No	No
1.4. Separate Reporting of Direct Costs and Benefits	Yes	Yes	No	No	Yes
1.5. Separate Reporting Contract and Employee Labor	Yes	Yes	No	Yes	Yes
1.6. Separate Reporting Volunteer and Paid Labor	Yes	No	Yes	Yes	No
<b>2. Vehicles</b>					
2.1. Separate Reporting of Multiple Vehicles	Yes	No	No	No	Yes

	EMSCAP	GEMT	GAO	Moran	Rural Ambulance Service Budget Model
<b>3. Facilities</b>					
3.1. Separate Reporting of Multiple Facilities	Yes	No	No	No	Yes
<b>4. Equipment, Supplies, and Consumables</b>					
4.1. Reporting of Multiple Types of Equipment and Consumables	Yes	No	No	Yes	Yes

### 3.7 Comparison of Tools Using the Revenue Framework

Only two of the five tools (Moran and GAO) track revenues. The others focus primarily on costs. Those that ask about revenue ask that revenue from fee-for-service Medicare payments for ground ambulance transportation services be reported separately. The Moran survey asks for total revenue from Medicare, whereas the GAO survey asks for revenue from all sources and then asks for the percentage that came from Medicare payment. The Moran and GAO surveys both ask for revenue from other insurance payments and combine all these revenues into a single category. The Moran survey also asks separately about Medicare co-payments.

Both surveys ask for separate reporting of subsidies and public financing. The Moran survey asks for public subsidies specifically covering uncompensated care (as opposed to other public subsidies). Only the Moran survey requests revenue from contracting ambulance services to other entities. The Moran survey also asks specifically about revenue from fundraising and donations.

### 3.8 Comparison of Overall Design and Approach

The five tools differ in their instructions, format, and design on three dimensions relevant to CMS's ground ambulance data collection effort: allocation, time frame, and flexibility of reporting.

#### 3.8.1 Allocation

Allocation is necessary when ambulance providers or suppliers report a cost that is shared with other aspects of the entity's business, such as fire services or hospital operation. The GAO survey intentionally excludes respondents where such allocation is necessary, such as hospital and firefighting entities. The GEMT cost report has separate reporting for capital and administrative costs that may be shared between different lines of service within an organization. These combined costs are reported by the respondents, and then costs are allocated to Medical Transportation Services or Non-Medical Transportation Services by the GEMT cost report. The Moran survey asks respondents to allocate shared services proportionally when reporting on costs but does not provide a specific allocation method.

### 3.8.2 Time Frame

The time frame over which respondents are asked to report differs by tool and sometimes among domains within each tool. The five tools primarily request that cost be reported on an annual basis. The Rural Ambulance Service Budget Model uses both monthly and yearly costs depending on cost domain. The EMSCAP instrument generally asks for annual costs but asks for hourly rate and hours worked per year for labor. The Rural Ambulance Service Budget Model also asks for costs of vehicles and automatically calculates annual costs based on time or mileage until replacement. The GAO survey asks for annual reporting but allows respondents to select calendar year or define their fiscal year. The GEMT cost report asks for annual costs based on fiscal year.

### 3.8.3 Flexibility of Reporting

The tools vary in the levels of flexibility allowed in reporting across domains. In general, the EMSCAP instrument provides respondents the most flexibility in defining multiple subcategories of costs across domains. For example, it allows respondents to define employee categories, types of vehicles, names of buildings, and types of training, among others. The other tools tend to either ask for aggregate costs or provide predefined categories of costs. Each approach has its benefits and challenges. Allowing respondents to define their own categories within cost domains may reduce the respondent burden by eliminating non-relevant questions and may increase coverage of important domains the survey developers had considered. However, self-defined categories make summarizing and comparing data very difficult or potentially impossible, depending on the degree of variability across respondents. However, providing predefined categories can guide respondents to consider costs they may have otherwise missed and allows for both easier aggregation of responses and more relevant comparisons of costs across ambulance organizations.

## 3.9 Conclusion

While all five of the tools we reviewed covered each of five high-level domains (specifically, labor, facilities, vehicles, supplies and equipment, and revenue), no single tool covered all cost elements at the more detailed level in our framework. The five tools also differed in terms of their instructions, format, approach for handling allocation, and reporting time frame. These findings suggest the need for a new, comprehensive data instrument to collect the information required by the BBA of 2018.

## 4. Summary of Findings from Key Informant Discussions, Stakeholder Engagement, and Cognitive Interviews

We collected information through key informant discussions, other stakeholder engagement, and cognitive interviews in order to:

- Assess stakeholder feedback on organizational characteristics important for the sampling plan
- Ensure that our cost and revenue framework and later our instrument covered all relevant cost and revenue domains and components
- Develop definitions for key terms
- Gather feedback on a draft data collection instrument
- Collect stakeholder perspectives on data collection process, timing, and burden

Key informant discussions and other stakeholder engagement occurred early in our project timeline. Key informant discussions were one-on-one conversations with ambulance organizations that delved deeper into understanding relevant cost and revenue domains, term definitions, preference for administration mode and methods, and respondent burden. Other Stakeholder engagement consisted of small-group sessions to allow for a more robust discussion than key informant interviews on issues such as definitions and terminology, often with a more engaged set of organizations that are active in their national associations. The stakeholder engagement also began the process of raising awareness among the industry regarding CMS's future data collection process.

Later in the project, we conducted a small number of cognitive interviews. These interviews were designed to assess respondents' understanding of the draft instructions and questions; to assess whether the requested information was readily available; and, to the extent possible, to assess respondent burden in completing the instrument.

The methods used in this chapter are described briefly in Chapter 1 and in detail in Appendix B. Because findings across the key informant interviews, other stakeholder engagement, and cognitive interviews were similar, we present results for all three together. We use the term "respondent" to refer to participants in any of the three types of qualitative data collection.

We begin this chapter by discussing findings related to the characteristics of organizations and their service areas. The next sections discuss key findings related to the instrument content, differences in state and local regulations that could affect the collected data, and findings related to the current availability of information that will be collected. Finally, we discuss findings relating to the process of fielding of the instrument and ways to reduce burden on participants. Due to their importance in refining the survey, a detailed summary of the findings from the cognitive interviews is in Appendix C.

### 4.1 Findings on Characteristics of Organizations and their Service Areas

Respondents identified a variety of organizational characteristics and characteristics of the areas served by ambulance organizations that can affect costs and revenues. Many of these factors are interrelated. For example, rural areas have large service areas with fewer hospitals. A large



service area means it takes longer to reach each patient and that each ambulance staff is unable to pick up a new call for a longer period of time, which in turn means fewer transports can be made with the same number of ambulances, which therefore reduces revenue. We first discuss respondents' thoughts on the key characteristics that differentiate organizations and then discuss characteristics of service areas that affect costs and revenues.

### 4.1.1 Ambulance Organization Characteristics

Based on our initial environmental scan, we identified provider versus supplier status, ownership (for profit, non-profit, or government), transport volume, and location (rural or urban) and service area population density as key characteristics of ambulance organizations that likely have implications for ambulance organization costs and revenue. We proposed these four characteristics to key informants and stakeholder groups for feedback on (a) whether these four characteristics were crucial, and (b) whether other characteristics should be considered. Respondents generally thought these key characteristics were appropriate, particularly service area population density. As one respondent explained, "A major factor of costs is location and this is generally whether you're in an urban area, a rural area, or you're serving a wilderness area. That type of area characterization sets the level of expected service the community receives." Faster response times in urban areas require more staff; however, volume is also higher in urban areas, which would lower the cost per transport.

In contrast, many rural departments said that their fixed costs were high and volumes were low, which result in a higher cost per transport. Being farther away from hospitals increases the time per transport, results in higher labor costs, and in turn reduces volume, as one respondent notes: "Because the hospital is far away, EMTs end up treating many patients while in transit—this means we need to pay EMTs premium wages, which is a further cost for the organization. In more urban places, EMTs don't have to treat patients while in transit because the distances are shorter. [Ambulance organizations] in the inner city can scoop [patients] up and run them to the hospital."

#### 4.1.1.1 Additional Ambulance Organization Characteristics

There were several additional characteristics that respondents use to describe their organizations, the most often cited being the use of volunteer labor.<sup>28</sup> Since many of the organizations using volunteer labor are also likely to be government entities and located in rural or super rural areas, respondents thought that these characteristics would likely capture these organizations. Some respondents noted that suburban areas may also have a high number of volunteer-based organizations.

Additional characteristics include staffing models (discussed in the next section), whether the organization's service mix was primarily scheduled/non-emergency transports, and organization "types" beyond Medicare's existing structure for suppliers (for-profit, non-profit, and government). Respondents noted that organizations focused on non-emergency transports had very different business models and costs than organizations that provide 911 emergency response, because they provide services on demand and do not have the higher fixed costs associated with being ready to respond to emergencies. Respondents felt strongly about how

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<sup>28</sup> We did not identify a source of information related to the use of volunteer labor in Medicare data.

their organization was described. Particularly among the government organizational type, respondents felt that further breakdowns were important to distinguish between fire-based, police-based, or stand-alone ambulance organizations. These distinctions are not captured in any existing data source.

#### 4.1.1.2 EMS Service Level and Readiness Factors

The term “readiness” has been used to describe the factors associated with being able to provide continuous, round-the-clock ambulance response within certain parameters (such as within a target response time). Local communities make decisions regarding the level of readiness provided by their EMS organization(s). In general, increasing readiness through additional ambulances or more staff entails additional costs. Importantly, the concept of readiness and associated “readiness costs” are primarily relevant to ambulance organizations serving an EMS function; ambulance organizations providing primarily non-emergency services do not incur the added fixed costs to achieve a target level of readiness.

Due to the variation in readiness and the associated costs, some respondents suggested that CMS should collect additional information on organizational characteristics that are related to readiness costs, such as average response times and whether the organization uses a static (i.e., 24/7) or dynamic (i.e., varying at different times of day) staffing model. Others thought that collecting information on readiness was not necessary because readiness costs would already be reflected in the total costs reported to Medicare. AAA recommended that CMS collect information on the ratio of deployed to on-call ambulance hours as a means to quantify readiness.

Many respondents were not familiar with the term “readiness cost” and were unclear or unsure as to what costs or components would fall into this category. Among those familiar with the term, understanding of its meaning varied. For example, a rural, not-for-profit organization thought that it referred to costs associated with maintaining their emergency service operation such that they were ready to provide services, regardless of whether they got any calls for which they could bill. When asked what she would include to determine costs associated with “readiness,” the respondent included factors such as utilities, maintenance for the vehicles, and facility insurance. Another key informant reported that, in his organization, they “look at readiness and readiness costs as what is covered by tax dollars, but when we come out and do the actual response, that is when we are looking for reimbursement.” On the other hand, a key informant for a large, organization reported that readiness costs referred to personnel training costs as well as costs associated with participating in “desktop drills” for things like mass casualty events as well as disaster preparedness drills.

We asked some participants whether collecting information on response times and staffing models would adequately capture differences in readiness across organizations. Staffing models impact the number of full-time staff on hand, the availability of vehicles, and the overall density of services provided, which in turn impact the overall readiness of ground ambulance organizations. These staffing models include static deployment (same number of fully staffed ambulance units available no matter the time of day), dynamic deployment (units vary depending on the time of day), and combined deployment (certain times of the day are static with a fixed number of units, and other times are dynamic depending on need). Most participants said that they use a staffing model that reflects the demands placed on them by their communities or required as part of their service contract with a city or county. Many noted that static models of

deployment may be more common in areas where there are not multiple organizations that can respond to calls, such as rural areas or areas with sole-source contracts. Costs associated with maintaining different staffing and deployment models account for variation in overall operation costs for ambulance organizations.

There was less consensus over whether response times would reflect readiness. Respondents noted that there are a variety of ways to measure response times and that this could make standardization challenging. There are a variety of ways to define when the clock starts (e.g., when a call come into the station or when the ambulance leaves the station) or stops (e.g., arrives on scene) for the purposes of tracking response times. For example, fire departments are historically more geographically dispersed throughout communities and can get to the scene first, so the fire trucks are what “stop the clock” on the response times in some communities. Fire crews may provide services on scene but do not always transport the patient. Some respondents reported that this model of service is more efficient than adding ambulances, while others reported that having both a fire truck and an ambulance respond to a call raises costs.

Those in rural areas cautioned that “out-the-door” times matter more than response times. Many ground ambulance organizations serving primarily rural areas depend on volunteer labor, and these volunteers are often not at the station but rather on-call at home or at their other job. Organizations in these areas report trying to get crews on the road within a certain number of minutes of receiving an emergency call. Due to the long distances, road conditions, and other variables, response times to the patients may not be tracked as intensely as they might in an urban area with response time targets. One respondent said, “We don’t look at response times super heavily because it’s hard to compare a call that’s two miles away with a call that’s 75 miles away up in the mountains on dirt roads.”

## 4.1.2 Service Area Drivers of Cost and Revenue

### 4.1.2.1 Service Area Definition

A service area in which a given organization is allowed to operate is generally defined by state or local governments. However, participants in discussions and stakeholder engagements explained that service areas can be difficult to define in practice. Respondents noted that their organizations may serve multiple service areas. For example, a large, national for-profit company may operate in multiple jurisdictions, or an organization may operate several services within a service area. Additionally, a supplier that operates ALS service for its county may also have a separate contract to operate a combination ALS/BLS service for the major city within that county. Some organizations may also contract with particular providers within a service area, such as hospitals or SNFs, to provide transfer services for that organization.

Organizations with service areas bordering nearby towns or those with mutual or auto-aid agreements with nearby areas also mentioned that these arrangements can utilize time and resources and remove crews from circulation for long periods of time. Mutual aid agreements are joint agreements with neighboring areas in which they can ask each other for assistance. Auto-aid arrangements allow a central dispatch to send the closest ambulance to the scene. One participant noted that their organization is in a large city surrounded by a large super rural county with many unincorporated parts of the county without their own ambulance services. As a result, this participant noted that around 40 percent of their calls can be auto-aid outside their primary service area.

Many respondents reported that the sheer size of the rural and super rural service areas drives costs. An urban ambulance provider or supplier may have a service area of 20 square miles or less, whereas several of the respondents from rural and super rural areas have service areas of several hundred or thousands of square miles. Several respondents reported that their service area is so large that they had to open a second and, in some cases, a third station in the more remote parts of their service area. While this allows them to respond to calls within a target response time, transport costs for calls to those stations are higher because they have a much lower transport volume with higher fixed costs. Most of these organizations reported that the rural add-on payments from Medicare for the rural and super rural organizations were not enough to offset these costs.

#### 4.1.2.2 Access to Providers

Many rural and super rural organizations noted that hospital closings have significantly affected their ability to transfer patients to hospital care quickly. While this was often an issue mentioned in relation to rural organizations, some urban ambulance organizations also stated that wait times at area hospitals can create delays of several hours until a patient can be handed off to hospital staff. The wait times significantly increase the turnaround time for the ambulance staff, which decreases the number of calls that a particular ambulance staff can take.

In addition, several rural organizations reported that they sometimes travel a great distance (anywhere from 250 miles to 500 miles) to take patients to Level 1 or 2 trauma centers or to specialty care centers (burn centers or hospitals with child psychiatry facilities, for example), which again significantly increases the ambulance staff's turnaround time and the amount of time the ambulance staff is out of circulation. This issue places a particular burden on small organizations that depend on labor from volunteer staff who may have other jobs with regular hours that compete for availability. Several respondents noted that, in some areas, the ambulance unit has become the only healthcare provider available after a hospital closure.

#### 4.1.2.3 Population Demographics

Respondents reported that local demographics can affect the services demanded. Both the income of the local areas (and resulting payer mix) and the overall acuity of the population can drive demand and thus costs associated with services.

Several key informants reported that the communities they serve include a large proportion of residents who are underinsured or uninsured and/or who live at or below the federal poverty level and are therefore unable to pay for transports. Some reported that they do not even bother billing for these transports because they know they will never get paid. A key informant from a hospital-based ground ambulance provider reported that they are sometimes asked by the hospital to transport patients who have been released but have no one to pick them up, even though they know they cannot get paid for those types of transports. Another reported seeing a significant increase in the homeless population in their service area and noted they also typically are unable to get paid for transports of homeless patients.

In addition, some respondents reported that the health status and age of the population can affect costs and revenues. For example, several respondents noted that the population in the community they serve is aging, which means they respond to a lot of calls from elderly patients who need help because they have fallen (also called "patient assists"). Not all of those calls result in transports, which means that the organization will not get paid for costs associated with

responding. Finally, one key informant reported the opioid epidemic is having an impact on their service, explaining that “if you look at total call volume of a typical service, about 1 to 1.5% of the total volume of calls responds to cardiac arrest. Now we are seeing the same response to an opioid call and typically those people aren’t payers so that also affects costs.”

## 4.2 Findings Related to Data Collection Content

We now discuss key findings from the qualitative data collection process relevant to the development of the survey content. We sought to understand whether we had identified all relevant service, cost, and revenue domains, and to explore how respondents defined certain terms.

### 4.2.1 Volume and Mix of Ground Ambulance Services

Respondents varied widely in the type of services they provided, which is expected given the number of organizations offering ambulance services. Some respondents are focused on emergency ALS responses, while others were focused on non-emergency scheduled transports. Respondents recommended that we collect data on all types of services, not just Medicare transports, to gain a more complete view of the services provided than can be determined with Medicare data.

#### 4.2.1.1 Definitions

Across respondents, we heard a variety of terms to capture different aspects of ambulance service volume: both requests for service and transporting patients. These terms include “calls,” “responses,” and “runs.” We discussed this in detail with respondents to ensure that the data collection instrument would collect similar information on services across respondents. Figure 4-1 summarizes the terminology using several examples of incidents. In the top panel, a cardiac arrest occurs. A single “call” or request for assistance is made to dispatch, and one ambulance is sent to the scene (which is sometimes referred to as “ambulances assigned to units”). This ambulance transports the patient to the hospital. In the second panel, a serious car crash results in multiple calls into the dispatch center or directly into the ambulance organization via the car’s automated help requests when the airbag is released. From these calls, one or more ambulances may be sent to the scene. While multiple ambulances might be sent to the scene, this is commonly referred to as one “response.” Once at the scene, one or more ambulances can transport patients to the emergency room. Sometimes, one ambulance may transport multiple patients to the emergency room.

According to the respondents, transports are more commonly understood as taking a patient from the scene to an emergency room. Any ambulance that is sent to the scene but does not transport is categorized as a refusal or non-transport. Only the ambulance that transports a patient to the emergency room bills for a transport. In some jurisdictions, fire trucks with cross-trained EMT staff will be sent to the scene to stop the clock on the response time calculation, since the fire stations are often more geographically dispersed. In some cases, an ambulance is also dispatched to the scene. In the last panel, both the fire truck and the ambulance are dispatched to the scene. The patient does not need to be transported to the hospital, so no payment is made for this response.

A variety of other vehicles or staff may be sent to the scene to provide support for the ground ambulance that are also not reimbursed. These could include supervisory vehicles and staff or supporting staff to assist the crew in cases of patients being extremely obese or severely injured. The number of ambulances sent to the scene is what matters most for costs. For these reasons, the instrument will need carefully crafted definitions regarding calls, responses, and transports to uniformly track these categories across respondents.

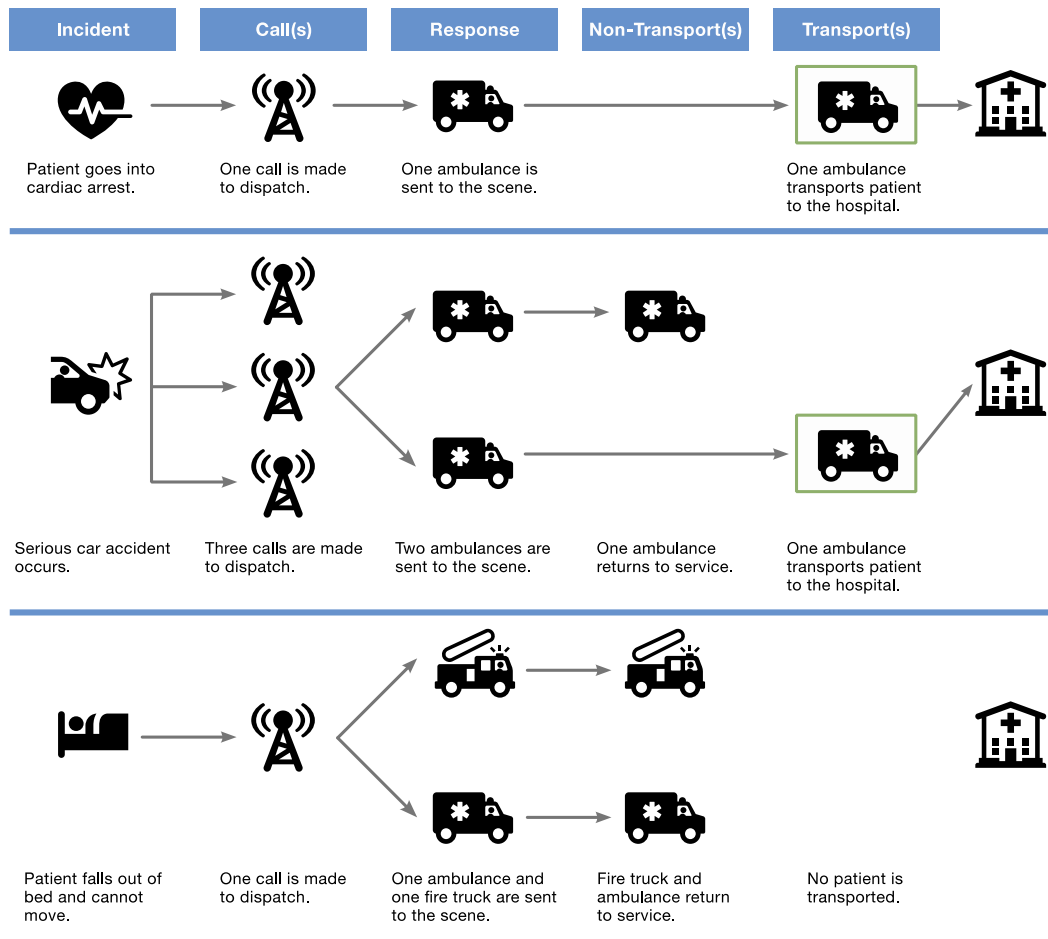


Figure 4-1. Examples of Call and Response Pathways

Note: In only the first two panels is the ambulance organization paid for transport.

#### 4.2.1.2 Services Not Reimbursed

Medicare and most other payers reimburse ambulance organizations only for situations in which the ambulance transports a patient. A key issue raised by many stakeholders is that many of the services they provide are not reimbursed by some or all healthcare payers. These include getting to the scene, providing services at the scene, and responding to calls that do not result in transport. Many organizations explained that these services increase their costs; however, it is not clear that Medicare or other payers should reimburse for these additional costs, particularly if local communities are subsidizing the ambulance organization with tax dollars.

Nearly all respondents reported a large percentage of their calls—commonly estimated at a third—did not result in a transport. This means that organizations are not able to bill for any services related to these calls. Relatedly, most described providing a variety of medical services at the scene that are not paid, regardless of whether the patient is transported: “It’s very easy to start that process with \$400–\$500 dollars already spent [at the scene for a cardiac arrest patient] just on those pieces of equipment and depending on whether you transport that patient or not is going to determine which level you can bill Medicare.”

Many respondents explained that not being paid for the costs of getting to a patient is a particularly challenging issue for rural areas. This is also an issue for wilderness, high altitude, or water rescue situations, where emergency personnel must get to the patient, stabilize them, and transport them to a ground ambulance. As noted above, many respondents explained that while these rescues may only account for a small share of an organization’s total volume, being prepared to provide this type of service is expensive in terms of staff training and special equipment and vehicles.

Many participants cited examples of local experiments with commercial payers to pay for services provided at the scene that keep individuals from visiting the ED or experiments with payments for alternative destinations, such as psychiatric inpatient facilities. Both are likely linked to increasing pay-for-performance incentives penalizing hospitals for inappropriate emergency room visits and inpatient admissions. Two organizations reported that they have a community paramedicine program (paid for by tax dollars) that is designed to reduce unnecessary trips to the emergency room. These programs involve identifying “super users” of emergency services (often uninsured patients) and sending EMS staff (usually a paramedic) to the patient’s home to help provide basic medical care, educate those with chronic conditions such as diabetes or asthma on self-care, and connect them with community resources. Several organizations reported that, while they do not have a paramedicine program in place currently, they have an interest or have plans to implement such a program in their service area.

In addition, almost all the key informants reported that they provide services that are for their community’s benefit but do not generate any revenue. Some organizations reported that they provide emergency and/or disaster response training to staff at local schools/colleges, provide standby assistance for all 911 calls to the fire department, participate in community health events, or hold health events on their own (e.g., cardiac clinic, diabetes education). These findings suggest the need for clear instructions on which activities are in and out of scope for reporting via the instrument and for clear definitions on the different services for which data is being collected (e.g., total responses versus responses that did not result in transport versus total transports).

## 4.2.2 Cost Domains

Organizations generally confirmed that the cost domains identified in Chapter 3 from previous tools represent their organizations’ main cost categories. We found there is substantial variability in how organizations classify items under each category, particularly for non-labor costs, which suggests the need for clear definitions of terms and how to measure items on the survey.

#### 4.2.2.1 Labor

Because labor is one of the largest contributors to costs, we asked about key staff categories that were essential to capture on the instrument. Many respondents cited factors that can influence labor costs: staff training levels, whether EMT staff are also firefighters, overtime, having union employees, and regulations surrounding workweek schedules (shorter workweek schedules could result in the need for more staff, which raises costs). In terms of the scope of labor costs, many respondents considered benefits (health and/or pension) as well as worker's compensation insurance as part of their labor costs.

In terms of how to report **medical personnel** labor on the instrument, there was a concern that just reporting the simplest breakdown of EMT and paramedic was easiest but would lose some of the granularity within the EMT category. For example, many rural organizations said they generally could not pay high enough salaries to attract a paramedic-level staff person, so Advanced EMTs were the highest level of staff onboard their ambulances. Some organizations also noted that the driver of the ambulance is not required to have EMS training and may only go through a defensive driving course to be qualified, and thus some respondents argued that drivers should be in their own category. During the cognitive interviews, several interviewees were not familiar with some of the specific EMS response staff categories that we listed (particularly emergency medical responder). These findings point to the need for clear definitions in the instrument around labor categories.

**Medical directors** are another category of medical staff whose level of involvement varied widely, and thus their employment status within the organization also varied. In general, medical directors oversee the development of care protocols for front-line staff (some of this may be standardized at the state level, but it depends on the state), they may be responsible for ensuring that the protocols are adhered to in the field, and may also be responsible for fielding real-time support for field personnel when they need to deviate from protocols due to the needs of the patient. Organizations had a variety of ways of employing medical directors that ranged from full-time employees to those who were contracted for a portion of their time. Some respondents reported that they had a medical director for the county who served this function for all EMS organizations. Others mentioned that a local hospital emergency room physician would serve this function on a contractual basis. During the cognitive interviews, some respondents reported costs associated with contracted medical directors twice—once in the labor section of the draft instrument and again in the other costs section of the draft instrument. These findings suggest the need for flexibility and clear instructions in collecting information on medical directors.

The amount and type of **administrative staff** varied widely across respondents as well. In general, respondents and interviewees found it difficult to categorize administrative staff by type. Smaller organizations are more likely not to have dedicated administrative staff, and EMS staff serve in multiple roles, such as vehicle maintenance, administrative, or janitorial staff. Larger organizations may be more likely to have dedicated staff for administrative roles. Some administrative functions such as information technology or billing may be contracted services or be services provided by the local government.

Almost all the organizations reported that they cover some or all staff training costs. This can include books, subscription to an EMS training curriculum, software, immunizations, the cost of sending staff to an outside training, vehicles to allow staff to do “practicals,” licenses, and



license renewals. Some organizations reported that they have a full-time in-house trainer, while others reported that they have a trainer who is also a paramedic.

#### 4.2.2.2 Volunteer Labor

Many organizations rely on volunteers or use volunteers to supplement paid staff. For many fire departments, the only paid staff are the chief and the firefighters who are cross-trained as EMS personnel. While it is more likely for organizations that service rural and super rural areas to rely on volunteers, some respondents noted that suburban service areas may also have a high number of volunteer-based organizations. Some departments pay volunteers a small stipend per shift or per transport, and some are considering strategies to offer retirement benefits and/or health coverage to attract volunteers to these positions.

Respondents wanted to ensure that volunteer labor did not “deflate” labor costs but differed in their suggestions of how to accurately reflect the contribution of volunteer labor on the instrument. Several suggested capturing data on the number of volunteers or the hours each volunteer donated and then using a geographically adjusted labor rate calculated from external data to input labor costs for that organization. Organizations using volunteer labor generally thought that they would be able to report on the number of volunteer labor hours. Organizations that pay a per-transport stipend or an hourly fee for standby services track volunteer hours more closely. Some noted that some organizations do not pay their volunteers and thus may not formally track volunteer labor hours at all. Organizations will need guidance on whether they should count volunteer labor hours spent waiting for calls.

#### 4.2.2.3 Vehicle Expenses

Some organizations reported this category as the second largest set of costs. It typically includes vehicle maintenance, vehicle insurance, vehicle licenses, and vehicle replacement costs. For some organizations, this category also includes fuel costs, though some organizations reported that a local government entity might pay for fuel for all government vehicles. Some organizations also reported that they “remount” ambulances instead of purchasing or leasing a new vehicle to save money. In remounting, the box (the cabin that houses the patient) is removed from the chassis, and the box is placed on a new chassis.

Some cost categories, particularly those related to vehicle costs and medical equipment (e.g., cardiac monitors, backboards, power lifts) can vary quite a bit from one year to the next depending on whether replacements were purchased. Most organizations reported that ambulances are typically replaced every five to seven years, or after a certain number of miles. In addition, some organizations reported that some ambulances can be purchased “fully loaded”—with all equipment needed, including tablets, a cardiac monitor, backboards, a power lift, and other smaller medical equipment. In these instances, the cost for these items would not be reported separately but rather would be included under the category that includes vehicle costs.

#### 4.2.2.4 Medical and Non-medical Equipment

Medical and non-medical equipment is the second largest set of costs for many organizations. Medical equipment can include such items as power stretchers, backboards, C-collars, cardiac monitors, continuous positive airway pressure (CPAP) equipment, glucometers, etc. Non-medical equipment can include such items as radios, pagers, cell phones, computer equipment, laundry, laptops and/or tablets, etc. Often, medical and non-medical equipment is categorized as

capital versus non-capital equipment. Capital medical equipment refers to equipment that can endure repeated use, including defibrillators, ventilators, monitors, nebulizers, and power lifts.

Most organizations we spoke with treated capital equipment differently from non-capital equipment and supplies, and thus would be able to report these items separately. Non-capital equipment and supplies includes equipment that cannot endure repeated use, and organizations typically divide this into two subcategories, non-medical and medical. Non-medical capital equipment includes computers, tablets, communication equipment, and furniture. Medical non-capital equipment includes medical supplies and medicines such as oxygen, cold packs, bandages, and gloves. Many respondents reported medications as a large cost category. Driving costs in this category are the prices of the drugs themselves, supply shortages of some medications, and the need to replace expired medications. Two respondents noted that their state was allowing the use of expired medications to alleviate shortages of certain drugs. One organization included supplies required for cleanup of biohazardous materials in this category.

#### 4.2.2.5 Contracted Services

Organizations may need to pay for several additional types of services or personnel that they do not provide in-house. These can include licensing costs for the health record system and the electronic patient record system, costs for collecting patient satisfaction data, the costs for a physician who provides medical oversight for staff and oversees quality control, shared costs for county staff that conduct audits and gather information for quality assurance purposes, costs for nursing staff that are not employed by the organization but must accompany EMT staff for certain types of facility transfers, and costs for disposal of biohazardous material. We note a few categories that were commonly mentioned:

- **Billing costs:** There was a mix across respondents on whether organizations conducted billing in-house or contracted out this service. Several key informants reported that billing service fees represent a large cost for their organization. Some organizations reported that the billing service charges a percentage of what they collect, and the percentage reported by the key informants ranged from 2.5 percent to as much as 8 percent of the revenue collected. One organization reported that their billing costs could run as high as \$15,000 per month.
- **Regulatory/compliance fees and other jurisdictional fees:** Many of the key informants interviewed reported that they do not have to pay any regulatory, compliance, or other jurisdictional fees. Other respondents noted that there might be license fees at either the state or local level or both to operate in the particular jurisdiction.
- **Radio system/911 dispatch:** Some organizations reported that the cost for the 911 dispatch they use is covered by tax dollars from the city or county and is often shared with other departments (e.g., fire department, sheriff's department). One organization reported that they pay on a quarterly basis for a portion of a radio system that is shared by three different counties. Other organizations reported that they pay a monthly fee for the 911 dispatch service operated by their local sheriff's department.

### 4.2.3 Sources of Revenue

In general, government entities and some non-profit organizations receive tax dollars (or subsidies from local governments), while for-profit and non-profit organizations do not, unless

tax dollars are part of their contracts. For-profit and non-profit organizations were more likely to report that billing for transports is their main source of revenue.

Across the board, organizations reported that their largest payer by both volume and revenue was Medicare. This was followed by either Medicaid or commercial insurers, with private pay or uninsured patients last; however, the percentage contribution to total revenue mix varied by locality. One organization reported that they have a large contract to provide emergency care and transport services to a private firm that serves a large prison in the eastern part of the United States. For this organization, the private firm's payments represented their second highest revenue source, after Medicare.

Some organizations reported earning additional revenue from offering training classes or providing "standby" services at community events such as fairs, sporting events, and music concerts. A small number of organizations also reported requesting donations or fund-raising with pancake breakfasts, spaghetti dinners, fish fries, and other types of events. Some fire-based organizations also mentioned being able to access state grants to purchase equipment or pay for training.

### 4.3 Differences in State and Local Regulations

EMS is largely regulated and paid for at the state and local level. Historically, emergency services included only fire, but then gradually grew to incorporate EMS, and now many other tasks such as disaster and first responder or even homeland security tasks. Since the 1970s and 1980s, states have begun to standardize some facets of the ambulance industry, but it is still largely up to local communities to decide how they want to provide and finance their emergency services. As a result, many categories of costs and revenues that we have touched on in this chapter may be affected explicitly by these local rules and regulations. Respondents identified several domains that vary by state:

- Requirements for what constitutes an ambulance: Vehicles and the equipment required may vary by state, though many are moving to adopt national standards, such as those set by the National Fire Protection Association. [38] One exception mentioned was vehicles needed for search and rescue operations in wilderness areas, such as sport utility vehicles (SUVs) or all-terrain vehicles, for which there may not be a national standard. States may also vary on whether they regulate wheelchair vans for non-emergency transports. CMS does not regulate what constitutes an ambulance for payment purposes and defers to the local level: "The vehicle must comply with State or local laws governing the licensing and certification of an emergency medical transportation vehicle. At a minimum, the ambulance must contain a stretcher, linens, emergency medical supplies, oxygen equipment, and other lifesaving emergency medical equipment and be equipped with emergency warning lights, sirens, and telecommunications equipment as required by State or local law."<sup>29</sup>
- Labor requirements: The staffing mix required on the ambulance varies according to state, and sometimes local, regulation. Some states may require that the driver be a certified EMS driver who has taken an approved defensive driving course similar to what law enforcement officers take, and that the person in the back of the ambulance be a

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<sup>29</sup> Medicare Benefit Policy Manual Chapter 10 - Ambulance Services

healthcare provider. For ALS transports, this person must be a paramedic, and for BLS, the minimum is an EMT. Some states require at least two EMTs to be on board. Some require two paramedics for ALS transports. One state with large rural areas said they require an EMT and an Advanced EMT to be on board for the ALS services. They explained that since many rural areas are dependent on volunteer labor, it is difficult to find or hire paramedic-level staff. Other types of transports, such as specialty transports, may require additional personnel, such as a nurse or respiratory technician, to be on board.

- **Medical director autonomy**: Generally, medical directors oversee the development of protocols for ambulance services. They also conduct the quality assurance reviews to make sure protocols are being followed in the field. States vary on whether the local medical directors develop these protocols or whether the states develop them and require that local areas adopt them.
- **Training requirements**: States may vary on how often and what types of continuing education personnel must take to maintain their licenses. Several states mentioned moving to be a “National Registry State,” which means they are adopting national training guidelines for staff from NHTSA.
- **Licensure**: State and local governments license the staff, vehicles, and organizations providing ambulance services. There is variation in the level at which these functions might occur. Licensing of services, which means that an organization can operate in a specific area providing a specific level of service (e.g., ALS or BLS), often occurs at the local level. States will also require that organizations register with the state and may charge license fees either by the organization or by the number of vehicles that will transport patients. Staff are often licensed at the state level by medical boards or the state emergency services department.
- **State funding sources**: Some states provide additional resources for ambulance organizations. Grants are commonly used for equipment purchases or continuing education. One state issued grants to raise the training level of personnel, so that the state now no longer has any volunteer services. Funding sources for the grants can also vary: some states use general funds, others use funds recovered in criminal justice proceedings.
- **Other sources of variation** include reporting requirements, whether the state purchases reporting software on behalf of organizations, and differences in the environment or market. State law or local practice limits some organizations from billing for certain types of transports. For example, fire departments providing ambulance services in New York cannot bill for transports, and other communities may refrain from collecting out-of-pocket payments if the ambulance organization is funded by tax dollars.

As a result of these variations, there may be distinct patterns in the data that will require careful interpretation from the end user.

## 4.4 Availability of Information

In addition to asking about the domains for inclusion in the data collection instrument, we asked respondents whether they currently collect data of various types to understand the possible burdens associated with collecting and reporting data. We found that most organizations collect

at least some information on costs, revenues, utilization, and other data, though there is variability in the level of detail at which they are able to track this information.

We found that many, but not all, respondents already report some financial information to corporate, local, or state entities. Some respondents noted that some states require some form of reporting as either a part of the regular licensing process, to set rates for commercial payers, or for the purposes of obtaining extra payments for Medicaid. About half of the respondents in the key informant discussions noted that they report financial information for local governments or corporate entities as part of annual financial processes.

Several of the organizations that participated in the cognitive interviews provided only partial information but stated that given sufficient time, they could work with their billing service or other departments to obtain the information required to report on costs and revenues.

#### 4.4.1 Tracking Costs

Nearly all the key informants and organizations represented in stakeholder engagements reported that they track costs on an ongoing basis. However, there is variability in terms of who tracks their costs, how they track costs, and the level of detail at which they track costs. While in some smaller organizations, the director of emergency services or the chief of emergency services is responsible for tracking costs, in others, costs are tracked by the county treasurer or the county clerk. One key informant from a small, rural organization that depends entirely on volunteer labor reported that she keeps track of both costs and revenues herself and clarified that she is also the county treasurer. Larger organizations reported that their financial department keeps track of their costs and produces reports that are sent to them on a regular basis.

All the key informants reported that their costs are tracked electronically; however there is some variability in the tools they use, ranging from commercially available software such as Excel or QuickBooks, to software that is licensed by large organizations, to proprietary software developed by a large organization, in one case. Almost all the organizations reported that they review cost reports monthly and track costs/expenses by category against what was budgeted by category for the year, in some cases making adjustments to stay within budget. However, most organizations reported that, while they can easily report costs in terms of broad categories (e.g., labor, medical and non-medical supplies, medical and non-medical equipment, training), it can be difficult to report costs for specific items, particularly consumables. Hospital-based providers that buy supplies in bulk through the hospital's purchasing department were one notable example.

#### 4.4.2 Tracking Revenues

Access to information on revenue varied across organizations. While some keep track of their revenue on an ongoing basis and could report their revenue for the previous fiscal year, others reported that revenue information is not something they typically receive on an ongoing basis. In these instances, informants reported that the information on revenue is tracked and reported by either a financial department or, in the case of some non-profit organizations, by the city or county treasurer or clerk.

Many organizations do use billing organizations that may be able to assist them with reporting revenue information. Across organizations interviewed or participating in the stakeholder engagements, there was variation in whether they used a billing company or handled billing

internally. Of the 30 key informants interviewed, 20 reported that they contract an external billing service to process, mail out, and collect transport service bills submitted for payment. There does not seem to be a link between size of the organization and propensity to use a billing company.

Most of the informants reported that, for the purposes of reporting revenue data to CMS, they would be able to request this information from other departments. However, they reported that, because there is a lag in billing and collections, information on revenue will not necessarily be accurate if collected on a monthly or quarterly basis. They recommended collecting this information for the previous fiscal year but cautioned that this information may not be available until several months after the close of the fiscal year.

#### 4.4.3 Tracking Equipment and Supplies

Several larger organizations reported using software to track purchase costs, dates, and servicing schedules for capital equipment such as defibrillators. Several larger organizations also reported using software that can track supplies and expiration dates, primarily for medicines. As one respondent explained, “We have implemented a very strict detailed inventory accounting system and we’re keeping track of the expiration dates of all of our inventory not only our medications but also our expendable supplies...we’d pull medications that are nearing their expiration date from a slower company and put them on a busy company.” Other organizations reported using an approximation method where they would know the total cost of supplies and the total number of calls, and they would calculate a cost of supplies per transport.

#### 4.4.4 Tracking Ambulance Services and Mileage

Most respondents reported having some type of state or federal reporting system that requires them to submit patient care reports, which also keeps track of transports by type. One key informant, for example, reported that their organization keeps track of the calls that come in and creates a patient chart using EMS Charts. Their coders then transfer codes for services provided into EPIC to determine whether the call resulted in a transport and the type of service provided (BLS emergency or non-emergency, for example). Some of the small, rural organizations reported that they keep track of the transports they provide using an electronic spreadsheet that they populate with information from the call and information provided by their EMTs or paramedics. Participants noted that these systems also collect information on the type of service provided, mileage from the point of ambulance pick-up of the patient to the hospital, and transport time, as well as turnaround time (time that they arrive at the hospital to the time the ambulance staff is back in service).

Beyond transports, most organizations keep track of other types of utilization such as transports by payer type or responses that do not result in a transport. Most organizations said they could report on transports by payer type either through retrieving information from their reporting system or requesting information from their billing company. Some reported that this information is included in the monthly reports they receive from their billing company.

Ground ambulance organizations do not get paid by healthcare payers for 911 calls that are cancelled after an ambulance is en route or for calls that do not result in a transport (either because the patient did not need to be transported or because the patient declined transport). Most of the key informants reported that they do keep track of both these types of calls. Some

said that they must report this information to their city or county board or commission. One key informant said that they must report on all activities or services provided as a “community benefit,” that is, services that account for costs but do not provide any revenue, including calls that do not result in a transport.

All the organizations interviewed reported that they keep track of the “transport mileage,” that is the mileage from the location where the patient is loaded onto the ambulance to the facility to which they are being transported, because they can bill for this mileage. The average number of miles reported by the key informants is 14.44 miles for 911 calls (minimum of one mile, maximum of 41 miles, and a median of 13.5 miles) and 450 miles for inter-facility transfers. Nine of the 30 key informants reported that they keep track of mileage getting to a patient; this is not mileage for which organizations can get paid, so most do not track this information. Five informants reported that, if this information is of interest to CMS, they could probably approximate an average based on proxy measures (e.g., fuel cost records).

## 4.5 Data Collection and Reporting Burden

### 4.5.1 Likely Respondent

Organizations varied widely in their responses about the most appropriate person in their organization to complete the instrument. Many respondents reported that the most appropriate instrument respondent would be the chief or other EMS leadership, a financial person, or someone outside their agency such as a city clerk or county treasurer. Several respondents reported that they would have to gather information from other entities or departments to complete the instrument. In addition, two-thirds of the key informants reported that more than one person would have to take part in completing the instrument (of the key informant interviews, 16 reported that two people would have to be involved, two reported that three people would have to be involved, and three reported that four or more people would have to be involved in completing the instrument). Most of the nine respondents who participated in the cognitive interviews reported that they completed the draft instrument on their own with no assistance from others within or outside of their organization. Only three reported that more than one person was involved in completing the instrument.

### 4.5.2 Level of Effort Required to Complete the Instrument

Most organizations participating in the key informant discussions reported it would take them approximately four to six hours to gather the information on revenues and costs, and that this amount of time could be cut significantly after the first instrument round (once they know what information is going to be requested and have set up templates or reports for generating this information). One key informant reported that how quickly they could complete the instrument would depend on the time of year they received the instrument and on other factors such as paperwork deadlines, grant submission deadlines, audits, and volunteer staff availability.

The time required to complete the instrument by organizations that participated in the cognitive interviews ranged from one hour to several days. However, it should be noted that the organizations that reported taking one to two hours to complete the instrument only partially completed the instrument and/or provided approximations or estimates based on their experience rather than pulling information from reports or requesting information from their billing service

or other departments/entities. Almost across the board, organizations participating in cognitive interviews reported that gathering the information to complete the instrument accurately and then completing the instrument itself is likely to take several hours spread out over several weeks (respondents have other responsibilities and are rarely able to complete the instrument in one sitting).

It is not clear whether we spoke with enough smaller organizations that may have fewer resources available to assist in reporting to fully understand their reporting burden. Many organizations expressed concern over their ability or the ability of smaller organizations to report some information, and these concerns were conveyed in the cognitive interviews. It could be especially challenging if multiple groups need to be involved in reporting (e.g., the ambulance organization and someone at the city or municipality) or if the organization lacks the sophistication required to respond to certain questions.

### 4.5.3 Strategies to Reduce Burden

Respondents did have some suggestions on ways to reduce the burden of collecting and reporting data.

- **Timing of the instrument:** Most respondents reported that it is difficult to identify the best time of the year for fielding the instrument. However, some expressed a preference for receiving the instrument in the spring (between March and May). Some organizations suggested that the end of the fiscal year would not be a good time for them to complete the instrument; however, they acknowledged that different organizations have different fiscal years. As noted in the section on revenues, some organizations may not fully realize all revenues for a reporting period until six to eight months after the close of the period, due primarily to a lag in receiving payments.
- **Period of reference:** Most respondents want the flexibility to report data on their fiscal year. Some respondents noted that they have the flexibility to report for any time period, but for many smaller organizations, reporting over the time frame used by their local government would be easiest. No respondents preferred a reporting time frame of less than one year. The main reasons were that shorter time frames would not capture seasonal variation in demand (e.g., flu season) or costs (e.g., fuel prices) and would potentially also miss costs that are not evenly distributed throughout the year, such as fees to local governments.
- **Preference for data collection mode:** Most respondents would prefer a web-based collection instrument that allows organizations to stop/start and save their work. Many would prefer to be able to print out the instrument in advance so that they can review the type of information that is being requested and collect the requisite data prior to beginning the instrument. Several respondents noted that the web-based instrument should include some consistency checks for data validation to reduce errors.

## 4.6 Conclusions

The qualitative data collection illustrated the immense variation in organizational structure, services provided, and personnel involved in the ground ambulance industry. Despite this variation, and the fact that the data collection was tailored to each respondent group, there was



consensus over the key cost and revenue domains to include in the instrument, the terminology used for key concepts, and factors that will affect the reporting burden on organizations.

## 5. Characterizing Ground Ambulance Organizations Using Medicare Data

### 5.1 Motivation and Research Questions

This chapter describes analyses related to ambulance organizations using Medicare claims and enrollment data. The chapter has three main aims. First, it aims to supplement our description of the ambulance industry presented in Chapter 2 in terms of total Medicare volume and payments by presenting more recent estimates than we found in existing sources [3]). Second, the results in this chapter provide context for instrument development by exploring how ambulance organizations vary across key characteristics expected to influence costs and revenues. Finally, this chapter concludes with two alternatives that can be used to group ambulance organizations into categories for the purposes of analysis and sampling.

The analyses in this chapter describe:

1. The number of ground ambulance organizations.
2. The distribution of ground ambulance organizations across key characteristics identified in our research, including provider versus supplier designation, ownership, service area population density, and billed transport volume.
3. An assessment of whether other characteristics, including the share of transports that are non-emergency, offer important distinctions between organizations.
4. Results from a cluster analysis assessing whether there is an empirical basis for distinguishing between groups of ambulance organizations sharing certain characteristics.

As described in Chapter 2, there are many characteristics of ambulance organizations that are potentially related to costs and revenues. There are four characteristics, however, that are particularly significant because they are (a) supported by prior empirical evidence, (b) relevant to every ambulance organization, and (c) are available for analysis in Medicare data. These four characteristics were also highlighted as important in existing ambulance cost data collection tools (see Chapter 3) and by many ambulance organizations and stakeholder groups in our qualitative research (see Chapter 4). They are:

- **Provider versus supplier designation.** Estimates from the GAO (2014) [4] and HHS (2015) [5] reports described in Chapter 2 suggest that per-transport costs for ambulance providers are much higher than those for ambulance suppliers. It is likely that the ground ambulance cost structures for ground ambulance providers and suppliers are fundamentally different.
- **For-profit, non-profit, and government ownership.** For-profit, non-profit, and government ambulance organizations likely have business models and mixes of services leading to different costs. Conceptually, for-profit organizations maximize profit and operate only in markets and service lines with positive margins. Non-profit and government organizations more broadly provide emergency service to communities and may be organized and operated in a way that does not maximize profits. GAO (2014) found ambulance organizations with more limited government support are more likely to have incentives to keep costs lower. [4] They found that for each 2 percent decline in the

average level of government subsidy, there was a 2 percent decline in the average cost per transport. As a result, we expect that costs will differ based on ownership.

- **Transport volume.** Prior studies found some evidence of economies of scale in the ambulance industry (i.e., a lower average cost per transport as the number of transports increased). The GAO study found that average costs decline with volume and level off after the organization reaches 600 transports per year. [4] Similarly, the HHS study found that for every 10 percent increase in the number of transports, there was a 3 percent decrease in the cost per trip. [5]
- **Service area population density.** There are multiple possible mechanisms linking service area population density to cost. First, paid labor and other inputs necessary to the operation of an ambulance organization may be more expensive in these areas. Second, lower density areas may have a higher per-transport cost due to longer distances traveled and more time required per response. Third, organizations providing EMS services to rural and super-rural communities may incur more fixed costs—such as facilities and vehicles—to provide a target level of response compared to areas with a higher population density. There is mixed evidence as to whether there is a relationship between service area population density and cost. The GAO report found a higher median cost per transport for organizations that provide ambulance services in super rural area as opposed to organizations that provide services in urban areas. [4] In contrast, the HHS study found that the median cost per transport is higher in urban areas than in rural areas. [5] We anticipate that there will be differences in per-transport cost and revenue based on where the organization renders services. We also anticipate differences in Medicare revenue because CMS’s payments under the AFS include three temporary add-on payments depending on whether the transport originated in an urban, rural, or super-rural ZIP code.

In addition to these key characteristics, the mix of emergency and non-emergency transports was identified in the literature but more narrowly in the context of the private, for-profit organizations where some organizations specialize in non-emergency transports. The share of transports that was non-emergency was generally not a focus of existing ambulance cost data collection tools (see Chapter 4) or in our qualitative research (see Chapter 5).

- **Non-emergency transport.** The GAO report found that a 7 percent decrease in the average share of Medicare non-emergency transport led to a 3 percent increase in the cost per transport. [4] Thus, the distribution of the number of non-emergency or emergency transports that the organization does will have implications for the total cost structure of the organization. A subset of non-emergency transports involves transporting patients to and from dialysis facilities.

## 5.2 Chapter Overview

The methods used in this chapter are described briefly in Chapter 1 and in detail in Appendix D. In the remainder of this chapter, we first describe the overall volume and payments for Medicare ambulance transports in 2016 and how they vary by type of service, geography, and diagnosis. Then we describe the number of ambulance organizations and how ambulance organizations are distributed across characteristics, including those listed above. We present two broad alternatives to grouping ambulance organizations based on characteristics, one relying more directly on the

characteristics themselves and the other on a cluster analysis. Finally, we synthesize the key takeaways from the analysis and the implications for the sampling strategy.

### 5.3 Medicare Volume and Payments for 2016 Ground Ambulance Services

In 2016, ambulance organizations billed Medicare for 14.8 million Part B ground ambulance transports, for which they received \$6.1 billion in Medicare fee-for-service payments.<sup>30</sup> In this section, we provide an overview of the types of transports and where they occurred.

First, to illustrate how volume and payment vary across different types of services, in Table 5-1 we report the volume of Medicare ground ambulance services and allowed payments aggregated at several levels:

- In total, across all organizations
- By HCPCS codes
- By emergency versus non-emergency transport
- By ALS versus BLS transport

The most common types of transport were BLS, non-emergency (A0428), which made up 37.5 percent of all ambulance transports, and ALS1, emergency (A0427), which made up 36.6 percent. While the two types of transports are similar in volume, the total payment for ALS1, emergency (A0427) was much higher (44.6% of total payments vs. 26.5%), reflecting higher payment rates for more intensive services. The total volume and payments in 2016 for ground ambulance organizations separately are reported in Appendix Table D-1.

The rate of transports per beneficiary varies across geography. To illustrate the differences that exist in where ground ambulance transports are rendered, we mapped the volume of transports across the United States in Figure 5-1.<sup>31</sup> In general, transport rates are higher in the east and in Puerto Rico. We also mapped emergency transports per 1,000 enrollees (Figure 5-2) and non-emergency transports per 1,000 enrollees (Figure 5-3) by county to understand whether there are differences in utilization by transport type.<sup>32</sup> Overall, the volume of emergency transports displays less variation than total transports, though volume is slightly higher in the eastern United States. There are very few counties with outlier transport volume on a per capita basis (more than 600 services per 1,000 enrollees). Non-emergency transports volume is generally low

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<sup>30</sup> In this report, we use the term “payments” to mean the total payments received by the provider or supplier, which includes the payment from Medicare and any out-of-pocket expense paid by the beneficiary. This is also referred to as the “allowed amount” because it is the total that a provider or supplier is allowed to bill for providing ambulance services to a Medicare beneficiary. Actual payments may be slightly lower due to bad debt (i.e., cases where beneficiaries did not pay cost-sharing in full).

<sup>31</sup> We have used county to present transport rates because we felt it was the best geographic level of display to demonstrate geographic variation without being too detailed. We identified the county of residence for Medicare FFS enrollees. To compute the annual rate, we calculated the ratio of the total number of ambulance services provided to FFS enrollees to total FFS enrollee months and in each county and multiplied by 12. We then multiplied by 1,000 to get the rate per 1,000 enrollees. We classified counties by number of services per 1,000 in bins of 120. A total of 424 counties have >600 services per 1,000.

<sup>32</sup> We counted the number of ambulance services with emergency HCPCS codes and then computed the average number of emergency services per month per 1,000 FFS enrollees for Figure 5-2. We counted the number of ambulance services with non-emergency HCPCS codes and then computed the average number of non-emergency services per month per 1,000 FFS enrollees for Figure 5-3. We classified counties using the same bins that we used for all services in Figure 5-1.

and uniform for most counties. However, there are several counties in the eastern United States, South Texas, and Puerto Rico that are high volume. These maps provide evidence that there is geographic variation in transport rates, especially for non-emergency services.

Table 5-1. Medicare Part B Ground Ambulance Service Volume and Payments by Category, 2016

	Millions of Medicare Ground Ambulance Services	Percent of Total Medicare Ground Service Volume	Percent of Organizations with at Least One Service	Average Payment per Transport	Total Payment for Ground Ambulance Services (\$Billions)	Percent of Total Payment for Ground Ambulance Services
<b>Total Services</b>	<b>14.79</b>	<b>100</b>	<b>100</b>	<b>\$414</b>	<b>\$6.12</b>	<b>100</b>
<b>By HCPCS Code</b>						
A0426: ALS1, non-emergency	0.42	2.8	30.8	\$535	\$0.22	3.7
A0427: ALS1, emergency	5.42	36.6	82.7	\$504	\$2.73	44.6
A0428: BLS, non-emergency	5.55	37.5	48.4	\$293	\$1.62	26.5
A0429: BLS, emergency	3.17	21.4	94.5	\$425	\$1.35	22.0
A0432: Paramedic intercept	<0.01	<0.1	0.6	\$371	<\$0.01	<0.1
A0433: ALS2	0.13	0.9	56.8	\$721	\$0.09	1.5
A0434: Specialty care transport	0.11	0.7	13.9	\$958	\$0.10	1.7
A0999: Unlisted ambulance service	<0.01	<0.0	1.8	\$323	<\$0.01	<0.1
<b>By Emergency/Non-Emergency</b>						
Total non-emergency services	5.96	40.3	50.3	\$310	\$1.85	30.2
Total emergency services	8.83	59.7	97.9	\$484	\$4.28	69.8
<b>By BLS/ALS</b>						
Total BLS services	8.72	58.9	97.3	\$341	\$2.97	48.5
Total ALS services	5.84	39.4	83.5	\$507	\$2.96	48.3

Source: RAND analysis of merged Medicare enrollment and claims data.

Note: Percentages may not sum to 100% due to rounding. The mileage HCPCS code is not included in this table. 99.5 percent of claims with one of the HCPCS codes included in this table also have a mileage HCPCS code. “Average Payment per Transport” represents the average allowed amount per transport including mileage. For claims with more than one transport (3.8% of claims), the allowed amount for the mileage line is split evenly among the transports. The ordering of services by average payment per transport in the table differs in some cases from the ordering of services based on the AFS valuation for the corresponding transport services alone. For example, the reported average payment per transport for A0426, “ALS1, non-emergency” is

higher than the average for A0427, “ALS1, emergency” due to payments for mileage and geographic adjustment even though the base valuation is higher for A0427 than for A0426. “Total non-emergency services” includes HCPCS codes A0426 and A0428. “Total emergency services” includes HCPCS codes A0427, A0429, A0432, A0433, and A0999. We omit specialty care transport from the emergency vs. non-emergency comparison; as a result, the volume and payment shares do not sum to 100%. BLS services include A0428 and A0429, and ALS services include A0426 and A0427. We exclude other services from the BLS vs. ALS comparison; as a result, the volume and payment shares do not sum to 100%.

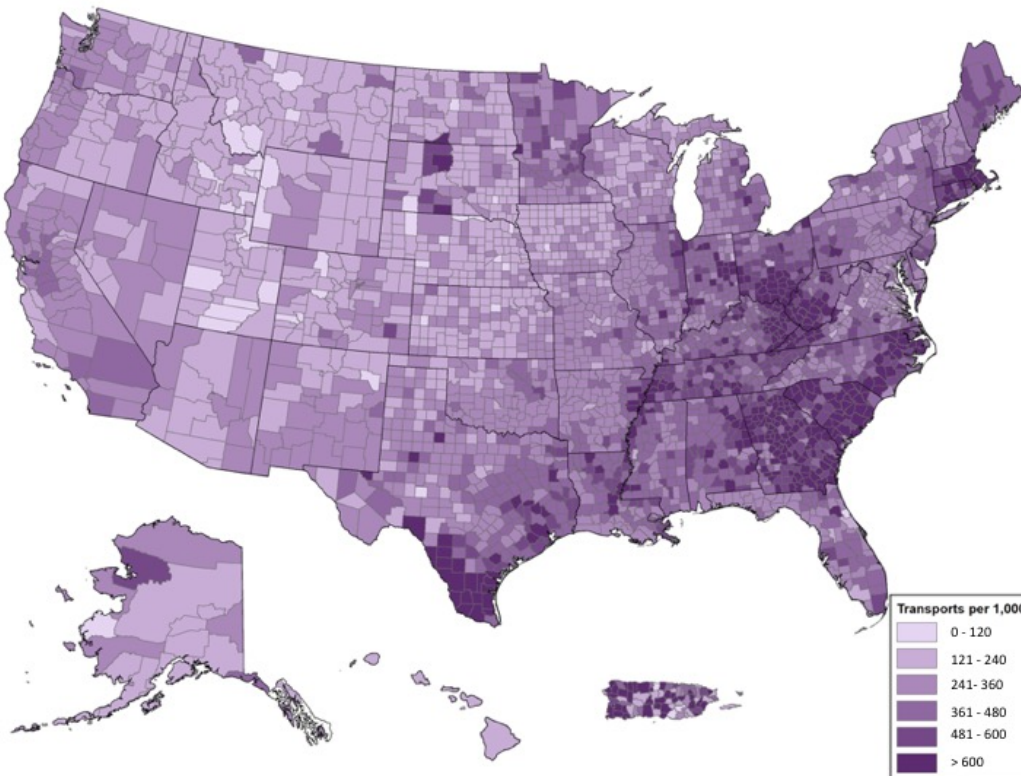


Figure 5-1. Total Annual Ambulance Transports per 1,000 Enrollees, by County, 2016

Source: RAND analysis of merged Medicare enrollment and claims data combined with Census county geographic boundary file. Medicare enrollment and claims data accessed on IDR on Feb. 5, 2019.

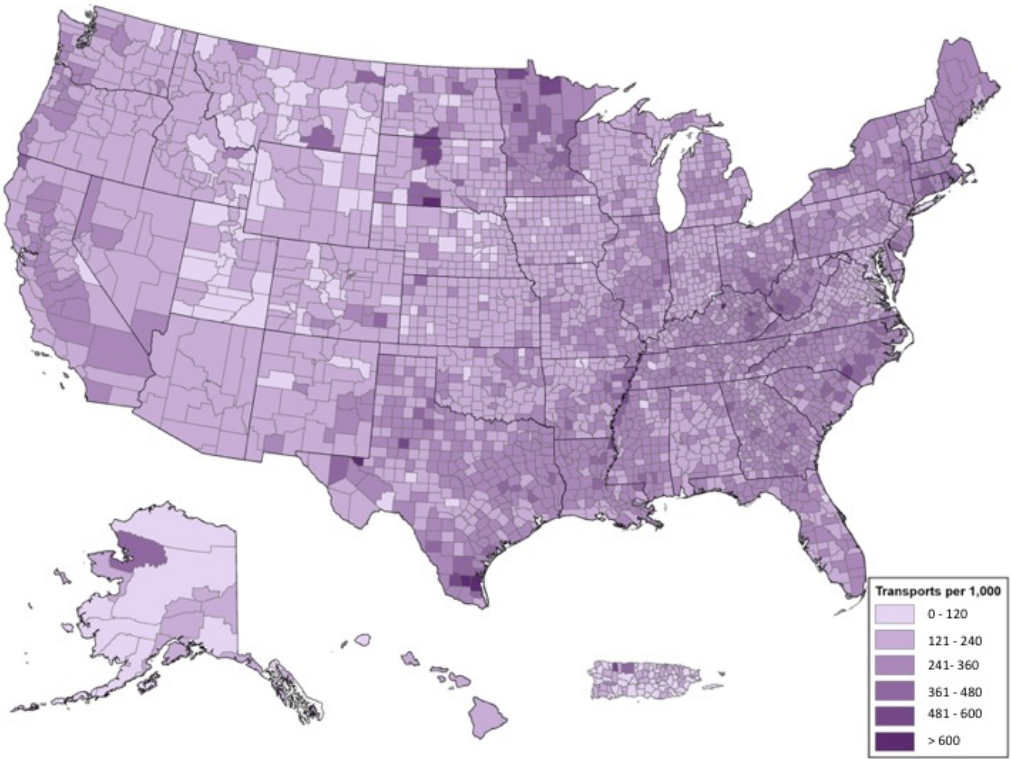


Figure 5-2. Annual Emergency Ambulance Transports per 1,000 Enrollees, by County, 2016

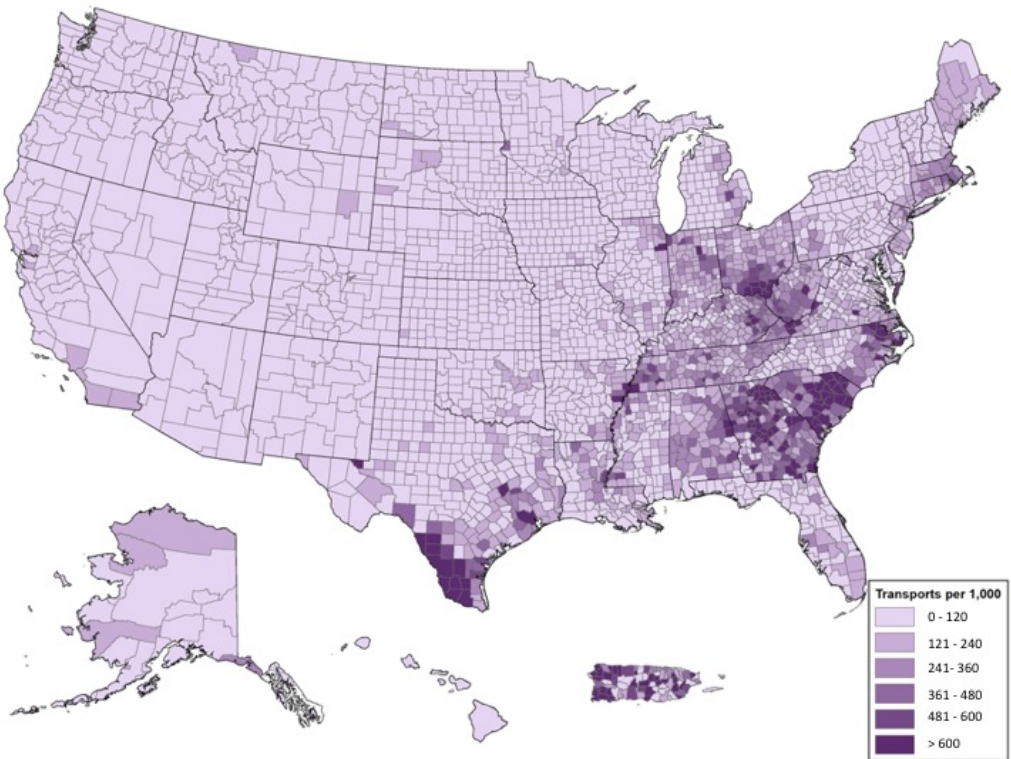


Figure 5-3. Annual Non-Emergency Ambulance Transports per 1,000 Enrollees, by County, 2016

Source: RAND analysis of merged Medicare enrollment and claims data combined with census county geographic boundary file. Medicare enrollment and claims data accessed on IDR on Feb. 5, 2019.

## 5.4 Key Characteristics of Ground Ambulance Organizations

In this section, we describe how ambulance organizations vary across key characteristics that are expected to affect costs and revenues. We summarize the population of ground ambulance organizations by four important characteristics that we hypothesize, based on our review of the literature and discussion with stakeholders, will be associated with both costs and revenue: provider versus supplier designation, ownership, Medicare ground ambulance transport volume, and service area population density.

### 5.4.1 Provider versus Supplier Enrollment

Based on our analysis of the NPI-level data, 10,758 NPIs billed for at least one ambulance service in 2016. Of these, 5.7 percent were ambulance providers and 94.3 percent were ambulance suppliers (Table 5-2). The share of total NPIs that were providers is similar to the corresponding share (6 percent) noted in the HHS report. [5] Ambulance providers accounted for a slightly larger share of Medicare payments (6.5 percent) compared to their share of organizations (5.7 percent) and transports (5.8 percent), indicating that the average provider's service mix and/or mileage results in a higher payment per transport compared to the average supplier.

Table 5-2. The Share of Total Volume and Payments Across Ground Ambulance Organizations

Provider versus Supplier Enrollment	Number of NPIs	Percent of Organizations	Percent of Total Medicare Ground Ambulance Volume	Percent of Total Medicare Ground Ambulance Payments
Ambulance Providers	612	5.7	5.8	6.5
Ambulance Suppliers	10,146	94.3	94.2	93.5

Note: The percentages in second column sum to 100 percent across the rows for each group. The third and fourth columns show the proportion of total volume and total payments. The percentages in these columns sum to 100 percent across all rows in the table.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

As seen in Figure 5-4, among the 612 ambulance providers, the majority are critical access hospitals (45%) and other hospitals (54%), while a small proportion are associated with a different type of organization, including Indian Health Services Facility, SNF, and psychiatric and rehabilitation hospitals and units (1% combined).



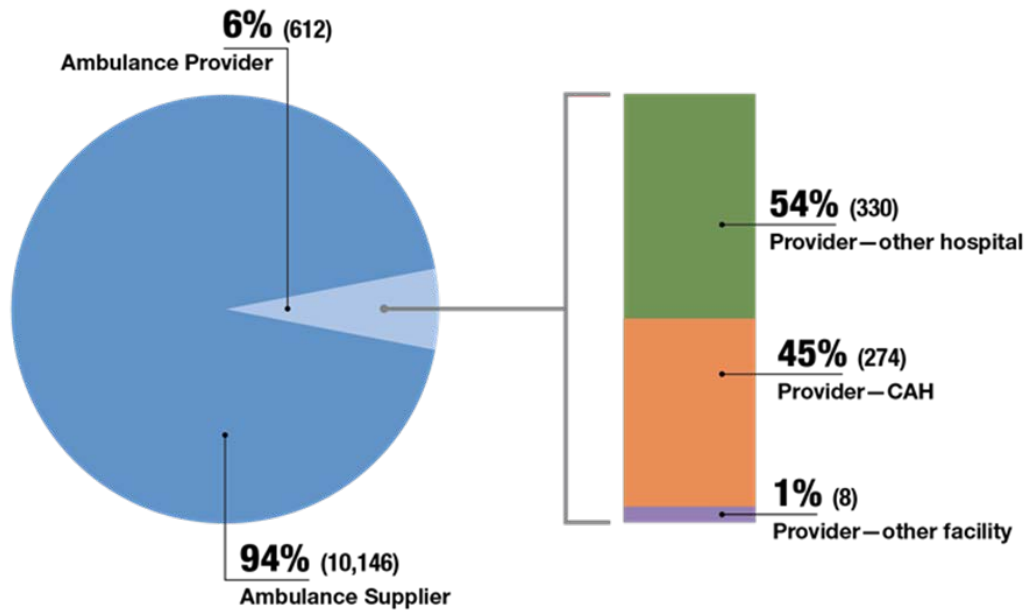


Figure 5-4. Distribution of Ambulance Providers and Suppliers and Types of Ambulance Providers

Source: RAND analysis of merged 2016 Medicare enrollment and claims data

## 5.4.2 For-profit, Non-profit, and Government Ownership

As described in Chapter 2, whether an ambulance provider or supplier is a government organization, a private, not-for-profit, or a private for-profit organization affects the business model and is expected to be associated with costs and revenues. For 2016, we find that government ownership is the most common ownership type among ambulance organizations (Table 5-3), accounting for nearly half of organizations. Those organizations, however, represent a smaller proportion of total volume (28.4%) and total payments (32.0%), suggesting that government ambulance organizations bill Medicare for a smaller number of transports per year on average compared to for-profit and non-profit organizations. At the other end of the spectrum, private for-profit or not specified organizations are the smallest group (22.1% of organizations), but account for a largest proportion of volume (52.9%) and payments (47.7%).<sup>3334</sup>

<sup>33</sup> PECOS contains one indicator distinguishing “non-profit” and “proprietor” organizations. A second indicator describes the organizational structure. Both measures are based on the CMS-855B form. Organizations that could not be clearly identified as being either a government, for-profit or not-for-profit entity were grouped into the for-profit category. This was the case for 137 NPIs. For a detailed description of the procedure to classify ownership for each NPI, please see Appendix A.

<sup>34</sup>The ownership classification in 2016 for ground ambulance organizations is reported in Appendix Table A.3.

**Table 5-3. Ground Ambulance Organization Counts and Shares of Medicare Volume and Payments by Ownership Category, 2016**

Ownership Category	Number of NPIs	Percent of Organizations	Percent of Total Medicare Ground Ambulance Volume	Percent of Total Medicare Ground Ambulance Payments
Government	5174	48.1	28.4	32.0
Private, not-for-profit	3210	29.8	18.6	20.3
Private, for-profit or not specified	2374	22.1	52.9	47.7

Note: Percentages in each row may not sum to 100% due to rounding. Entities that could not be classified as either government, for-profit or not-for-profit were grouped with for-profit. For more, please see Appendix section D.2.1.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

**Table 5-4. Distribution of Ambulance Organizations Across Transport Volume Categories**

Volume Category	Number of NPIs	Percent of Organizations	Percent of Total Medicare Ground Ambulance Volume	Percent of Total Medicare Ground Ambulance Payments
Low: 1-200 transports/year	4528	42.1	2.1	2.8
Medium: 201-800 transports/year	2999	27.9	8.6	10.6
High: 801-2500 transport/year	1902	17.7	17.8	19.1
Very high: >2500 transports/year	1329	12.4	71.5	67.5

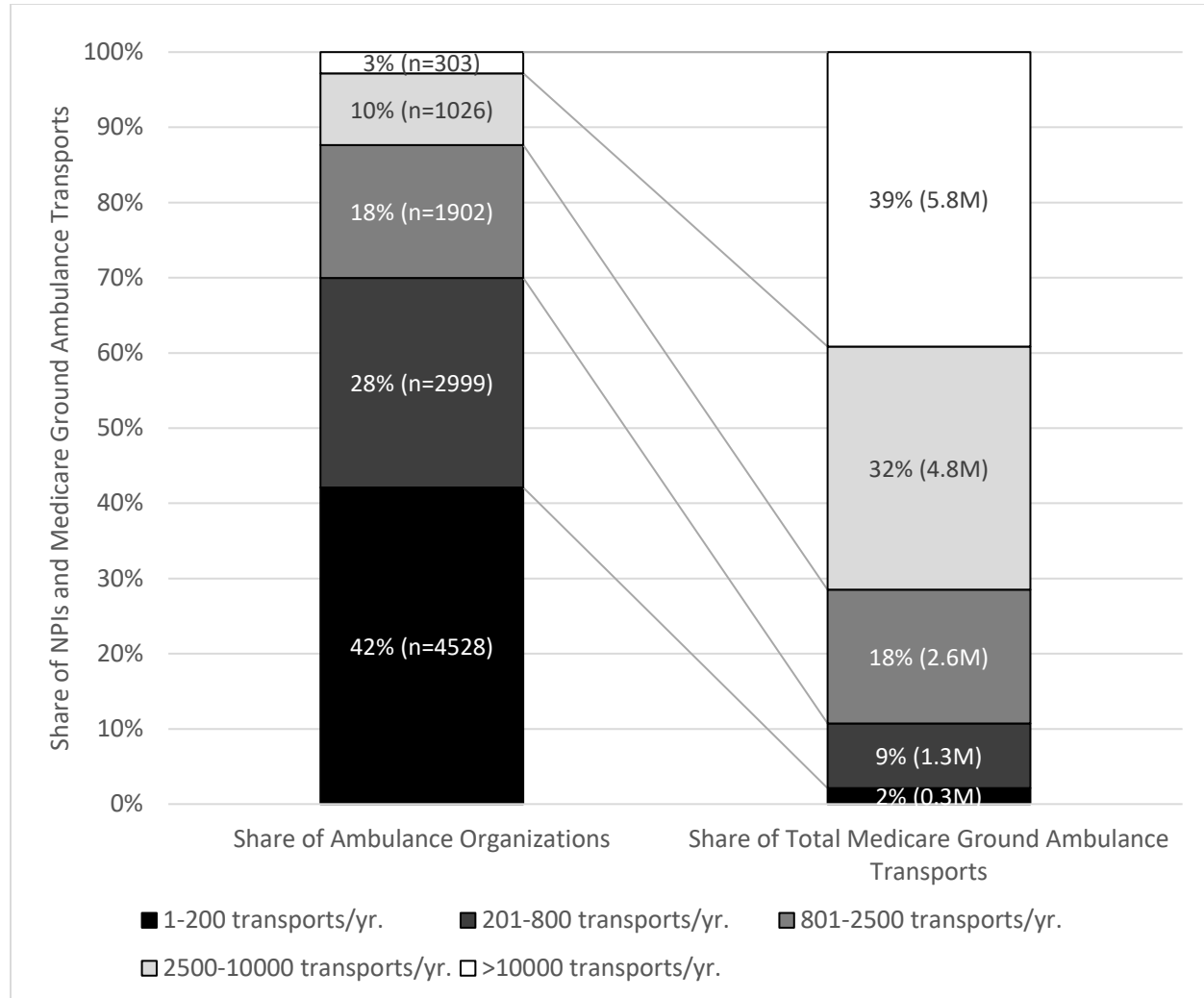
Note: Percentages in each row may not sum to 100% due to rounding. NPIs are assigned to volume categories based on annualized volume for some ground ambulance organizations not in operation throughout 2016. See Appendix D for details.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

### 5.4.3 Transport Volume

The total volume of transports provided by an organization is an important characteristic that can affect costs and revenues. If there are economies of scale, organizations providing a larger volume of services would face lower per-transport costs. We find that the volume distribution is highly skewed. In other words, the majority of organizations have a low volume of transports, but there are a small number of organizations with a very high volume of transports. To illustrate this point and to inform the sampling plan, we categorized each organization into one of four volume categories: low (1–200 transports/year), medium (201–800 transports/year), high (801–

2500 transports/year), and very high (more than 2,500 transports/year).<sup>35</sup> The thresholds between categories were informed by our review of the literature and the data. [4] As seen in Table 5-4, nearly half of ambulance organizations (42.1%) are in the low volume category, providing 200 or fewer Medicare transports during the year. In contrast, only 12.4 percent of organizations fall into the very high volume category.



Source: RAND analysis of 2016 Medicare claims data.

Figure 5-5. Share of Total Medicare Ground Ambulance Transports by Ground Ambulance Organizations in Different Volume Categories, 2016

Note: Shares of ambulance organizations are out of 10,758 NPIs with Medicare-paid ground ambulance transports in 2016. NPIs are assigned to volume categories based on annualized

<sup>35</sup> NPIs are assigned to volume categories based on annualized volume for some ground ambulance organizations not in operation throughout 2016. See Appendix A for details. The annualized volume classification in 2016 for ground ambulance organizations is reported in Appendix Table A.4.

volume for some ground ambulance organizations not in operation throughout 2016. Shares of total Medicare ground ambulance transports are out of 14.8 million total transports.

Source: RAND analysis of 2016 Medicare claims data.

Figure 5-5 further illustrates this point through the comparison of the distribution of organizations by volume measured in transports per year (left column) with the share of total Medicare transports for each category by volume (right column). For the purposes of this graph, we further break down the very high volume category to highlight that there are a small number of organizations that provide an extremely high volume of Medicare transports per year. The bottom 42 percent of organizations by volume have 200 or fewer transports per year, and these organizations collectively account for only 2 percent of total Medicare transports. In contrast, the top 3 percent of organizations by volume account for 39 percent of total Medicare ground ambulance transports.

#### 5.4.4 Service Area Population Density

The population density of the area in which an ambulance organization is operating is expected to affect costs and revenues in a number of ways. Organizations serving rural and super rural areas generally face lower demand for services and thus deliver a smaller number of transports. In addition, in rural and super rural areas the average distance traveled per transport tends to be greater. Finally, payment rates will also differentially impact revenue by population density because the Medicare AFS accounts for mileage and, in addition, ground ambulance organizations that serve primarily rural and super rural service areas receive larger add-on payments.

Our results in Table 5-5 indicate that the majority of ambulance organizations (52.7%) serve primarily urban ZIP codes, with smaller proportions working in rural or super rural areas.<sup>36</sup> The organizations serving urban areas also account for the vast majority of transports (78.9%) and payments (75.8%). In contrast, while many ambulance organizations serve rural or super rural areas (47.3%), these organizations account for a disproportionately small proportion of total volume (20.2%) and payments (24.2%).<sup>37</sup>

Table 5-5. Distribution of Ambulance Organizations Across Population Density Categories

Service Area Population Density Category	Number of NPIs	Percent of Organizations	Percent of Total Medicare Ground Ambulance Volume	Percent of Total Medicare Ground Ambulance Payments
Rural	3036	28.2	16.5	18.5
Super rural	2057	19.1	3.7	5.7
Urban	5665	52.7	79.8	75.8

<sup>36</sup> See Appendix A for details on how each organization was assigned to a service area population density category.

<sup>37</sup> The service area population density classification in 2016 for ground ambulance providers and suppliers is reported in Appendix Table A.5.

Note: The percentages in second column sum to 100 percent across the rows for each group. The third and fourth columns show the proportion of total volume and total payments. The percentages in these columns sum to 100 percent across all rows in the table.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

## 5.5 Groups of Ambulance Organizations by Ownership, Volume, and Service Area Population Density Categories

The key characteristics expected to affect costs and revenues—volume, ownership, and population density—are related. For example, because urban areas are more populated, the total volume of transports in those areas is higher. As described in Chapter 2, these characteristics may be combined in different ways across different business models. The next three sections of this chapter explore different approaches to organizing ambulance organizations based on their characteristics for the purposes of analysis and sampling. This section considers an approach using the four characteristics that emerged from our review of the literature and qualitative research: whether the organization is a Medicare provider or supplier; for-profit, non-profit, or government ownership; Medicare ground ambulance transport volume; and service area population density. Section 5.6 considers whether any additional characteristics—including the share of transports that are non-emergency or related to dialysis—should be considered as additional key characteristics. Section 5.7 presents results from a cluster analysis where we rely on an algorithm to define groups of ambulance organizations with similar observable characteristics.

In Table 5-6, we describe the 36 possible combinations of three key characteristics (3 ownership x 4 volume x 3 population density = 36 combinations) and present the distribution of ambulance suppliers across those 36 cells. We separately report the number of ambulance providers over only the service area population density characteristic due to the smaller overall number of ambulance providers (for a total of 39 cells). This analysis helps to identify common combinations of characteristics.

The only categories that are very sparsely populated are the very high volume categories across all ownership types serving super rural areas. This analysis illustrates that some combinations of characteristics are more common than others and builds upon the one-way analyses described above. For example, as noted in Table 5-4, nearly half of suppliers are government owned. In Table 5-7, we see that among that group, regardless of population density, suppliers are more likely to be in the lower volume categories. Similarly, not-for-profit suppliers in both urban and rural areas tend to provide a low volume of transports. In contrast, for-profit suppliers tend to provide more transports and serve urban areas. These common combinations of ownership, volume, and population density are reflective of different business models that were identified in Chapter 2 and that have potentially important implications for costs and revenues.

Table 5-6. The Number and Share of Ambulance Organizations by Ownership, Volume, and Service Area Population Density Characteristics

Ground Ambulance Organization Category	Count of NPIs: Urban	Count of NPIs: Rural	Count of NPIs: Super Rural	Share of All NPIs: Urban	Share of All NPIs: Rural	Share of All NPIs: Super Rural
<b>Gov't</b>						
Low	859	660	745	8.0	6.1	6.9
Medium	862	396	287	8.0	3.7	2.7
High	485	318	53	4.5	3.0	0.5
Very high	241	56	2	2.2	0.5	<0.1
<b>For-profit</b>						
Low	278	141	159	2.6	1.3	1.5
Medium	265	107	57	2.5	1.0	0.5
High	351	162	47	3.3	1.5	0.4
Very high	645	116	12	6.0	1.1	0.1
<b>Non-profit</b>						
Low	631	527	362	5.9	4.9	3.4
Medium	502	247	77	4.7	2.3	0.7
High	194	114	25	1.8	1.1	0.2
Very high	120	41	2	1.1	0.4	<0.1
<b>Providers</b>						
All Providers	232	151	229	2.2	1.4	2.1

Note: The cells in the left panel sum to 10,758, the number of ground ambulance organizations. The denominator for the shares is 10,758, and the shares sum to 100 percent.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

Table 5-7. The Number and Share of Ambulance Suppliers by Ownership, Volume, and Service Area Population Density Characteristics

Ground Ambulance Supplier Category	Share of Orgs.: Gov't (%)	Share of Orgs.: For-profit (%)	Share of Orgs.: Not-for-profit (%)	Share of Volume: Gov't (%)	Share of Volume: For-profit (%)	Share of Volume: Not-for-profit (%)	Share of Payments: Gov't (%)	Share of Payments: For-profit (%)	Share of Payments: Not-for-profit (%)
<b>Urban</b>									
Low	8.5	2.7	6.2	0.5	0.1	0.4	0.6	0.1	0.4
Medium	8.5	2.6	5.0	2.6	0.8	1.5	2.9	0.7	1.7
High	4.8	3.5	1.9	4.5	3.6	2.3	4.9	2.9	2.4
Very high	2.4	6.4	1.2	12.7	41.2	9.5	13.4	36.3	9.6
<b>Rural</b>									
Low	6.5	1.4	5.2	0.3	0.1	0.3	0.4	0.1	0.3
Medium	3.9	1.1	2.4	1.3	0.3	0.8	1.6	0.4	1.0
High	3.1	1.6	1.1	3.1	1.7	1.6	3.7	1.8	1.8
Very high	0.6	1.1	0.4	1.6	4.1	1.5	1.7	4.0	1.7
<b>Super-rural</b>									
Low	7.3	1.6	3.6	0.4	<0.1	0.2	0.6	0.1	0.3
Medium	2.8	0.6	0.8	1.0	0.2	0.3	1.5	0.3	0.6
High	0.5	0.5	0.3	0.4	0.4	0.3	0.6	0.6	0.5
Very high	<0.1	0.1	<0.1	<0.1	0.4	0.1	0.1	0.5	0.1

Note: Percentages in each row may not sum to 100 percent due to rounding. “Org.” is organization and “gov’t.” is government.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

## 5.6 Other Organizational Characteristics of Interest

Several common combinations of ownership, population density, and volume are evident in the data and are consistent with the literature describing different business models. There are other characteristics, such as those related to the mix of services provided, that could further distinguish between different cost structures. For example, as noted in Chapter 2, some for-profit suppliers specialize in non-emergency, scheduled transports.

In this section, we describe how additional characteristics available in Medicare data overlay on top of the four primary characteristics described in the prior section. The additional characteristics fall in three broad categories:

1. Measures of scheduled transports
2. Broader measures related to service mix
3. Measures related to vehicle costs

The second category is relevant for the development of data collection instrument items related to vehicle costs.

### 5.6.1 Measures of Scheduled Transports

We used two measures from the claims data to assess how scheduled transports vary across ambulance organizations: the percentage of non-emergency transports determined by HCPCS reported on Medicare claims and the percentage of dialysis transports determined by reported origin and destination codes on Medicare claims.<sup>38</sup>

#### 5.6.1.1 Non-emergency Transport Share

The proportion of transports that are non-emergency (HCPCS codes A0426 and A0428) is related to an organization's business model. Organizations providing emergency medical services to the community will typically have a low proportion of non-emergency transports. In contrast, organizations that specialize in scheduled transports, such as to and from dialysis facilities, will have a high proportion of non-emergency transports. Across all ambulance organizations, most billed Medicare for very small shares of non-emergency transports while a small share (621 NPIs, or 5.8 percent of all organizations) billed for non-emergency transports that accounted for 95 percent or more of their total transports (Figure 5-6). However, of the 1,564 total ambulance organizations that we categorized as urban and for-profit, 29.3 percent billed for non-emergency transports that accounted for 95 percent or more of their total transports, and nearly two-thirds had non-emergency shares greater than 50% (Figure 5-7). Very few organizations that were not urban and for-profit had primarily non-emergency transports.

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<sup>38</sup> See Appendix A for the detailed methods used to calculate both measures.



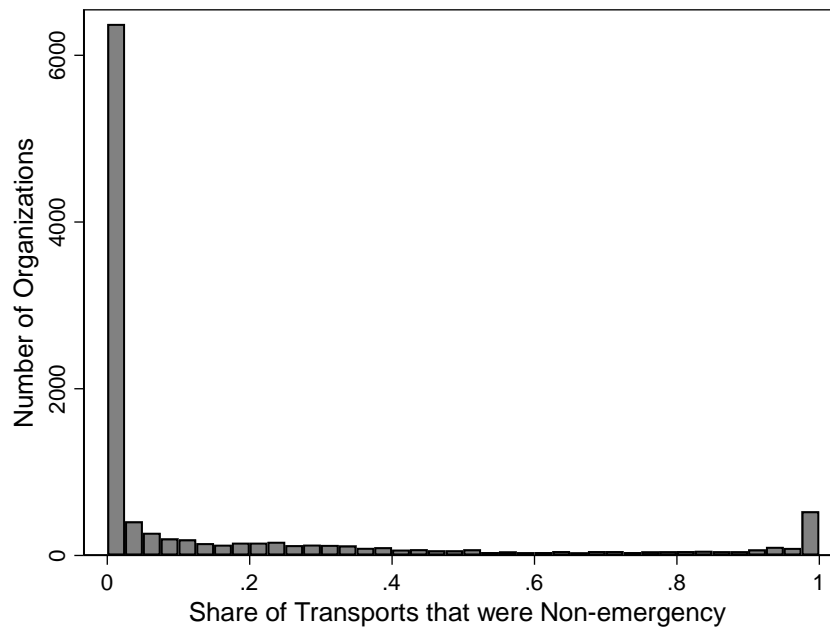


Figure 5-6. Distribution of All Ambulance Organizations by Their Share of Billed Medicare Transports that Were Non-Emergency, 2016

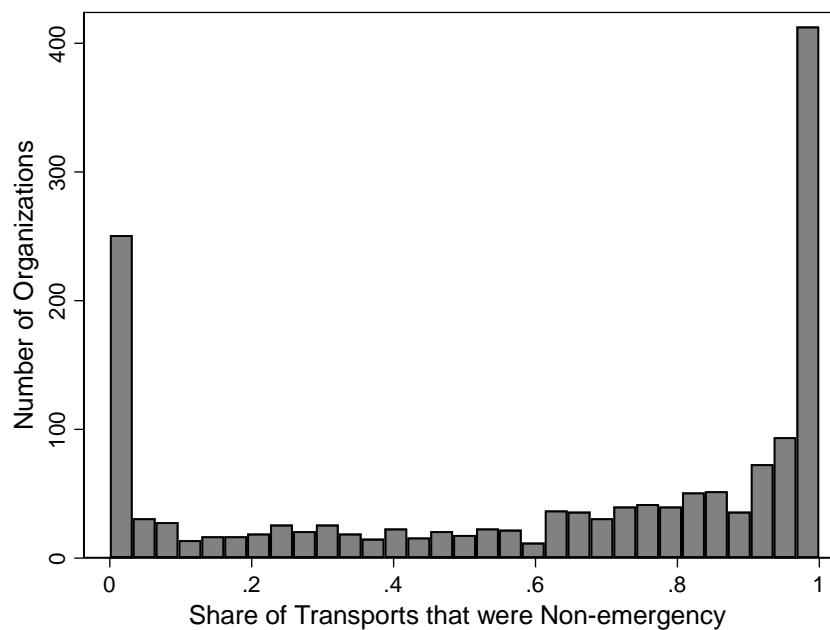


Figure 5-7. Distribution of All Ambulance Organizations by Their Share of Billed Medicare Transports that Were Non-Emergency, 2016

In Table 5-8, we report the median and interquartile range for the proportion of transports that are non-emergency by ownership, population density, and volume. We find large differences in the median proportion of non-emergency transports by ownership and population density. As expected given their role in emergency medical systems, government-owned ambulance organizations, across all population densities and volume categories, provide a relatively small proportion of non-emergency transports. For-profit organizations operating in urban areas, however, have a significantly higher median proportion of non-emergency transports, suggesting an organizational choice to specialize in such transports. We do see somewhat higher proportions of non-emergency transports among government and not-for profit organizations operating in high-volume rural or super rural areas. This likely reflects ambulance organizations associated with critical access hospitals that serve these areas.

Table 5-8. Proportion of Transports that Are Non-Emergency for Ambulance Organizations, by Ownership, Volume, and Population Density, Median and Interquartile Range of Total in Each Cell

Ground Ambulance Supplier Category	Median: Urban	Median: Rural	Median: Super Rural	Interquartile Range: Urban	Interquartile Range: Rural	Interquartile Range: Super Rural
<b>Gov't</b>						
Low	0.00	0.00	0.00	0.00	0.00	0.03
Medium	0.00	0.03	0.09	0.00	0.14	0.21
High	0.00	0.14	0.16	0.00	0.30	0.23
Very high	0.00	0.26	0.18	0.04	0.34	0.06
<b>For-profit</b>						
Low	0.06	0.00	0.00	0.90	0.02	0.01
Medium	0.90	0.27	0.14	0.95	0.72	0.25
High	0.90	0.39	0.25	0.38	0.62	0.48
Very high	0.74	0.68	0.31	0.54	0.64	0.45
<b>Non-profit</b>						
Low	0.00	0.00	0.00	0.00	0.01	0.02
Medium	0.00	0.01	0.12	0.01	0.12	0.24
High	0.00	0.23	0.22	0.29	0.33	0.21
Very high	0.32	0.30	0.36	0.48	0.18	0.07
<b>Providers</b>						
All Providers	0.22	0.24	0.08	0.56	0.32	0.29

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

The interquartile ranges reported in Table 5-8 are a measure of the variation in non-emergency transport shares within each cell.<sup>39</sup> Higher interquartile range values indicate more variation among organizations in the cell. We found very high interquartile ranges for for-profit organizations, approaching one, particularly in urban areas and of larger size in terms of the number of Medicare transports. This suggests that organizations in these cells specialize in non-emergency or emergency transports, which aligns with the distributions presented in Figures 5–6 and 5–7.

To better understand non-emergency and emergency transports, we identified the top diagnosis codes reported with each transport (see Appendix Table D-2 and Appendix Figure D-1). Among non-emergency transports, the two most common diagnoses are acute kidney failure and chronic kidney disease (19.3%) and signs and symptoms involving the nervous and musculoskeletal system (14.2%), while among emergency transports, the two most common are symptoms and signs involving the circulatory and respiratory systems (21.9%) and convulsions (17.6%). Given the prevalence of dialysis-related diagnoses, we next separately looked at the share of transports to and from dialysis facilities.

#### 5.6.1.2 Dialysis Transport Share

We looked separately at the share of transports that were to and from dialysis facilities. These transports are generally scheduled, non-emergency transports; most will therefore have been included in our analysis of non-emergency transports above. We found that only for-profit organizations had median shares of transports that were to and from dialysis facilities above 0.01 (Table 5-9). For-profit organizations operating in urban areas and with higher transport volume had relatively high medians and large interquartile ranges, suggesting that some larger, for-profit, urban organizations specialize in dialysis transport. Non-profit and government organizations had, in addition to very small median shares, relatively little variation in the share of transports that were to and from dialysis facilities (with interquartile ranges <0.10).

Table 5-9. Proportion of Transports that Are for Dialysis for Ambulance Organizations, by Ownership, Volume, and Population Density, Median and Interquartile Range of Total in Each Cell

Supplier	Median: Urban	Median: Rural	Median: Super Rural	Interquartile Range: Urban	Interquartile Range: Rural	Interquartile Range: Super Rural
<b>Gov't</b>						
Low	0.00	0.00	0.00	0.00	0.00	0.00
Medium	0.00	0.00	0.00	0.00	0.00	0.00
High	0.00	0.01	0.00	0.01	0.02	0.01
Very high	0.01	0.01	0.00	0.01	0.09	0.00
<b>For-profit</b>						
Low	0.00	0.00	0.00	0.05	0.00	0.00

<sup>39</sup> Interquartile range is the difference between the 25<sup>th</sup> and 75<sup>th</sup> percentile of the distribution of organizations in each cell. For example, if the 25<sup>th</sup> percentile organization in a cell had a non-emergency transport share of 0.1 and the 75<sup>th</sup> percentile organization in the same cell had a non-emergency transport share of 0.6, then the interquartile range would be 0.5 (or 0.6 minus 0.1).

Supplier	Median: Urban	Median: Rural	Median: Super Rural	Interquartile Range: Urban	Interquartile Range: Rural	Interquartile Range: Super Rural
Medium	0.10	0.00	0.00	0.91	0.02	0.00
High	0.48	0.03	0.00	0.89	0.31	0.08
Very high	0.16	0.33	0.02	0.54	0.64	0.25
<b>Non-profit</b>						
Low	0.00	0.00	0.00	0.00	0.00	0.00
Medium	0.00	0.00	0.00	0.00	0.00	0.00
High	0.00	0.01	0.00	0.01	0.03	0.01
Very high	0.01	0.01	0.00	0.10	0.08	0.01
<b>Providers</b>						
All Providers	0.00	0.00	0.00	0.01	0.00	0.00

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

### 5.6.1.3 Relationship Between Non-emergency and Dialysis Transport Share

We found that a group of primarily high-volume, for-profit suppliers provide primarily non-emergency, scheduled transports. Such transports are much less common among other types of organizations. It appears that ambulance organizations billing Medicare for dialysis transports are a subset of those billing Medicare for non-emergency transports more broadly. Figure 5-8 plots the share of transports that were non-emergency and dialysis within each of the 2,969 ambulance suppliers with both types of transports. Some suppliers provided relatively high shares of non-emergency transports with few dialysis transports (along the horizontal axis of Figure 5-8), some provided almost entirely dialysis transports (in the upper right corner of Figure 5-8), and others were arrayed between these two extremes. In almost all cases, however, the share of transports that were dialysis transports did not exceed the share of transports that were non-emergency.

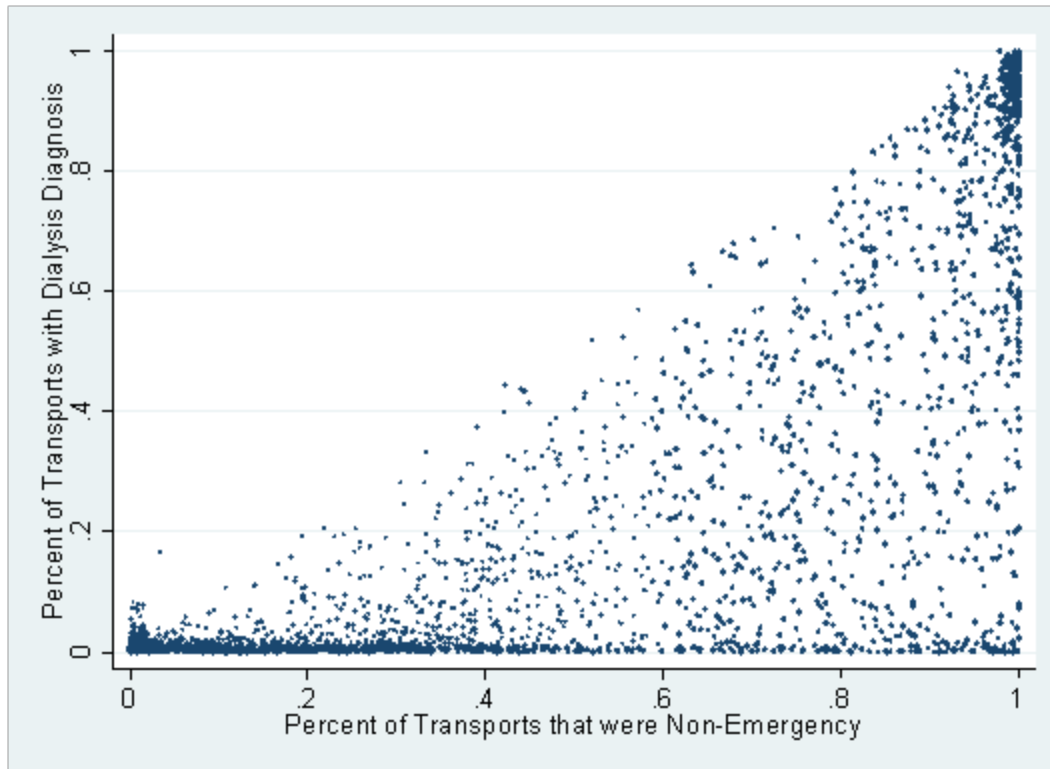


Figure 5-8. Share of Dialysis Transports versus Share of Non-Emergency Transports Among Ambulance Suppliers with Both Types of Transports, 2016

## 5.6.2 Broader Measures Related to Service Mix

The intensity of services provided is also important, as it affects both the type and quantity of resources used. The two measures of intensity that we consider are the average relative value units (RVUs) per transport and the proportion of transports that are BLS.

### 5.6.2.1 Average Resource Use per Transport

RVUs are a measure of resource use. They are used to compare the work and other resources involved in furnishing different healthcare services. Higher RVU services involve more work and resources than lower RVU services. To explore whether certain categories of ground ambulance organizations provided more resource intensive services, we calculate the average RVU across ownership, volume, and population density categories. We found few substantial differences in resource use within the ownership categories by volume and population density (see Appendix Table D-6.). The most notable differences are found within the for-profit ownership category. Consistent with the non-emergency findings, for-profit organizations in urban ZIP codes provide lower resource intensive services compared to all other organizations.

### 5.6.2.2 Share of Transports that Were BLS

For an organization, the proportion of transports that provide BLS, as opposed to ALS, affects the type and amount of resources used. We find very little variation in the proportion of BLS transports in general, and in particular within government and non-profit organizations (see

Appendix Table D-7.). The most notable finding is that urban, for-profit organizations have a very high share of BLS transports. This is consistent with a business model that specializes in non-emergency, low-intensity transports.

### 5.6.3 Proxies for Vehicle Costs Available in Medicare Data

Costs related to purchasing, leasing, and operating ambulances are an important component of total ground ambulance costs. To understand the extent to which existing Medicare data could be used to describe vehicle costs, we analyzed (a) enrollment data on the number of vehicles operated by each ambulance organization, and (b) mileage per transport.

#### 5.6.3.1 Vehicles Operated by Ambulance Suppliers

Ambulance vehicles represent an important component of costs. Medicare enrollment data for ambulance suppliers includes information on the number and type of vehicles the organization enrolls. The same information is not available for ambulance providers. Not surprisingly, across all ownership types and population densities, we find higher numbers of vehicles in the higher volume categories (Appendix Table D-8). On average, for each vehicle there are 200 transports. This distribution is substantially skewed, considering the median number of transports per vehicle is 84.3 and the standard deviation is 628.2.

We found several irregularities in the vehicle data available via PECOS. Most important, some ambulance organizations had fewer ground ambulances than would be reasonably necessary to provide the volume of transports billed to Medicare (let alone to other payers). It was relatively common for ambulances reported to Medicare via the PECOS enrollment form to be marked as both “land” and “marine” (and in some cases “land,” “marine,” *and* “air”) even though the make and model of the vehicle suggested that it was a land ambulance. In other cases, vehicle identification numbers were duplicated for many ambulance vehicles. These observations led us to conclude that (a) ambulance suppliers may not be reporting all vehicles on their PECOS enrollment form, and (b) quality concerns with the PECOS vehicle data likely contribute to unexpected and outlier results.

#### 5.6.3.2 Mileage

The average mileage per transport affects both costs and revenues, in part because longer transports require greater resources. This is reflected on the revenue side as the AFS incorporates mileage payments. We found that there is not much variation in the median for the average mile for transport within population density or ownership (Appendix Table D-9). Expectedly, the lowest mileage for transport is found for urban ZIP codes and is greater for rural and super-rural ZIP codes accordingly. In most cases, as the volume of transports rises, the median average mileage per transport goes down.

### 5.6.4 Assessment of Other Characteristics

We did not find significant unexpected variation in transport intensity, the share of transports that were BLS, vehicle counts, or mileage between ambulance organizations arrayed in terms of our four key characteristics. We did find that a subset of primarily for-profit organizations operating in urban areas provided primarily non-emergency transports, and among this subset we found an even narrower group providing primarily transports to and from dialysis facilities.

Organizations specializing in non-emergency and dialysis transports most often operated in urban areas and were high volume. Other than this important finding regarding non-emergency and dialysis transports, none of the other results indicate an additional business model or combination of characteristics that is not captured by ownership, population density, and volume. This finding informs the sampling plan outlined in Chapter 6.

## 5.7 Alternatives for Categorizing Organizations for Analysis and Sampling

This section considers two alternative approaches to categorizing organizations for analysis and sampling. The first approach, grouping by combinations of key characteristics, relies on groups of organizations defined by the four key characteristics described in this chapter:

- Provider versus supplier status
- Ownership (for-profit, non-profit, and government)
- Medicare billed transport volume
- Service area population density

The second approach, using a cluster analysis, relies on groups of organizations determined to be empirically related on eight observable characteristics: ownership, log-transformed<sup>40</sup> Medicare billed transport volume, share of Medicare pickups in urban ZIP codes, share of Medicare pickups in rural ZIP codes, the shares of transports that were BLS, non-emergency transports, and from or to dialysis facilities, and finally a log-transformed count of ground ambulance vehicles.

### 5.7.1 Grouping by Combinations of Key Characteristics

Table 5-6 presents the 36 possible combinations of three key characteristics (3 ownership categories \* 4 Medicare billed transport volume categories \* 3 service area population density categories = 36 combinations) for ambulance suppliers, plus three additional categories for ambulance providers using service area population density only for the smaller overall number of ambulance providers (for a total of 39 cells). We found that groups of ambulance organizations generally, but not always, shared certain characteristics. For example, for-profit organizations were more likely to be larger and operate in urban areas; similarly, government organizations tended to be smaller and were more likely to operate in rural and super-rural areas.

The main advantage of using this approach for analysis and sampling is that it targets sampling and analysis to specific subgroups of ambulance organizations. For example, a specific subset of the 39 cells are urban, rural, and super-rural, respectively, and therefore sampling based on these categories guarantees that a certain number of sampled respondents will have the key characteristic of interest. This approach provides a more granular look at some of the less common combinations of characteristics, for example larger organizations that provide services primarily in rural and super rural areas. Finally, this approach is compatible with options that CMS may consider in the future regarding data collection, such as volume-based exclusions from the reductions to payment (see discussion in Chapter 6).

One practical disadvantage is the large number of categories, although this comes at the benefit of more granularity, as noted above. Another disadvantage relates to omitted characteristics. Of

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<sup>40</sup> We transformed the raw Medicare billed transport volume by taking the natural logarithm due to skewness in the raw data.

all the characteristics that we analyzed beyond the four key characteristics, only the share of transports that were non-emergency and the share of transports that were to or from dialysis facility meaningfully varied within the cells defined by this approach. Specifically, it appears that some primarily for-profit organizations specialize in providing non-emergency or more narrowly dialysis transports. Because the shares of transports that were non-emergency or dialysis do not contribute to the definition of the 39 cells, CMS would not be guaranteed to sample a certain number of these organizations. The 39-cell framework could be expanded to accommodate a further distinction between for-profit organizations that do and do not appear to specialize in non-emergency and dialysis transports. Finally, another disadvantage is that some cells (for example, high-volume, for-profit organizations in rural and super-rural areas) are sparsely populated.

### 5.7.2 Cluster Analysis

The cluster analysis resulted in nine clusters, six of which met the customary threshold to be considered strongly supported by the source data (see Appendix D.4). In general, the nine clusters align with ownership and service area population density dimensions:

- There are three clusters for government-owned organizations, one each for urban, rural, and super rural geography. Transport volume and the number of vehicles increase from super rural to urban geography.
- Similarly, there are three clusters for non-profit organizations, one each for urban, rural, and super rural geography, and again increasing in transport volume and the number of vehicles from super rural to urban geography.
- There are three clusters for for-profit organizations, one including for-profit organizations that primarily provide services in rural areas, one including for-profit organizations that primarily provide services in urban areas with relatively few non-emergency transports and dialysis transports, and one including for-profit organizations that primarily provide services in urban areas with large shares of non-emergency transports and dialysis transports. Transport volume for these three for-profit clusters was much higher than for the other six clusters.

The cluster analysis suggests that ownership and service population density are key characteristics and that the variation in transport volume across suppliers is largely addressed through ownership and population density distinctions. The cluster analysis did not identify a cluster for for-profit, ambulance suppliers that primarily provide services in super rural areas, in large part because very few organizations fall into this category. Finally, the cluster analysis identified the share of emergency versus non-emergency transports and share of dialysis versus non-dialysis transports as additional important characteristics for for-profit suppliers.

The main advantage of this approach is that it results in a relatively small number of groups determined through empirical relationships between key variables. There are several disadvantages. First, the smaller number of categories necessarily omits specific categories for some of the more uncommon combinations of key characteristics. Second, and most important, we expect that MedPAC and CMS will be interested in analyzing differences in costs or other data between subgroups based on individual characteristics (e.g., urban, rural, and super-rural organizations) rather than between the nine clusters resulting from this analysis. While the clusters are generally organized around key characteristics, individual organizations may have a



characteristic (e.g., a service area population density category) that differs from the typical characteristic in its assigned cluster.

### 5.7.3 Recommendation Regarding Categorization

We recommend that CMS use the key characteristics framework for the purpose of sampling, with two modifications to address the disadvantages described above. First, we suggest collapsing the top two Medicare billed volume categories for organizations that provide services in primarily super rural areas due to the small number of organizations in these cells. This results in a total of 36 cells—33 for suppliers after collapsing cells as described above and 3 for providers. Second, we suggest checking whether the number of sampled organizations includes a enough organizations providing primarily non-emergency and dialysis transports. We revisit this recommendation in Chapter 6, Sampling Plan Considerations and Recommendations.

## 5.8 Summary

The analyses summarized above demonstrate that a number of important aspects of ambulance service delivery can be identified through data already available to CMS. We have identified some important dimensions that should be used in designing a sample of suppliers and providers so that the sampled organizations cover key observable differences and allow CMS to drill down into additional important details. Furthermore, we have highlighted several analyses that point to differences among ground ambulance organizations that are associated with the costs of delivering these services and the revenue received for these services. Our key findings include the following:

- **In 2016, ground ambulance organizations billed Medicare for 14.8 million ground ambulance transports, for which they received \$6.1 billion in payments.** These transports comprised a mix of emergency and non-emergency services and different levels of service intensity (BLS vs. ALS). Approximately 40 percent of all transports were non-emergency, and the rate of non-emergency transports per beneficiary is more variable across geography than the rate for emergency transports.
- **Ambulance organizations vary across four key characteristics that influence costs and revenues: provider or supplier, ownership, population density of area served, and annual volume.** We find that most ground ambulance organizations operate in urban areas and that nearly half of all suppliers are government owned. While 49 percent of suppliers are government owned, they account for only 27 percent of total Medicare transports. Private, for-profit suppliers are a smaller group, representing 23 percent of suppliers, but because many provide a high volume of transports, they account for 53 percent of total transports. Because providers are a relatively small proportion of the population of ambulance organizations (6%), in the sampling strategy outlined in Chapter 6 we recommend that all providers, regardless of ownership, population density, and volume be collapsed together into one stratum.
- **Ambulance organizations are relatively well distributed across the combinations of ownership, population density, and annual volume.** There are, however, some cells that are sparsely populated, particularly in the high-volume categories in rural and super-rural areas. The implications of this for the sampling plan are described in detail in

Chapter 6, but in brief can be addressed by collapsing some cells together (e.g., high and very high volume categories in super-rural areas).

- **Among for-profit, high-volume organizations serving urban areas, there is a subset that specializes in non-emergency and scheduled transports.** We find that organizations in this category tend to have more non-emergency transports, more dialysis transports, and on whole lower intensity transports. These findings indicate that for this group of ambulance organizations, there are important differences between organizations that are not fully captured by the three key characteristics.
- **A cluster analysis resulted in nine clusters organized roughly by ownership, service area population density, and, for for-profit urban organizations, whether the organization provided primarily emergency or non-emergency transports.** The cluster analysis provides CMS with an alternative approach to organize ambulance suppliers.

While the Medicare data provided useful information about ambulance organizations, several organizational characteristics that we identified as being potentially related to costs and revenues through our environmental scan and stakeholder engagement, such as use of volunteer labor and staffing model, were not to our knowledge available for analysis in existing Medicare data.

## 5.9 Conclusion

The analyses presented in this chapter describe how ambulance organizations vary in terms of key characteristics that are expected to drive differences in costs and revenues. The chapter also describes two alternative approaches to categorize ambulance organizations for the purposes of analysis and sampling. In Chapter 6 we propose that the combination of Medicare enrollment and claims data should be used to generate a data set describing the universe of ambulance organizations from which samples for data collection will be drawn. Our findings from other components of our project suggest that the different business models and cost structures used by suppliers will be captured across stratifications defined by provider versus supplier status, ownership structure, transport volume, and service area population density. Our analyses highlight the shares of transports that were non-emergency or related to dialysis as important but narrower characteristics relevant primarily to for-profit, high-volume ambulance suppliers that provide services in primarily urban areas.

## 6. Sampling Plan Considerations and Recommendations

### 6.1 Introduction

The BBA of 2018 requires that a representative sample of ground ambulance organizations submit ambulance information to CMS annually. The sample must be representative of:

- Different types of providers and suppliers of ground ambulance services
- The geographic locations in which ground ambulance services are furnished

The BBA of 2018 further specifies that the same ambulance provider or supplier cannot be included in the sample in two consecutive years “to the extent practicable,” and it allows the Secretary of HHS to exempt certain ground ambulance organizations from reporting in the event of significant hardship (e.g., natural disasters).

Within these broad requirements, CMS must make decisions to develop a sampling plan to support data collection. This chapter describes these decisions, options CMS should consider for each decision, and our recommendations among these options.

#### 6.1.1 Sampling Plan Goals

Our sampling plan recommendations aim to balance several objectives. First, we aim to develop a sample that is representative of different types of ground ambulance organizations and different geographic locations. This is not only to meet the BBA of 2018 requirements, but also to establish scientific rigor and reduce sampling bias to the extent possible. Prior chapters described the diversity of ground ambulance organizations that may be sampled in terms of ownership, size, location, and other characteristics. A representative sample must include at least some ground ambulance organizations of each type defined by these characteristics observed in the population. While the sample would ideally include ground ambulance organizations in the same distributions as those in the population, statistical weighting can yield generalizable results if at least some ground ambulance organizations of each type participate (see Section 6.4). If a sample does not include each type of ambulance provider and supplier or does not use statistical weighting, and if costs or revenues differ systematically across ambulance provider and supplier categories, then analyses based on the collected data would be biased. Details regarding decisions related to the overall sampling strategy and our recommendations are provided in Section 6.2.

Our second objective is to balance statistical precision against respondent burden. Although a larger sample will yield more statistical precision, it will also increase the reporting burden imposed on the population. Therefore, CMS’s decisions regarding sample size will involve balancing the gains (in terms of precision) and drawbacks (in terms of burden) from fielding a larger sample. We assessed these trade-offs by considering the analytic needs of MedPAC and CMS. We consider a set of numerical examples regarding calculated estimates of costs and other results, which will be necessary due to the BBA of 2018’s prohibition on sampling the entire population of providers, to help frame the trade-offs in different decisions. We elaborate upon sample size recommendations (with calculations to justify the recommendations) in Section 6.3.

Our third objective is to provide a flexible approach that CMS can apply in the first year and subsequent years of data collection. Since the BBA of 2018 allows CMS to implement a

reduction to payments for sampled organizations that do not sufficiently report data (set at 10% of Medicare AFS rates), the sample size calculations shown in Section 6.3 assume complete participation among all sampled organizations. However, that assumption may not hold true. For example, small organizations with few Medicare transports may prefer the payment reduction to the burden of reporting. Medicare may also implement volume-based exclusions from the payment penalty. In Year 2 and thereafter, once information is known regarding response rates, the sampling plan should accommodate approaches to address potential non-response. As noted above, if there are no specific types of organizations that are systematically excluded from the sample, weighting (discussed in Section 6.4) can be used to ensure representativeness of the sample by accounting for any response rates (or sampling rates) that are not consistent across strata. Further details regarding non-response and requisite adjustments are provided in Section 6.5.

## 6.2 Sampling Strategy

### 6.2.1 Broad Sampling Approach Recommendations

#### 6.2.1.1 Method for Sampling

As noted above, a representative sample can be obtained if no specific types of organizations are systematically excluded from the sample. A strategy that will satisfy this requirement is **stratified random sampling**, in which the population is stratified based on characteristics and a sample is selected at random from the strata. The rate at which organizations are sampled (e.g., the sampling rate) must be the same for organizations in the same stratum; however, the sampling rate may vary across strata. So long as the sampling rate is not zero within any stratum and so long as appropriate weighting adjustments are used, the sampling will be representative.

Stratified random sampling has several advantages. First, it is easy to implement, and it satisfies the requirement that the sample be representative. Furthermore, the flexibility to vary sampling rates across strata allows one the ability to account for anticipated and unanticipated rates of nonresponse (see Section 6.5). Likewise, while we do not recommend oversampling certain types of organizations in Year 1 of data collection, it is possible to oversample from less prevalent strata using this approach to facilitate more precise estimates for certain subgroups or comparisons between subgroups.

#### 6.2.1.2 Unit of Sampling

Some corporations and other ambulance organizations bill Medicare under multiple NPIs. There are many reasons why multiple NPIs might exist under the same broad parent organization, including a large for-profit company operating in multiple states and acquisition of one ambulance organization by another. **We recommend sampling at the NPI level (rather than a corporation or broader parent organization level) and prepopulating the instrument with specific NPI numbers for several reasons.** First, Medicare claims data are most readily aggregated at the NPI level. As described below, we propose using Medicare billed transports as one of several factors contributing to our sampling stratification. Second, the relationships detailed between NPIs and broader organizations in Medicare PECOS enrollment data can involve partial ownership and other complex arrangements. Furthermore, we found in an exploratory analysis that the enrollment ID in PECOS data does not align with what we would

consider to be the parent organization in many cases. Third, even if sampling could be conducted at the parent company level, the resulting data that would be collected would be an amalgamation of data across multiple states and would be difficult for end analysts to conduct analyses examining state or regional factors that may influence costs.

Fourth, and most practically, sampling at the parent organization level (if it could be done reliably) may place undue burden on some of the larger companies to report all of their data in a given year. Reporting on some rather than all NPIs in a given year may smooth the burden of reporting for these larger organizations. Furthermore, we do not think it will be burdensome for these large organizations to report data at the NPI level. During engagements with large for-profit providers and suppliers, stakeholders with multiple NPIs indicated that data can be accessed and reported at the NPI level.

Finally, we note that some large, for-profit companies operating ground ambulance NPIs in multiple states are almost guaranteed to be sampled in each year of data collection. It is not clear how the BBA of 2018 provision “to the extent practicable” on sampling the same provider or supplier two years in row applies in this situation.

## 6.2.2 Stratification Approach

We considered two alternatives for stratification in Chapter 5: defining strata using combinations of four key characteristics or using groupings of ambulance organizations identified through a cluster analysis. The prior chapter outlined our rationale for proceeding with the four key characteristic option.<sup>41</sup> The prior chapter also noted two adjustments to the approach that we initially considered. The first was to collapse the highest two transport volume categories for for-profit organizations that provide services in primarily super rural areas due to small sample sizes. The second was to check after sampling to ensure that enough organizations specializing in non-emergency transports were sampled. The resulting 36-cell stratification scheme is represented by Table 6-1.

Table 6-1. Number of Ambulance Organizations in the Nationwide Population Segmented by Strata Used for Sampling

	Urban (#)	Rural (#)	Super rural (#)
<b>Government suppliers</b>			
Low	859	660	745
Medium	862	396	287
High	485	318	55
Very high	241	56	55
<b>For-profit suppliers</b>			
Low	278	141	159
Medium	265	107	57
High	351	162	59

<sup>41</sup> The sampling plan described in this structure is largely compatible with other approaches to stratification should CMS opt to stratify based on the nine clusters or on other ambulance organization characteristics.

	Urban (#)	Rural (#)	Super rural (#)
Very high	645	116	59
<b>Not-for-profit suppliers</b>			
Low	631	527	362
Medium	502	247	77
High	194	114	27
Very high	120	41	27
<b>Providers</b>			
All sizes and ownerships	232	151	229

Note: The sum across cells is 10,758, the number of ambulance organizations billing Medicare for ground ambulance services in 2016.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

### 6.2.3 Specific Sampling Strategy Recommendations

Regardless of CMS's choice of stratification approach, we recommend that CMS collect a stratified random sample of NPIs. In the first year of data collection, NPIs should be sampled from each stratum at the same rate (see the following section for a discussion of which sampling rate should be used). We do not recommend sampling certain types of NPIs at higher rates than others for the purpose of increasing sample counts in less prevalent strata, since oversampling in such a manner would place a disproportionate burden on certain types of NPIs. Note that when the same sampling rate is used across strata, the process is effectively simple random sampling.

However, **we recommend that CMS consider sampling from strata at different rates in subsequent years of data collection** once more is known about factors that may influence the rate of participation of NPIs within the various strata. Such factors include nonresponse from NPIs that elect to accept a reduction in payment due to failure to provide sufficient data, and potentially the implementation of volume-based or other hardship exemptions by the Secretary. Note that if an exemption is implemented, exempted NPIs should still be sampled in order to ensure that the sample is representative of the NPI population. Further discussion of this issue is provided in Section 6.5.

We recommend that the sampling frame be assembled from all NPIs that bill Medicare for ground ambulance services in a reference year.<sup>42</sup> We recommend that the source data for the sampling file be an NPI-level combination of Medicare fee-for-service claims and enrollment data as described in Chapter 5 and reflected in the strata presented in Table 6-1. We do not recommend excluding any subset of providers or suppliers as this would adversely affect the

<sup>42</sup> A sampling frame drawing on all ambulance organizations (i.e., not just those enrolled in Medicare or billing Medicare) is of interest conceptually but is subject to practical limitations. Most important, we have not identified a data source listing all ground ambulance providers and suppliers that could be used as the source for a broader sampling frame. Furthermore, while all Medicare providers could potentially bill Medicare for ground ambulance services (for example, hospitals, SNFs, comprehensive outpatient rehabilitation facility, home health agency, or hospice program), we rely on claims data to identify the small subset of providers that do bill Medicare. Without relying on Medicare claims data, the only alternative may be to include all Medicare providers in the sampling frame.

generalizability of collected data. The timing of the construction of the sampling file is discussed in Section 6.6.

As an alternative, we also considered sampling NPIs in proportion to the volume of Medicare billed transports. This approach is potentially more efficient than the stratified random sample approach that we recommend if the primary goal of data collection is to be able to describe costs or revenues on a per-transport basis rather than on a per-NPI basis. However, we anticipate that MedPAC, CMS, and other users of the collected data will want to conduct some analyses at the NPI level, such as how cost per transport varies across organizations. The stratified random sampling approach will be more efficient for such analyses; therefore, we do not recommend sampling in proportion to volume. See Section 7.6 for further details.

### 6.3 Sample Size

The BBA of 2018 prohibits sampling the entire population of ground ambulance organizations annually, so the overall sample size must be smaller than all NPIs in this population. Consequentially, the estimates of costs and other results calculated using data collected from the sample will be subject to sampling error. That is, estimates calculated across the sample of ground ambulance organizations will be different from corresponding estimates calculated using the entire population. The statistical uncertainty (i.e., precision) of any estimate should be quantified and provided in tandem with the estimate to help indicate the magnitude of the aforementioned difference. This could be a margin of error, a standard error, a confidence interval, etc. Since increasing the sample size will result in improved precision, optimizing statistical precision is a driving factor behind our choice of sample size.

As an example of the effect of small sample sizes on precision, the 2012 GAO survey of ambulance suppliers (referenced as “providers” therein) yielded 153 responses. Estimates from these small sample sizes necessarily had wide confidence intervals. The cost per transport was estimated to be between \$401 and \$480, and the median Medicare margin with add-on payments to be between -2.3 percent and 9.3 percent for all suppliers. It is hard to base meaningful conclusions on such wide confidence intervals. If the estimated Medicare margin had been more precise, one might have been able to conclude that the margin is positive (or negative), but this was not possible using the GAO data. Among subgroups, these confidence intervals are even more imprecise. Specifically, the estimated cost per transport was estimated to be between \$445 and \$639, with a Medicare margin of between -6.3 percent and 24.2 percent for super rural providers that primarily provide services in super rural areas (of which there were only 26 for which they had data).

As noted previously, the selection of a total sample size is a trade-off between improved precision and the resulting increase in burden imposed on the population of ground ambulance organizations. Thus, we will sample as many NPIs as possible so long as the marginal improvement in inferences that can be yielded is greater than the increase in burden on ground ambulance organizations as a result of additional sampling.

We considered the specific improvements in precision yielded by increasing the size of the sample and note that the overall sample size for the first year of data collection will be governed by the sampling rate that is applied to all sampling strata. In 6-2, we illustrate the effect of increasing the total sample size on inferences, including inferences for subgroups. The table includes hypothetical confidence intervals for the estimated cost per transport and Medicare

margin with add-on payments.<sup>43</sup> We consider sampling rates of 5, 10, 25, and 50 percent to illustrate the effect of the overall sample size. We assume all sampled NPIs report data. Hypothetical confidence intervals (including relevant sample size information) are shown for all NPIs and for all (non-interacted) subgroups based on the characteristics used to create the sampling strata outlined in Table 6-1. Those include (1) NPI type (provider or supplier), (2) size (four categories), (3) population density (three categories), and (4) NPI ownership (three categories). We also consider subgroups based upon whether or not a majority of an NPI's transports are emergencies (two categories) as well as whether or not at least 25 percent of an NPI's transports are dialysis transports (two categories). To help guide sample size selection, it is our preference to implement a strategy that will yield sample size of at least 200 in each relevant subgroup.<sup>44</sup>

Table 6-2. Hypothetical Inferences for the Full Sample and for Subgroups for Different Sampling Rates

	Sampling rate	# sampled	Confidence interval: \$ per transport	Confidence interval: Medicare margin (w/ add-on payments)
All NPIs	5%	538	\$441 ± \$21	3.5% ± 3.1%
All NPIs	10%	1076	\$441 ± \$15	3.5% ± 2.2%
All NPIs	25%	2690	\$441 ± \$9	3.5% ± 1.4%
All NPIs	50%	5379	\$441 ± \$7	3.5% ± 1.0%
Supplier NPIs	5%	507	\$441 ± \$22	3.5% ± 3.2%
Supplier NPIs	10%	1015	\$441 ± \$15	3.5% ± 2.2%
Supplier NPIs	25%	2537	\$441 ± \$10	3.5% ± 1.4%
Supplier NPIs	50%	5073	\$441 ± \$7	3.5% ± 1.0%
Provider NPIs	5%	31	\$441 ± \$91	3.5% ± 13.4%
Provider NPIs	10%	61	\$441 ± \$63	3.5% ± 9.3%
Provider NPIs	25%	153	\$441 ± \$40	3.5% ± 5.8%
Provider NPIs	50%	306	\$441 ± \$28	3.5% ± 4.1%

<sup>43</sup> Note that all confidence intervals reported here are used for illustration only. The confidence intervals do not reflect actual results. Note also that these intervals assume the same means and variances as reported by GAO (2012), and we make assumptions about how GAO 2012 calculated their confidence intervals (which they do not explicitly state).

<sup>44</sup> A sample size of 200 within a subgroup will guarantee a maximum margin of error no more than 7 percent for estimates involving binary outcomes when calculated across the subgroup, and it will ensure a minimum detectable effect size of no more than 0.3 (in terms of Cohen's d) for comparisons between two subgroups of the same size (this is a small-to-medium effect). In other words, a sample of size 200 would yield hypothetical confidence intervals of \$441 ± \$34 for the cost per transport and 3.5 percent ± 5.1 percent for the median Medicare margin with add-on payments across all NPIs.



Category	Sampling rate	# sampled	Confidence interval: \$ per transport	Confidence interval: Medicare margin (w/ add-on payments)
NPIs with no more than 200 transports	5%	231	\$441 ± \$32	3.5% ± 4.7%
NPIs with no more than 200 transports	10%	461	\$441 ± \$23	3.5% ± 3.3%
NPIs with no more than 200 transports	25%	1154	\$441 ± \$14	3.5% ± 2.1%
NPIs with no more than 200 transports	50%	2307	\$441 ± \$10	3.5% ± 1.5%
NPIs with 200 to 800 transports	5%	149	\$441 ± \$40	3.5% ± 5.9%
NPIs with 200 to 800 transports	10%	298	\$441 ± \$28	3.5% ± 4.1%
NPIs with 200 to 800 transports	25%	745	\$441 ± \$18	3.5% ± 2.6%
NPIs with 200 to 800 transports	50%	1489	\$441 ± \$13	3.5% ± 1.8%
NPIs with 800 to 2500 transports	5%	94	\$441 ± \$51	3.5% ± 7.5%
NPIs with 800 to 2500 transports	10%	187	\$441 ± \$36	3.5% ± 5.2%
NPIs with 800 to 2500 transports	25%	468	\$441 ± \$22	3.5% ± 3.3%
NPIs with 800 to 2500 transports	50%	936	\$441 ± \$16	3.5% ± 2.3%
NPIs with more than 2500 transports	5%	65	\$441 ± \$61	3.5% ± 9.0%
NPIs with more than 2500 transports	10%	130	\$441 ± \$43	3.5% ± 6.3%
NPIs with more than 2500 transports	25%	324	\$441 ± \$27	3.5% ± 4.0%
NPIs with more than 2500 transports	50%	648	\$441 ± \$19	3.5% ± 2.8%
Urban NPIs	5%	283	\$441 ± \$29	3.5% ± 4.2%
Urban NPIs	10%	567	\$441 ± \$20	3.5% ± 3.0%
Urban NPIs	25%	1416	\$441 ± \$13	3.5% ± 1.9%
Urban NPIs	50%	2833	\$441 ± \$9	3.5% ± 1.3%
Rural NPIs	5%	152	\$441 ± \$40	3.5% ± 5.8%
Rural NPIs	10%	304	\$441 ± \$28	3.5% ± 4.1%

Category	Sampling rate	# sampled	Confidence interval: \$ per transport	Confidence interval: Medicare margin (w/ add-on payments)
Rural NPIs	25%	759	\$441 ± \$18	3.5% ± 2.6%
Rural NPIs	50%	1518	\$441 ± \$12	3.5% ± 1.8%
Super rural NPIs	5%	103	\$441 ± \$48	3.5% ± 7.1%
Super rural NPIs	10%	206	\$441 ± \$34	3.5% ± 5.0%
Super rural NPIs	25%	514	\$441 ± \$21	3.5% ± 3.1%
Super rural NPIs	50%	1029	\$441 ± \$15	3.5% ± 2.2%
Government NPIs	5%	259	\$441 ± \$30	3.5% ± 4.4%
Government NPIs	10%	517	\$441 ± \$21	3.5% ± 3.1%
Government NPIs	25%	1294	\$441 ± \$13	3.5% ± 2.0%
Government NPIs	50%	2587	\$441 ± \$10	3.5% ± 1.4%
Non-profit NPIs	5%	161	\$441 ± \$39	3.5% ± 5.7%
Non-profit NPIs	10%	321	\$441 ± \$27	3.5% ± 4.0%
Non-profit NPIs	25%	803	\$441 ± \$17	3.5% ± 2.5%
Non-profit NPIs	50%	1605	\$441 ± \$12	3.5% ± 1.8%
For-profit NPIs	5%	119	\$441 ± \$45	3.5% ± 6.6%
For-profit NPIs	10%	237	\$441 ± \$32	3.5% ± 4.6%
For-profit NPIs	25%	594	\$441 ± \$20	3.5% ± 2.9%
For-profit NPIs	50%	1187	\$441 ± \$14	3.5% ± 2.1%
Majority Emergency Transports	5%	458	\$441 ± \$23	3.5% ± 3.3%
Majority Emergency Transports	10%	917	\$441 ± \$16	3.5% ± 2.4%
Majority Emergency Transports	25%	2292	\$441 ± \$10	3.5% ± 1.5%
Majority Emergency Transports	50%	4584	\$441 ± \$7	3.5% ± 1.1%
Majority Non-Emergency Transports	5%	80	\$441 ± \$55	3.5% ± 8.1%
Majority Non-Emergency Transports	10%	159	\$441 ± \$39	3.5% ± 5.7%
Majority Non-Emergency Transports	25%	398	\$441 ± \$24	3.5% ± 3.6%
Majority Non-Emergency Transports	50%	796	\$441 ± \$17	3.5% ± 2.5%

Category	Sampling rate	# sampled	Confidence interval: \$ per transport	Confidence interval: Medicare margin (w/ add-on payments)
Less than 25% dialysis transports	5%	493	\$441 ± \$22	3.5% ± 3.2%
Less than 25% dialysis transports	10%	985	\$441 ± \$15	3.5% ± 2.3%
Less than 25% dialysis transports	25%	2463	\$441 ± \$10	3.5% ± 1.4%
Less than 25% dialysis transports	50%	4925	\$441 ± \$7	3.5% ± 1.0%
At least 25% dialysis transports	5%	45	\$441 ± \$74	3.5% ± 10.9%
At least 25% dialysis transports	10%	91	\$441 ± \$52	3.5% ± 7.6%
At least 25% dialysis transports	25%	227	\$441 ± \$32	3.5% ± 4.7%
At least 25% dialysis transports	50%	454	\$441 ± \$23	3.5% ± 3.3%

The table indicates that when 5 percent of NPIs are sampled, there are several subgroups for which our threshold of an effective sample size of 200 is not met. However, for the other sampling rates considered, the threshold is met in most circumstances. Situations in which the threshold is not met (excluding those involving the smallest sampling rates considered) include analyses of provider NPIs under sampling rates of 5, 10, and 25 percent (there are not enough provider NPIs in the population for an analyst to be able to produce reliable estimates from this domain under any sampling strategy considered here) and the largest two categories of NPIs under a 10 percent sampling rate. The table shows that a sampling rate of 25 percent will perform well for all analyses considered here (aside from those that isolate to providers). The table also shows that the improvement in precision is more pronounced when increasing sample sizes that were previously small. As such, the effect of increasing sampling rates is more obvious when looking at subgroups. In addition, the gains in moving from sampling 25 percent of NPIs to sampling 50 percent are marginal since sampling 25 percent yields sufficient precision for subgroups.

Based on these calculations, **we recommend sampling 25 percent of all NPIs** in Year 1 of data collection. Sampling in such a manner will produce a sample with a size that will yield sufficient precision for analysis of relevant subgroups. Furthermore, a 25 percent sample will be adequate to compensate for any nonresponses among a subset of those sampled. This approach may be reviewed and revised in subsequent years when more is known about response rates and the analytical needs for the sample.

## 6.4 Weighting

Above, we recommend sampling in a manner that is essentially simple random sampling (i.e., stratified random sampling with the same sampling rate across strata) in Year 1 of data collection. A simple random sample is straightforward to analyze and does not require non-standard methods for analysis. However, there are several reasons why the data collected from responder NPIs may not comprise a simple random sample. Foremost, response rates among sampled NPIs may differ across strata (e.g., smaller NPIs may be less likely to participate). Additionally, if sampling rates that differ across strata are used in the second year of data collection and/or thereafter, the sampled NPIs should not represent a simple random sample. In such circumstances, appropriate statistical techniques should be used for data analysis to ensure that estimates produced from the collected data will generalize to the NPI population.

In general, a sample may have a distribution across key characteristics that differs from that of the population for a variety of reasons. In such circumstances, the sample may not be considered to be representative of the population, and inferences drawn from the sample may not be assumed to generalize to the population. However, statistical weighting can be applied to such a sample in order to obtain representativeness.

**We recommend that statistical weighting be used to account for any observed differences in response rates.** With statistical weighting, each data unit is given a weight that indicates how much emphasis the unit receives in comparison to other units when analyses are performed. Certain types of data units that are underrepresented in the sample relative to the population will receive larger weights in comparison to overrepresented data units. As such, statisticians will often assume that, although an unweighted sample may not represent the population adequately, an appropriately weighted sample will be representative. For weighting to yield representativeness, all types of data units should be represented in the sample to some degree (in that the sample covers the population), and any differences between the sample and the population should be able to be captured using observed characteristics (i.e., there should be no unobserved confounding).

The most common type of weighting is inverse probability weighting, wherein a respondent's weight is set as being equal to the inverse of their (usually known) probability of being sampled times the inverse of their (often estimated) probability of responding. Calibration weighting may also be used, wherein weights are found that ensure that the weighted sample observes known aggregated characteristics of the population.

Appropriate statistics tools (e.g., software such as SAS, R, or Stata) must be used to analyze weighted samples. These methods must incorporate the weights into both the estimators themselves as well as estimates of their uncertainty. In that vein, it is known that weighted samples contain more uncertainty (i.e., worse precision) than unweighted samples of the sample size. As such, statisticians often consider the concept of an *effective sample size*, which is the size of an unweighted sample that yields the same precision as the weighted sample.

## 6.5 Sampling Considerations for Later Data Collection Years

Since we do not have any information regarding response rates, nor do we know the manner in which hardship exemptions may be implemented, we have not directly accounted for the potential of nonresponse in our recommendations outlined above for sampling in Year 1 of data

collection. We have instead recommended a sampling rate that will yield a size that is sufficient assuming that most or all sampled NPIs report data. **In future data collection years (i.e., after Year 1), we recommend that CMS consider oversampling from groups of NPIs with lower response rates for any reason.**

To illustrate the effect of nonresponse, we consider a scenario in which NPIs with 150 or fewer billed Medicare transports per year (which constitute 37% of the population in this setting) have a 25 percent response rate, while other NPIs have a 100 percent response rate. Table 6-3 shows an abridged version of Table 6-2 that is specific to this setting. Since there is nonresponse, and since weighting should be used to account for the nonresponse, Table 6-3 also shows the number of respondents and the effective sample size (which accounts for precision lost due to weighting) in addition to the number sampled. The table shows that a large portion of the sample is lost due to nonresponse (and weighting) and that the effect of nonresponse is most pronounced in the subgroup of small NPIs.

Table 6-3. Hypothetical Inferences for the Full Sample and Subgroup with Nonresponse

Category	Sampling Rate	# sampled	# responding	Effective sample size	\$ per transport	Medicare margin (w/ add-on payments)
All NPIs	10%	1058	765	502	\$441 ± \$22	3.5% ± 3.2%
All NPIs	25%	2645	1912	1254	\$441 ± \$14	3.5% ± 2.0%
NPIs with no more than 200 transports	10%	448	154	124	\$441 ± \$44	3.5% ± 6.5%
NPIs with no more than 200 transports	25%	1119	385	309	\$441 ± \$28	3.5% ± 4.1%

In the second year of data collection and beyond, it will be feasible to adjust the sampling mechanism to account for known patterns of nonresponse. To illustrate this, in the same scenario as outlined above, we consider inferences if NPIs with fewer than 150 billed Medicare transports per year are sampled at a rate of up to four times that of other NPIs when possible. Note that the maximum feasible rate at which any type of NPI can be sampled is 50 percent (due to the prohibition in the BBA of 2018 of sampling the same NPI in two consecutive years); therefore, in this setting, we are sampling 40 percent of low-volume NPIs under a 10 percent sampling rate for other NPIs and 50 percent of low-volume NPIs when a 25 percent rate is used for other NPIs. Table 6-4 shows the corresponding inferences under this setting. The table shows that oversampling yields a much more robust sample. In fact, when a base sampling rate of 10 percent of NPIs is used, there is no sample lost due to weighting (i.e., the effect sample size equals the number responding).

Table 6-4. Hypothetical Inferences for the Full Sample and Subgroup with Nonresponse and Oversampling

	Base Sampling Rate	Low-volume sampling rate	# sampled	# responding	Effective sample size	\$ per transport	Medicare margin (w/ add-on payments)
All NPIs	10%	40%	2232	1058	1058	\$441 ± \$15	3.5% ± 2.2%
All NPIs	25%	50%	3623	2156	1931	\$441 ± \$11	3.5% ± 1.6%
NPIs with no more than 200 transports	10%	40%	1621	448	448	\$441 ± \$23	3.5% ± 3.4%
NPIs with no more than 200 transports	25%	50%	2097	630	597	\$441 ± \$20	3.5% ± 2.9%

Finally, CMS will need to decide whether there are relationships between the Year 1 through Year 4 sampling files. In sampling terms, it is important to specify whether the samples will be drawn with and without replacement. The BBA of 2018 prohibits to the extent practicable the same ambulance provider or supplier from being sampled in two consecutive years. But the same ambulance provider or supplier could be sampled in the first and third years of data collection.

**We recommend pulling samples without replacement for the first four years of data collection** to minimize the burden on individual ambulance providers or suppliers. If a 25 percent sampling rate is used, this would generally be equivalent to every ground ambulance organization reporting in one of the first four years of data collection (ignoring the complexities of entry and exit over this period).

## 6.6 Timing of Sampling Activities

We recommend pulling samples as close to the start of data collection as possible to ensure that the ground ambulance organizations submitting data are representative of active ground ambulance organizations at that point in time. There are two practical considerations that may result in a discrepancy between the timing of the sampling pull and data collection:

- Claims data for a given service date calendar year are generally considered incomplete until several months—and often a full year—have passed. While many ground ambulance organizations bill Medicare for services shortly after the service date, the program allows ground ambulance organizations up to a year to submit claims. As a result, if a sample were to be pulled on December 1, 2019, claims data for calendar year 2018 might be viewed as incomplete, while claims data for calendar year 2017 would be viewed as complete.
- We anticipate the CMS will (a) ask respondents to report on a full year of data, and (b) provide sampled ground ambulance organizations advance notification so that they can collect the requested data in their systems for a full year before reporting.

One scenario is that a Year 1 sample would be pulled in 2019 using 2017 claims and enrollment data. In this case, the sample would be representative of ground ambulance organizations active in 2017 rather than 2019. We expect, based on an analysis of 2014 to 2016 claims data, that approximately 7 percent of NPIs billing Medicare for ground ambulance services in 2017 will no

longer be active two years later in 2019, and that about 5 percent of NPIs billing for ground ambulance services in 2019 will not have been active two years prior in 2017. While these rates were relatively similar for NPIs in different population density and volume category, NPIs with higher volumes of Medicare billed transports, NPIs that provide services primarily in rural areas, and NPIs that provide services in primarily super rural areas were slightly more likely to consistently bill Medicare for ground ambulance services from 2014 to 2017 compared to lower volume NPIs that provide services in primarily urban areas.

CMS could decide to use more recent claims data, such as 2018 data or partial data from 2019 to pull samples in late 2019. We recommend using either 2017 or 2018 claims data and enrollment data from the corresponding year to construct the sampling file. The completeness of the claims data that is used to identify all ambulance providers and some ambulance suppliers is important enough to justify the slight disconnect between the characteristics of the sample versus the population of ground ambulance organizations at the time of data collection.

Relatedly, CMS must decide whether (a) ground ambulance organizations that appear to be inactive during the year contributing data to the sampling file should be included in the sampling frame, and (b) ground ambulance organizations that appear to become inactive subsequently should be excluded. We identified two relevant scenarios in our analysis of claims and enrollment data. First, an NPI can disenroll from Medicare or it can cease billing Medicare for ground ambulance services mid-year during the year of data used to develop the sampling file (e.g., the NPI might bill January and February but not in any subsequent month). In this case, **we recommend leaving the NPI in the sampling frame.** Second, NPIs can disenroll from Medicare, stop billing Medicare for ground ambulance services, or cease operations after the year contributing data to the sampling file but before data submission begins. To avoid imposing an undue burden, **we recommend that CMS exempt ground ambulance organizations that ceased operations prior to the start of data submission.**

## 6.7 Conclusions

Because the sampling strategy must balance the gains in pursuing a larger overall sample with the added burden imposed on the NPI population from a larger sample, we recognize that specific decisions on the sampling approach, sample size, and the timing of sampling activities will be made on the basis of statistical and other considerations. However, we do offer recommendations regarding aspects of the sampling strategy that we feel are crucial to collecting a sample that will meet the needs of CMS as mandated by Congress.

**Use a stratified random sample:** We recommend sampling NPIs at random from the strata seen in Table 6-1, which are based on combinations of NPI size, population density, and ownership. In Year 1 of data collection, we recommend sampling from each stratum at the same rate, since nothing is known about how response rates may vary across strata.

1. **Use a sampling rate of 25 percent:** The overall sample size will be driven by the rate at which NPIs are sampled. We recommend a 25 percent sampling rate because if a lower sampling rate is used, analysis of subgroups will be performed with inadequate precision. Furthermore, our analyses illustrated that using a 50 percent sampling rate yielded only marginal gains over a corresponding strategy that involves sampling NPIs at a 25 percent rate. In our view, these gains are not sufficient to merit the increased burden that would be imposed by implementing a higher sampling rate. In addition, sampling at a 25 percent

rate will protect (to some degree) against the possibility of participation rates being lower than anticipated.

2. **Perform appropriate statistical adjustments:** To ensure representativeness of the sample, the data should be weighted in the case of nonresponse regardless of source.
3. Consider revisions to an implemented sampling strategy after the first year of data collection once more is known about response rates and other issues. After the first year of data collection, we expect to have a greater understanding of response rates across strata, as well as the analytical needs for the data. We recommend sampling at a higher rate (i.e., oversampling) from strata with nonresponse. Also, following the initial round of data collection, we expect to have a better understanding of the analyses that will be performed using the collected data. This may help influence the choice of sample size in subsequent years—if subgroup comparisons are de-emphasized, a smaller sample may be sufficient, whereas if analysis of less prevalent subgroups is needed, a larger (or strategically oversampled) sample may be required.
4. **Use claims and enrollment data from 2017 or 2018 to create a sampling file.** Certain ground ambulance organizations—including those that cease operations between the year of data used to construct the sample file and the start of data reporting—could be exempted from the reporting requirement.
5. **Pull samples without replacement for the first four years of data collection.** If CMS moves forward with our recommendation to sample 25 percent of ground ambulance organizations, this means that every ground ambulance organization would be required to report data over the first four years of data collection (with some exceptions for ground ambulance organizations that enter and exit the market over this period).



## 7. Instrument Considerations and Recommendations

### 7.1 Purpose and Approach

The purpose of this chapter is to (1) describe key issues and decisions that must be made regarding instrument scope, instrument design, and the future data collection approach, and (2) provide Medicare with recommendations related to each decision.

Our identification of key decisions and our recommendations are based on findings from activities described in Chapters 1–5 of this report. Specifically, we rely on:

1. A review of the BBA of 2018 requirement that Medicare collect cost, revenue, and utilization information from ground ambulance organizations.
2. The anticipated needs of CMS and MedPAC as the ultimate users of the data. BBA of 2018 indicates that MedPAC will use data collected via this system to study the adequacy of payments for ground ambulance services and the geographic variations in the cost of furnishing such services. While we do not know the specific methodology or approach that MedPAC intends to use for its study, in general our strategy for instrument design is to leave as many analytic avenues open to MedPAC and other users of this data as possible. For example, our recommendations on data collection regarding characteristics of ground ambulance organizations are motivated, in part, by the potential use of this data to support subgroup analyses beyond the specific subgroups that are noted in BBA.
3. Our ambulance cost and revenue frameworks (see Chapter 3).
4. Our review of approaches from existing tools used to collect information on cost, revenue, utilization, and other pertinent information on providers and suppliers of ground ambulance services.
5. The results of key informant discussions, stakeholder engagements, and cognitive interviews.
6. A review of findings from analyses of Medicare enrollment and claims data related to ground ambulance organization characteristics, Medicare ground ambulance volume, and Medicare ground ambulance payments.
7. The principle of balancing respondent burden against data quality and granularity as described below.

Our summary of key decisions and recommendations is divided into three sections. The first focuses on higher level decisions and recommendations regarding instrument scope. The second focuses more narrowly on considerations related to individual items or sets of items, such as the level of granularity to include or exclude in response options, appropriate ways to ask questions, and considerations for allowable response options. The last covers recommendations related to how the instrument is fielded, for example, options for the mode of invitation and administration and follow-up efforts that will be important in order to maximize respondent participation and data quality.

### 7.2 Balancing Respondent Burden Against Data Quality and Granularity

The burden placed on respondents to report information is a function of both the instrument that collects the information and the content of the instrument. In terms of cost data, CMS has developed methods to collect cost information from hospitals, for example, through cost

reporting. The cost reporting system for institutional providers is complex and requires sophisticated accounting systems and knowledge to complete. We heard from industry stakeholders that not all ambulance organizations have the analytic capabilities or sophisticated accounting systems to allow accurate and complete cost reporting. As such, in conjunction with CMS, we chose to recommend a survey approach to collecting similar information to a cost report. Surveys offer more flexibility to allow reporting of other information not usually a part of cost reporting, such as organizational characteristics, as well as adapt specific items to the wide range of diverse ambulance organizations.

Any survey should seek to maximize the quantity and quality of the data and minimize respondent burden. There is an inherent trade-off between these two objectives, and the required level of detail should closely conform to core research questions under investigation. There is no right or generally accepted level of detail or burden, but burden should not exceed what is minimally necessary to address the core research questions.

Complex research questions may merit a higher level of respondent burden, but any burden must be justified by a research objective. Analysts may require detailed data in some areas but not in others. For example, detailed information on staff hours by category may be necessary to estimate labor costs and compare these costs across organizations and over time or for estimating labor cost by personnel category from an outside source. In contrast, it might not be necessary to ask for detailed data on costs for office supplies. The analyst should consider whether the analysis would materially suffer if the data were broad as opposed to detailed. Broadly, the issues to consider when weighing respondent burden against data granularity are:

- **Accuracy.** Surveys that require the respondent to access detailed records may be more accurate than surveys that simply require respondents to report broad classes of costs. From our analysis in Chapter 3, for example, GEMT and EMSCAP require respondents to report detailed records, whereas GAO only asks respondents to report total costs by category (e.g., total labor costs). GAO may be less burdensome, but without recourse to detailed cost records, it is unclear whether estimates of total costs are accurate. Paradoxically, requiring more detailed reporting may invite more inaccuracies if the cost or revenue estimates are inherently subjective (e.g., valuation of in-kind donations). Yet, the analyst can exclude these costs or revenues if they are identified. If these suspect estimates are included in the totals and not identified, seemingly different totals will reflect differences in reporting rather than true cost differences.
- **Efficiency.** A thoughtfully constructed instrument may reduce respondent burden and increase detail if totals can be automatically calculated. A seemingly simpler survey, like GAO, may be more error prone and may require respondents to do manual calculations. Programming of “range checks,” calculations, and skip logic can significantly reduce respondent burden and increase data quality.
- **Availability of administrative or other data.** Federal, state, and local governments may have data that can reduce the need for survey-based data collection (e.g., the Bureau of Labor Statistics may have data on labor costs by metropolitan region). Administrative data may also inform the development of the survey instrument or protocols. For example, the designer may define labor categories as they are defined by the Bureau of Labor Statistics to allow cost comparisons back in time.

Several of the decisions and recommendations below involve balancing burden against data quality and granularity. We note each of these cases.

## 7.3 Decisions Related to Instrument Scope

### 7.3.1 Should Certain Categories of Respondents Receive an Abridged Instrument?

One approach to minimize respondent burden might be to present an abridged instrument with reduced numbers of sections and less granularity, selecting only certain sampled providers/suppliers to receive specific subgroups of questions. This approach could minimize burden to the ambulance community by reducing the number of items answered by any one provider or supplier. While this approach might be desirable to the stakeholder groups and theoretically might improve response rates and data quality, the risk is a reduction in the number of observations for items that are presented only to some respondents, and, as a result, a lack of precision of estimates and the feasibility of testing for differences between subgroups. This approach also increases the burden on CMS to field multiple instruments to different groups.

Our recommendation is to proceed with a single data collection instrument presented to all respondents. We recommend limiting the number of items presented to each respondent and excising irrelevant items for particular respondents through skip logic determined by individual responses. Implementation of an abridged tool requires a higher level of sophistication with instrument programming and testing, greater attention to administration, and an increase in analytic level of effort to create the full picture of per-transport costs across the provider and supplier landscape.

That said, we encourage re-evaluation of this approach after CMS receives additional feedback from stakeholders during the rulemaking process. The eventual choice of approach for data collection hinges most significantly on the ability of data retrieval by and burden on respondents, as well as on the expertise and resources available to program and field the data collection instrument (these activities are out of scope for the current project).

### 7.3.2 Should Organizations Report on Total or Medicare-only Costs, Revenue, and Volume?

Conceptually, some share of an organization's total costs and revenue is associated with services provided to Medicare beneficiaries. We found that ground ambulance organizations do not maintain systems that record costs assigned to specific activities or patients. **Even if it were possible to do so, we do not recommend that respondents be asked to distinguish between costs associated with Medicare-covered services and other activities or services, due to the significant burden of reporting at this level of granularity. Our recommendation is to focus on collecting total ambulance costs and revenue.** CMS, MedPAC, and others using the data can choose how to report these total ambulance costs relative to one or more volume measures, such as total ambulance costs per transport. Analyses of the collected data should assess how these costs vary across subgroups of respondents. Revenue data is generally available by payer and other category, and for that reason we suggest collecting revenue by category.

### 7.3.3 Should Any Costs or Sources of Revenue Be Excluded?

Reporting cost data in the ambulance industry is complicated by the fact that many organizations provide ground ambulance services in conjunction with other services. Common examples we heard in interviews and stakeholder engagements were fire departments providing ground ambulance services or organizations providing both air and ground ambulance service. Other examples include health systems where staff might have both ambulance duties and provide some direct care to patients in a clinic operated by the system, or organizations that provide non-emergency wheelchair transports. We used the term “shared services” to incorporate all of these scenarios.

This section summarizes the overall approach to **non-allowable costs** and **allocation** used in various sections of the instrument for organizations with shared services. Figure 7-1 is a generalized description of the reporting approach. We first discuss our recommendations on out-of-scope (non-allowable) costs, which we define as entire categories of costs that are completely unrelated to ground ambulance functions and are therefore out of scope for reporting (such as air ambulance operation costs; first [“excluded from reporting”] box in Figure 7–1).<sup>45</sup> Then we discuss how shares of reported allowable costs could in some cases be allocated to calculate the total costs for ground ambulance services (third [“requires allocation”] box in Figure 7–1).

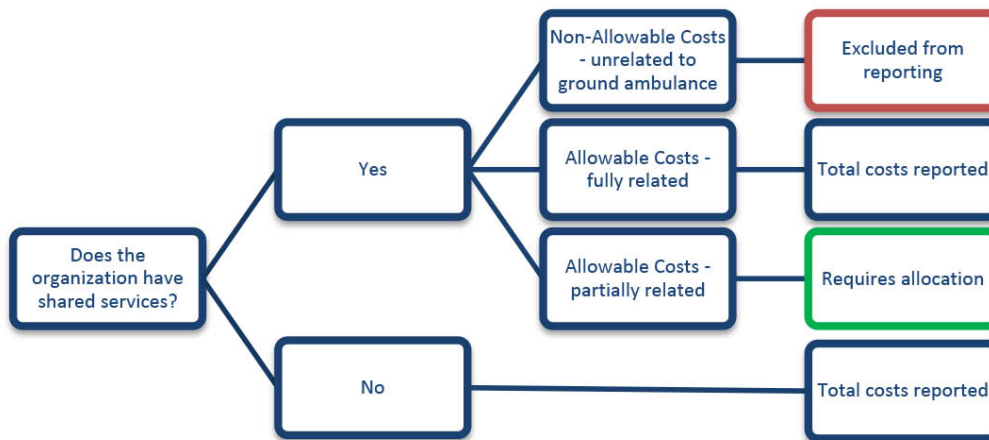


Figure 7-1. Flowchart of Reporting for Organizations with Shared Services

For organizations with shared services, we recommend excluding the following costs and revenues from the data reported via the instrument:

- All air ambulance costs including staff, facilities, vehicles, and equipment and supplies
- Staff, facilities, vehicles, and equipment or supplies without any ground ambulance function (e.g., staff with only fire duties in fire-based organizations)
- Community paramedicine
- Performance-related costs such as penalties or fines

<sup>45</sup> The same concept can apply to revenue.

We have two overall exceptions to the recommendation to exclude non-allowable costs. At the end of the instrument, we recommend asking for the organizations' **total costs** and **total revenues** inclusive of all services provided, even those unrelated to ground ambulance services. The rationale is that these data items will give the end user some scope of the costs associated with other activities for ambulance organizations with shared services. These items will also, particularly for organizations without shared services, provide a check against which the sum of costs and revenue reported in other sections can be compared.

The allocation process (the green box in Figure 7–1) is necessary for all costs that are partially associated with ground ambulance services. Given feedback we received from interviews, stakeholder engagements, and the cognitive interviews, **we recommend an approach that would generally require those analyzing data collected via instrument to allocate the costs attributable to ground ambulance services, rather than requiring the respondents to do this allocation themselves.**

We ask respondents to report total costs for most sections (i.e., costs completely related plus costs partially related to ground ambulance services) and then provide the analyst with inputs that could be used for allocation. Table 7-1 summarizes the allocation approaches feasible with collected data for each instrument section. We know that the statistical basis for allocation should be (a) measurable and (b) functionally related to the item being allocated. We ask respondents to report several possible bases for allocation that meet these criteria, such as the share of responses that are ground ambulance related or the square footage of facilities that are related to ground ambulance. In other cases, however, due to the survey nature of the data collection, we do permit a more subjective allocation to minimize burden by asking respondents to estimate the share of the cost that is attributable to ground ambulance services. Analysts will have the choice of using this more subjective allocation or a more objective approach using the share of responses or other factors.

Related to shared services, a small share of ground ambulance organizations may be jointly operated by the same parent company. In this scenario, the parent company or organization may incur costs (e.g., for management, information technology infrastructure, or billing) that is relevant to ground ambulance services. **We recommend including explicit instructions in each instrument section directing respondents to allocate a share of these parent organizations costs, if applicable. In order to reduce burden, we propose to allow respondents to use their customary accounting practice to allocate costs rather than provide specific instructions.**

Table 7-1. Summary of Allocation Approaches for Shared Costs and Revenues, by Cost Category

Cost Category	Allocation Inputs Requested from Respondents	Allocation Options for Analysis
Labor	Requires respondent to report total hours worked in a typical week and annual compensation for EMT/Response staff and administrative/facilities staff fully or partially related to ground ambulance. Section requires respondent to report share of hours during a typical week representative of firefighters or police officers by staff category and share of non-ground ambulance related responsibilities (excluding fire and police).	Costs for shared staff can be allocated by end user with share of hours during a typical week for non-ground ambulance responsibilities or other method of their choosing.
Facilities	Requires respondent to report total square footage and estimate the square footage attributable to ground ambulance services.	End user can allocate with square footage ratio or other method of their choosing.
Other Vehicles (excluding ground ambulances)	None.	End user can allocate with ratio of ground ambulance to total responses or a method of their choosing.
Vehicles – Other Costs (for both ground ambulances and other vehicles)	Requires respondent to list percent of total maintenance and fuel costs attributable to ground ambulance services.	End user could allocate with the respondent-reported percentages or other method of their choosing.
Medical Equipment and Supplies; Non-Medical Equipment and Supplies; Other Costs	Requires respondent to list percent of total costs attributable to ground ambulance.	End user could allocate with the respondent-reported percentages or other method of their choosing.

### 7.3.4 Over Which Period Should Respondents Report on Ambulance Costs, Revenue, and Volume?

Another strategy to maximize data availability and quality while reducing respondent burden is allowing for flexibility in the reporting period. Many respondents explained that using a reporting period of less than one year could miss important temporal effects such as seasonality in ambulance services, costs (such as heating/cooling), and labor. CMS may prefer reporting over a calendar year because the AFS (which determines Medicare revenue) is updated on a calendar year basis. However, ground ambulance organizations have varied cost reporting schedules—some generate reports monthly, some quarterly, some on a calendar year, and others on a fiscal year. For these reasons, it would be to the benefit of the data collection effort if respondents could use existing reporting periods to inform their responses. **We recommend that data be collected for the calendar year, with the option for respondents to specify a different reporting period (fiscal year). We do not recommend allowing respondents to report on periods of less than one year.**

## 7.4 Decisions Related to Instrument Content

We used standard frameworks in the cost analysis field to identify relevant cost and revenue elements for our instrument development. Our framework, outlined in detail in Chapter 3, is organized around four primary domains:

1. Provider and supplier characteristics
2. Labor costs: includes all labor costs such as salaries, wages, benefits, taxes, etc.
3. Non-labor costs: includes facilities costs, vehicle costs, equipment, supplies, and consumables, and other costs (e.g., fees, dues), etc.
4. Revenues

Below we provide an overview of considerations, alternative approaches for data collection, and recommendations for data collection in each of the cost and revenue domains outlined in the framework, as well as information related to the characteristics of ambulance organizations that should be collected to inform analysis. The resulting instrument from these considerations can be found in Appendix E.

### 7.4.1 Organizational Characteristics

Even when CMS may already have access to some relevant claims and enrollment information, we suggest asking respondents to report their characteristics. This will ensure that the data is up-to-date, and it may identify cases where the respondent and Medicare have conflicting data or impressions. **We recommend collecting data on several characteristics of respondent organizations:**

- Ownership
- Organization type
- Service area population density
- Service area
- Factors related to readiness

Three of these characteristics—organization type, service area, and factors related to readiness—warrant additional discussion.

### 7.4.2 Organization Type

From the qualitative data collection process, many organizations thought the description of their ownership type in PECOS does not accurately reflect their ownership type. These characteristics act as the screening questions that later affect the skip patterns in the survey, so it is particularly important that they accurately reflect how respondents commonly view their organizations. For the government-based organizations, respondents argued for more granularity in the categories to include fire-based, police-based, or stand-alone EMS agency. **We recommend including the following organization types on the survey:** fire-based; police or other public safety department-based; government stand-alone EMS agency; hospital or other provider-based; independent/proprietary organization providing EMS services under contract; and other independent/proprietary organization. **We also recommend specifically asking a separate question about whether the organization shares services with police, fire, hospital, or other services** so that organizations with shared services will be prompted to answer questions on the allocation of funds (which we describe below) across service lines. Finally, in this section, we

also ask about whether the organization uses volunteer labor, which will initiate the prompts for questions on volunteers in the labor costs section.

### 7.4.3 Service Area

From our interviews and stakeholder engagements, we recognize that organizations may have a primary service area in which they are responsible for a certain type of service (e.g., ALS or BLS) and may have secondary services areas for a variety of reasons, such as providing mutual or auto-aid, or providing a different service in a secondary area (e.g., non-emergency transports statewide). **We recommend asking respondents to identify their primary and secondary service areas by selecting the geographic areas that comprise their primary service area (e.g., ZIP codes).** Most of the cognitive interviewees reported that they would be able to identify their primary service area in this manner. If technically feasible, we suggest that other pre-identified geographic areas be available for respondent selection (e.g., towns or municipalities, counties). In all cases, a crosswalk could be provided on the back end based on known data (e.g., whether the specified area is considered urban, rural or super rural; the population of the area; or the square miles of the service area), allowing this data to be populated at the NPI level. We suggest this approach to minimize respondent burden in having to look up this information and instead relying on information (like ZIP code) that should easily be available to the individual completing the instrument.

### 7.4.4 Factors Related to Readiness

We note that asking organizations to report data on total costs will implicitly include readiness costs, but there may be analytic value for end users of the data to understand how some key characteristics of readiness vary across the industry. **We recommend assessing two key organizational characteristics related to readiness: average response time and staffing/deployment model.** We choose these characteristics as particular drivers of readiness, and the costs associated with readiness, based on feedback from stakeholder engagements and interviews. These are also characteristics that communities themselves may drive. For example, a community that wants all 911 calls to result in an ambulance at the scene within eight minutes requires a certain level of staffing and vehicles to meet this requirement.

Through interviews and stakeholder engagements, we learned that response times can depend on the type of transport (emergency vs. non-emergency), location (rural areas will have longer response times), and a variety of other issues. **For average response time, we recommend asking for average response time for 911 emergency calls only. For staffing model, we recommend that respondents indicate which of the three deployment models best describes their organization.**

### 7.4.5 Service Volume and Mix

We recommend that the instrument collect information on eight categories of utilization:

1. Total responses
2. Ground ambulance responses (i.e., responses when an ambulance was deployed)
3. Ground ambulance responses that did not result in a transport
4. Total transport volume
5. Paid transport volume



6. Ground ambulance standby services
7. Paramedic intercept services following Medicare's definition of this service
8. Provision of paramedics to support a BLS response where another organization provided the ambulance that does not meet Medicare's paramedic intercept criteria

The difference between the first and second categories is primarily relevant to organizations that respond to fire and police calls for service in addition to ambulance calls. End users of the data may use the ratio of ground ambulance responses to total responses as a basis for allocating certain costs (e.g., labor costs for firefighters who are also EMTs). We also recognize that only a portion of responses will result in a transport, and payers will pay for only a subset of these transports, so we ask organizations to report these totals separately. Finally, standby events, paramedic intercept, and other cases where an organization provides paramedic labor to support a response by another organization can also contribute to costs.

We recommend a two-pronged approach to collecting this information. First, we suggest collecting total amounts for the eight categories. The second step will collect more detailed information on the subset of utilization categories that drive costs and revenues: responses and billed transports. **Specifically, we recommend collecting:**

1. The share of responses that were emergency and non-emergency
2. The share of transports that were land and water-based (for organizations reporting that they bill for water ambulance transports)
3. The distribution of transports across transport level of services listed on Medicare's AFS
4. The share of transports that were inter-facility transports

Collecting data on organizations' mix of transports by type will allow analysts to estimate the costs associated with individual AFS services.

#### 7.4.6 Labor Costs

After a review of existing data collection tools and based on stakeholder feedback, we learned that ambulance organizations use a broad mix of labor across types of staff and that ambulance organizations track staffing levels and costs in a multitude of ways. Most organizations tracked staffing and labor costs at one of three levels: (1) the individual staff member level, (2) aggregated by category such as EMT-Basic or EMT-Paramedic, or (3) aggregated across all staff. Organizations reported that tracking ground ambulance staff and labor costs by category is complicated when staff have more than one role (i.e., roles in multiple categories) and/or when staff perform ground ambulance and other functions (such as air ambulance). To balance response burden with the need to collect more detailed information, **we recommend collecting staffing and labor cost information using standardized labor categories rather than (a) collecting aggregate staffing and labor information in total across all staff or (b) collecting information on a per-person basis.** In addition, we recommend aligning labor categories with the Bureau of Labor Statistics' occupation profiles. This approach allows for the use of publicly available burdened labor rate data to impute labor costs if no salary or labor cost information is provided for a particular labor category.

We recommend standardizing the labor categories in the following way for the purposes of reporting staffing and labor costs: (a) by granular category for response staff (e.g., EMT-basic, EMT-intermediate, and EMT-paramedic), (b) in a single category for administrative and facilities staff (e.g., executives, billing staff, and maintenance staff), and (c) in a single category

for medical directors. This approach involves less respondent burden compared to reporting on each individual staff member and likely less burden compared to reporting staff and costs in more granular categories, depending on the data available to an individual provider or supplier. The burden involved in assigning administrative and facilities staff with multiple roles to individual categories or apportioning their labor and costs to separate categories would increase if more granular categories were used, and hence may threaten data quality and completion rates.

We recommend initially asking a series of yes-or-no questions to determine whether the organization uses labor in granular response staff (e.g., EMT-basic, EMT-intermediate, and EMT-paramedic) and administration/facilities staff (e.g., billing, vehicle maintenance, and administrative) categories. For administration/facilities staff with multiple roles, we recommend asking respondents to assign each individual to a category indicating their primary activity in most cases. For example, if an individual performs primarily administrative duties but also has some dispatch/call center responsibilities, the respondent would include the individual in the administrative category. In addition, we recommend gathering information on whether the ambulance organization has one or more individual staff members devoting a total of at least 20 hours a week to billing, data analysis, training, or medical quality assurance. Although detailed information on staffing levels and costs for specific administration/facilities labor categories would not be collected, this level of detail is not necessary to accurately report total labor costs.

We recommend collecting information on staffing in terms of the number of hours worked during a typical week in the reporting year. This approach avoids the complication of tallying full-time-equivalents (FTEs) or total hours worked over a full year and is an easier method to report for part-time workers. Reporting on the basis of these other measures could be complicated by staff starting and stopping during the reporting year. Collecting information on staffing levels during a typical week can account for (a) part-time labor, which is common for some ground ambulance organizations, and (b) staff with responsibilities unrelated to ground ambulance services. This approach does introduce some subjectivity on the part of the respondent, particularly in selecting the week during which counts of hours are reported. While we recommend collecting staffing information in terms of hours worked during a typical week, we note that conceptually it is straightforward to convert between weekly hours worked, annual hours worked, or full-time equivalents on a 40-hour basis. The proposed labor section of the instrument could be adapted to collect staff information using one of these other metrics or providing respondents with a choice of metrics. We propose an optional worksheet that allows respondents to report per-person data in weekly hours and calculates totals per category for reporting.

We recommend items to collect information on the share of staff hours in each category that have ground ambulance responsibilities and either (a) fire and police emergency response responsibilities or (b) responsibilities that are not related to ground ambulance response or fire and police emergency response. The availability of this information will allow analysts to remove some or all staff hours and costs for individuals with responsibilities that are broader than ground ambulance services. For example, analysts may want to exclude a share of labor costs for firefighter EMTs based on the ratio of the organization's ground ambulance responses to total responses. As another example, analysts may want to exclude the share of labor costs associated with air ambulance services entirely when calculating ground ambulance labor costs.

**We recommend requesting information on fully burdened labor costs.** In general, labor costs include compensation (salaries and/or wages), benefits (e.g., healthcare, paid time off, retirement

contributions), and stipend and overtime pay. The extent to which these factors impact total labor costs may vary depending on whether an individual is employed directly by the ambulance organization, contracted through an outside entity, or volunteer staff. Through the stakeholder engagements and the cognitive interviews, we found that some ground ambulance organizations track compensation but not benefits or certain types of pay (e.g., overtime pay, call-back pay, training) because another entity such as a municipality pays for benefits or additional wages. In these situations, the ability of ground ambulance organizations to report fully burdened labor costs based on available data may be limited.

It is important that respondents do not report any costs requested in the labor section of the instrument on another part of the instrument. **We recommend that the instructions note that vehicle maintenance, facilities maintenance, billing, dispatch, and other services that involve some labor are related to ground ambulance services, and that those labor services that are purchased by the respondent through a broader contractual arrangement must be reported in the “other costs” section of the instrument and not in the labor section.**

#### 7.4.7 Volunteer Labor

Through stakeholder engagements and cognitive interviews, we learned that a significant share of ground ambulance organizations rely in part or entirely on volunteer labor and that the systems and data available to track the number of volunteers and the time they devoted to ground ambulance services varied. **We recommend collecting information on paid and unpaid volunteer hours during a typical week using the same EMT/response staff categories used elsewhere in the instrument, and then totaling other volunteer hours.** Reported hours can be converted, if desired, to market rates using data from other sources. **We also recommend collecting total costs associated with volunteer labor such as stipends, honorariums, and other benefits. The end user of collected data can decide whether and how to impute values for volunteer labor using external data of their choosing, such as the Bureau of Labor Statistics’ wage data.**

#### 7.4.8 Facility Costs

The total annual costs of facilities include factors such as rent, property taxes, utilities, insurance, and maintenance and may differ depending on the number of buildings, whether the provider/supplier rents or owns, and how the use of the space is allocated. **For these reasons, we recommend a multi-tiered approach to data collection.** First, respondents should report the total number of buildings that house ambulance services and operations. Second, they should report whether the facilities are leased, owned with mortgage payments, owned outright, or donated, and the percentage of facility square footage that is directly attributable to ambulance services. Organizations should be asked to report facility-specific square footage and the share of each facility that is related to ground ambulance services. We also recommend reporting of facility-specific costs, including rent/lease payments, mortgage payments, or annual depreciated value for facilities that are rented/leased, owned with mortgage payments, or owned outright, respectively.<sup>46</sup> Respondents should not report an annual cost for donated buildings. Analysts may

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<sup>46</sup> As in other sections of the survey, we propose that the instructions ask respondents to report costs paid by another entity with which the respondent has an ongoing business relationship, such as a municipality that pays facility costs for an ambulance organization. These cases should not be treated as a donation.

choose to impute a fair market value for these buildings based on location and square footage. Finally, respondents should report aggregate facility costs for insurance, utilities, maintenance, and taxes related to the buildings.

If these costs are already separately calculated within the organization, asking for this type of information would provide minimal burden to the respondent and may allow for additional research insights. Without separate reporting by facility and cost type, organizations may calculate combined total facility costs at their discretion and use different methods to account for these types of aspects in their total costs. If these categories (insurance, taxes, etc.) are not tracked, the respondent burden could be significant and there is no guarantee that the respondents could accurately report these costs.

#### 7.4.9 Vehicle Costs

We recognize that while organizations transport patients in ambulances, many organizations have a variety of other vehicles that are associated with ground ambulance responses. For example, a fire truck staffed with fire personnel cross-trained as EMTs may respond with a ground ambulance to an emergency call. Other vehicles might be used in responses such as a non-transporting EMS vehicle, a quick response vehicle or fly-car, or an SUV that carries a paramedic to a BLS ambulance in a paramedic intercept scenario. **Due to the complexity around vehicles involved in ground ambulance responses, we recommend collecting vehicle information in two parts: (1) ground ambulance vehicles and (2) all other vehicles related to ground ambulance responses.**

For both parts (ambulances and other vehicles), **we recommend requesting the annual depreciated value for each vehicle.** We suggest providing a worksheet for organizations needing assistance with depreciated value calculations. **We recommend asking if each vehicle is donated and providing an instruction to report an annual cost of zero for donated vehicles.**<sup>47</sup> It is common to remount older ambulances (i.e., removing the box from an ambulance that is old and putting a new chassis underneath) to save on costs. Hence, **we also recommend asking providers and suppliers whether they have remounted any ambulances and the associated costs. For vehicles other than ambulances, we also recommend that respondents report the type of vehicle.**

While we considered asking respondents to report per-vehicle registration, license, insurance, maintenance, and fuel costs, we found in discussions and cognitive interviews that ambulance organizations often did not track these costs on a per-vehicle basis. **As a result, we recommend asking for these costs aggregated across all vehicles associated with ground ambulance services.** If organizations do not have aggregate costs available, we suggest providing an optional per-vehicle worksheet to assist in calculation of total in each type of cost. Similar to many other sections of the instrument, the vehicles section would require respondents to remove the costs associated with particular vehicles (such as a fire truck that is never used for ground ambulance responses) or other transport mechanisms (such as helicopters) not associated with ground ambulance responses from these aggregate responses.

We recommend analysts allocate these aggregated costs as follows:

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<sup>47</sup> Analysts may choose to impute a fair market value for these vehicles.

- **Evenly across all vehicles (ambulance and non-ambulance) for registration and license costs**
- **On the basis of annual depreciated value for insurance costs**
- **Based on respondent-reported factors for maintenance and fuel**

We opted to ask respondents directly for shares of maintenance and fuel associated with vehicles of different types because we learned through stakeholder engagement and key informant discussions that these costs differ considerably for different vehicle types.

#### 7.4.10 Equipment and Supplies

We recommend collecting costs on all equipment and supplies related to ground ambulance services, both medical and non-medical and, for equipment, capital and non-capital. Specifically, we recommend asking respondents to report:

- Capital medical equipment, including equipment that can endure repeated use, such as defibrillators, ventilators, monitors, nebulizers, and power lifts
- Other medical equipment and supplies, consumables, and medications
- Capital non-medical equipment, such as computers, tablets, communication equipment, and furniture
- Other non-medical equipment and supplies such as office supplies

We recommend asking for capital and non-capital costs separately so that respondents can report annual depreciated costs for capital equipment and total annual costs otherwise. We also allow respondents to report annual maintenance and service costs for capital equipment. **We recommend allowing respondents to use their own standard practice to categorize equipment as capital or non-capital.** While it would be possible to ask respondents to use a standard approach, this would require respondents with another practice to recalculate annual depreciated cost.

Separate reporting on medical and non-medical equipment and supplies will facilitate allocation. In most cases, 100 percent of medical equipment and supplies are related to ground ambulance services.<sup>48</sup> An additional consideration is that some suppliers receive medications and other consumables from the hospitals to which they transport patients, so we specifically ask about medications separately. Internal accounting of the costs of these supplies may vary significantly from ground ambulance organizations that purchase their own consumables. We recommend asking organizations to try to gather this information from other organizations where possible, understanding that some of the costs for the most disposable items are not tracked. Non-medical equipment and supplies may be shared between ground ambulance and other functions in organizations with shared costs. While other allocation methods (such as the share of responses that are ground ambulance responses) may be appropriate to allocate to equipment and supply costs, **we recommend asking respondents to provide their estimate of the share of**

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<sup>48</sup> In some cases, for example ground ambulance providers or ground ambulance suppliers cointegrated with a healthcare delivery organization, some medical equipment and supply costs may need to be allocated to ground ambulance services rather than another healthcare use.

**equipment and supply costs related to ground ambulance services after each item in this section.**

**In general, we recommend requesting total costs for equipment and supplies categories rather than itemized information.** Through stakeholder engagement and discussions, we found that some but not all ambulance organizations would be able to report detailed item-by-item equipment and supply information. While this granular data would be potentially useful, in our assessment the added value cannot justify the extensive additional respondent burden. **However, we recommend separating a few categories that are large cost drivers for organizations, such as medications and uniforms. We recommend providing respondents optional schedules to facilitate calculation of annual depreciated capital costs for both medical and non-medical equipment if respondents do not already have these totals available for reporting.**

#### 7.4.11 Revenue

We recommend asking for revenue across a range of categories, including revenue from healthcare payers by type and from other sources, including the communities served by the organization. Specifically, we recommend requesting total revenue from the following healthcare payers over the reporting period: Medicare fee-for-service, Medicare Advantage, Medicaid (possibly fee-for-service and managed care separately), Tricare, Veterans Administration, commercial insurance, worker's compensation, and self-pay (i.e., patients without a source of coverage). If an organization cannot provide payment information by payer, we suggest at a minimum collecting total revenues from all sources. Throughout the cognitive interviewing process, it became apparent that accounting systems handle patient-paid amounts for patients with coverage in various ways—sometimes counting them as revenue from the payer and other times as patient revenue. Given what we have learned, we suggest asking respondents to clarify for each payer type how patient co-payments are recorded and additionally reporting if patient payments are pursued never, sometimes, usually, or always.

**Finally, we recommend asking respondents if they receive any revenues (and the amounts) from a menu of possible other sources.** These include government support, grants, contracted services, fees charged for events or community programming, and donations.

#### 7.4.12 Addressing State and Local Differences in Costs and Revenues

Through literature review, discussions with national organizations, stakeholder engagements, and key informant interviews, we identified state-specific policies that will affect the availability of data reported by individual ground ambulance organizations. This means that for some items, all organizations in a particular state report in the same way; however, the end analyst may not know why all ambulance organizations have reported the same type of information. For example, in New Jersey, paramedics are employed by hospitals and staffed on ALS ambulances for calls. It is not clear whether New Jersey ambulance suppliers will have burdened labor rates for paramedics. Another example is that New York fire departments cannot bill for transports, so this revenue category will be zero for these organizations.

There are a variety of ways to address state and local differences. One possible approach is to survey ambulance organizations separately regarding the types of laws and regulations that affect their costs of doing business; however, this would add burden on Medicare to develop and

administer a separate survey. It would also increase respondent burden to fill out an additional survey. Another approach would be to allow organizations a free-text field in the cost data collection instrument to describe local laws. However, it is not clear that this information would be evenly reported across organizations, and it would place a large burden on the end users of the collected data to turn the free-text information into something useful.

We recommend a third approach of collecting certain pieces of information that will either explicitly or implicitly allow end users of the collected data to examine jurisdictional differences. We are explicitly asking organizations to identify their primary service area by selecting from a pre-populated drop-down menu of geographic units. This allows end users to merge in area-level information from other data sets such as the Bureau of Labor Statistics or American Community Survey. Implicitly, we have many instrument items that allow for responses that will reflect differences in local regulations. For example, we know some areas require that all ambulance responses have at least one paramedic. These organizations will report a higher share of staff at the paramedic level than organizations not facing this requirement. If there are patterns in the data for all organizations within a particular state, such as no organization in the state reporting volunteer labor, the end users can likely interpret this as a state requirement. Another example is in local propensity to bill for services—some organizations told us that it is not their policy to bill patients for out-of-pocket costs or bill for certain types of transports altogether. The difference between the total transport and billed transports will give the end user some information about whether these practices might occur for particular organizations, as will information on revenues. Some organizations are supported by tax dollars, others are not, and this reflects decisions that local communities make about financing emergency services. Other examples of questions that reflect local preferences are response times, staffing mix, and the miscellaneous costs section. The limitation of this approach is that patterns in the data will exist, but it may not be clear why certain patterns exist without follow-up research on whether state or local laws or organizations are causing the patterns.

## 7.5 Operational Considerations for CMS

Instrument design and content decisions are critical to ensure that the instrument can measure ground ambulance organization costs, revenues, utilization, and other factors while being sensitive to respondent burden. However, it will also be essential for CMS to consider the data collection approach to ensure high response and quality data. If non-response or missing data is prevalent, the utility of the instrument could suffer. Below, we detail important instrument features or functionalities, considerations related to mode of invitation and administration, and approaches to maximize response rate and address respondent reporting quality.

### 7.5.1 Important Features for Fielding

When designing a business survey of any kind, there are key design features that are important to keep in mind to ease the burden on the responding organization or entity and maximize data quality.

- **Survey mode:** A key consideration in identifying the most appropriate data collection mode is how to maximize the response rate while minimizing respondent burden: should the survey be fielded by phone, by mail, by web, or by a mixed mode approach? Because the type of information that will be collected as part of the survey will require

organizations to gather information *a priori*, conducting the survey via telephone is not a viable option. Some of our key informants have also expressed a clear preference for completing the survey via the web. Alternative approaches include fillable Portable Document Format (PDF) or Excel files, but these mechanisms are less flexible in skip logic, do not allow for programmed range and data checks, lack modular options, and do not have data storage in a single back-end database that comes with a web-based survey. For these reasons and because there might be multiple respondents per organization, we recommend a web survey.

- **Survey instructions and definitions:** To ensure that all survey respondents are capturing comparable data across ground ambulance organizations, vocabulary needs to be well defined and any inclusions and exclusions need to be explicit. Some previous surveys/data collection tools in this field (GEMT, GAO) have used a definitions file or separate instruction sheet. Another commonly accepted approach is to provide definitions in active survey links within the survey (e.g., “click here for more information”). We caution against separate instruction or definitions pages/forms, even if the link is embedded into a web survey. Instead, we encourage an approach that includes definitions and calls out inclusions and exclusions directly in the survey instrument text. Requiring respondents to open a separate document or reference supporting materials increases respondent burden and therefore increases likelihood that respondents will misinterpret important instructions.
- **Multiple respondents per provider/supplier:** Surveys focused on business processes, finance, and operational activities often require the input of multiple individuals to provide complete responses. Depending on the business structure and the survey content, it is likely that no single individual can fully answer all questions. For this reason, it is essential that (a) the survey materials communicate to respondents that there might be a need to involve multiple individuals to complete the survey, (b) the mode and access to the survey allow for multiple users, and c) organizations know the scope and detail of the reporting required up front.
- **Surveys completed in multiple sessions:** Similarly, business surveys and cost reporting will likely require pulling data from multiple sources. Ground ambulance organizations at a minimum will need to access salary and labor cost information, detail on numbers of calls and numbers of transports, detail on non-labor costs, and a breakdown of multiple revenue sources. During key informant interviews and stakeholder engagements, respondents indicated that most of this information was available but is located in a variety of databases and would require time to access. For this reason, it is unlikely respondents will be able to complete a survey in a single session. Additionally, the same individuals responsible for tracking such cost and call information are also paramedics or EMTs who might be called away at a moment’s notice and rarely have uninterrupted blocks of time. The survey mode will need to accommodate respondents providing partial information across multiple sessions prior to submission.
- **Survey preview/print functionality:** For the reasons noted above, it is also essential for organizations to be able to preview the survey and the full series of items for which they will be asked to provide data. Previewing allows a single respondent to review responses that might have been provided by multiple individuals within the organization and/or information recorded over multiple survey sittings. The survey could be provided to



organizations as a downloadable PDF accessed via the survey website, via email attachment, or as a mail-ahead paper document. This will allow organizations to identify the best respondent, identify and gather the necessary existing reports and documents, and identify any new reports that might not otherwise be easily available.

Building a mechanism for the organization to print/download a completed copy will allow the respondent to reference the document during any data cleaning or data retrieval efforts. Additionally, if the survey is administered multiple times (every other year, for example), a reference copy will allow the organization to check for consistency in response. Finally, we also recommend that respondents be allowed to preview their completed responses prior to submitting.

## 7.6 Conclusion

In this chapter, we posed a variety of instrument design decisions, recommendations on instrument content, and operational considerations for CMS. Attached in Appendix E is a survey instrument that puts into practice the recommendations contained herein. The instrument is organized into 14 sections of questions asking about cost, revenue, and provider/supplier characteristics. The instrument will be revised based on comments submitted to CMS during the CY 2020 proposed rulemaking and resulting CMS decisions.

## Appendix A Detailed Cost Components Comparison of Data Collection Tools

### A.1 Labor Costs

All five instruments provide some mechanism to account for labor costs associated with the operation of ambulance services. However, the tools differ markedly in their methods of collecting this information and in the level of detail they provide. In general, cost calculations of labor involve multiplying the number of full-time equivalent staff by the burdened labor rate across multiple categories of workers. Some tools allow for costs to be broken out by different categories of labor, account for volunteer labor, or separately account for salary and benefits. They may also differ in whether specific categories of workers are defined by the survey or respondent provided. A synthesis follows of key differences in the instruments' accounting of labor costs.

#### A.1.1 Ability to Provide Subcategories of Labor Costs

Four of the five instruments allow for detailed reporting of subcategories of labor costs (Table 3-3). Only one, GAO, does not allow for such reporting. Of the five that allow detailed reporting, the instruments vary in the granularity of reporting possible. For example, Moran only breaks down labor cost reporting into EMT and non-EMT costs, whereas Moran asks separate questions for multiple labor subcategories (e.g., administrative staff, dispatch call center staff, EMT staff).

#### A.1.2 Defined Versus Respondent-Provided Labor Subcategories

When the instruments allow for reporting subcategories of labor, some of these subcategories are defined by the tool and others are respondent-provided (Table 3-3). The Rural Ambulance Service Budget Model defines multiple subcategories of labor, while EMSCAP provides space to report on up to four subcategories of labor, which are defined by the respondent. GEMT takes a hybrid approach, including both a limited number of defined subcategories and space for respondents to define additional subcategories. Defined labor subcategories may prompt a more complete and detailed breakdown of labor costs but may miss important types of labor if respondent-provided subcategories are not allowed as well.

#### A.1.3 Accounting of Direct Costs and Benefits

Three of the tools (EMSCAP, GEMT, and the Rural Ambulance Service Budget Model) allow for separate reporting of benefit costs (Table 3-3). EMSCAP asks for hourly benefit wages for each employee type and has separate reporting for overall workers' compensation costs. GEMT allows for reporting of benefits costs by labor subcategory. The Rural Ambulance Service Budget Model includes separate accounting of benefits, but not by labor type. GAO and Moran ask respondents to include the costs of benefits when reporting labor costs, but do not allow for separate reporting.

#### A.1.4 Contract and Employee Labor

Ambulance services may rely on both contract and employee (in-house) labor, each of which carries different cost implications. EMSCAP, GEMT, Moran, and the Rural Ambulance Service

Budget Model all allow for the breakout of contract labor costs to some degree. EMSCAP breaks out contract costs only for administrative services. GEMT accounts for contract labor as a separate subcategory within the broader umbrellas of Medical Transport Services, Non-Medical Transport Services, and Administration and General. Moran and the Rural Ambulance Service Budget Model have separate reporting for contract labor, but do not distinguish between types of contract labor. GAO makes no distinction between contract and employee labor.

### **A.1.5 Volunteer and Paid Labor**

Only two of the tools (Moran, and GAO) specifically request reporting of volunteer and paid labor (Table 3-3). AAA breaks out volunteer and paid labor across all subcategories; Moran breaks out volunteer and paid labor for some labor subcategories; and GAO breaks out volunteer and paid labor only for overall labor costs. EMSCAP and the Rural Ambulance Service Budget Model do not specifically request reporting of volunteer labor, but respondents can provide salaries for each category of employee, so separate reporting of volunteer labor is possible, in theory. GEMT does not allow for separate reporting of volunteer labor.

## **A.2 Facility Costs**

Determining the total annual costs of facilities relies on the summation of the annual costs of items such as rent, property taxes, utilities, insurance, and maintenance. All five tools allow for reporting on facilities costs in some way, but the surveys differ in the amount of detail requested and how various costs were categorized.

### **A.2.1 Multiple Buildings**

Two of the tools (EMSCAP and the Rural Ambulance Service Budget Model) allow for reporting of costs of multiple buildings. EMSCAP and the Rural Ambulance Service Budget Model allow for multiple buildings with respondent-provided names. GEMT does not specifically allow for reporting multiple buildings but has separate categorizations for facilities costs under the categories Medical Transport Services, Non-Medical Transport Services, and Capital Related.

### **A.2.2 Taxes, Insurance, Utilities, Depreciation, and Maintenance**

Three of the tools (EMSCAP, GEMT, and Moran) allow for more detailed reporting about the costs of a given building. All three include breakouts for depreciation. EMSCAP and Moran include breakouts for utilities and maintenance, and GEMT includes breakouts for taxes and insurance.

### **A.2.3 Donated, Rented, and Owned Buildings**

The Rural Ambulance Service Budget Model allows respondents to distinguish between owned, leased, and donated building facilities. Moran allows respondents to report rent/depreciation. EMSCAP allows respondents to distinguish between rented and owned facilities.

## A.3 Vehicle Costs

The calculation of vehicle costs must consider a variety of factors, including costs for leasing or purchasing the vehicle, vehicle depreciation, license and registration fees, insurance, maintenance, and fuel. All five tools account for at least some aspect of vehicle cost, though the detail and comprehensiveness requested varies by survey.

### A.3.1 Multiple Vehicles

Only two tools, EMSCAP and the Rural Ambulance Service Budget Model, allow for separate reporting of multiple vehicles. Additionally, the Rural Ambulance Service Budget Model distinguishes between ambulances and other vehicles. For some fire-based ambulance services, this may allow respondents to indicate both ambulances and fire trucks that are used to provide ambulance services.

### A.3.2 Fuel Cost Calculations

Three tools (EMSCAP, GAO, and Moran) explicitly request the cost of fuel. The Rural Ambulance Service Budget Model does not explicitly request fuel costs, but does request vehicle mileage, which could be used to approximate total fuel costs. Both approaches allow for estimation of fuel costs; however, there may be greater potential for estimation error or inflation when allowing a respondent to report only fuel cost without reporting the components that determine it (mileage, average miles per gallon, etc.).

### A.3.3 Lease, Depreciation, and Purchase

Each tool takes a different approach to reporting lease costs for rented vehicles and purchase price and depreciation for purchased vehicles. EMSCAP allows for the most detailed reporting, breaking out lease, depreciation, and purchase costs. Moran does not ask for separate reporting of lease and purchase but does ask for depreciation costs. GAO only asks for vehicle costs without any more granular breakout. GEMT has no reporting for vehicle costs outside of maintenance, though it is possible that these costs could be reported in separate categories if the respondent desires (i.e., “equipment” or “other”).

### A.3.4 Maintenance, Taxes, and Fees

A number of additional costs are associated with operating vehicles beyond the cost of vehicles themselves. All five tools take these costs into account to various extents. For example, three of the surveys (GEMT, EMSCAP, and Moran) explicitly ask for maintenance costs, while a fourth (GAO) prompts respondents to consider these costs when calculating total vehicle costs but does not require separate reporting. Examples of other specific costs mentioned include tolls, insurance, taxes, licenses, and registration.

## A.4 Equipment, Supplies, and Consumables Costs

Equipment and supplies may be classified in a number of different ways. Equipment may be classified as medical (e.g., defibrillators and stretchers) or non-medical (e.g., computers, office furniture). In addition to the cost of purchasing or leasing this equipment, depreciation and maintenance costs must be considered in the total cost calculations. Additionally, medications

and certain medical supplies (e.g., gauze) are considered consumables for one-time use, and the total cost of these items is typically calculated on an annual basis. All the tools account for these types of costs in some way but differ in their structure and the level of detail required in reporting.

#### **A.4.1 Multiple Types of Equipment and Consumables**

Three tools (EMSCAP, the Rural Ambulance Service Budget Model, and Moran) allow for reporting of multiple types of equipment. The Rural Ambulance Service Budget Model asks about defined categories of medical and non-medical equipment (e.g., stretchers, defibrillators, furniture, computers), whereas EMSCAP asks for respondent-defined categories of equipment. Moran allows respondents to distinguish between medical equipment, supplies, drugs, and non-medical equipment. GEMT does not specifically allow for reporting of multiple types of equipment or for separation of medical, non-medical equipment, and consumables, but does allow for separate reporting of “minor medical equipment” for medical transport services and non-medical transport services.

#### **A.4.2 Depreciation and Maintenance**

Four tools (EMSCAP, Moran, GEMT, and GAO) specifically ask for equipment depreciation, although GAO does not distinguish between medical and non-medical equipment. Of the five tools, only EMSCAP specifically asks for the cost of maintaining equipment, and it does not distinguish between the maintenance of medical and non-medical equipment.

### **A.5 Miscellaneous Costs and Fees**

In addition to costs associated with labor, facilities, vehicles, and equipment, the tools included a range of other costs that may add to an ambulance operator’s total costs. For instance, several collected information on regulatory or compliance fees (e.g., collected by EMSCAP), local jurisdiction fees, insurance beyond that included in staff benefits (e.g., EMSCAP), and training (e.g., EMSCAP, the Rural Ambulance Service Budget Model). GEMT has a broad category that requests reporting for “other” costs.

## Appendix B Approach for Key Informant Discussions, Stakeholder Engagements, and Cognitive Interviews

### B.1 Key Informant Discussion Approach

#### B.1.1 Sampling

We used the analytic file constructed using PECOS enrollment and Medicare FFS claims data, as described in Chapter 5, to sample individual NPIs for key informant discussions. We used phone number contact information from National Plan and Provider Enumeration System (NPPES) data. The early PECOS extract we received from the data contractor only contained practice and mailing address at the time we sampled for interviews; NPPES has a contact person and both a practice and mailing phone number.

We aimed to conduct a total of 30 key informant discussions with both ground ambulance suppliers and providers. As in the Chapter 5 analyses, we considered provider versus supplier status, ownership, Medicare billed transport volume, and service area population density as key characteristics and recruited up to a target number of NPIs with different combinations of these characteristics (see shaded cells in Table B-1). We then randomly selected organizations for the key informant discussions until we reached our target number of discussions in each cell. The cutoff was selected based on the distribution of organizations across cells. We targeted cells with higher numbers of organizations to maximize the likelihood of finding participants. Because hospital providers are a small fraction of suppliers, we sorted them based on volume and selected the largest within the main categories of critical access hospital and hospital. Hospitals were sorted by volume of transports and sampled in order. The 10 largest hospitals by volume within the critical access hospital and hospital categories were reserved for the stakeholder engagement recruitment, which is described in the next section. Finally, we sampled 10 organizations with marine vehicles to discuss their activities surrounding water ambulance transports.

Table B-1. Target Number of Discussions by Category

Suppliers	Rural	Super rural	Urban	Total
Small				
For-profit	0	0	1	1
Government	2	2	2	6
Non-profit	1	1	2	4
Medium				
For-profit	0	0	2	2
Government	2	1	2	5
Non-profit	1	0	2	3
Large				
For-profit	0	0	2	2
Government	2	0	2	4
Non-profit	0	0	0	0
<b>Providers</b>	1	1	1	3
<b>Total</b>	9	5	16	30

Note: Small volume organizations conduct 1-200 transports/year, medium conduct 201-1000, and large conduct 1001+ transports/year.

### B.1.2 Recruitment

Our initial sample consisted of 1,696 unique NPIs. Selected organizations were contacted by telephone by two RAND recruiters using a scripted recruitment guide. Once recruiters identified the most appropriate person(s) to include in the discussions and scheduled an appointment, they obtained the candidate's email address and sent them a confirmation email with the date and time of the appointment, the call-in information, and a read-ahead document that provided background information on the purpose and goal of the discussion. Although recruiters emailed all candidates an appointment reminder the day before the interview, there were a significant number of last-minute appointment cancellations and no-shows. Our experience in trying to schedule and conduct the key informant discussions points to how busy ambulance organizations are, to the limited amount of time they have (particularly smaller organizations that rely on volunteer labor) for engaging in activities outside of their regular duties, and for the need to look for ways to reduce the burden to participating in the survey to maximize participation.

Table B-2 below provides an overview of the sample for the key informant discussions and the results of our recruitment attempts.

Table B-2. Key Informant Discussion Sample Overview

Category	Ground Suppliers	Providers	Marine Transports	Total
# Organizations sampled	1074	612	10	1696
# Contacted	131	20	10	161
# Interviewed	26	4	1	31
# Refusals	3	0	1	4
# Never responded or unable to interview	102	13	8	123
# Cancelled/no shows	5	2	0	7
# Ineligible*	10	1	0	11
Not attempted/unused sample	788	572	0	1360

\* Organizations coded as ineligible for the key informant interviews were located in Puerto Rico.

Altogether, we contacted 131 ground ambulance suppliers, 10 marine transport suppliers, and 20 hospital-based ground ambulance providers in order to complete 31 discussions, including 26 discussions with ground ambulance suppliers, one discussion with a marine transport ambulance supplier, and four discussions with hospital-based ground ambulance providers. Of the 161 organizations contacted, 102 (63%) did not respond to our voicemail and email messages requesting participation in a discussion or were unavailable to take part in the discussion. Table B-3 below provides an overview of the key informant discussions conducted, with the difference from targeted number of discussions in parentheses. The shaded cells indicate the cells (the combination of characteristics) that we prioritized.



Table B-3. Number of Completed Key Informant Discussions by Category

Suppliers	Rural	Super rural	Urban	Total
Small				
For-profit	0	0	1	1
Government	2	2	2	6
Non-profit	1	1	3 (+1)	5 (+1)
Medium				
For-profit	0	0	2	2
Government	2	1	2	5
Non-profit	1	0	2	3
Large				
For-profit	0	0	1 (-1)	1 (-1)
Government	1 (-1)	0	2	3 (-1)
Non-profit	0	0	0	0
Marine transport	0	0	1 (+1)	1
<b>Providers (2 critical access and 2 regular)</b>	2 (+1)	0	2 (+1)	4 (+1)
<b>Total</b>	<b>9</b>	<b>4</b>	<b>18</b>	<b>31</b>

Note: Small volume organizations conduct 1–200 transports/year, medium conduct 201–1,000 transports/year, and large conduct 1,001+ transports/year.

Most of the discussions were conducted with one key informant; however, a small number of them included more than one informant. Most discussions were conducted with senior management staff (e.g., EMS captain, fire chief, director of EMS services, executive director, chief executive officer); however, some were conducted with financial staff (e.g., billing manager, accounting coordinator, billing aide). Only one of the organizations that participated in a discussion reported that they primarily provide inter-facility transfers. The majority of key informants included in the discussions had been employed at their organization for a significant period of time, with an average of 18.8 years (minimum of three months, maximum of 43 years, and median of 21 years).

### B.1.3 Methods

The key informant discussions were conducted by telephone and were led by RAND researchers using a scripted discussion guide that covered the following topics:

- Key informant background
- Organizational background
- Revenue streams
- Payer mix
- Services provided
- Prospective survey domains

- Drivers of cost
- Labor and non-labor costs
- Cost sharing
- Tracking of costs
- Other factors that affect costs
  - Access to hospitals
  - Local laws related to staffing or other requirements
  - Service area demographics
- Readiness cost
- Reporting burden
  - Access to information
  - Identification of potential survey respondent(s)
  - Use of billing services
  - Survey timeframe
  - Preference for mode of survey administration

The discussion moderators were instructed to follow the discussion guide but were given leeway to pursue topics that emerged that were not covered by the discussion guide. Discussions were scheduled for one hour, but approximately half of them ran well over an hour. All key informant discussions were audio recorded but not transcribed. However, a note-taker took detailed notes during each discussion.

After each discussion, note-takers listened to the recording and edited/supplemented their notes as necessary. Audio recordings were not transcribed and notes from the discussion sessions were not coded. Instead, each discussion moderator reviewed the discussion notes, identified the key takeaways for each of the topics covered during the discussion, and documented them in an Excel spreadsheet. In addition, the four lead moderators (as well as other team members) met throughout the data collection period to identify emerging themes.

In analyzing the notes from each of the discussions, we again used the discussion guide to identify the key questions to be answered, ranging from factual questions (e.g., how many organizations use volunteer labor, what is the average transport mileage, do they keep track of the number and type of transports provided, do they use a billing service) to questions that provide insight into ambulance organizations' ability to report the kind of information that CMS is interested in collecting (e.g., revenue by provider type, costs by different cost category), to questions related to the level of effort or burden required to gather specific types of information, issues related to the implementation of the survey (preference for survey mode, reporting period, etc.), and issues that are important drivers of cost that are not under consideration by CMS. A lead researcher and two research assistants then reviewed the notes and the key takeaways spreadsheet and identified common themes across discussions.

#### **B.1.4 Limitations on Sampling for Key Informant Interviews**

In the process of recruiting for interviews, we found several challenges: the contact information from CMS' administrative sources did not identify the right person to respond, so we likely had many organizations that ignored our request. Second, respondents, particularly at smaller organizations, wear multiple hats and often did not have the time to participate. Despite these challenges, we feel that the interviews were reasonably representative of the three main characteristics we had available to characterize respondents—volume, location, and ownership

type. Under ideal circumstances, we would have interviewed organizations in every state, given the variability in local laws that affect the costs of providing ground ambulance services. However, given the timeline for the development of the survey, we did not have this luxury. To further ensure that we were capturing a range of views, the stakeholder engagement process allowed us to interact with key national organizations representing a variety of members, and we specifically held engagements with the state EMS regulators' group and a listening session that was open to all state EMS associations.

## B.2 Stakeholder Engagement Approach

The stakeholder engagement efforts served two purposes. The first was to raise awareness among large, national organizations and their membership regarding the future CMS data collection process. The second was to gather feedback on survey domains, understand local factors affecting their business, and understand burdens associated with reporting.

### B.2.1 Sampling and Recruitment

The stakeholder engagement process was conducted in two phases. The first phase consisted of a series of introductory phone conversations with the leadership of several of the large, national organizations that are active in the ambulance industry. During August and September 2018, we spoke with representatives of the following organizations:

- National Association of Emergency Medical Technicians (NAEMT)
- Ambulance Association of America (AAA)
- International Association of Fire Chiefs (IAFC)
- National Volunteer Fire Council (NVFC)
- National Association of State EMS Officials (NASEMSO)
- International Association of Fire Fighters (IAFF)
- National Association of EMS Physicians (NAEMSP)
- National Rural Health Association (NRHA)

We also reached out to the American Hospital Association, but they did not respond to our requests.

The second phase of the stakeholder engagement consisted of 13 engagements with small groups of organizations representative of the industry. We used a multi-pronged recruitment strategy for the 13 engagements. Several engagements were designed to focus on members recommended by some of the large national organizations from the introductory calls, including AAA, IAFC, NVFC, NASEMSO, NAEMT, and NAEMSP.

To ensure a balanced sample of views regarding the cost data collection instrument and reporting burden, we also randomly sampled organizations from the same data set we sampled for interviews, making sure that we did not sample organizations more than once. This resulted in engagements with large, for-profit suppliers; large government suppliers; and small government suppliers; we did not stratify by population density for this sample. We also contacted hospital providers for an engagement, contacting the 10 highest volume hospital providers within the critical access hospital and regular hospital categories.

We targeted six to nine participants per stakeholder engagement. This number allows for enough variation in viewpoints, while still allowing for a manageable conversation where all views are

heard. The one exception was a state association listening session where associations representing non-governmental ambulance, rescue, and/or EMS were invited from states with non-governmental associations. This engagement excluded the state offices of EMS, which were covered as part of our NASEMSO engagement, and states that do not have non-governmental associations.

For the groups that were randomly sampled, we used the same process as in the interview recruitment strategy to contact the organizations, determine the correct contact person, and ask for an email address to send follow up information. For the large, for-profit suppliers, we reached out to 52 organizations and identified the appropriate contact person and email for 14 organizations (27%). For the large government organizations, we reached out to 46 organizations, received contact information for 22 organizations (48%), and reached out to 15. For the small government suppliers, we reached out to 46 organizations and received emails for 22 organizations (48%; one organization invited two additional staff members).

Recruitment for the recommended groups was facilitated by the national organizations, which sent up-to-date contact information and email addresses. We found that ambulance suppliers and providers recommended by the national organizations were more engaged in general and had been made aware of the data collection effort. The scheduling rate and attendance for these groups was higher than that of the randomly sampled groups.

## B.2.2 Methods

We tailored the discussion topics to the unique perspectives of each stakeholder group. The discussion areas included:

1. How organizations characterized themselves, in addition to volume, population density, and ownership type
2. Key cost and revenue categories
3. How organizations currently track transports, costs, and revenues
4. The extent to which state and local factors—and what type of local factors—can affect reported costs and revenues
5. The meaning of certain terms, and how organizations think about standardizing terms across the industry
6. Issues related to cost reporting for organizations with shared services, such as fire-based ambulance suppliers and hospitals
7. Questions specific to providers of ambulance services
8. Issues specific to rural areas
9. How billing companies could assist in reporting data for ground ambulance services to reduce burden on ambulance organizations
10. Labor issues such as labor mix, common tasks, and tracking of time spent on task
11. The potential burden of reporting cost and revenue information for organizations

During the engagements that occurred during late October and November—when a draft survey instrument had already been developed—we were able to ask participants how they viewed certain topics on the survey and the burden involved with collecting and reporting pieces of information. These topics also varied according to the particular stakeholder group and included how participants interpreted specific terms (such as call, response time, readiness, service area, scheduled versus unscheduled non-emergency transports, and loaded transport), preferred time

frames for reporting, staff categories within their organizations, and the ability to track detailed information on supplies, equipment, transports and other information.

At least two members of the RAND team organized, attended, and moderated every engagement. Additional RAND team members attended and assisted in moderating some of the engagements, as schedules allowed. Representatives from CMS and MITRE attended all stakeholder engagements and sometimes asked additional follow-up questions. Each engagement lasted between one and two hours. Several of the engagements were conducted in person at conferences, and the rest were conducted by phone.

All engagements were audio recorded and transcribed. Two project staff developed summaries of key themes after each engagement, with input from MITRE and CMS. Finally, we analyzed the transcripts of each engagement to supplement key themes developed from meeting notes.

## B.3 Cognitive Interview Approach

The primary goal of the cognitive interviews was to collect general feedback on the draft ground ambulance survey, as well as more detailed feedback on the following:

- Survey completion process (time to complete, resources required, overall burden)
- Availability of information requested
- Specific questions that the respondent was unable to answer or that presented difficulties
- Understanding of specific terminology or concepts (e.g., “calls,” “benefits assessments”)
- Understanding of specific questions
- Need for additional information in order to complete the survey (e.g., definitions of specific terms such as “service area”)

### B.3.1 Sampling and Recruitment

We purposely selected five candidate organizations from each of the interview sampling categories below based on the characteristics that arose as most important from our work in the literature review and discussions with stakeholders and key informants:

1. Fire department-based ambulance supplier serving a largely urban area
2. Fire department-based ambulance supplier serving a largely rural area
3. Super rural supplier with only volunteer labor (EMS stand-alone or fire-based)
4. Non-profit ambulance supplier serving a largely urban area
5. Non-profit ambulance supplier serving a largely rural area
6. Hospital-based ambulance provider
7. Ambulance supplier that is large and multi-NPI (like AMR)
8. For-profit ambulance supplier that provides emergency transport services as well as other types of services (facility transfers, equipment leasing, non-emergency care, etc.)
9. For-profit supplier that provides only scheduled transports

We reached out to some organizations that participated in the key informant discussions and were particularly insightful, as well as organizations that we had not approached previously for the key informant discussions or stakeholder engagements. We used different approaches to pull together the list of candidate organizations from each group.

*Key informant discussions organizations:* We reviewed our notes from the key informant discussions and identified a subset of key informants that were particularly helpful and insightful. We then compared the characteristics of each of these organizations in terms of population density and organization type and assigned them to one of the interview sampling categories if they matched the sampling criteria for that category.

*Organizations not contacted before:* We identified a sample of over 900 ambulance provider and supplier organizations that were randomly selected (from a sample of over 9,000 organizations pulled from CMS administrative data) but not contacted for either the key informant discussions or the stakeholder engagements. We sorted them by population density and ownership type and reviewed the name and type of organization to identify the subsample of organizations that met the criteria (at least initially) for each of the interview categories. We then randomly selected five organizations from each subsample, making sure to select organizations from different states and geographic regions. For interview categories 1 and 2 with fire department-based organizations, we also checked the organization name to verify that they were in fact fire-department based. For interview category 3 with suppliers that provide services primarily in super rural areas and use volunteer labor, we again checked the organization name and selected organizations that included the word “volunteer” in the name. Finally, for interview categories 8 and 9, we checked each organization’s website to verify that they provide other types of services beyond emergency transports (for category 8) and only scheduled transports for category 9. Table B-4 provides an overview of the organizations that participated in the cognitive interviews.

**Table B-4. Description of Organizations Participating in Cognitive Interviews**

<b>Category</b>	<b>Volume</b>	<b>Rural/Urban Status</b>	<b>Ownership Status</b>
Fire department-based ambulance supplier serving a largely urban area	Medium	Urban	Government
Fire department-based ambulance supplier serving a largely rural area	Low	Rural	Government
Super rural supplier with only volunteer labor (EMS standalone or fire-based)	Low	Super rural	Non-Profit
Non-profit, ambulance supplier serving a largely urban area	Low	Urban	Non-Profit
Non-profit, ambulance supplier serving a largely rural area	Medium	Rural	Non-Profit
Hospital-based ambulance provider	High	Urban	Non-Profit
Ambulance supplier that is large and multi-NPI	Very high	Urban	For-Profit
For-profit ambulance supplier that provides emergency transport services as well as other types of services (facility transfers, equipment leasing, non-emergency care, etc.)	High	Urban	For-Profit

Category	Volume	Rural/Urban Status	Ownership Status
For-profit supplier providing only scheduled transports	High	Urban	For-Profit

We used PECOS and NPDES to identify the point of contact for each organization and to obtain valid contact information (searching online for updated contact information as necessary). For targeted individuals who participated in either key informant discussions or stakeholder engagements, we used the contact information we had on file for the respondent. A RAND recruiter contacted the designated point of contact using a recruitment script to provide information on the purpose of the interview and verify that they would be the most appropriate person to review and provide feedback on the survey. Once we identified the most appropriate respondent for the cognitive interview, we scheduled an appointment for a telephone interview and sent the designated respondent a confirmation email with a PDF copy of the survey attached. The confirmation email included instructions for completing and returning the completed survey to RAND at least a day before the date of the interview.

### B.3.2 Methods

Interviews were conducted by phone between January 29 and February 28, 2019. All interviews were led by one or more RAND researchers. Prior to the interview, the lead interviewer reviewed the organization's completed survey and identified specific questions that required probing, in particular, questions that were left blank (or for which they entered "0") or for which they provided more than one response. RAND interviewers had a copy of the organization's completed survey on hand during the interview so they could refer to specific questions and the responses provided by the organization.

Cognitive interviews were conducted using a semi-structured, scripted interview guide. The RAND interviewer started the interview by collecting background information on the respondent followed by questions on the process for completing the survey including questions on:

- Who completed the survey
- How long it took
- Whether the information needed to complete the survey was readily available
- Whether there were any sections or question in the survey that they found particularly difficult to answer
- General reactions to the survey
- Whether anything was missing from the survey

Following this initial discussion, the interviewer proceeded to go through each section of the survey probing on specific questions (particularly those that were left blank, where responses appeared out of range, or where responses were repeated). Throughout the interview, the interviewer probed on the meaning of specific terms or phrases and definitions provided in the survey. A note-taker took notes during each interview, and all interviews were audio recorded. After the interviews were completed, the lead RAND interviewer reviewed the interview notes to identify issues in each section of the survey (e.g., questions that were misunderstood, questions that are redundant, questions that respondents had difficulty answering, and questions that presented measurement errors such as double counting, under counting, and response categories

or definitions that are missing or incomplete). Findings from the interviews were used to inform significant changes to the survey.



## Appendix C Detailed Findings from Cognitive Interviews

### C.1 Availability of Information

Respondents reported that for the most part, the information required to complete the instrument was available to them. However, in several cases the information required to complete certain sections (service volume, service mix, revenue by payer type) must be provided by their billing companies. While in some cases information on responses and transports by level of service and revenue by payer type is included in regular monthly reports, in others, this information must be requested in the form of special reports from billing companies. Organizations that use a billing service reported that obtaining information required for the instrument from their billing company should not be a problem.

Some provider respondents (a hospital-based ambulance service and an ambulance service that is part of a larger health system) reported that some of the information requested in the instrument must be provided by another department within their organization. This can include certain costs that are paid for by the larger organization and for which they are subsequently billed (e.g., utilities, maintenance, certain medications and medical supplies). It can also include the allocation of labor costs for certain staff, such as a medical director for the ground ambulance organization who also works as an emergency room doctor, billing staff that handles pre-billing for the ground ambulance organization as well as billing for the hospital, or maintenance staff for the hospital. Organizations that are largely funded by a town or municipality also reported that information on their portion of certain types of costs that are negotiated at the city or municipal level (e.g., facility and/or vehicle insurance) must be requested from another department or government office. Requests for information from other offices or departments can require advance notice and can take several days.

Finally, organizations that are reporting for multiple NPIs reported that there are certain costs (overhead, data analysis, facility and vehicle insurance, management costs) that are allocated to each NPI and that producing the NPI-level allocation for these costs is feasible but will also require several days.

### C.2 Respondent Burden

The level of effort required to complete the instrument varied across organizations with which we conducted cognitive interviews. While some organizations reported that completing the instrument took approximately one hour, these organizations left several questions on the draft instrument blank and/or provided estimates for others. A large, for-profit organization that opted to report for multiple NPIs reported that they spent several hours over several days gathering the information and completing the instrument. Based on the interviews, it appears that smaller organizations with relatively few costs to report will experience significantly less burden than larger organizations that will need to gather information from different offices or departments, and/or will need to calculate allocation costs for certain types of expenses, with the heaviest burden being placed on ground ambulance organizations that may have to report for multiple NPIs.

Several of the respondents reported that if they had more time to complete the instrument, they would have consulted with others within their organization and/or requested more detailed

information from their billing companies or from another outside entities (e.g., the towns or counties with which they contract and which pay for certain costs or “pool” certain costs such as insurance). Some of the organizations reported that they had not had enough time to complete the instrument and therefore left some questions blank or provided an estimate based on their experience or an educated guess. Our impression is that most interviewees spent approximately one hour recording available information.

In general, respondents reported that the instrument was long and that reviewing the instrument to identify the information they will need to complete the survey, gathering the information required to complete the instrument accurately, and then actually completing the instrument could take several hours and will require more time than the one to two weeks they were given to complete and return the instrument before their cognitive interview appointment.

### C.3 General Reactions to the Instrument

In general, interviewees had a positive response to the instrument and reported that it was very thorough. Several organizations rescheduled their interviews once or more to give themselves more time to complete the instrument. Even when given more time, several organizations opted to provide estimates rather than tracking down the information to complete the instrument and/or failed to fully complete the instrument, leaving several questions blank primarily because they did not have the time to track down or request from another organization (such as a billing organization) the information requested in the instrument. Several of the organizations also reported that completing the instrument accurately and completely would require several hours, at least for the first round of data collection (some organizations reported that once they created report templates for the information required to complete the instrument, it would go faster). Some organizations noted that they either do not track or do not have easy access to some of the information requested in the instrument and therefore would need time to track down, run, or request special reports (e.g., average response time, revenue by payer type, insurance or facility costs paid for by a separate entity), or calculate certain costs (e.g., allocation of certain costs paid by a parent organization, cost of medications or supplies purchased through a parent organization such as a hospital).

Only three organizations recommended specific changes or additions to the instrument. One recommended that we clarify whether they should include paramedic intercept transports when reporting on service volume, another recommended that we ask separately for purchase price and maintenance or service costs associated with medical equipment, and another provided several examples of additional costs that had not been contemplated in the sections of the instrument that collect information on various cost categories and also provided a recommendation for how to allocate overhead or other costs for organizations that bill under multiple NPIs. Some of the respondents reported that certain instrument questions were unclear or difficult to answer (e.g., in cases where they do not track certain data). Detailed findings by instrument module are included as Appendix D.

### C.4 Organizational Characteristics

This section of the survey presented few problems for respondents. All but one of the organizations reported that they only bill under one NPI, although one respondent did not know

what an NPI was and another reported that she did not know what her organization's NPI number was and had to verify it with the organization's billing service.

All nine of the organizations reported that they report their statistical and financial data by the calendar year (one organization reported that their fiscal year is the calendar year). In reporting ownership status, several organizations reported a different status from what is found in the CMS data. In reporting on the category that best describes their ground ambulance organization (fire department-based, police or other public safety department-based, EMS-based, hospital or other Medicare provider-based, independent/proprietary, or other), one fire-department based organization left this question blank because he did not consider his organization as fire department-based but rather a fire department/EMS organization. The other fire department-based organization did not have any issues with the response options for this question.

## C.5 Service Area

For the most part, respondent organizations were able to provide the total population and square miles for their primary service area and excluded areas they cover through mutual aid agreements in their counts. However, one organization included areas covered through mutual aid agreements, another reported that she did not have this information, and yet another organization, which primarily provides scheduled transports, reported that she was unclear as to whether the question on total population was asking for the total number of patients they serve or the total population living in their primary service area. Most of the organizations reported that if asked, they would be able to report their primary service area by ZIP code or by county or city.

Respondent organizations were also asked to describe the geographic designation that best describes their primary service area and were provided a link to the ZIP code to Carrier Locality file. However, only one organization took the time to search the file to determine how to describe their primary service area. One organization reported that they used the CMS definition to describe their service area, and another reported that they consulted their billing agency. Most reported that their response to this question was based on their own judgment and not on any specific definition.

This section of the survey also asked respondents to report the percentage of their response volume from jurisdictions in which they are the sole/exclusive emergency provider. Several respondents struggled to understand/answer this question. Four organizations left this question blank, and one organization reported that all of their transports are scheduled.

Some organizations also struggled to report the number of emergency departments in their service area. One organization was confused by this question and left it blank, one reported the number of emergency departments they typically go to (not all in their service area), and another reported that they did not have any emergency departments in their service area and provided the number of emergency departments they go to outside of their service area.

## C.6 Ground Ambulance Service Volume

Respondent organizations generally understood the definitions provided in this section of the survey; however, some organizations struggled to provide the information requested. Four of the organizations participating in cognitive interviews provided the same response for the total number of calls and the total number of responses. Two organizations were unable to provide a

specific response for questions on ground service volume and instead provided ranges. Fire-based ground ambulance organizations reported that their total number of calls and responses included both fire and EMS calls.

In reporting total number of responses, some organizations included responses that involved a ground ambulance vehicle, as well as responses in which only a non-transporting emergency vehicle was dispatched. The organizations that provide paramedic intercept services counted both transports for which they used their own vehicles as well as transports for which they used another organization's vehicles when reporting the total number of ground transports.

Most of the organizations reported the same number for total number of transports and total number of billed transports and explained that if they transport a patient, they bill for that transport. Some organizations reported that the response provided for "billed" transports did not equal the number of transports for which they were fully or partially paid, as there are some transports for which they are unable to collect costs. One organization was not able to provide information on the total number of responses that did not result in a ground ambulance transport, another provided a response but reported that the number was likely to be inaccurate, and two were only able to provide a range. Two organizations were unable to report a percentage of the number of responses that received medical treatment on-site, and one organization reported that they do not track this information and therefore provided an "approximate guess."

The question on total transport miles also presented some issues with respondents using different criteria in formulating a response. While two organizations provided an educated guess, one organization reported that they do not track this information and would have to look at each individual run report to provide a total. Another organization reported an estimate based on an average of 15 miles per transport and clarified that it included both billed and unbilled miles. Some organizations reported that the number they provided only included "billable" miles and that they do not keep track of total miles.

Finally, one respondent reported that she had found this section of the survey particularly frustrating because their reports do not track information in the way the survey asked.

## C.7 Service Mix

Six of the nine organizations were able to provide a breakout their service mix by category of service. While some of these organizations reported that they pulled this information from the reports they receive from their billing company, one organization provided estimates based on experience. Two organizations were only able to provide ranges but reported that they would have been able to provide a precise breakdown had they had more time to complete the survey. One respondent left the questions in this section of the survey blank and explained that she would have to get this information from her billing company.

## C.8 Response Time and Staffing Model

All but one of the organizations were able to provide an average response time, with some organizations providing an educated guess and others reporting that they track this information. Some of the organizations provided an average that took into account response times to different parts of their service areas or between day and nighttime shifts. A small, for-profit organization reported that they respond to calls that they can respond to within 30 minutes. A small, for-profit

organization that only provides scheduled transports indicated that this question did not apply to them. Only two organizations reported being required or incentivized through contract provisions to meet average response targets. All the organizations were able to describe their deployment model.

## C.9 Labor Costs

Providing information on labor costs proved challenging for most of the organizations. When asked to provide total number of FTEs by category, several organizations failed to convert labor hours to FTEs and instead simply reported the total number of employees. Only one of the organizations reported being fully staffed by unpaid volunteers but provided estimates on the total number of labor hours by category and reported that she does not track this information. The two fire department-based organizations that reported that all their staff are cross-trained as firefighters/EMS staff reported total number of FTEs in the organization and stated that it would be difficult to allocate labor hours just for EMS services.

Several of the organizations reported payroll information instead of total compensation including salary/wages and benefits (one of the small, for-profit organizations reported that they do not provide any benefits). In addition, several organizations reported that the labor costs they reported did not include overtime pay, callback pay, or training pay because these costs come from different accounts. Only three organizations included benefits in the labor costs they reported, and only one organization included all labor costs (including overtime pay, training, etc.). The two fire department-based organizations reported total labor costs for fire-fighter/EMT staff instead of reporting labor costs just for EMT labor hours. One organization failed to report labor costs and explained that he would need more time to provide this information. One organization reported total labor costs and stated that they would need more time to break it out by EMT staff category.

This section of the survey also includes a question on whether the organization has staff that devote at least 20 hours a week to billing, data analysis, training, and medical quality assurance. Seven of the nine organizations reported that they do not have any staff that devote at least 20 hours a week to these activities. However, when probed, it became apparent that there was some confusion about this question. Some organizations reported that staff they were thinking of for this question did not in fact spend at least 20 hours a week on the activities listed. One organization reported that one person spent time on each of these activities for a combined total of about 20 hours a week, but not 20 hours a week per activity. Some organizations did not understand what “data analysis” referred to in this question.

Finally, this section of the survey also included questions on volunteer staff and labor costs. However, of the three organizations that reported using volunteer labor, two organizations reported that they employ paid volunteers but failed to report their hours because they thought this question was only asking about unpaid volunteer labor.

## C.10 Facilities Costs

Of the nine organizations that participated in the cognitive interviews, three organizations reported only one facility. The remaining organizations reported two or more separate buildings. Some organizations struggled to report the percentage of the facility’s square footage that is directly attributable to ambulance services. Some organizations provided an educated guess,

while one organization based her estimate on the total number of bays in the facility. One of the fire department-based organizations insisted that since everyone in his department is cross-trained as fire fighters/EMS staff, he could not allocate square footage to one activity versus the other. The other fire department-based organization provided an estimate of 50 percent for one facility and indicated that the other two facilities they utilize are based in the police department, but failed to provide a percentage of the square footage devoted to ambulance services in these facilities.

## C.11 Insurance, Maintenance, Utilities, and Taxes

Organizations were asked to provide information on what they paid for insurance, maintenance, utilities, and taxes. This proved challenging for several organizations. Three organizations were unable to provide these costs because they did not have access to the information at the time they were completing the survey. Organizations that shared costs with other organizations or with a fire department also struggled to provide this information, with only two organizations reporting on just their share of costs. One organization was able to provide information on her share of facilities insurance but was not able to break out maintenance or utilities costs. One of the fire department-based organizations reported on costs for the entire facility and was not able to provide costs just for EMS services. Only one of the organizations that completed this section of the survey reported having to pay property taxes on the buildings they utilize. Finally, the large, multi-NPI for-profit organization also reported costs for leasehold improvement/depreciation.

## C.12 Vehicle Costs

Organizations were asked to provide information on vehicle costs and again struggled with some of the questions in this section of the survey. Some organizations reported that their municipality or town pays for things like insurance and maintenance on their vehicles and that they did not have access to information on their share of costs. Some organizations provided only estimates for these costs. Several reported that maintenance costs included costs for ground ambulances as well as other vehicles owned by the organization such as supervisor vehicles and quick response vehicles. Four of the nine organizations were unable to report average gas mileage, either because they do not keep track of this information or did not have access to this information at the time they were completing the survey. Of the five organizations that reported average miles per gallon, two reported that the information provided was based on an educated guess.

Respondent organizations were also asked to complete a table with information at the vehicle level (total cost to the organization, age of the ambulance, mileage of the ambulance, etc.). Again, several organizations had difficulty completing this table. Three organizations were unable to provide total costs per vehicle, one misunderstood the question and provided total expenses including utilities and supplies, and one provided the purchase price for the vehicles. Of the three organizations that provided total costs per vehicle, one provided average costs per vehicle and one provided an estimate. The large, multi-NPI organization also added costs for fuel costs and vehicle depreciation expenses.

Finally, organizations were asked to provide information on other types of vehicles used to respond to ground ambulance calls or to support ground ambulance operations. Three of the nine organizations did not report owning any other type of vehicle. The rest of the organizations all reported owning other types of vehicles (supervisor vehicles, quick response vehicles, all-terrain

vehicles, swift water rescue boats, and company vehicles). The large, multi-NPI for-profit organization stood out by reporting a large number of these types of vehicles and explained that they use them as lead cars to support ground ambulance operations. For some of the NPIs for which they reported, the number of land rescue vehicles reported was larger than the number of ambulances owned by the organization.

## **C.13 Equipment, Consumables, and Supplies**

Organizations were asked to provide information on costs for different types of equipment, consumables, and supplies.

### **C.13.1 Medical Equipment**

Respondent organizations were asked to report total expenses for capital medical equipment. Of the nine organizations, only one reported no expenses on capital medical equipment. Eight provided a response to this question but when probed, it became apparent that organizations answered this question using different criteria. One organization reported an estimate of the value of the medical equipment they use (basing it on information provided for insurance purposes), while another provided only an estimate. One organization provided costs for what they consider capital medical equipment (anything greater than \$2,000), and another included costs for all medical equipment (not just capital) plus maintenance and certification costs. One organization included the purchase of a new ambulance, and one organization included the cost of medical equipment and medical consumables.

Organizations were asked to complete a table listing each type of medical equipment and reporting the equipment description/name, whether they rent or own it, purchase price, age in years, and total maintenance cost for each piece of equipment. Several of the organizations reported that being asked to provide this level of detail is overly burdensome, and five of the nine organizations failed to provide this information. Of the four organizations that provided this information, none completed the table in its entirety, and two provided approximate purchase price for each type of equipment.

### **C.13.2 Medications**

Organizations were asked whether they had any medication costs and if not, to provide a reason why they did not have any medication costs for the year referenced in the survey. Three of the nine organizations reported that they did not have any medication costs because the medications they use are supplied by another entity (a hospital or the parent organization). When probed, two organizations reported that their reported cost for medications in fact included other medical supplies.

### **C.13.3 Other Medical Consumables**

Organizations were asked to report costs for other medical consumables. Two reported that these costs were combined with the costs they reported for medications, and one reported that these costs were combined with medical equipment. Two of the organizations that reported these costs explained that the costs reported were based on an educated guess.

### C.13.4 Non-medical Equipment

Organizations were asked to report on non-medical equipment. Of the nine, three reported no costs for non-medical equipment for the year referenced in the survey. Equipment included in the costs reported in this category by some of the organizations primarily included computers, tablets, and radios, but one organization also included technology and software (electronic charting system, computer-aided diagnosis system). The two fire department-based organizations reported that it was difficult to break out costs for equipment just for their EMS operation because their staff are cross-trained and use this equipment for both fire and EMS operations. Finally, as part of this subsection of the survey, organizations were asked to complete a table with information at the individual equipment level. Some organizations again stated that this was an overly burdensome request; notably, none of the organizations completed this table.

### C.13.5 Other Non-medical Supplies

Organizations were asked to provide costs for other non-medical supplies, including uniforms and non-medical consumables, and to report the percentage of these costs that should be attributed to ground ambulance services. Three of the organizations reported no costs for uniforms. One of the fire department-based organizations reported costs but explained that these were uniform costs for staff that are cross-trained. Three organizations reported no costs for non-medical supplies (one explained that these were costs covered by the city, and the two fire department-based organizations reported that these supplies are shared by both the fire and EMS side of the house and thus are not broken out by type of service).

## C.14 Miscellaneous Costs

Organizations were asked to report costs for various types of services, fees, and taxes. Some were confused by some of the cost categories in this section, with some double-counting certain costs that they had reported in other parts of the survey (e.g., accounting, dispatch, or maintenance services reported as part of labor costs or information technology support services or information technology costs for software or licensing that had been reported under non-medical equipment). Several organizations also double-counted costs for a medical director, reporting this cost under labor and again in this section of the survey. Finally, a large, multi-NPI organization that reported for 10 different NPIs as part of this effort added several cost categories to this section of the survey, including external provider services, response time penalties, physicals and recruiting costs, audit fees, bond and line of credit fees, depreciation for different types of equipment, and other operating expenses.

## C.15 Revenue

Of the nine organizations, two were unable to report total revenue and three organizations were unable to report the approximate share of revenue from all payers combined and for Medicare only, although they reported that given more time, they would be able to get this information. In addition, five of the organizations failed to report revenue by payer type (Medicare FFS, Medicare Advantage, Medicaid, etc.) as well as revenue from different sources (contracts, fees for standby events, charitable donations, grants, etc.). Four organizations reported that this revenue data was unavailable at the time they completed the draft survey.



## Appendix D Characteristics of Ambulance Organizations: Detailed Methods and Tables

### D.1 Data Sources

Our analyses used two main sources of Medicare data: PECOS enrollment data and claims data accessed via CMS's IDR. Each of these data sources and our precise specifications are described in detail below. In brief, the PECOS data includes information used by CMS to determine enrollment for ground ambulance providers and suppliers and a wide range of information submitted by ground ambulance providers and suppliers through the enrollment process, including information on the type of organization, service locations, and, for ambulance suppliers, the number and types of vehicles used. Medicare claims data include information on the ambulance services billed to Medicare and paid by Medicare, including the level of service (e.g., BLS, ALS), the mileage from the patient's point of ambulance pickup to the nearest appropriate facility that can treat the patient's condition, and the origin and destination of these ambulance transports (e.g., home, hospital, dialysis center). In addition to these two sources, we use data from the American Community Survey (ACS) to describe the socioeconomic characteristics of the areas served by ground ambulance providers and suppliers.

#### D.1.1 Enrollment Data

We requested and received extracts of PECOS data for (1) all organizations that were enrolled in 2016 as ambulance suppliers, and (2) all other organizations that billed for ground ambulance services in 2016 (as described in the following section). The second component of the extract is necessary for two reasons. First, there was a small number of ambulance suppliers that billed Medicare for ground ambulance services with 2016 service dates even though they did not have 2016 enrollment records, as we note below. Second, only a small share of Medicare providers bill for ground ambulance services, and, unlike with ambulance suppliers, there is no provider type or specialty that indicates that they should be included in the set of providers that furnish ground ambulance services.

The PECOS data includes information on each initial or change in enrollment based on responses to the CMS-855A and CMS-855B enrollment forms. Our team created an NPI-level database using a single enrollment record as a base for the NPI-level record. For ambulance suppliers, we used the most recent enrollment record for the NPI where they list their specialty as an "Ambulance Service Supplier."<sup>49</sup> Ambulance providers could have concurrent enrollment records of several types (e.g., as a hospital, CAH, SNF, or dialysis facility). We classified ambulance providers as either a CAH, a hospital, or "other." The classification was sequential, with organizations with a CAH enrollment record assigned to that category first, followed by organizations with a hospital enrollment record assigned accordingly, and all other providers assigned to the "other" category. We selected the most recent and relevant provider enrollment record for each NPI that we identified as an ambulance provider for calendar year 2016. We

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<sup>49</sup> For each enrollment application, a unique number is assigned by PECOS.

included 37 organizations (three ambulance providers and 34 ambulance suppliers) in our analysis that had enrollment records that were not active in 2016 but billed Medicare in 2016.<sup>50</sup>

The final enrollment database contained 12,074 unique NPIs. For each NPI, we merged in additional information and characteristics of the organization from a range of PECOS data tables. These additional fields included the organization's name, address, for-profit status, organization structure, whether the organization enrolled as a provider or supplier, and enrollment type. For ambulance suppliers, we additionally integrated NPI-level summaries of the number of land or marine ambulance vehicles in total and providing different levels of services and the locations in which the organization operates.

### D.1.2 Claims Data

We accessed Medicare claims data through CMS's IDR and analyzed line-level claims data for NPIs that billed ground ambulance services<sup>51</sup> in 2016 on professional or facility-format records. Each line-level claim contains common data elements, including NPI, date of service, paid amount, HCPCS codes, and the ambulance modifier codes. The HCPCS codes identify the type of service and the miles driven. There are usually two line-level records for each transport, one with the HCPCS code identifying the level of service and one with the HCPCS code that corresponds to mileage. The modifier codes identify the origin and destination of the transports, such as home, hospital, or dialysis facility. The professional claims had the ZIP code for the point of the ambulance pickup and the payment for the claim. After selecting claims based on HCPCS codes and revenue center code, we excluded professional claims that had \$0 for payment and institutional claims that were billed under Part A (92 NPIs). Our final claims database contained records for over 14 million trips by 10,585 unique NPIs.

We calculated per-transport payments by summing the allowed amounts for transports and mileage claim lines. Most ambulance service claims have two claim lines and represent a single transport (service line units = 1), but there are a few claims (3.8%) that cover more than one transport. They may have multiple transports of the same service type, or they may have different service types. In these cases, we are not able to identify the mileage associated with each separate transport, so we split the mileage equally among the transports. That means that we also split the allowed amount for the mileage equally among the transports when we calculate the per-transport allowed amount.

### D.1.3 Constructing the NPI-level Analytic File

We combined our PECOS and claims data and selected NPIs that were in both. In total, 10,146 (88.7%) of ambulance suppliers in PECOS were found to have billed Medicare for ambulance-

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<sup>50</sup> To create an NPI-level database of ground ambulance providers and suppliers, we used the following procedure. First, we imported records in the "Enrollment History" table and kept the most recent enrollment record in 2016 for each PECOS Associate Control ID. Second, we merged this data set with the "Enrollment Information" table using the enrollment identifier. Third, we merged the new combined dataset with the "Enrollment NPI" database using the Enrollment ID. Observations with a missing NPI were dropped. Fourth, we merged in information from the "Ambulance Service Area" table. Fifth, we merged in information from the "Ambulance Practice Location" and "Ambulance Vehicle" tables.

<sup>51</sup> Ambulance services defined by HCPCS codes A0425, A0426, A0427, A0428, A0429, A0432, A0433, and A0434 for professional services claims and revenue center code 540-549 for Part B institutional claims. The Part B institutional claims also contain lines with one of the HCPCS codes listed here.

related claims in 2016. Six hundred 12 (91.9%) of ambulance providers billed Medicare for ambulance-related claims in 2016. In total, we excluded 1,343 NPIs that were in the enrollment data but did not bill Medicare for ground ambulance-related claims in 2016.

## D.2 NPI-Level Characteristics

In this section, we define the NPI-level characteristics that we constructed in the analytic file to describe ground ambulance providers and suppliers. Most of the characteristics in this section are based on Medicare claims data. Because we calculated these measures using Medicare rather than all-payer claims data, they may not represent the NPI's overall mix or volume of services or payments.

### D.2.1 Ownership

For-profit, non-profit, and government ambulance suppliers may face different incentives and have different cost structures compared to one another. AAA recommended collecting information on “type of control,” including voluntary non-profit, proprietary, and government. [33] Similarly, a 2015 Acumen study found variation in the costs per ambulance trips for hospitals by whether they are a non-profit, government, or for-profit.[5]

The PECOS enrollment data contains an indicator distinguishing “non-profit” and “proprietor” organizations. The enrollment data includes a separate variable on organizational structure. The organizational structure measure codes include “Corporation,” “Individual,” “LLC,” “Not Selected,” “Partnership,” “Sole Owner,” “Sole Proprietor,” and “Other.” Within the “Other” category there are multiple unique (i.e., write-in) responses. Based on the information within the codes, we classified organizations into one of three categories: non-profit, private for-profit, or unclassifiable and government. To do so we used the following steps. First, based on the entry written on the CMS-855B form and entered into PECOS, we classified an organization as either non-profit or proprietary. Second, we examined the text fields under the organizational structure. If an organization self-identified as either a non-profit or government organization, we classified them as non-profit or government. Third, we performed internet searches for each of the organizations for which we did not have a measure. Fourth, we grouped all remaining organizations into the for-profit category. Thus, the three categories are government, private not-for-profit, and private for-profit, or unclassifiable.<sup>52</sup>

### D.2.2 Volume

Ambulance suppliers and providers may face different operating costs based on the annual volume of transports they perform. We treated the volume of transports billed to Medicare as a proxy for the total volume of transports performed by each organization. We totaled all of the units on 2016 ground ambulance service claim lines, excluding the mileage HCPCS code, to approximate the number of transports for each NPI to create a measure of volume.<sup>53</sup>

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<sup>52</sup> 137 of the NPIs were deemed to be unclassifiable and were put into the private for-profit category.

<sup>53</sup> Currently we use the total volume of transports. However, because an ambulance provider or supplier might not bill Medicare in every month of the year or be enrolled to bill Medicare for the entire year, we plan to annualize the total volume of transports in a future version of the report. 96.24% of NPIs in the analytic file were enrolled in PECOS

We then used information on the months enrolled and months with claims to create an annualized volume and categorize NPIs. An annualized measure is needed to ensure that ground ambulance providers and suppliers that participated in Medicare for only part of the year are correctly categorized. For NPIs that were enrolled for the full year and had claims in each month, the total volume and the annualized volume are the same. However, for NPIs that were only enrolled for part of the year, the annualized volume provides an estimate of what the NPI's volume would have been if they had been enrolled for the full year.

In general, we calculate annualized volume by multiplying the average monthly volume observed in the data by 12. In the majority of cases, the number of months enrolled and the months observed in the claims data are the same and the annualization calculation was straightforward ((total observed volume/months enrolled)\*12). In other cases (2,300), there is a mismatch between the months enrolled and the months where claims are observed. The vast majority of these cases (1,931) are low-volume providers that were enrolled for the full year but had zero transports in some months. For these cases, we use the months enrolled to adjust volume, and the total volume and annualized volume are the same. However, there are other cases where the enrollment data and claims data do not match, and it is more complicated to determine how to annualize the volume. These mismatches can be classified into several distinct categories: consistent billers (48), new billers (97), and exits (171). Consistent billers are not enrolled for the full year but have claims in each month. New billers are typically enrolled for the full year, but no claims are observed in the initial months of the year. Exits are typically enrolled for the full year, but no claims are observed in the final months of the year. In all of these cases, we treat the months with zero claims as if the NPI were not enrolled and calculate the average monthly volume based on the total volume and the number of months with non-zero claims. Therefore, the annualized volume is calculated as ((total observed volume/months in claims)\*12). A small number of cases, 53, did not fit neatly into any of these categories, so we looked at each one individually to determine how to calculate the annualized volume.

Using the annualized volume measure, we classified each NPI into one of four categories:

- **Low volume:** 200 or fewer transports
- **Medium volume:** 201 to 800 transports
- **High volume:** 801 to 2,500 transports
- **Very high volume:** more than 2,500 transports

Our choice of volume thresholds was informed by our review of the literature and the distribution of suppliers and providers by volume. The distribution has a large group of suppliers with up to approximately 800 transports and then a very long tail with some suppliers and providers having an annual volume of over 50,000 transports. The lowest volume category (200 or fewer) is based on an analysis by GAO that indicates that the decrease in cost per transport diminishes after approximately 600 total transports. [4] Medicare typically accounts for about 30 to 40 percent of total transport volume,<sup>54</sup> so we use 200 Medicare transports (or 33% of 600) as

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for each month in calendar year 2016 (mean number of enrolled months is 11.79 and the median is 12 months). 79.32% of NPIs in the analytic file billed Medicare for ground claims in each month for calendar year 2016 (mean number of months billed Medicare for a ground claim is 11 and the median is 12 months).

<sup>54</sup> Calculated based on data included in Table 1-1 (page 17) of 2007 Institute of Medicine report, "Emergency Medical Services: At the Crossroads."

the initial cut point. The medium category cut point of 800 Medicare transports per year is based on the distribution as described above. After this point we see a transition to smaller numbers of higher volume providers. The high and very high categories are designed to split the remaining suppliers relatively evenly across categories.

### D.2.3 Service Area Population Density

There are many possible location variables in the enrollment data (e.g., business address, service area) and claims data (e.g., point of ambulance pickup locations) that could be used to assign NPIs to an urban/rural status. For ambulance service suppliers, we chose to use point of ambulance pickup location information from the professional claims data because it provides direct information about where the supplier is rendering services. Each point of ambulance pickup ZIP code was classified as urban, rural, or super rural using a Census crosswalk.<sup>55</sup> We then looked at the distribution of point of ambulance pickups across these three service areas for each supplier to assign it to one urban/rural/super rural status category. Over half of suppliers, 54 percent, have point of ambulance pickups in only one service area and so are easily assigned to that category. The other suppliers have pickups in at least two different types of areas (e.g., rural and super rural). For those suppliers, we use the most prevalent service area type. For ambulance providers, we use the business location ZIP code for the institutional claims, since point of ambulance pick-up location is not available for these claims.

### D.2.4 Average Relative Value Units per Transport

RVUs are used to compare the work and other resources involved in furnishing different healthcare services. Higher RVU services involve more work and resources than lower RVU services. To assess whether some NPIs furnish a higher intensity mix of services, we calculated the average number of RVUs per ground ambulance transport at the NPI level. We used HCPCS code-based RVUs from the AFS.<sup>56</sup> We excluded mileage (HCPCS code A0425) and unlisted ambulance service (HCPCS code A0999) codes from the numerator and denominator for this calculation.

### D.2.5 Total Payments for Ground Ambulance Services

To capture differences in revenue among ground ambulance providers and suppliers, we summed the allowed amount from the professional ambulance service claims and calculated the allowed amount for the institutional claims. Institutional claim lines do not have an allowed amount field in the IDR, so we calculated the line allowed amount by summing the line amounts paid by Medicare and by the beneficiary. We then calculated the total 2016 Medicare payments for each NPI by summing these payments. This is a proxy for total revenue from all payers.

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<sup>55</sup> We used a Census-provided crosswalk to classify ZIP codes as urban, rural, or super rural. This is the same classification that is used to calculate add-on payments for rural and super rural services. For more information about the classification, please see [https://www2.census.gov/geo/pdfs/reference/ua/Defining\\_Rural.pdf](https://www2.census.gov/geo/pdfs/reference/ua/Defining_Rural.pdf). CMS's list of ZIP codes and their designations can be found at <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AmbulanceFeeSchedule/index.html>, ZIP Code to Carrier Locality file.

<sup>56</sup> See <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AmbulanceFeeSchedule/afspuf.html>

## D.2.6 Share of Transports that Were Non-emergency

Ambulance services focusing on scheduled transports likely face different cost structures than those providing primarily emergency transports. Claims data does not indicate whether an individual transport was scheduled. We used two approaches— one relying on HCPCS codes and the other on origin and destination ambulance modifiers—to distinguish between NPIs that provide primarily scheduled and unscheduled transports. First, we classified claims with an HCPCS code of ALS, level 1, non-emergency (HCPCS code A0426) or BLS, non-emergency (HCPCS code A0428) as non-emergency transports.<sup>57</sup> We then calculated the proportion of total transports that are non-emergency claims for each NPI.

## D.2.7 Share of Transports that Were Related to Dialysis

Many transports to dialysis facilities are scheduled transports. We used the ambulance service claims modifier codes to identify claims with origins and destinations at hospital-based or freestanding ESRD facilities and classified these as renal dialysis-related claims.<sup>58</sup> We then calculated the proportion of total claims that are renal dialysis services for each NPI.

## D.2.8 Number of Vehicles

An ambulance supplier reports on Attachment 1 of their CMS-855B detailed information on each of their vehicles. Specifically, they report the vehicle type (automobile, aircraft, boat, etc.), the vehicle identification number, make (e.g., Ford), model (e.g., 350T), year, and then the services that the vehicles provide. The services include ALS, BLS, emergency runs, non-emergency runs, specialty care transport, land ambulance, air ambulance—fixed wing, air ambulance—rotary wing, and marine ambulance. A unique vehicle had either a distinct vehicle make, vehicle model, or vehicle year. A difference in any of these three fields as reported by an ambulance provider or supplier we believe could reflect a separate vehicle. This assumption may lead to an overestimate of the number of vehicles for a particular NPI. That said, there are no external databases that we can use to verify the number of vehicles for each individual NPI in the analytic file. Given that an individual vehicle can report different services across enrollment records, we decided to assign a vehicle as providing either ALS, BLS, emergency or non-emergency services if they ever indicated that they do so on any enrollment record. We classified an ambulance as being a land vehicle based on the vehicle type, make, and model. We restricted marine ambulances to those that were clearly defined as a boat. A small number of NPIs (n=89) had zero land or marine ambulances but did report billing for ground ambulance services in 2016. We included these organizations in our analyses, and they were assigned a value of zero for the number of land and marine ambulances.

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<sup>57</sup> CMS assumes that all other ground ambulance services are emergency, even though in some cases specialty care transports may be non-emergency. Definition of emergency response can be found at: 42 CFR §414.605. There is one code to identify specialty care transports.

<sup>58</sup> Ambulance modifiers codes with G or J in the first or second position are classified as renal dialysis-related.

### D.3 Detailed Tables of Ambulance Organization Characteristics

Table D-1. Total Volume of Medicare Paid Ambulance Services for Ground Ambulance Providers and Suppliers, by HCPCS Codes

	Number of Medicare Ground Ambulance Services <sup>a</sup>	Percent of Total Medicare Ground Service Volume <sup>b</sup>	Percent of Providers or Suppliers That Provide At Least One Service <sup>c</sup>	Average Payment per Transport <sup>d</sup>	Total Payment For Ground Ambulance Services <sup>e</sup>	Percent of Total Payment For Ground Ambulance Services <sup>b</sup>
<b>Total Services</b>	14,793,861				\$6,124,778,435	
Ambulance Providers	858,737	5.8	100	\$463	\$397,895,657	6.5
Ambulance Suppliers	13,935,124	94.2	100	\$411	\$5,726,882,778	93.5
<b>A0426: ALS1, non-emergency</b>						
Ambulance Providers	55,813	6.5	64.869	\$556	\$31,041,251	7.8
Ambulance Suppliers	362,494	2.6	28.721	\$534	\$193,467,249	3.4
<b>A0427: ALS1, emergency</b>						
Ambulance Providers	401,756	46.8	85.294	\$516	\$207,290,114	52.1
Ambulance Suppliers	5,015,589	36.0	82.594	\$503	\$2,524,993,397	44.1
<b>A0428: BLS, non-emergency</b>						
Ambulance Providers	177,265	20.6	80.2	\$311	\$55,149,431	13.9
Ambulance Suppliers	5,368,786	38.5	46.5	\$292	\$1,568,380,258	27.4
<b>A0429: BLS, emergency</b>						
Ambulance Providers	194,691	22.7	83.0	\$407	\$79,215,524	19.9

	Number of Medicare Ground Ambulance Services <sup>a</sup>	Percent of Total Medicare Ground Service Volume <sup>b</sup>	Percent of Providers or Suppliers That Provide At Least One Service <sup>c</sup>	Average Payment per Transport <sup>d</sup>	Total Payment For Ground Ambulance Services <sup>e</sup>	Percent of Total Payment For Ground Ambulance Services <sup>b</sup>
Ambulance Suppliers	2,977,515	21.4	95.2	\$426	\$1,268,340,118	22.1
<b>A0432: Paramedic intercept</b>						
Ambulance Providers	118	0.0	1.1	\$401	\$47,370	0.0
Ambulance Suppliers	2,285	0.0	0.6	\$369	\$843,655	0.0
<b>A0433: ALS2</b>						
Ambulance Providers	14,250	1.7	65.7	\$756	\$10,768,550	2.7
Ambulance Suppliers	113,626	0.8	56.3	\$719	\$81,744,449	1.4
<b>A0434: Specialty care transport</b>						
Ambulance Providers	14,798	1.7	40.5	\$972	\$14,383,354	3.6
Ambulance Suppliers	92,214	0.7	12.3	\$957	\$88,219,670	1.5
<b>A0999: Unlisted ambulance service</b>						
Ambulance Providers	46	0.0	1.6	\$1	\$63	0.0
Ambulance Suppliers	2,616	0.0	1.8	\$342	\$893,982	0.0
<b>Total non-emergency services<sup>f</sup></b>						
Ambulance Providers	233,078	27.1	83.0	\$370	\$86,190,682	21.7
Ambulance Suppliers	5,730,827	41.1	48.3	\$329	\$1,888,127,133	33.0
<b>Total emergency services<sup>g</sup></b>						
Ambulance Providers	596,447	69.5	95.3	\$480	\$286,505,639	72.0



	Number of Medicare Ground Ambulance Services <sup>a</sup>	Percent of Total Medicare Ground Service Volume <sup>b</sup>	Percent of Providers or Suppliers That Provide At Least One Service <sup>c</sup>	Average Payment per Transport <sup>d</sup>	Total Payment For Ground Ambulance Services <sup>e</sup>	Percent of Total Payment For Ground Ambulance Services <sup>b</sup>
Ambulance Suppliers	8,111,245	58.2	98.1	\$478	\$3,877,648,755	67.7
<b>Total BLS services<sup>h</sup></b>						
Ambulance Providers	371,956	43.3	92.5	\$361	\$134,364,955	33.8
Ambulance Suppliers	8,346,092	59.9	97.6	\$355	\$2,964,600,636	51.8
<b>Total ALS services<sup>i</sup></b>						
Ambulance Providers	457,569	53.3	88.4	\$521	\$238,331,366	59.9
Ambulance Suppliers	5,378,567	38.6	83.2	\$505	\$2,717,886,396	47.5

<sup>a</sup> The numbers in this column are the total claims in 2016 with the associated HCPCS code or HCPCS code classification. The mileage HCPCS code is not included in this table. 99.5 percent of claims with one of the HCPCS codes included in this table also have a mileage HCPCS code.

<sup>b</sup> The percentages in these columns represent the percent of the total for the corresponding type of entity (provider or supplier). They may not sum to 100 due to rounding.

<sup>c</sup> The amounts in this column represent the percent of providers or suppliers who have at least one paid claim in 2016 for a service with the associated HCPCS code or HCPCS code classification. Note that the percentages are relative to the total number of providers or suppliers.

<sup>d</sup> The amounts in this column represent the average allowed amount per transport. For claims with more than one transport (3.8% of claims), the allowed amount for the mileage line is split evenly among the transports.

<sup>e</sup> The amounts in this column represent the total payment for suppliers and providers for claims in 2016 with the associated HCPCS code or HCPCS code classification.

<sup>f</sup> Sum of services with HCPCS A0426 and A0428.

<sup>g</sup> Sum of services with HCPCS A0427, A0429, A0432, A0433, A0999

<sup>h</sup> Sum of services with HCPCS A0428 and A0429.

<sup>i</sup> Sum of services with HCPCS A0426 and A0427.

Source: RAND analysis of merged Medicare enrollment and claims data.

### D.3.1 Diagnoses Reported in Medicare Ground Ambulance Transport Claim Lines

To understand the patterns of emergency and non-emergency transports, we looked at the most common diagnoses reported. The most common among all transports in 2016 was ESRD, present for 6.2 percent of transports. This was followed by shortness of breath, present for 4.2 percent of transports. Table D-2 lists the top 10 diagnosis codes<sup>59</sup> for non-emergency and emergency transports in 2016. The shares reported in the table represent the percentage of all transports. The top reasons for transport differ by type of transport as expected, though there is some overlap in reasons. Weakness and altered mental status are top reasons for both non-emergency and emergency transports. For example, 4 percent of all transports were for altered mental status, with 2.6 percent emergency and 1.4 percent non-emergency transports.

Table D-2. Top 10 Diagnosis Codes for Non-emergency and Emergency Transports

Emergency Transports <sup>a</sup> Diagnosis	Percent <sup>c</sup>	Non-emergency Transports <sup>b</sup> Diagnosis	Percent <sup>c</sup>
Shortness of breath	4.2%	End-stage renal disease	6.2%
Chest pain, unspecified	3.8%	Unspecified lack of coordination	3.1%
Altered mental status, unspecified	2.6%	Weakness	1.5%
Weakness	2.3%	Altered mental status, unspecified	1.4%
Syncope and collapse	2.2%	Other lack of coordination	1.2%
Unspecified abdominal pain	1.5%	Bed confinement status	1.1%
Pain, unspecified	1.5%	Muscle weakness (generalized)	0.7%
Dyspnea, unspecified	1.3%	Chronic kidney disease, unspecified	0.7%
Transient alteration of awareness	1.1%	Delirium due to known physiological condition	0.6%
Dizziness and giddiness	1.1%	Transient alteration of awareness	0.6%

<sup>a</sup> Transports with HCPCS A0426 and A0428.

<sup>b</sup> Transports with HCPCS A0427, A0429, A0432, A0433, A0999.

<sup>c</sup> Percent of all transports in 2016.

Source: RAND analysis of Medicare claims data on IDR. Accessed Feb. 26, 2019.

We grouped the diagnosis codes on ambulance transport claims into broader categories<sup>60</sup> and calculated the percentage of transports for each category. In Figure D-1 we show the percentage of all 2016 transports that have a diagnosis code within each category as well as the relative percentage within each that are emergency and non-emergency transports. We have presented the top 20 categories separately and collapsed the remainder into a single, other category. The most common diagnosis category is diagnosis codes that are unspecified. The second largest category is other lower respiratory disease. This includes the individual diagnoses of shortness of

<sup>59</sup> Ambulance claim lines contain an ICD-10-CM diagnosis code.

breath and chest pain in Table D-2 as well as many others related to the circulatory and respiratory systems. As a group, these are present in 8 percent of all transports. Most of these are emergency transports, and among emergency transports, they represent the largest category of diagnoses. Chronic kidney disease is the third most common diagnosis category overall, representing just over 7 percent of transports. Almost all of these are non-emergency transports, and among non-emergency transports, they represent the largest category of diagnoses. The top 20 diagnosis categories represent almost 80 percent of all transports.

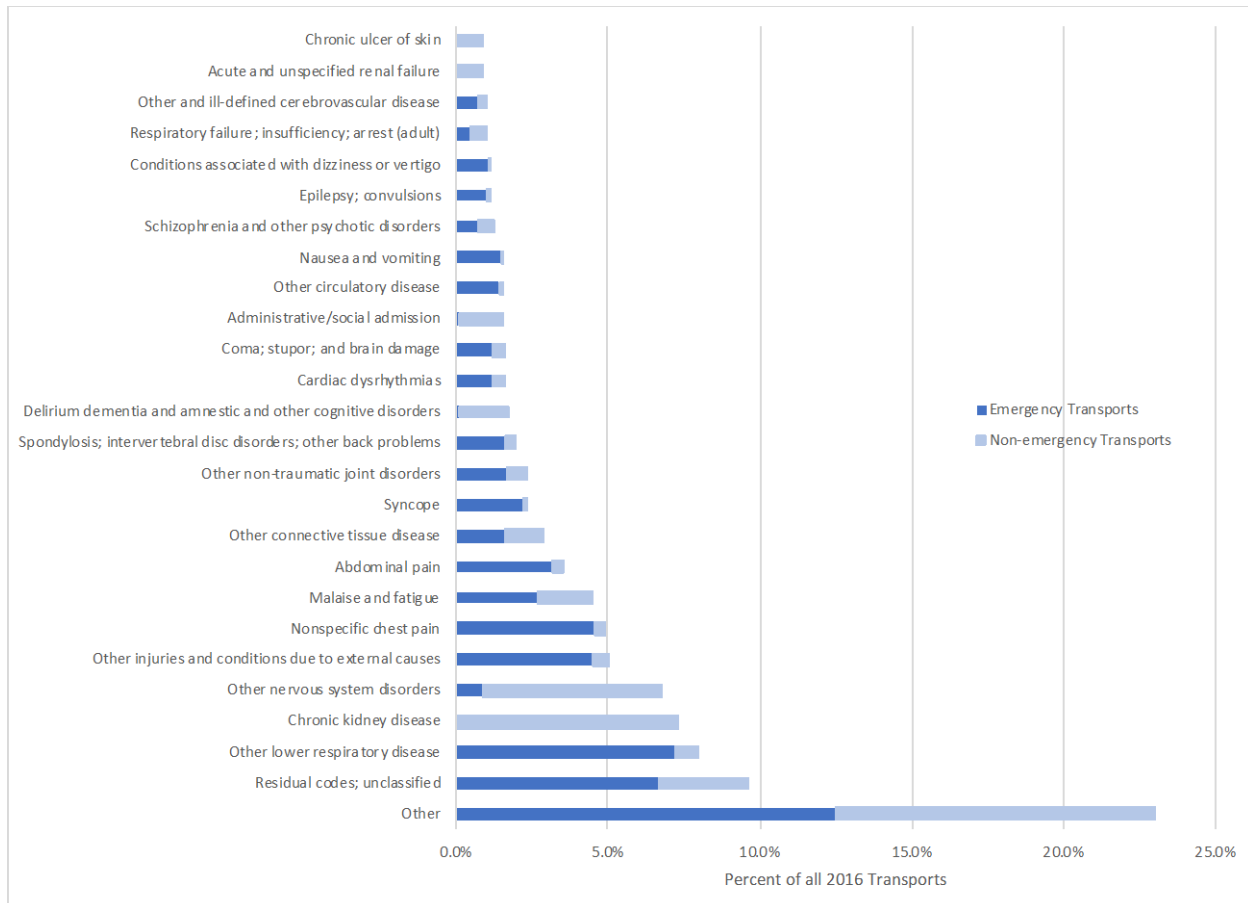


Figure D-1. Percentage of Transports by Diagnosis Category

Note: Emergency transports are transports with HCPCS A0426 and A0428. Non-emergency transports are transports with HCPCS A0427, A0429, A0432, A0433, and A0999. ICD-10-CM diagnosis codes were assigned categories using version 2018.1 of the Clinical Classification Software (CCS) available from AHRQ.

Source: RAND analysis of Medicare claims data on IDR. Accessed Feb. 26, 2019.

Table D-3. The Share of Ambulance Ground Providers and Suppliers Across Ownership Status

Ownership	Number of NPIs	Percent of Providers or Suppliers	Percent of Total Medicare Ground Ambulance Volume	Percent of Total Medicare Ground Ambulance Payments
<b>Ambulance Providers</b>				
Government	210	34.3	1.4	1.6
Private, not-for-profit	368	60.1	4.1	4.6
Private, for-profit or not specified	34	5.6	0.3	0.3
<b>Ambulance Suppliers</b>				
Government	4964	48.9	27.0	30.4
Private, not-for-profit	2842	28.0	14.5	15.7
Private, for-profit or not specified	2340	23.1	52.6	47.4

Note: The second column shows the distribution within the provider or supplier category. The percentages in this column sum to 100 percent across the rows for each group. The third and fourth columns show the proportion of total volume and total payments across both ground ambulance providers and suppliers. The percentages in these columns sum to 100 percent across all rows in the table.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

Table D-4. Distribution of Ground Ambulance Providers and Suppliers Across Transport Volume Categories

Volume	Number of NPIs	Percent of Providers or Suppliers	Percent of Total Medicare Ground Ambulance Volume	Percent of Total Medicare Ground Ambulance Payments
<b>Ambulance Providers</b>				
Low: 1-200 transports/year	166	27.1	0.1	0.1
Medium: 201-800 transports/year	199	32.5	0.6	0.8
High: 801-2500 transport/year	153	25	1.4	1.7
Very high: >2500 transports/year	94	15.4	3.7	3.8
<b>Ambulance Suppliers</b>				
Low: 1-200 transports/year	4,362	43.0	2.0	2.7
Medium: 201-800 transports/year	2,800	27.6	8.1	9.8
High: 801-2500 transport/year	1,749	17.2	16.3	17.4
Very high: >2500 transports/year	1,235	12.2	67.8	63.7

Note: The second column shows the distribution within the provider or supplier category. The percentages in this column sum to 100 percent across the rows for each group. The third and fourth columns show the proportion of total volume and total payments across both ground ambulance providers and suppliers. The percentages in these columns sum to 100 percent across all rows in the table.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

Table D-5. Distribution of Ground Ambulance Providers and Suppliers Across Population Density Categories

Population density	Number of NPIs	Percent of Providers or Suppliers	Percent of Total Medicare Ground Ambulance Volume	Percent of Total Medicare Ground Ambulance Payment
<b>Ambulance Providers</b>				
Urban	232	37.9	4.0	4.2
Rural	151	24.7	1.2	1.4
Super Rural	229	37.4	0.6	0.9
<b>Ambulance Suppliers</b>				
Urban	5,433	53.6	75.8	71.6
Rural	2,885	28.4	15.3	17.1
Super Rural	1,828	18.0	3.1	4.8

Note: The second column shows the distribution within the provider or supplier category. The percentages in this column sum to 100 percent across the rows for each group. The third and fourth columns show the proportion of total volume and the total payment across both ground ambulance providers and suppliers. The percentages in these columns sum to 100 percent across all rows in the table.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

Table D-6. Ambulance Organizations Average Relative Value Unit, by Ownership, Volume, and Population Density, Median and Interquartile Range of Total in Each Cell

	Median Urban	Median Rural	Median Super Rural	IQR <sup>a</sup> Urban	IQR Rural	IQR Super Rural
<b>Gov't Suppliers</b>	1.8	1.7	1.7	0.1	0.2	0.2
Low	1.8	1.7	1.6	0.1	0.2	0.2
Medium	1.8	1.8	1.7	0.1	0.2	0.2
High	1.8	1.7	1.7	0.1	0.2	0.2
Very high	1.8	1.6	1.7	0.1	0.3	0.0
<b>For-profit Suppliers</b>	1.2	1.6	1.7	0.6	0.6	0.2
Low	1.6	1.8	1.7	0.6	0.3	0.3
Medium	1.1	1.6	1.7	0.6	0.6	0.2
High	1.1	1.5	1.7	0.3	0.5	0.4
Very high	1.2	1.3	1.6	0.4	0.5	0.3
<b>Non-profit Suppliers</b>	1.7	1.7	1.7	0.2	0.2	0.2
Low	1.7	1.7	1.7	0.2	0.1	0.2
Medium	1.7	1.7	1.7	0.2	0.1	0.2
High	1.7	1.6	1.7	0.2	0.2	0.2
Very high	1.6	1.6	1.5	0.4	0.2	0.1
<b>All Providers</b>						
All Providers	1.7	1.6	1.7	0.4	0.2	0.2

<sup>a</sup> Interquartile Range (IQR)

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

Table D-7. Proportion of Transports that are BLS for Ambulance Organizations, by Ownership, Volume, and Population Density, Median and Interquartile Range of Total in Each Cell

	Median Urban	Median Rural	Median Super Rural	IQR <sup>a</sup> Urban	IQR Rural	IQR Super Rural
<b>Gov't Suppliers</b>	0.34	0.43	0.55	0.27	0.36	0.64
Low	0.36	0.52	0.74	0.42	0.56	0.63
Medium	0.31	0.35	0.37	0.23	0.30	0.32
High	0.34	0.41	0.36	0.21	0.26	0.16
Very high	0.35	0.44	0.34	0.25	0.31	0.09
<b>For-profit Suppliers</b>	0.94	0.53	0.43	0.36	0.61	0.74
Low	1	0.25	0.65	0.50	0.79	0.95
Medium	1	0.47	0.31	0.37	0.47	0.29
High	0.99	0.55	0.38	0.27	0.49	0.52
Very high	0.84	0.77	0.37	0.36	0.49	0.38
<b>Non-profit Suppliers</b>	0.53	0.50	0.65	0.40	0.33	0.62
Low	0.54	0.51	0.78	0.53	0.41	0.59
Medium	0.51	0.45	0.38	0.34	0.28	0.36
High	0.53	0.50	0.30	0.37	0.27	0.26
Very high	0.56	0.53	0.47	0.35	0.19	0.29
<b>All Providers</b>						
All Providers	0.43	0.35	0.41	0.42	0.20	0.48

<sup>a</sup> Interquartile Range (IQR)

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.



Table D-8. Total Number of Land and Marine Vehicles for Ambulance Suppliers, by Ownership, Volume, and Population Density, Median and Interquartile Range of Total in Each Cell

	Median Urban	Median Rural	Median Super Rural	IQR <sup>a</sup> Urban	IQR Rural	IQR Super Rural
<b>Gov't Suppliers</b>	4	3	3	4	4	2
Low	2	2	2	1	2	1
Medium	4	4	4	2	2	3
High	6	7	7	4	5	4
Very high	19	12.5	12	23	13	2
<b>For-profit Suppliers</b>	6	4	3	16	7	4
Low	2	2	2	3	1	1
Medium	3	4	4	4	4	3
High	4	6	7	7	5	6
Very high	19	10	18	37	13	18
<b>Non-profit Suppliers</b>	3	3	2	3	3	1
Low	2	2	2	2	2	2
Medium	3	4	4	2	2	1
High	6	7.5	6	4	5	7
Very high	21	15	8	16	9	14

<sup>a</sup> Interquartile Range (IQR)

Note: Analyses are limited to ambulance suppliers only.

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

Table D-9. Average Mileage per Transport for Ambulance Organizations, by Ownership, Volume, and Population Density, Median and Interquartile Range of Total in Each Cell

	Median Urban	Median Rural	Median Super Rural	IQR <sup>a</sup> Urban	IQR Rural	IQR Super Rural
<b>Gov't Suppliers</b>	8	16	25	8	11	16
Low	11	16	26	9	11	17
Medium	7	16	24	7	15	14
High	5	15	18	4	10	9
Very high	6	12	14	4	4	2
<b>For-profit Suppliers</b>	9	17	26	6	13	23
Low	10	31	32	9	53	34
Medium	8	19	25	8	18	20
High	8	16	23	5	9	11
Very high	9	14	21	4	8	14
<b>Non-profit Suppliers</b>	9	17	26	6	13	23
Low	13	18	30	10	11	22
Medium	9	16	23	8	13	11
High	7	15	19	5	9	9
Very high	9	13	25	5	5	2
<b>All Providers</b>						
All Providers	11	18	26	13	11	20

<sup>a</sup> Interquartile Range (IQR)

Source: RAND analysis of merged 2016 Medicare enrollment and claims data.

## D.4 Cluster Analysis

Chapter 5 presents a series of descriptive comparisons of ambulance companies that focuses on ambulance provider ownership, transport volume, and population density. These variables emerged as of key importance from our qualitative literature review and discussions with stakeholders.

As an alternative approach to categorizing ambulance organizations, we also conducted an unsupervised cluster analysis based on these and other characteristics that describe ambulance providers. The cluster analysis attempts to group individual data points (i.e., ambulance providers) into non-overlapping groups that maximize similarity within each group and maximize dissimilarity between them.<sup>61</sup> [39, 40] After clustering the data, we examined whether the distinctly clustered groups varied in their ownership, transport volume, or population density.

We used a *k*-medoid clustering method that is related to the well-known *k*-means clustering approach. While *k*-means calculates an arithmetic mean individual across the multiple variables (*n*-dimensional) submitted to the analysis, *k*-medoid uses an *n*-dimensional median individual. This is thought to make the cluster analysis more robust in the context of data, like ours, that combine variables with very different distributions. In our case the variables included binary, nominal, ratio, and log-normal distributions. We scaled continuous variables to a unit range prior to the clustering, which we implemented with the `pamk` function in the R package `fpc` and searched for between 1 and 20 clusters.[41]

The analysis produced nine clusters, six of which had silhouette indices above the 0.4 threshold that is often taken as indicative of substantial cluster structure (Table D-10). [39]<sup>62</sup> Table D-10 also gives the cluster size (in terms of number of NPIs) and the transport volume across the clusters. The smallest cluster contains 545 NPIs and the largest contains 2,484 NPIs, whereas the number of transports per NPI ranges from 159 to 5,772 across the clusters. To help distinguish other representative characteristics of the clusters, gives the value of each of the variables used in the analysis for the medoid (i.e., the NPI selected as the most median representative) of each cluster. When examining these clusters, we observe that ownership type, population density, and log total number of lines vary distinctly between the individuals the analysis has selected as the most median representatives from each cluster (called medoids).

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<sup>61</sup> Kaufman, L. and Rousseau, P.J. (1990). "Finding Groups in Data: An Introduction to Cluster Analysis." Wiley, New York.; Hennig, C. and Liao, T. (2013) How to find an appropriate clustering for mixed-type variables with application to socio-economic stratification, *Journal of the Royal Statistical Society, Series C Applied Statistics*, 62, 309-369.

<sup>62</sup> Kaufman, L. and Rousseau, P.J. (1990). "Finding Groups in Data: An Introduction to Cluster Analysis.. Wiley, New York.

Table D-10. Clusters by Silhouette Index and Size

<b>Cluster</b>	<b>Cluster Average Silhouette Index</b>	<b>Number of NPIs</b>	<b>Total number of Transports</b>	<b>Average transports per NPI</b>
A	0.23	870	5021694	5772
B	0.53	925	500975	542
C	0.43	1176	233893	199
D	0.60	2484	2834690	1141
E	0.51	1421	1502244	1057
F	0.52	1424	866340	608
G	0.44	743	2120282	2854
H	0.24	545	766313	1406
I	0.39	558	88693	159

Table D-11. Medoid Characteristics for Each Cluster

Cluster	Ownership Type	Mean Log of Transport Volume	Share in the Urban Population Density Category	Share in the Rural Population Density Category	Share of Transports that were BLS	Share of Transports that were Non-Emergency	Share of Transports that were dialysis transports	Mean Log Number of Ground Ambulances
A	For-profit	7.94	99.9%	0.1%	71.7%	42.6%	0.7%	2.30
B	Non-profit	4.89	0%	100%	51.1%	0%	0%	1.39
C	Gov't.	4.43	0%	0%	48.8%	0%	0%	1.10
D	Gov't.	5.96	100%	0%	33.0%	0%	0%	1.39
E	Non-profit	5.62	100%	0%	52.%	0%	0%	1.39
F	Gov't.	5.79	0%	100%	40.7%	0%	0%	1.39
G	For-profit	6.94	100%	0%	100%	98.7%	88.5%	1.39
H	For-profit	6.97	0.3%	99.4%	39.4%	22.3%	1.0%	1.61
I	Non-profit	3.97	0%	0%	79.2%	0%	0%	1.10

## Appendix E Draft Survey Questionnaire

### 1. Introduction

This section contains the proposed instrument to collect data on costs, revenues, utilization, and other information from ground ambulance organizations.

#### 1.1 Assumptions and Considerations for the Development of the Instrument

The instrument is organized by domain to capture the information required by section 1834(17) of the Social Security Act (the Act) and needed, based on our assessment, by the Medicare Payment Advisory Commission (MedPAC) for their required analysis of the relationship between ground ambulance (land and water ambulance) costs and Medicare Ambulance Fee Schedule (AFS) payments. This instrument reflects our assumptions regarding the purpose and objectives of the ground ambulance data collection effort and our general recommendations to CMS related to instrument structure, item wording, and other decisions as described in the Instrument Considerations and Recommendations chapter of the Medicare's Ground Ambulance Data Collection System: Sampling and Instrument Considerations and Recommendations Report (Chapter 7). The key assumptions and recommendations from that chapter include:

1. While we do not know the specific methodology or approach that MedPAC intends to use for the Congressionally-mandated analysis of data collected through this instrument, in general our strategy for instrument design is to leave as many analytic avenues open to MedPAC and other users of this data as possible. For example, our recommendations on data collection regarding characteristics of ground ambulance providers and suppliers are motivated in part by the potential use of this data to support subgroup analyses beyond the specific subgroups that are noted in section 1834(17) of the Act.
2. Relatedly, we acknowledge the ambiguity in how MedPAC or other analysts of the data will decide to include or exclude certain costs that may or may not be relevant to ground ambulance operations, depending on the perspective of the analysis and the policy objective at hand. For example, some staff may have ground ambulance and other responsibilities. Whether or not the entire cost associated with these staff or some portion of the costs are considered in-scope for analysis is not always clear. Our approach, as above, is to provide analysts with flexibility in potential approaches to allocate costs.
3. While we do not know the specific method that CMS intends to use to field the instrument (e.g., paper vs. interview vs. web-based electronic format), we assume the use of a web-based electronic instrument that allows for complex skip patterns and flexible data entry options.
4. Although the majority of providers and suppliers is assigned to only one National Provider Identifier (NPI), a small percentage of providers and/or suppliers is associated with multiple NPIs. However, this instrument is structured to query providers and suppliers on one NPI only. We use the phrases "ground ambulance organization" and "your organization" to reflect data on one NPI which potentially is one of several NPIs in a broader organization (such as a large corporation). For providers and suppliers that are associated with multiple NPIs, we remind them that any reference to "organization"

refers ONLY to the NPI number noted in the instrument and provide instruction to allocate a portion of parent organization level costs (e.g., executives, corporate facilities, reporting technologies) to the NPI referenced in the instrument.

## 1.2 Description of the Structural Design of the Instrument

The instrument is designed so that all respondents are asked some questions about all content area domains. The instrument accounts for availability of information with embedded skip patterns based on provider/supplier characteristics (e.g., whether the organization responds to emergency calls for service, whether the organization shares operational costs with another function like fire response, or whether the organization has volunteer labor) and availability of financial data (e.g., aggregate tracking versus itemized tracking of costs). Based on respondents' answers to these questions, they may receive questions that will assess cost and revenue information at a more granular level or present items that are more relevant to their staffing, deployment, or business model.

## 2. Recommended Data Collection Instrument

**The Centers for Medicare & Medicaid Services (CMS) or its contractors should tailor final Instrument instructions to include logistical instructions about accessing the survey, saving work, final data collection timelines, details about CMS requirements of participation/penalties, and information about where to go for questions, help, or support.**

**All programming notes, skip patterns, and annotations to improve readability are indicated in [blue].** This text will not appear in the final programmed survey but is included in this proposed paper version of the data collection instrument to indicate the intended functionality of the programmed instrument. Item wording, definitions, and response options for the respondent appear in black.

### 2.1 General Survey Instructions

Section 50203(b) of the Bipartisan Budget Act of 2018 requires the Secretary of the Department of Health and Human Services (HHS) to develop a data collection system to collect cost, revenue, utilization, and other information from providers and suppliers of ground ambulance services (“ground ambulance organizations”). The Centers for Medicare & Medicaid Services (CMS) has developed this data collection instrument to collect this information. The Medicare Payment Advisory Commission (MedPAC) will analyze the collected information to assess the adequacy of Medicare payments for ground ambulance services.

You were randomly selected to participate in the data collection this year from among all National Provider Identifiers (NPIs) that billed Medicare for ground ambulance services in 201X. Once randomly selected, participation is mandatory, and there will be penalties for organizations that fail to respond.

This instrument includes detailed questions about your organization’s characteristics, ground (land and water) ambulance costs, revenue, and volume of services. The questions in the instrument generally refer to your organization’s total ground ambulance costs, revenue, and volume of services, not the portion of costs, revenue, and volume related to services that you provided to Medicare beneficiaries. Organization-specific data collected through this effort will not be published or shared beyond CMS and MedPAC.

If your organization bills Medicare for ground ambulance services under multiple NPIs, the instrument will specify the NPI for which we are requesting data. We use the term “ground ambulance organization” to refer to the NPI for which we are requesting data. We are requesting information pertaining to calendar year 201X, or your fiscal year that started in 201X.

The instrument consists of 13 sections and is expected to take 3 hours to enter and submit the requested information. The time spent gathering the data needed to complete the instrument will vary depending on your organization’s accounting and recordkeeping systems and is estimated to take 20 hours on average including your ongoing data collection over the 12-month period.

We want to get a full picture of the cost of operating ground ambulance services at your ground ambulance organization. While completing this instrument, you may need to confer with colleagues to gather the requested information. If your ground ambulance organization does **not**



carry the burden of a specific cost directly (e.g., if your municipality pays facility rent) you **will** need to reach out to other organizations and individuals to gather this cost information. We recommend that you use the printed version of the instrument to do so. Then you can enter the information into the online instrument when all of the information is collected.

You can complete the web instrument in multiple sittings. If you need to stop before completing the instrument, you can log out by clicking on the "Exit" button. This step will save your responses. When you log in again later, you will enter the system where you left off.

To learn more about completing the instrument, printing your responses, and whom to contact if you have questions, [click here for help \[use active URL for programmed version\]](#).

## 2.2 Organizational Characteristics

We are interested in learning more about your ground ambulance organization and how you collect data related to costs and revenues. Your answers to these questions will help ensure that you are presented with questions about costs and revenues that are relevant to your organization.

1. Is [\[pre-populate number\]](#) an NPI your organization uses to bill for ground ambulance services? Yes (1) / No (0) **[If No (0), either exit instrument or allow respondent to correct number or contact support]**
2. Does your organization use **more than one** NPI to bill Medicare for ground ambulance services? Yes (1) / No (0)
  - a. **[If Yes (1)]** You are being asked to complete this instrument and enter data **only** for the following NPI: [\[pre-populate number\]](#). You will be asked to allocate a portion of costs and revenues incurred at the level of your parent organization (e.g., corporate management, information technology [IT] systems, etc.) in sections below.
3. What is the name of your organization? For the remainder of the instrument, we use the term "organization" to refer to the NPI for which we are requesting data. (enter name)
4. What is the name, job title, and contact information for the primary person completing this instrument? (enter name, job title, and contact information)
5. Do you report statistical and financial data by the calendar year (i.e., January-December)? Yes (1) / No (0)
  - a. If No (0), What is the starting month of your regular fiscal year that ended in 201X [\[year prior to data collection\]](#)? (select month from drop-down list)

*Note: We will define the data collection period as either (a) the calendar year aligning with the data collection year, or (b) 12-month period from the start of the organization's fiscal year in the data collection year.*

6. Which category best describes your ownership status?
  - a. For-profit
  - b. Non-profit excluding government
  - c. Government (e.g., federal, state, county, city/township/other municipal)
  - d. Public/private partnership

7. Does your organization use volunteer labor for any positions related to your ground ambulance service? Please include volunteers even if they receive small stipends, allowances, or other incentives from your organization. Yes (1), No (0)
8. Which category best describes your ground ambulance operation?
  - a. Fire department-based
  - b. Police or other public safety department-based
  - c. Government stand-alone emergency medical services (EMS) agency
  - d. Hospital or other Medicare provider of services (such as skilled nursing facility). For the full list of Medicare provider of services categories, see <https://www.cms.gov/Research-Statistics-Data-and-Systems/Downloadable-Public-Use-Files/Provider-of-Services/>.
  - e. Independent/proprietary organization primarily providing EMS services under contract
  - f. Other Independent/proprietary organization
  - g. Other (please specify)
9. **[If Question 8= a, b, or d]** You indicated that your ground ambulance operation is **[FILL “fire department-based” or “police or other public safety department- based” or “hospital-based or other Medicare provider-based.”]** Please confirm that your ground ambulance operation shares operational costs, such as building space or personnel, with these other operations.
  - a. Yes, we share some or all costs (1)
  - b. Costs are **not** shared (0)
10. Does your ground ambulance operation share any operational costs, such as building space or personnel, with one of the following?
  - a. **[Do not display if Question 8 = a]** A fire department? Yes (1), No (0)
  - b. **[Do not display if Question 8 = b]** A police or other public safety department? Yes (1), No (0)
  - c. **[Do not display if Question 8 = d]** A hospital or other Medicare provider of services (such as a skilled nursing facility). For the full list of Medicare provider of services categories, see [https://www.cms.gov/Research- Statistics-Data-and- Systems/Downloadable-Public-Use-Files/Provider-of- Services/](https://www.cms.gov/Research-Statistics-Data-and-Systems/Downloadable-Public-Use-Files/Provider-of-Services/)) Yes (1), No (0)
  - d. Another healthcare organization (excluding hospitals, skilled nursing facilities, or other Medicare provider of services)? Yes (1), No (0)
  - e. An air ambulance operation? Yes (1), No (0)
  - f. Other (specify)? \_\_\_\_\_

*Note: For the remainder of the instrument, we show items related to shared services to organizations that answer Section 2.2, Question 9 = Yes(1) OR Question 10 = Yes(1) to a-f. To streamline the skip logic, we refer to the answers to these questions as “Shared Services = Yes” for the remainder of the document.*

11. Does your organization routinely provide ground ambulance responses to 911 calls? Yes (1), No (0)
12. Do you operate land-based ambulances? Yes (1), No (0)

13. Do you operate water-based ambulances? Please do **not** include vehicles used exclusively for water rescues that do not meet the requirements to be a water ambulance in your jurisdiction. Yes (1), No (0)

*Note: This response will be used to prompt for some water-specific volume and cost information.*

14. Do you operate air ambulances? Yes (1), No (0) **[If Yes (1), show the following warning prior to each section:]** “Do **not** include air ambulance services in responding to the following questions.”
15. Which staff deployment model best describes your organization?
- Static deployment (same number of fully staffed ambulance units available no matter the time of day or day of the week)
  - Dynamic deployment (units vary depending on the time of day or day of the week)
  - Combined deployment (certain times of the day have a fixed number of units, and other times are dynamic depending on need)
16. **[If Question 11=Yes]** Do you provide 911 emergency service around the clock for all days in the year (also known as “24/7/365” service) in most or all of your service area? Yes (1), No (0)
17. Do you ever perform paramedic intercepts? A paramedic intercept service is an Advanced Life Support (ALS) level of service that CMS defines as a “rural area transport furnished by a volunteer ambulance company which is prohibited by state law from billing third party payers where services are furnished by an entity that is under contract with the volunteer ambulance company that does not provide the transport but is paid for their service (State of NY only meets these requirements)”. Yes (1), No (0)
18. Other than what was reported in item 17, do you ever deploy ALS emergency response staff as a joint response to meet a Basic Life Support (BLS) ambulance from another organization during the course of responses? Yes (1), No (0)

## 2.3 Service Area

This section asks about characteristics of the area served by your ground ambulance organization. Your **primary** service area means the area in which you usually provide service and where the majority of your transport pickups occur. We will also ask you about other areas where you regularly provide services through mutual or auto-aid agreements (your **secondary** service area), if applicable. Do **not** include areas where you provide services only under exceptional circumstances (e.g., when participating coordinated national or state responses to disasters or mass casualty events).

- Please select the ZIP codes(s) in which your **primary** service area is located:  
**[Select ZIPs from drop-down menu and allow respondents to type in, allow respondent to select multiple]**

*Note: We recommend also providing the user with other geocoded alternatives like counties and municipalities.*

- [If Yes (1) to Section 2.2, Question 11]** Are you the primary emergency ambulance provider in most or all of your primary service area (either for ALS, BLS, or both)? Yes (1), No (0)

3. During a response, what is the approximate **average trip time** (in minutes) across all service levels (BLS, ALS, etc.) in your primary service area from the time the ambulance leaves the station to when that ambulance is available to take another call?
  - a. Less than 30 minutes
  - b. 30 minutes–60 minutes
  - c. 61 minutes–90 minutes
  - d. 91 minutes–120 minutes
  - e. 121–150 minutes
  - f. More than 150 minutes
4. Do you have a secondary service area? A **secondary** service area is **outside** your primary service area, but one where you regularly provide services through mutual or auto-aid arrangements. Do **not** include areas where you provide services only under exceptional circumstances (e.g., natural disaster or mass casualty events).
  - a. Yes (1) [**Continue to remaining questions in this section**]
  - b. No (0) [**Skip to Section 2.4**]
5. Please select the ZIP codes(s) in which your secondary service is located [**Select ZIPs from drop-down menu and allow type in, allow to select multiple**]

*Note: We recommend also providing the user with other geocoded alternatives like counties and municipalities.*
6. During a response, what is the approximate **average trip time** (in minutes) across all service levels (BLS, ALS, etc.) in your **secondary** service area from the time the ambulance leaves the station to when that ambulance is available to take another call?
  - a. Less than 30 minutes
  - b. 30 minutes–60 minutes
  - c. 61 minutes–90 minutes
  - d. 91 minutes–120 minutes
  - e. 121–150 minutes
  - f. More than 150 minutes

## 2.4 Emergency Response Time

[Ask only if Section 2.2, Question 11 is Yes (1)]

To help us better understand your ground ambulance organization's response time, please answer the following questions:

1. We are interested in your organization's response time for ground ambulance responses to emergency calls for service in your **primary** service area (the area in which you usually provide service and where the majority of your transport pickups occur). We define response time as the time from when the call comes in to when the ambulance or another EMS response vehicle arrives on the scene. Is this information that you are able to report? Yes (1), No (0)
  - a. **IF YES,**

- i. What is the **average** response time for ground ambulance emergency responses in your **primary** service area? (Enter minutes)
  - b. **IF NO,**
    - i. What is your best estimate of the **average** response time for ground ambulance emergency responses in your **primary** service area? (Enter minutes)
2. **[If Yes (1) to Section 2.2, Question 11 AND Yes (1) to Section 2.3, Question 4],** What is the **average** response time for ground ambulance emergency responses in your **secondary** service area? (Enter minutes)
3. Is your organization required or incentivized to meet response time targets? Yes (1), No (0)
  - a. **If No (0), skip to Section 2.5.**
  - b. **If Yes (1), ask the following questions:**
    - i. Who determines the response time targets required or incentivized?
      1. Our organization sets our own target response time
      2. Local municipality
      3. County
      4. Other (please specify):
    - ii. Are you penalized if you exceed the response time targets? Penalties can take the form of reduced payments or a fine. Yes (1), No (0)

## 2.5 Ground Ambulance Service Volume

This section asks about your organization's service volume. For the purposes of this instrument:

- **[Display only if Section 2.2, Question 11 is Yes (1)] Total responses** is defined as the total number of responses by your organization regardless of whether a ground ambulance was deployed. Include EMS responses that did not involve a ground ambulance (e.g., responses only involving a quick response vehicle (QRV), a "fly-car," or "sprint" vehicle). If more than one vehicle is sent to the scene, count this as one response. **[If Section 2.2, Question 8 is "a" also display]** "Include emergency responses that only involved a fire truck or other fire/rescue vehicles;" **[if "b"]** "Include emergency responses that only involved a police car or other public safety vehicle"
- A **ground ambulance response** is a response by a fully equipped and staffed ground ambulance, scheduled or unscheduled, with or without a transport, and with or without payment. If more than one vehicle is sent to the scene, count this as one response.
- A **ground ambulance transport** is the use of a fully staffed and equipped ground ambulance responding to a request for service. It also provides a medically necessary transport of a patient from the site of response to the nearest appropriate facility that can treat the patient's condition. In addition, traveling to the destination by any other means would endanger the patient's health.

- A **paid transport** refers to a ground ambulance transport for which your organization has been paid in full or in part by a payer and/or patient. Please note that in some questions we ask only about paid transports, and in other questions we are interested in both the paid transports and transports that are not paid, either because your organization did not bill for them or because your organization billed but did not collect payment for them.
4. **[If Yes (1) to Section 2.2, Question 11]** What was your organization's **total number of responses** (with and without a ground ambulance) in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. (Enter number)
  5. What was your organization's total number of **ground ambulance responses** in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]** across all payer types and regardless of the level of service or geography? This number should be based on all responses by a fully equipped and staffed ground ambulance, regardless of whether the response resulted in a transport. (Enter number)
  6. What percentage of your ground ambulance responses are in your **secondary** service area? A **secondary** service area is **outside** your primary service area, but one where you regularly provide services through mutual or auto-aid arrangements. Do **not** include areas where you provide services only under exceptional circumstances (e.g., when participating coordinated national or state responses to disasters or mass casualty events). (Enter percentage)
  7. What was the total number of ground ambulance responses **that did not result in a transport** in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? For example, this might include patient refusals to be transported, responses when another ambulance provider/supplier handled the transport, patient was deceased on arrival, patient was treated onsite with no medically necessary transport required, or responses that were cancelled after the ground ambulance was already on the way. Please note the sum of ground ambulance responses that did and did **not** result in a transport (reported in this and in the next item) should equal your total number of ground ambulance responses. (Enter number)
    - a. Of the responses that did **not** result in a transport, what percentage received medical treatment on site? (Enter percentage)
  8. What was the total number of ground ambulance **transports** for your organization in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**, across all payer types, and regardless of the level of service or geography? The sum of ground ambulance responses that did and did not result in a transport (reported in this and in the prior item) should equal your total number of ground ambulance responses. (Enter number)
    - a. **[If Yes (1) to Section 2.2, Question 2]** Here we are interested in **ALL** of the NPIs associated with your parent organization. What was the total number of ground ambulance **transports** for your **parent** organization in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**, across all payer types and regardless of the level of service or geography? (Enter number)

9. What was the total number of **paid transports** in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**, across all payer types and regardless of the level of service or geography? (Enter number)
10. Does your organization participate in standby events? These are events where a ground ambulance is requested to be present on scene in case of an incident. Examples include fairs, concerts, sporting events, or police incidents. These services may or may not be paid. Yes (1), No (0)
11. **[If Yes (1) to Section 2.2, Question 17 is Yes(1)]** What was the number of responses in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]** when your organization provided paramedic intercepts? A paramedic intercept is an ALS level of service that CMS defines as “a rural area transport furnished by a volunteer ambulance company which is prohibited by state law from billing third party payers where services are provided by an entity that is under contract with the volunteer ambulance company that does not provide the transport but is paid for their paramedic intercept service (State of NY only meets these requirements).” (Enter number)
12. **[If Yes (1) to Section 2.2, Question 18 is Yes(1)]** Excluding paramedic intercepts meeting Medicare’s definition reported above, what was the number of responses in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]** when your organization provided an ALS intervention as a joint response to meet a Basic Life Support (BLS) ambulance from another organization? Do **not** include responses when your organization billed for a transport. (Enter number)

## 2.6 Service Mix

The following questions ask about the percentage of your organization’s ground ambulance **responses and transports** by type. If you are unable to provide an exact percentage, you will be prompted to select a percentage range. If you did not have any responses in a particular category of service, please enter 0%.

**[If Section 2.2, Question 14 is Yes (1) show the following warning “Do not include air ambulance services in responding to the following questions.”]**

1. Please reply to the following questions regarding the mix of your organization’s **ground ambulance responses** in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**.

CMS defines an emergency response as “a BLS or ALS1 level of service that has been provided in immediate response to a 911 call or the equivalent. An immediate response is one in which the ambulance provider/supplier begins as quickly as possible to take the steps necessary to respond to the call.” The percentage of emergency and non-emergency responses should add to 100%.

Enter 0% if you do not provide responses in either category.

	What percentage of your organization’s <b>ground ambulance</b> responses fell into the following categories? Enter 0% if you do not provide responses in a category.
Emergency	Enter percentage
Non-emergency	Enter percentage

2. **[If Yes (1) to Section 2.2, Question 13]** Please indicate what percentage of your organization’s **transports** used land or water ambulances in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. The percentages should add to 100%. Enter 0% if you do not provide transports in either category.

	What percentage of your organization’s <b>transports</b> fell into the following categories? Enter 0% if you do not provide transports in a category.
Land ambulance transports (excluding water)	Enter percentage
Water ambulance transports (excluding land)	Enter percentage

3. Please indicate what percentage of your organization’s **total transports** fell in the following categories during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. We have included the billing codes for reference. The percentages should add to 100%. Enter 0% if you do not provide transports in a category.
- a. CMS uses the following definitions for EMT staff categories:
    - i. EMT-Basic: certification depends on state or local level.
    - ii. EMT-intermediate: “EMT-Intermediate is an individual who is qualified, in accordance with state and local laws, as an EMT-Basic and who is also certified in accordance with state and local laws to perform essential advanced techniques and to administer a limited number of medications.” “Advanced-EMT” is another term used in the industry.
    - iii. EMT-paramedic: “EMT-Paramedic possesses the qualifications of the EMT-Intermediate and, in accordance with state and local laws, has enhanced skills that include being able to administer additional interventions and medications.” “Paramedic” is another term used in the industry.



	<p><b>What percentage of your organization's transports fell into the following categories?</b></p> <p>Enter 0% if you do not provide transports in a category.</p>
<b>Basic Life Support (BLS), Non-emergency</b> [Basic Life Support (BLS) is a transport staffed by certified Emergency Medical Technicians (EMTs - basic).]	Enter percentage
<b>Basic Life Support (BLS), Emergency</b>	Enter percentage
<b>Advanced Life Support, Level 1 (ALS1), Non-emergency</b> [ALS1 is a transport staffed by EMT-Intermediate or EMT- Paramedics but not including any ALS2 procedures, as defined by CMS.]	Enter percentage
<b>Advanced Life Support, Level 1 (ALS1), Emergency</b>	Enter percentage
<b>Advanced Life Support, Level 2 (ALS2)</b> [ALS2 is an emergency transport staffed by EMT-Intermediate or EMT-Paramedics including at least three separate administrations of one or more medications by intravenous (IV) push/bolus or by continuous infusion (excluding crystalloid fluids) or at least one procedure defined by CMS as ALS2.]	Enter percentage
<b>Specialty Care</b> [The interfacility transportation of a critically injured or ill patient by a ground ambulance vehicle, including the provision of medically necessary supplies and services, at a level of service beyond the scope of the EMT-Paramedic]	Enter percentage

4. In thinking **across all of your transports**, what is the percentage of transports that are interfacility, i.e., transfers for current patients admitted to an inpatient or skilled nursing facility? These transports are not separately payable under Part B for Medicare. We are interested in the share of transports that are interfacility across all payers. (Enter percentage)

## 2.7 Labor Costs

This section asks about the labor costs to operate your organization.

- This question asks about your organization's staff in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Please review the following instructions before completing the table below.
  - Please provide a response for each row in the table below.
  - Staff categories are listed under "EMT/Response Staff," "Administration/Facilities Staff," and "Medical Director" headings.
    - CMS uses the following definitions for EMT staff categories:

- i. EMT-Basic: certification depends on state or local level.
  - ii. EMT-intermediate: “EMT-Intermediate is an individual who is qualified, in accordance with state and local laws, as an EMT-Basic and who is also certified in accordance with state and local laws to perform essential advanced techniques and to administer a limited number of medications.” “Advanced-EMT” is another term used in the industry.
  - iii. EMT-paramedic: “EMT-Paramedic possesses the qualifications of the EMT-Intermediate and, in accordance with state and local laws, has enhanced skills that include being able to administer additional interventions and medications.” “Paramedic” is another term used in the industry.
- **[Include only for NPIs where Shared Services = Yes]** Include only individuals who had responsibilities that were either partly or entirely related to your ground ambulance operation, including frontline staff responding to ground ambulance calls and administrative and facilities staff that supported your ground ambulance operation. They may include, for example, fire fighter/EMTs and managers (such as a fire chief) with ground ambulance responsibilities.
  - **[Include only for NPIs where Shared Services = Yes]** Do not include individuals who had only non-ground ambulance responsibilities (e.g., firefighters who were not EMT/response staff or managers such as deputy fire chiefs with no ground ambulance responsibilities). **[Include only for air ambulance NPIs if Section 2.2, Question 14 is Yes (1)]** Do not include individuals who had only air ambulance responsibilities.
  - Include EMT/response staff in the EMT/response category that matched their level at the start of calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**.
  - The default is to report individuals with **any** EMT/response responsibilities in the appropriate EMT/response category and not in any other category. Include EMT/response staff who had supervisory or administration/facilities responsibilities in the EMT/response staff category that matched their level at the start of calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Do **not** report these staff in the administration/facilities staff categories. For example, an EMT with vehicle maintenance responsibilities would contribute to the appropriate EMT category but **not** to the vehicle maintenance category.
  - For administration/facilities staff with multiple roles, assign each individual to a category indicating the individual’s primary activity. For example, if an individual performed primarily management duties but also had billing or pre-billing duties, include the individual in the management category.
  - Do **not** report outside contracted services, for example vehicle maintenance provided under contract, if the contract covered services and supplies in addition to labor. You will have the opportunity to report these costs in another section.
  - Use the “other” category only to report staff who (a) have at least some ground ambulance responsibilities, and (b) do **not** have any responsibilities in any of the listed categories.

Please indicate if your organization had paid staff (full and/or part time) **[and/or used volunteer staff (show only if Section 2.2, Question 7 is Yes(1))]** in each of the following categories in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**.

Staff Category	Paid Staff	Volunteer Staff <b>[Display if Section 2.2, Question 7 is Yes (1)]</b>
<b>EMT/Response Staff</b>		
EMT – Basic	Yes (1), No (0)	Yes (1), No (0)
EMT – Intermediate	Yes (1), No (0)	Yes (1), No (0)
EMT – Paramedic	Yes (1), No (0)	Yes (1), No (0)
Nurse, doctor, respiratory therapist, or other medical staff	Yes (1), No (0)	Yes (1), No (0)
Emergency Medical Responder (EMR)	Yes (1), No (0)	Yes (1), No (0)
Ambulance Driver (non-EMT/EMR)	Yes (1), No (0)	Yes (1), No (0)
<b>Medical Director</b>	Yes (1), No (0)	Yes (1), No (0)
<b>Administration/Facilities Staff</b>		
Administrative (clerical, human resources [HR], billing, IT support, etc.)	Yes (1), No (0)	Yes (1), No (0)
Management (executive, public information officer, etc.)	Yes (1), No (0)	Yes (1), No (0)
Dispatch / Call Center	Yes (1), No (0)	Yes (1), No (0)
Vehicle Maintenance	Yes (1), No (0)	Yes (1), No (0)
Facilities Maintenance (janitorial staff, laundry, repairs, etc.)	Yes (1), No (0)	Yes (1), No (0)
Other not reported above <b>[If respondent selects “other,” a blank field will appear requesting the respondent to specify category]</b>	Yes (1), No (0)	Yes (1), No (0)

2. **[For each category on the table where a respondent selected “No” for both paid and volunteer staff, a follow-up question will be presented to assess the reasons why the respondent selected “No.”]** In the previous question, you reported that you did **not** use any **[insert staff category]** in your ground ambulance operation in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Please select the reason why:
- This labor category is part of our ground ambulance operation but is paid for or provided at no cost by another entity (1). **[If this option is selected, present a statement that indicates the respondent will be asked to report associated typical weekly hours and associated costs in the following sections.]**

- b. One or more staff do perform these functions, but we assigned these staff to another category per the instructions (2).
- c. We do not have staff in this labor category related to our ground ambulance operation and/or we contract with another organization for this role (3).

## 2.7.1 Paid EMT/Response Staff Compensation and Hours Worked

**[If Section 2.7, Question 1, Paid Staff Column is “Yes” for one or more EMT/Response staff categories. A separate section asks about volunteers.]**

1. This question asks about paid EMT/Response staff (both full and/or part time) in your organization during a **typical week** in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**; specifically about:
  - Total annual compensation for all paid EMT/response staff
  - Total hours during a typical week worked by paid EMT/response staff
  - **[Include only if Section 2.2., Question 8 is “a” or “b”]** Total hours during a typical week worked by paid EMT/response staff who also serve as **[Firefighters/police officers is “a” and/or “b” respectively]**
  - Total hours during a typical week that are **not** related to (a) ground ambulance responsibilities, or (b) fire/police responsibilities for paid EMT/response staff

Please review the following instructions before completing the table below.

- **[Include only for NPIs where Shared Services = Yes]** Include only paid EMT/response staff who had responsibilities that were either partly or entirely related to your ground ambulance operation, including frontline staff responding to ground ambulance calls. This may include, for example, firefighters or EMTs.
- **[Include only for NPIs where Shared Services = Yes]** Do not include individuals with only non-ground ambulance responsibilities (e.g., firefighters who are not EMT or response staff). **[Include for air ambulance NPIs only if Section 2.2, Question 14 is Yes (1)]** Do **not** include individuals who had **only** air ambulance responsibilities.
- Report paid staff with **any** EMT/response responsibilities in the appropriate EMT/response category and **not** in any other category. Include EMT/response staff who had supervisory or administration/facilities responsibilities in the EMT/response staff category that matched their level at the start of calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Do **not** count these staff when responding to the administration/facilities staff questions below. For example, an EMT with vehicle maintenance responsibilities would contribute to the appropriate EMT category but **not** to the vehicle maintenance category. You will report on staff with only administrative responsibilities in a later section.

- **[Include only for those for whom Section 2.2, Question 7 is Yes (1).]** Do not include volunteer EMT/response staff. You will report on these staff in a different section.
- Include paid EMT/response staff in the EMT/response category that matched their level at the start of calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a].**

### **For Total Annual Compensation**

- Report **total annual compensation** for paid staff in each of the EMT/response staff categories in the table below.
- Report total compensation including salary/wages and, when applicable, benefits (e.g., healthcare, paid time off [PTO], retirement, stipends, life insurance), overtime, training time, and callback and standby pay for paid staff.
- If one or more components of compensation costs (e.g., benefits) were paid by another entity with which you had a business relationship (e.g., a municipality that you serve), please obtain and include these costs when you report total compensation. If only total costs in a category are available from another entity (e.g., total benefits costs across all staff), please allocate to labor categories based on salary or wages across labor categories. For example, if total benefits were \$60,000, one-third of EMT/response staff salary and wages was for EMT-Basic and two-thirds of EMT/response staff salary and wages was for EMT-Paramedic, \$20,000 (\$60,000 multiplied by one-third) would contribute to total compensation for EMT-Basic and \$40,000 (\$60,000 multiplied by two-thirds) would contribute to total compensation for EMT-Paramedic.

### **For Total Hours Worked in a Typical Week**

- Please report **total hours worked** by all paid EMT/response staff (including full- and part-time staff) in each category **during a typical week**. If your organization has two paid paramedics who both work 40 hours during a typical week, and two paid paramedics who each work 25 hours a week, the reported total would be  $40 + 40 + 25 + 25 = 130$  hours for paramedics.
- Select a week for reporting that is typical, in terms of seasonality, in the volume of services you offer (if any), and in staffing levels during the reporting year.
- Report total hours worked by paid staff with some or entirely ground ambulance responsibilities. As an example, for a paid firefighter/EMT who works 40 hours during a typical week across fire and ground ambulance operations, add 40 hours to your total hours for all EMT/response staff, **not** the share of hours related to ground ambulance services.

Include only staff whose EMT roles are with your organization. If staff are employed as EMTs with your organization and as firefighters for another organization, include only the EMT hours for your organization in this section.

**[Include only if Section 2.2, Question 8 = “a” or “b.”] For Total Hours Worked in a Typical Week by Staff With Fire/Police Response Roles**

- Please report **total hours worked during a typical week** by paid EMT/response staff (full and part time) **who are also firefighters or police officers** in each category. If your organization has three paid EMT-Basic staff who each work 40 hours a week, and if two are firefighters or police officers and one is EMT only, report 80 hours in this item (compared to 120 hours for all staff in this category).
- Include only staff whose police or firefighter roles are with your organization. As an example, if a staff member is employed as an EMT with your organization and as a firefighter for another organization, include this staff member’s EMT hours only in the previous section (do **not** include this staff member in this section).
- Use the same week for reporting as you selected to report “Total Hours Worked in a Typical Week.”
- All of the paid staff who contribute to this column must also contribute to “Total Hours Worked in a Typical Week.”
- The total hours worked during a typical week by paid EMT/response staff who also served as firefighters/police officers should be less than the total hours reported for all paid EMT/response staff.

**[Include only for NPIs where Shared Services = Yes.] Hours Worked During a Typical Week Unrelated to Ground Ambulance or Fire/Police Response Roles**

- In this column we are interested in the non-ground ambulance hours for EMT staff with shared roles other than those previously discussed. Report the hours during a typical week worked by paid EMT/response staff in each category that were **not** related to (a) ground ambulance responsibilities or (b) fire/police response activities.
- Other responsibilities could include:
  - Air ambulance operations
  - healthcare delivery unrelated to ground ambulance, such as work in a clinic
  - Public health responsibilities
  - Community education and outreach
  - Community paramedicine
  - Any other responsibility unrelated to ground ambulance and fire/police activities
- Use the same typical week for reporting as you selected to report “Total Hours Worked in a Typical Week.”
- All of the staff who contribute to this total must also contribute to reported “Total Hours Worked in a Typical Week.”
- As in other items, do **not** include individuals who have no ground ambulance responsibilities. For example, staff with 100% air ambulance responsibilities do **not** contribute to your response to this item, while staff with 50% ground ambulance and 50% air ambulance responsibilities **do** contribute.

- Unlike in earlier questions where each of your staff contributed all of their hours to total hours worked during a typical week, staff contribute only a fraction of their total hours worked during a typical week to your response in this item.
  - For example, a paramedic working a 40-hour week who splits work time evenly between ground and air ambulance operations would contribute 20 hours (40 hours multiplied by one-half) to this item. The same paramedic contributes a full 40 hours to total hours worked during a typical week in a prior item.
  - As another example, a firefighter/EMT-Basic working a 40-hour week who spends 20 hours a week responding to ground ambulance calls for service, 10 hours a week responding to fire calls for service, and 10 hours a week on community education and outreach would contribute:
    - 40 hours to “Total Hours Worked in a Typical Week by Paid EMT/Response Staff”
    - 40 hours to “Total Hours Worked in a Typical Week by Paid EMT/Response Staff Who Also Served as Firefighters”
    - 10 hours to this item, “Hours Worked During a Typical Week Unrelated to Ground Ambulance or Fire/Police Activities”
- Total hours reported for each of these groups should be less than the total hours reported for all EMT/response paid staff.

Please report about EMT/response staff in your organization in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**; specifically:

- Total annual compensation for all paid EMT/response staff
- Total hours during a typical week worked by paid EMT/response staff
- **[Include only if Section 2.2, Question 8 = “a” or “b.”]** Total hours worked during a typical week unrelated to ground ambulance or fire/police response [Fill firefighters/police officers is “a” and/or “b” respectively]
- **[Include for NPIs where Shared Services = Yes.]** Total hours worked during a typical week that were **not** related to (a) ground ambulance responsibilities or (b) fire/police responsibilities for paid EMT/Response staff

**[Auto-populate table based on responses to Section 2.7, question 1]**

EMT/Response Staff Category	Total annual compensation for paid EMT/response staff	Total hours in a typical week for ALL paid EMT/response staff	[Display if Section 2.2, Question 8 = "a" or "b"] Total hours in a typical week for paid EMT/response staff with fire/police response duties ONLY	[Display if Shared Services = Yes] Hours worked during a typical week unrelated to ground ambulance or fire/police response duties
EMT – Basic	dollars	hours	hours	hours
EMT – Intermediate	dollars	hours	hours	hours
EMT – Paramedic	dollars	hours	hours	hours
Nurse, doctor, respiratory therapist, or other medical staff	dollars	hours	hours	hours
Emergency Medical Responder	dollars	hours	hours	hours
Ambulance Driver (non-EMT/EMR)	dollars	hours	hours	hours

## 2.7.2 Paid Administration, Facilities Staff, and Medical Director Compensation and Hours Worked

**[If Section 2.7, Question 1, Paid Staff Column is “Yes” for one or more Administration, Facilities or Medicare Director Staff. Volunteers are asked about in a separate section.]**

Please review the following instructions before completing the table below.

- Administrative/facilities staff include staff with the following responsibilities:
  - Administration (e.g., clerical, HR, and IT support)
  - Management (e.g., executives and public information officers)
  - Billing
  - Dispatch/call center
  - Vehicle maintenance



- Facilities maintenance (e.g., janitorial, laundry, and repairs)
- **[Include only for NPIs where Shared Services = Yes.]** Include only paid administration/facilities and medical director staff who had responsibilities that were either partly or entirely related to your ground ambulance operation. This may include, for example, fire chiefs with management responsibilities related to your ground ambulance operation.
  - Do **not** include staff with some or entirely EMT/response responsibilities. These staff are included in a prior item and are **not** reported here. For example, an EMT with vehicle maintenance responsibilities would contribute to your prior responses related to EMT/response staff and **not** to administration/facilities staff in this item.
  - **[Include only for those with volunteers Section 2.2, Question 7 is Yes (1).]** Do **not** include volunteer administration/facilities or medical director staff. You will report on these staff in a different section.
  - **[Include only for NPIs where Shared Services = Yes]** Do **not** include individuals with **only** non-ground ambulance responsibilities (e.g., fire chiefs who do not have ground ambulance management responsibilities).
  - **[Include only for air ambulance NPIs if Section 2.2, Question 14 is Yes (1).]** Do **not** include individuals who had **only** air ambulance responsibilities.

### **For Total Annual Compensation**

- Report **total annual compensation** for paid staff in the administration/facilities and medical director categories in the table below.
- Report total compensation including salary/wages, and when applicable, benefits (e.g., healthcare, PTO, retirement, stipends, life insurance), overtime, training time, callback and standby pay for paid staff.
- If one or more components of compensation costs (e.g., benefits) were paid by another entity with which you had a business relationship (e.g., a municipality that you serve), please obtain and include these costs when you report total compensation. If only total costs in a category are available from another entity (e.g., total benefits costs across all staff), please allocate to labor categories based on salary or wages across labor categories. For example, if total benefits were \$60,000, one-third of EMT/response staff salary and wages was for EMT-Basic and two-thirds of EMT/response staff salary and wages were for EMT-Paramedic, \$20,000 (\$60,000 multiplied by one-third) would contribute to total compensation for EMT-Basic and \$40,000 (\$60,000 multiplied by two-thirds) would contribute to total compensation for EMT-Paramedic.

### **For Total Hours Worked in a Typical Week**

- Please report **total hours worked** by all administration/facilities and medical director staff **during a typical week**. If your organization had two paid administration/facilities staff who both worked 40 hours during a typical week,

and two paid administration/facilities staff who each worked 25 hours a week, the reported total would be  $40 + 40 + 25 + 25 = 130$  hours.

- Select a week for reporting that was typical, in terms of seasonality, in the volume of services that you offer (if any), and in staffing levels during the reporting year.
- Report total hours worked by paid administration/facilities staff with some or entirely ground ambulance responsibilities, **not** just the hours that were related to ground ambulance services. As an example, for a paid deputy fire chief who worked 40 hours during a typical week across fire and ground ambulance operations, add 40 hours to your total hours for administration/facilities staff, **not** the share of hours related to ground ambulance services.
- Do **not** include staff with some or entirely EMT/response responsibilities. These staff are included in a prior item and are **not** reported here.

**[Include only if Section 2.2, Question 8 = “a” or “b.”] For Total Hours Worked in a Typical Week by Staff with Fire/Police Response Roles**

- Please report **total hours worked** by paid administration/facilities staff **who were also firefighters or police officers during a typical week**. If your organization has three paid administration/facilities staff who each work 40 hours a week, and if two were police officers and one was not, report 80 hours in this item (compared to 120 hours for all staff in this category).
- Use the same typical week for reporting as you selected to report “Total Hours Worked in a Typical Week.”
- All of the staff who contribute to this total must also contribute to reported “Total Hours Worked in a Typical Week.”
- The total hours worked during a typical week by paid administration/facilities staff who also served as firefighters/police officers should be less than the total hours reported for all paid administration/facilities staff.
- Do **not** include staff with some or entirely EMT/response responsibilities. These staff are included in a prior item and are **not** reported here.

**[Include only for NPIs where Shared Services = Yes.] Hours Worked During a Typical Week Unrelated to Ground Ambulance or Fire/Police Response Roles**

- In this column, we are interested in the hours during a typical week worked by administration/facilities and medical director staff in each category that were **not** related to (a) ground ambulance responsibilities or (b) fire/police response activities. Do **not** include staff with some or entirely EMT/response responsibilities. These staff are included in a prior item and are **not** reported here.
- Other responsibilities could include:
  - Air ambulance operations
  - Healthcare delivery unrelated to ground ambulance, such as work in a clinic
  - Public health responsibilities

- Community education and outreach
  - Community paramedicine
  - Any other responsibility unrelated to ground ambulance or fire/police activities
  - Use the same typical week for reporting as you selected to report “Total Hours Worked in a Typical Week.”
  - All of the staff who contribute to this total must also contribute to reported “Total Hours Worked in a Typical Week.”
  - As in other items, do **not** include individuals who have no ground ambulance responsibilities. For example, staff with 100% air ambulance responsibilities do **not** contribute to your response to this item, while staff with 50% ground ambulance and 50% air ambulance responsibilities **do** contribute.
  - Unlike in earlier questions where each of your staff contributed all of their hours to your total hours worked during a typical week, staff contribute only a fraction of their total hours worked during a typical week to your response in this item.
    - For example, an individual with clerical responsibilities working a 40-hour week who splits their time evenly between ground and air ambulance operations would contribute 20 hours (40 hours multiplied by one-half) to this item. The same individual contributes a full 40 hours to total hours worked during a typical week in a prior item.
    - As another example, a deputy fire chief working a 40-hour week who spends 20 hours a week managing ground ambulance services, 10 hours a week managing fire response activities, and 10 hours a week on community education and outreach would contribute:
      - 40 hours to “Total Hours Worked in a Typical Week”
      - 40 hours to “Total Hours Worked in a Typical Week by Staff With Fire Response Roles”
      - 10 hours to this item, “Hours Worked During a Typical Week Unrelated to Ground Ambulance or Fire Response Roles”
  - Total hours reported for each of these groups should be less than the total hours reported for all administration/facility and medical director staff.
1. This question is about staff without EMT/response responsibilities, including administrative/facilities staff and medical director(s), in your organization during a **typical week** in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Specifically:
- Total annual compensation for all paid administration/facilities and medical director staff
  - Total hours during a typical week worked by paid administration/facilities and medical director staff
  - **[Include only if Section 2.2, Question 8 = “a” or “b.”]** Total hours worked during a typical week for paid non-EMT/response staff with ground ambulance or fire and/or police response duties

- Total hours during a typical week that were **not** related to (a) ground ambulance responsibilities or (b) fire/police responsibilities for paid administration/facilities and medical director staff

**[Auto-populate table based on responses to Section 2.7, question 1]**

Non- EMT/Response Staff Category	Total annual compensation for paid non-EMT/ response staff	Total hours in a typical week for ALL paid non-EMT/ response staff	[Display if Section 2.2, Question 8 = "a" or "b."] Total hours in a typical week for paid non- EMT/ response staff with fire/police response duties ONLY	[Display if Shared Services = Yes.] Hours worked during a typical week unrelated to ground ambulance or fire/police response duties
Administrative/ Facilities Staff	dollars	hours	hours	hours
Medical Director(s)	dollars	hours	hours	hours

2. Among staff who were partly or entirely related to your ground ambulance operation, did you have one or more individual staff members devoting a total of at least 20 hours a week in a typical week to each of the following activities? Do **not** include individuals whose services were part of an outside contracted service(s).

- Billing (Yes/No)
- Data analysis (Yes/No)
- Training (Yes/No)
- Medical quality assurance (Yes/No)

3. **[Ask Only if Section 2.2, Question 2 (multiple NPIs) is Yes (1).]** Please report the allocated portion of administrative labor costs incurred at the level of the parent organization of this NPI based on your organization's approach for allocating costs to specific NPIs. (Enter dollar amount.)

### 2.7.3 Volunteer Labor

**[If Section 2.2, Question 7 is Yes (1).]**

1. How many **individuals** were EMT/response volunteers in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**?

2. This question is about the **hours** of EMT/response volunteers during a **typical week** during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Specifically:
- Total hours for all EMT/response staff volunteers
  - **[Include only if Section 2.2, Question 8 = “a” or “b.”]** Total hours related to serving as fire/police personnel for EMT/response staff volunteers

**[Auto-populate table based on responses to item 1]**

EMT/Response Staff Category	Total hours for all volunteer EMT/response staff	<b>[Display if Section 2.2, Question 8 = “a” or “b.”]</b> Total hours in a typical week for volunteer non-EMT/ response staff with fire/police response duties ONLY
EMT – Basic	hours	hours
EMT – Intermediate	hours	hours
EMT – Paramedic	hours	hours
Nurse, doctor, respiratory therapist, or other medical staff	hours	hours
EMR	hours	hours
Ambulance Driver (non-EMT/EMR)	hours	hours

3. How many individuals were administration/facility volunteers in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? Please read the following instructions before answering this question.
- Include only volunteers who were related to your ground ambulance operation. Do **not** include volunteers with both EMT/response roles and administrative/facilities responsibilities (you reported those individuals in item 1 above).

Number of individuals: \_\_\_\_\_

4. **[Include only if Item 4 is greater than or equal to 1.]** What was the total number of administration/facility volunteer labor hours in a typical week in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**?

- Include only hours for volunteers who were related to your ground ambulance operation. Do **not** include hours for volunteers with both EMT/response roles and administrative/facilities responsibilities (you reported those individuals in item 2 above).

Number of hours: \_\_\_\_\_

5. What was the total number of medical director volunteer labor hours in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**?

Number of hours: \_\_\_\_\_

6. Did your organization provide stipends, honoraria, benefits, and/or other compensation for ground ambulance volunteer labor? Yes (1), No (0)
- i. **[If Yes (1)]** What was the total cost for stipends and/or benefits in calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? (Enter dollar amount)

## 2.8 Facilities Costs

This section asks about the facilities costs for your ground ambulance organization. These facilities may have been used for dispatch/call centers, vehicle storage, administrative and EMT staff, or other activities to support your organization's ground ambulance services.

**[If Section 2.2, Question 14 is Yes (1), show the following warning: "Do not include air ambulance services in responding to the following questions."]**

### 2.8.1 Facility Information

1. How many total facilities (separate buildings) did your NPI utilize related to your ground ambulance operations? Please think about any facilities you had for dispatch/call centers, garages, and administrative and EMT staff. Do **not** include facilities that were used by contracted entities that your organization does not occupy itself (e.g., call center to which you pay a monthly fee for call services). (Enter number)
2. Please provide a name or function for the facilities that were used to support your organization's ground ambulance services (e.g., dispatch/call center, garage, administrative building, EMT staff building). If you had one building for

dispatch/call centers, garages, and administrative and EMT staff, list only that one building.

- Facility 1: (enter name)
- Facility 2: (enter name)
- Facility 3, etc.: (enter name)

**[The following matrix will be prepopulated from responses to Section 2.8.1, Question 2.]**

3. For each of the following types of facilities, please check the option that best applies:

	Your organization or another entity currently pays rent for the facility	Your organization or another entity owns the facility and pays a mortgage	Your organization or another entity owns the facility outright	Facility was donated – no costs (excluding maintenance, utilities, insurance, and taxes)	Facility square footage	[Include only for NPIs where Shared Services = Yes.] Percentage of your facility square footage directly attributable to ground ambulance services
Facility 1 name	√	√	√	√		Enter percentage
Facility 2 name	√	√	√	√		Enter percentage
Facility 3 name	√	√	√	√		Enter percentage
...	√	√	√	√		Enter percentage

## 2.8.2 Lease/Mortgage Costs for Facilities

1. Please indicate the total amount your organization paid for the following in calendar year 201X **[or fill fiscal year for all as specified in Section 2.2, Question 5a]**. Total includes costs paid by another organization or entity on

your behalf and includes costs for facilities that were partially related to your ground ambulance operations. Exclude donations or exceptions for which there was no cost.

**[Present options below based on responses to Section 2.8.1, Question 3.]**

	<b>[IF RENT]:</b> Lease or rental costs for each facility	<b>[IF OWNED, mortgage]:</b> Mortgage and interest costs (do not report interest costs elsewhere) for each facility	<b>[IF OWNED, no mortgage]:</b> Annual depreciation for each facility	<b>[IF DONATED]</b> Do not report any costs for donated facilities.
Facility 1 name				
Facility 2 name				
Facility 3 name				
...				

2. **[Ask Only if Section 2.2, Question 2 (multiple NPIs) is Yes (1)]** Please report the allocated portion of other facilities costs incurred at the level of your parent organization (e.g., corporate or regional buildings, garages or service facilities serving multiple NPIs) to this NPI based on your organization's approach for allocating rent/mortgage costs to specific NPIs. (Enter dollar amount)

### 2.8.3 Insurance, Maintenance, Utilities, and Taxes

1. Please indicate the total amount your organization paid for the following in calendar year 201X **[or fill fiscal year for all as specified in Section 2.2, Question 5a]**. Total includes costs paid by another organization or entity on your behalf and includes costs for facilities that were partially related to your ground ambulance operations. Exclude donations or exceptions for which there was no cost.

<b>Expenditure</b>	<b>Amount</b>
Total <b>facilities-related</b> insurance costs for calendar year 201X <b>[or fill fiscal year for all as specified in Section 2.2, Question 5a]</b> . Enter dollar amount.	



Expenditure	Amount
Total facilities maintenance and improvement costs for calendar year 201X <b>[or fill fiscal year for all as specified in Section 2.2, Question 5a]</b> . Do <b>not</b> include any labor costs if included in labor section of the instrument. Enter dollar amount.	
Total facilities utilities costs for calendar year 201X <b>[or fill fiscal year for all as specified in Section 2.2, Question 5a]</b> . Enter dollar amount.	
Total facilities taxes for calendar year 201X <b>[or fill fiscal year for all as specified in Section 2.2, Question 5a]</b> . Do <b>not</b> include any taxes if included in the mortgage section of the instrument. Enter dollar amount.	

2. **[Ask Only if Section 2.2, Question 2 (multiple NPIs) is Yes (1).]** Please report the allocated portion of other facilities costs incurred at the level of your parent organization (e.g., corporate or regional buildings, garages or service facilities serving multiple NPIs) to this NPI based on your organization's approach for allocating rent/mortgage costs to specific NPIs. (Enter dollar amount)

## 2.9 Vehicle Costs

The following questions are about vehicles your organization uses.

### 2.9.1 Ground Ambulance Vehicle Costs

For each of the following questions, consider only vehicles that constitute **ground ambulances** in your jurisdiction. We define ground ambulances as including both land and water ambulances. Include all ground ambulances regardless of whether the ambulance transported patients or whether you billed for transports made by this ambulance. Do **not** include fire trucks, rescue vehicles, or other vehicles not considered a ground ambulance in your jurisdiction – we will ask about those next.

1. How many ground ambulances does your organization own (including vehicles that have been purchased, gifted, or donated)? \_\_\_\_\_
2. How many ground ambulances does your organization lease?
3. **[If Section 2.2, Question 12 is Yes (1)]** What was the total number of miles (billed and unbilled) traveled by land ambulances for any reason for calendar year 201X **[or fill fiscal year for all as specified in Section 2.2, Question 5a]**? (Enter number of miles)

4. **[If Section 2.2, Question 13 is Yes (1)]** What was the total number of nautical miles traveled by water ambulances for any reason for calendar year 201X **[or fill fiscal year for all as specified in Section 2.2, Question 5a]**? (Enter number of nautical miles)

### Option 1: If OWNED

	Individual Ground Ambulance Vehicles				
	<b>[Note. Prepopulated based on answer Section 2.9.1, Question 1]</b>				
	1	2	3	4	...
Was this ambulance used to transport patients in calendar year 201X <b>[or fill fiscal year for all as specified in Section 2.2, Question 5a]</b> ? Yes (1), No (0)					
Was this vehicle donated? Yes, (1) No (0)					
<b>[If No(0) to question above]</b> What was the annual depreciated value of the vehicle? If you do not have this value available, please refer to the depreciation worksheet.					
Was this ambulance remounted in calendar year 201X <b>[or fill fiscal year for all as specified in Section 2.2, Question 5a]</b> ? Yes (1), No (0)					
<b>[If Yes(1) to question above]</b> What was the cost to your organization for the remount?					

### Option 2: If LEASED

	Individual Ground Ambulance Vehicles				
	<b>[Note. Prepopulated based on answer to Section 2.9.1, Question 2]</b>				
	1	2	3	4	...
Was this ambulance used to transport patients in calendar year 201X <b>[or fill fiscal year for all as specified in Section 2.2, Question 5a]</b> ? Yes (1), No (0)					

	<b>Individual Ground Ambulance Vehicles</b>				
	<b>[Note. Prepopulated based on answer to Section 2.9.1, Question 2]</b>				
	1	2	3	4	...
Total lease cost to your organization for this ambulance for calendar year 201X <b>[or fill fiscal year for all as specified in Section 2.2, Question 5a]</b> ?					

## 2.9.2 Other Vehicle Costs (Non-Ambulance)

In this section, we ask about vehicles that were used to respond to ground ambulance calls or support ground ambulance operations that are **not** ambulances. Do **not** include vehicles that meet the requirements for an ambulance in your jurisdiction.

**[If Section 2.2 Question 14 is Yes (1), show the following warning:]** “Do **not** include air ambulance services in responding to the following questions.”]

1. Did you own or lease any **non-ambulance vehicles** (including vehicles that have been purchased, gifted, or donated) that were used to respond to ground ambulance calls or support ground ambulance operations? Yes (1), No (0)
  - a. **Yes (1), proceed with questions in this section.**
  - b. **No (0), skip to Section 2.9.3.**
2. How many non-ambulance vehicles did your organization own or lease (including vehicles that have been purchased, gifted, or donated) that were used to respond to ground ambulance calls or support ground ambulance operations? These might include fire trucks, land or water rescue vehicles, vehicles that respond to emergencies but are not designed to transport patients (e.g., QRVs, “fly-cars,” lead cars, or “sprint” vehicles), supervisory vehicles, or other types of vehicles.
  - a. Number of non-ambulance vehicles OWNED (include donated vehicles): \_\_\_\_\_
  - b. Number of non-ambulance vehicles LEASED: \_\_\_\_\_
3. What was the total number of miles traveled by non-ambulance land vehicles for any reason in calendar year 201X **[or fill fiscal year for all as specified in Section 2.2, Question 5a]**? (Enter number of miles)
4. **[Ask if Section 2.2 Question 13 is Yes (1).]** What was the total number of nautical miles traveled by non-ambulance water vehicles for any reason in calendar year 201X **[or fill fiscal year for all as specified in Section 2.2, Question 5a]**? (Enter number of nautical miles)

**Option 1: If OWNED**

	Individual Non-Ambulance Vehicles				
	[Note. Prepopulated based on answer Section 2.9.2, Question 2a]				
	1	2	3	4	...
What type of vehicle is this? (Pull-down menu: Fire truck; Land rescue vehicle, Water rescue vehicle, Vehicle that responds to emergencies but is not designed to transport patients (e.g., QRVs, "fly-cars," lead cars, or "sprint" vehicles), Other vehicle)					
Was this vehicle used to respond to ambulance calls or support ground ambulance operations in calendar year 201X [or fill fiscal year as specified in Section 2.2, Question 5a]? Yes (1), No (0)					
Was this vehicle donated? Yes (1), No (0)					
[If No (0) to the question above:] What was the annual depreciated value of the vehicle? If you do not have this value available, please refer to the depreciation worksheet.					

**Option 2: If LEASED**

	Individual Non-Ambulance Vehicles				
	[Note. Prepopulated based on answer to Section 2.9.2 Question 2b]				
	1	2	3	4	...
What type of vehicle is this? (Pull-down menu: Fire truck; Land rescue vehicle, Water rescue vehicle, Vehicle that responds to emergencies but is not designed to transport patients (e.g., quick QVRs, "fly-cars," lead cars, or "sprint" vehicles), Other vehicle)					

	<b>Individual Non-Ambulance Vehicles</b>				
	<b>[Note. Prepopulated based on answer to Section 2.9.2 Question 2b]</b>				
	1	2	3	4	...
Total lease cost to your organization for this vehicle for calendar year 201X <b>[or fill fiscal year as specified in Section 2.2, Question 5a]</b> :					

5. **[Ask only if Section 2.2, Question 2 (multiple NPIs) is Yes (1).]** Please report the allocated portion of other vehicle costs incurred at the level of the parent organization of this NPI based on your organization’s approach for allocating costs to specific NPIs. (Enter dollar amount)

### 2.9.3 Other Costs Associated with Vehicles

**[If Section 2.2 Question 14 is Yes (1), show the following warning: “Do **not** include air ambulance services in responding to the following questions.”]**

1. What was the total **registration** cost of all vehicles (ambulance and non-ambulance) used to respond to ambulance calls or support ground ambulance operations for calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? (Enter dollar amount)
2. What was the total **license** cost of all vehicles (ambulance and non-ambulance) used to respond to ambulance calls or support ground ambulance operations for calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? (Enter dollar amount)
3. What was the total **insurance** cost of all vehicles (ambulance and non-ambulance) used to respond to ambulance calls or support ground ambulance operations for calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? **[Additional instruction if Shared Services = Yes: If another entity pays the insurance cost for vehicles used in ground ambulance response, please record the cost for the vehicles used by your organization.]** (Enter dollar amount)
4. What was the total **maintenance** cost of all vehicles (ambulance and non-ambulance) used to respond to ambulance calls or support ground ambulance operations ground ambulances for calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? Do **not** include any in-house labor costs already included in the labor section or any outside service or contract (you will be asked to report these later). (Enter dollar amount)

a. Please report the share of maintenance costs attributable to:

Ground Ambulances	_____ %
Fire Trucks	_____ %
Land Rescue Vehicles	_____ %
Water Rescue Vehicles	_____ %
Other Vehicles that respond to emergencies (but not designed to transport patients)	_____ %
Other Vehicles	_____ %

5. What was the total **fuel** cost for all vehicles used to respond to ambulance calls or support ground ambulance operations ground ambulances for calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]? [Additional instruction if Shared Services = Yes: “If another entity pays the fuel cost for vehicles used in ground ambulance response, please record the cost for the vehicles used by your organization.”]** (Enter dollar amount)

a. Please report the share of fuel costs attributable to:

Ground Ambulances	_____ %
Fire Trucks	_____ %
Land Rescue Vehicles	_____ %
Water Rescue Vehicles	_____ %
Other Vehicles responding to emergencies (but not designed to transport patients)	_____ %
Other Vehicles	_____ %

6. **[Ask Only if Section 2.2, Question 2 (multiple NPIs) is Yes (1).]** Please report the allocated portion of other vehicle costs incurred at the level of the parent organization of this NPI based on your organization’s approach for allocating to specific NPIs. (Enter dollar amount)

## 2.10 Equipment, Consumables, and Supplies

In this section, we are interested in equipment, consumables, and supply costs.

- Please use your organization’s guidelines to categorize goods as capital expenses versus operation expenses. If you need assistance to make this determination, please refer to the supplemental depreciation worksheet.
- For capital expenditures, medical and non-medical equipment, amortize costs over the life of the good.
- For purchased capital expenditures (medical and non-medical equipment), provide the annual depreciated value of the item or refer to the supplemental depreciation worksheet for assistance in calculating this cost.
- For leased capital goods and medical and non-medical equipment, the annual cost is simply the annual lease expenditures for the piece of equipment.
- For all of the cost categories in this section: If you have an ongoing relationship with an organization that pays this cost for your organization, report the cost here. Otherwise, do not include costs for donated items.

**[If Section 2.2 Question 14 is Yes (1), show the following warning: “Do not include air ambulance services in responding to the following questions.”]**

### 2.10.1 Medical Equipment/Supplies

1. Please report the following for all **capital medical equipment** your organization purchased and used for ground ambulance services during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Capital medical equipment refers to equipment that can endure repeated use; it includes, but is not limited to, defibrillators, ventilators, monitors, nebulizers, and power lifts.
  - a. Annual depreciated costs  
(Please see supplemental depreciation worksheet if needed.) \$ \_\_\_\_\_
  - b. Maintenance, certification, or service costs \$ \_\_\_\_\_
  - c. **[If Section 2.2, Question 10 is Yes (1):]** What was the percentage of **capital medical equipment** attributable to ground ambulance services during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? (Enter percentage)
2. Did your organization have any costs associated with **medications** purchased for ground ambulance services during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? Yes (1), No (0)
  - a. **[If Yes(1):]** Can you report these costs separately from other medical supplies and consumables? Yes (1), No (0)
    - i. **[If Yes(1):]** What was the total cost of medications your organization purchased during calendar year 201X **[or fill fiscal year as specified in**

- Section 2.2, Question 5a]** for ground ambulance services? Do not include in-kind donations. (Enter dollar amount)
- ii. **[If No(0):] Skip to Question 2b.]**
- b. **[If No(0):]** Please select all reasons for no associated costs for medications during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]:**
- i. The medications are supplied by a hospital or hospitals. Yes (1), No (0)
  - ii. The costs are paid for by another entity (e.g., local municipality). Yes (1), No (0)
  - iii. The medications were donated or provided in-kind. Yes (1), No (0)
  - iv. We do not stock medications on our ground ambulances. Yes (1), No (0)
3. What was the total cost of all other **medical equipment, supplies, and consumables** (e.g., bandages, gauze, gloves, basins, oxygen, sterile water, stethoscopes, blood pressure cuffs, IV supplies) your organization purchased during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? Include all medical equipment, supplies, and consumables that were **not** reported in the medical equipment/supplies capital expenditures and medications sections above. (Enter dollar amount)
- a. **[If Shared Services = Yes:]** What was the percentage of medical supplies and consumables attributable to ground ambulance services during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? (Enter percentage)

## 2.10.2 Non-Medical Equipment/Supplies

1. Please report the following for **capital non-medical equipment** your organization purchased and used for ground ambulance services during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Capital non-medical equipment refers to equipment that can endure repeated use; it includes, but is not limited to, computers, dispatch equipment, and furniture.
  - a. Annual depreciated costs \$\_\_\_\_\_  
(Please see supplemental depreciation worksheet if needed.)
  - b. Maintenance, certification, or service costs \$\_\_\_\_\_
  - c. **[If Section 2.2, Question 10 is Yes (1):]** What was the percentage of **non-medical equipment** that was attributable to ground ambulance services during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? (Enter percentage)
2. What was the total annual cost of **uniforms** by your organization purchased during calendar year 201X **[or fill fiscal year for all as specified in Section 2.2, Question 5a]** for ground ambulance services? (Enter dollar amount)



- a. **[If Shared Services = Yes:]** What was the percentage of **uniforms** that was attributable to ground ambulance services during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? (Enter percentage)
  
3. What was the total cost of other non-medical supplies (e.g., paper, office supplies, postage) your organization purchased during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? If any of this equipment was shared with other business lines (e.g., fire), list only the costs associated with ground ambulance services. (Enter dollar amount)
  - a. **[If Shared Services = Yes:]** What was the **percentage of non-medical supplies** that was attributable to ground ambulance services during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**? (Enter percentage)
  
4. **[Ask only if Section 2.2, Question 2 (multiple NPIs) is Yes (1):]** Please report the allocated portion of **non-medical equipment and supplies** incurred at the level of the parent organization of this NPI based on your organization's approach for allocating costs to specific NPIs. (Enter dollar amount)

## 2.11 Other Costs

In this section, we ask about **additional costs** during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]** not covered in previous sections, directly related to supporting your organization's ambulance services. Include only costs that were **not** covered earlier in this instrument.

**[If Section 2.2 Question 14 is Yes (1), show following warning: "Do not include air ambulance services in responding to the following questions."]**

1. Please report costs your organization incurred for **outside contracted services** for which you paid a fee (including labor, supplies, etc.) that were not reported elsewhere in this instrument, such as medical director services or dispatch/call center service fee, to support your ground ambulance services. Did your organization use any of the following **contracted** services during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**?

Please select all that apply and indicate total cost for each outside contracted service, and, if applicable, percentage of the cost attributable to ground ambulance services. **Do not include any costs already reported elsewhere in this instrument.**

	Contracted service during calendar year 201X [or fill fiscal year as specified in Section 2.2, Question 5a]	[If selected] Total cost for the service	[If Shared Services = Yes] Percentage of this cost attributable to ground ambulance services
Medical director services	<input type="checkbox"/>	Enter dollar amount	Enter percentage
Billing service	<input type="checkbox"/>	Enter dollar amount	Enter percentage
Accounting service	<input type="checkbox"/>	Enter dollar amount	Enter percentage
Vehicle maintenance/repair service	<input type="checkbox"/>	Enter dollar amount	Enter percentage
Dispatch/call center service	<input type="checkbox"/>	Enter dollar amount	Enter percentage
Facilities maintenance services	<input type="checkbox"/>	Enter dollar amount	Enter percentage
IT support service	<input type="checkbox"/>	Enter dollar amount	Enter percentage

2. **[Ask only if Section 2.2, Question 2 (multiple NPIs) is Yes (1):]** Please report the allocated portion of these services incurred at the level of the parent organization of this NPI based on your organization's approach for allocating costs to specific NPIs. (Enter dollar amount)
3. Please indicate if your organization incurred any of the following expenses during calendar year 201X [or fill fiscal year as specified in Section 2.2, Question 5a]. These expenses should be partly or entirely related to supporting your organization's ambulance services. **Do not include any costs already reported elsewhere in this instrument.**

**[Note: All respondents will be presented with the following.]**

<b>Medical or Ambulance-Related Expenses</b>	
Biohazard waste and medication removal fees	Yes (1), No (0)
Fee to physician to oversee the paramedics and provide quality assurance (excluding labor for medical director if accounted for in Question 1 above or in the labor section)	Yes (1), No (0)
Laundry	Yes (1), No (0)
<b>Administrative and General Expenses</b>	
Travel other than for training (including lodging, transportation, per diem, and other travel related costs)	Yes (1), No (0)
Organization dues, subscriptions	Yes (1), No (0)

<b>Medical or Ambulance-Related Expenses</b>	
Subsidies paid to other organizations (e.g., fire department, dispatch center)	Yes (1), No (0)
Funds paid to other ambulance organizations for services (e.g., paramedic staff for BLS transports, subcontracted ambulance services)	Yes (1), No (0)
Overhead allocation from parent organization or government office	Yes (1), No (0)
Board of Directors / Trustees expenses	Yes (1), No (0)
Advertising	Yes (1), No (0)
Event / meeting costs (including meals)	Yes (1), No (0)
Miscellaneous administrative fees/costs not already reported in Section 2.10.2 or Section 3 (telephone, trash and shredding services, printing and copying costs)	Yes (1), No (0)
IT software, licensing fees (excluding costs accounted for in IT service fee in earlier section)	Yes (1), No (0)
Training and continuing education costs (e.g., costs for materials, travel, training fees, and labor). Do not include any labor costs associated with training that was already covered by standard labor costs.	Yes (1), No (0)
<b>Fees, Fines, and Taxes</b>	
911 service fees	Yes (1), No (0)
Fees for toll roads	Yes (1), No (0)
Fees paid to local jurisdictions required as condition of providing ground ambulance service	Yes (1), No (0)
Fees for regulatory compliance or accreditation (annual cost per year)	Yes (1), No (0)
Business registration and related fees	Yes (1), No (0)
Licenses	Yes (1), No (0)
Fines, forfeitures, and citations	Yes (1), No (0)
Taxes	Yes (1), No (0)
Liability / malpractice insurance	Yes (1), No (0)
Workers' compensation insurance ( <b>only if not</b> reported in Labor Section above)	Yes (1), No (0)
General insurance (excluding insurance for facilities or insurance reported in other sections)	Yes (1), No (0)
Interest paid	Yes (1), No (0)
Physicals and recruiting	Yes (1), No (0)
Audit fees, legal fees, and other professional fees	Yes (1), No (0)
Other miscellaneous operating expenses	Yes (1), No (0)

**[Populate other expenses by source table based on “Yes (1)” responses to the previous question.]**

4. Please report total expenses by source for calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**.

	Total Expense	What % of Expense is Attributable to Ground Ambulance Services?
Source 1	Enter dollar amount	Enter percentage
Source 2	Enter dollar amount	Enter percentage
Source 3	Enter dollar amount	Enter percentage
Source 4	Enter dollar amount	Enter percentage
...		
...		
...		

5. **[Ask only if Section 2.2, Question 2 (multiple NPIs) is Yes (1):]** Please report the allocated portion of these miscellaneous costs incurred at the level the parent organization of this NPI based on your organization's approach for allocating costs to specific NPIs. (Enter dollar amount)

## 2.12 Total Cost

1. As a way to cross-check total costs reported throughout the instrument, please provide the total costs of your NPI for calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. The total cost reported here should include all operating and capital costs (including services not related to ground ambulance services).

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## 2.13 Revenues

This section asks about your organization's sources of ground ambulance revenue.

**[If Section 2.2 Question 14 is Yes (1), show following warning: "Do not include air ambulance services in responding to the following questions."]**

1. Please report total revenue from all sources your organization received during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Include revenues not related to ground ambulance services. (Enter dollar amount)

2. Can you report revenue for billed ground ambulance transports by healthcare payer category (e.g., Medicare, Medicaid, commercial insurance)? Yes (1), No (0)
- [If Yes (1), proceed to question 3.]**
  - [If No (0):]** Please report the approximate share of revenue from billed transports for all payers combined. (Enter dollar amount)
3. **[If Section 2.13, Question 2 is yes (1)]** Please indicate if your organization received any revenue from paid ground ambulance transports from the following payers during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**.

Source of Revenue from Paid Ground Ambulance Transports	Received revenue during calendar year 201X <b>[or fill fiscal year as specified in Section 2.2, Question 5a]</b> ?	<b>[If Yes (1) for received revenue from category]</b> Total revenues	<b>[If Yes (1) for received revenue from category]</b> Indicate if cost sharing (i.e., the amount for a transport that is billed to a patient with this insurance) was included
Medicare Fee for Service	Yes (1), No (0)	Enter dollar amount	Yes (1), No (0)
Medicare Advantage (also known as Medicare Managed Care)	Yes (1), No (0)	Enter dollar amount	Yes (1), No (0)
Medicaid	Yes (1), No (0)	Enter dollar amount	Yes (1), No (0)
Tricare	Yes (1), No (0)	Enter dollar amount	Yes (1), No (0)
Veterans Administration	Yes (1), No (0)	Enter dollar amount	Yes (1), No (0)
Commercial insurance	Yes (1), No (0)	Enter dollar amount	Yes (1), No (0)
Workers' compensation	Yes (1), No (0)	Enter dollar amount	Yes (1)/No (0)
Patient self-pay	Yes (1), No (0)	Enter dollar amount	-

4. How often did your organization try to bill the following types of payers for the amount owed for a transport during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**?

Insurance type	Frequency of billing
Medicare Fee for Service	Never (0), Sometimes (1), Usually (2), Always (3)
Medicare Advantage (also known as Medicare Managed Care)	Never (0), Sometimes (1), Usually (2), Always (3)
Medicaid	Never (0), Sometimes (1), Usually (2), Always (3)
Tricare	Never (0), Sometimes (1), Usually (2), Always (3)
Veterans Administration	Never (0), Sometimes (1), Usually (2), Always (3)
Commercial insurance	Never (0), Sometimes (1), Usually (2), Always (3)
Workers' compensation	Never (0), Sometimes (1), Usually (2), Always (3)
Patient self-pay	Never (0), Sometimes (1), Usually (2), Always (3)

5. Please indicate if your organization received any revenues from any of the following sources during calendar year 201X **[or fill fiscal year as specified in Section 2.2, Question 5a]**. Include only revenue specifically related to ground ambulance services.

Source of Revenue	Received revenue from category during calendar year 201X <b>[or fill fiscal year as specified in Section 2.2, Question 5a]</b> ?	<b>[If Yes (1) for received revenue from category] Total revenues</b>	<b>[If Yes (1) for received revenue from category] What % of revenue was attributable to ground ambulance services?</b>
Contracts from facilities (e.g., hospitals, nursing homes, prisons, businesses)	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Revenues for subcontracted ambulance services	Yes (1) / No (0)	Enter dollar amount	Enter percentage
<b>[If Section 2.5, Question 7 is Yes (1):]</b> Fees for standby events	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Membership fees associated with an ambulance club	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Charitable donations (e.g., foundations and individual donors) <b>excluding vehicles or any cost offsets reported elsewhere in the instrument</b>	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Executive loan programs (e.g., chief executive officer, business development, etc.)	Yes (1) / No (0)	Enter dollar amount	Enter percentage

Source of Revenue	Received revenue from category during calendar year 201X [or fill fiscal year as specified in Section 2.2, Question 5a]?	[If Yes (1) for received revenue from category] Total revenues	[If Yes (1) for received revenue from category] What % of revenue was attributable to ground ambulance services?
Program-related investments (e.g., public-private investment)	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Local taxes earmarked for EMS services	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Enterprise funds and utility rates	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Sale of assets and services	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Bond or debt financing	Yes (1) / No (0)	Enter dollar amount	Enter percentage
State or local donation of surplus vehicles and durable equipment	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Other donations (includes market value for donations) <b>excluding labor, facilities, vehicles, equipment, supplies, medication, and other items reported elsewhere in the instrument</b>	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Special-purpose grants (generally state)	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Matching grants (generally state)	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Technical assistance (e.g., subsidized training)	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Demonstration grants (federal)	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Congressional earmarks	Yes (1) / No (0)	Enter dollar amount	Enter percentage
Other (specify)	Yes (1) / No (0)	Enter dollar amount	Enter percentage

6. **[Ask only if Section 2.2, Question 2 (multiple NPIs) is Yes (1):]** Please report the allocated portion of revenue at the level of the parent organization (e.g., corporate investments, donations, etc.) of this NPI based on your organization's approach for allocating costs to specific NPIs. (Enter dollar amount)

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*[Note: Respondents will be allowed to 1) Review a copy of final responses before a final "Click to Submit," and 2) print out a completed copy of their responses at the end.]*



## Appendix F Citations

- [1] Center for Medicare & Medicaid Services. *Ambulance Fee Schedule - Centers for Medicare & Medicaid Services*. 2019. Available: <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AmbulanceFeeSchedule/index.html>
- [2] Medicare Payment Advisory Commission. *Report to Congress: Medicare and the Health Care Delivery System*. 2013. Available: [http://www.medpac.gov/docs/default-source/reports/jun13\\_entirereport.pdf](http://www.medpac.gov/docs/default-source/reports/jun13_entirereport.pdf).
- [3] Office of Inspector General, U.S. Department of Health and Human Services. "Utilization of Medicare Ambulance Transports, 2002-2011." Washington, DC: U.S. Department of Health and Human Services, 2013. Available: <https://oig.hhs.gov/oei/reports/oei-09-12-00350.asp>.
- [4] U.S. Government General Accountability Office. *GAO-13-6, AMBULANCE PROVIDERS: Costs and Medicare Margins Varied Widely; Transports of Beneficiaries Have Increased*. 2012, Available: <https://www.gao.gov/assets/650/649018.pdf>
- [5] U.S. Department of Health and Human Services. "Report to Congress Evaluations of Hospitals' Ambulance Data on Medicare Cost Reports and Feasibility of Obtaining Cost Data from All Ambulance Providers and Suppliers." 2015. Available: <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AmbulanceFeeSchedule/Downloads/Report-To-Congress-September-2015.pdf>.
- [6] Institute of Medicine. *Emergency Medical Services At the Crossroads*. Washington, DC: The National Academies Press, 2007, p. 310.
- [7] Center for Medicare & Medicaid Services, Medical Learning Network. *ICN 006400, Critical Access Hospitals*. 2017. Available: <https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/CritAccessHospfetsht.pdf>
- [8] G. Mears et al. *2011 National EMS Assessment*. 2012, Available: <https://www.ems.gov/pdf/811723-National-EMS-Assessment-2011.pdf>.
- [9] R. K. Taymor et al. "Policy, Practice, and Research Agenda for Emergency Medical Services Oversight: A Systematic Review and Environmental Scan." *Prehospital and Disaster Medicine*, vol. 33, no. 1, 2018, pp. 89-97.
- [10] Institute of Medicine. *Strategies to Improve Cardiac Care Survival: A Time to Act*. Washington, DC: The National Academies Press, 2015.
- [11] H. K. Mell et al. "Emergency Medical Services Response Times in Rural, Suburban, and Urban AreasEmergency Medical Services Response Times in Rural, Suburban, and Urban AreasLetters," *JAMA Surgery*, vol. 152, no. 10, 2017, pp. 983-984.
- [12] Federal Emergency Management Agency. *Handbook for EMS Medical Directors*. 2012. Available: [https://www.usfa.fema.gov/downloads/pdf/publications/handbook\\_for\\_ems\\_medical\\_directors.pdf](https://www.usfa.fema.gov/downloads/pdf/publications/handbook_for_ems_medical_directors.pdf)
- [13] K. G. Morganti et al. "Should payment policy be changed to allow a wider range of EMS transport options?" *Annals of emergency Medicine*, vol. 63, no. 5, 2014, pp. 615-626.
- [14] "Medicare Payments for Ambulance Services—Comparison to Non-Medicare Payers." Available: <https://oig.hhs.gov/oei/reports/oei-09-95-00411.pdf>

- [15] U.S. Fire Administration. *Funding Alternatives for Emergency Medical and Fire Services*. FA-331. 2012. Available: [https://www.usfa.fema.gov/downloads/pdf/publications/fa\\_331.pdf](https://www.usfa.fema.gov/downloads/pdf/publications/fa_331.pdf).
- [16] Oklahoma State Department of Health. *Emergency Medical Services Statutes and Regulations*. 2016. Available: <https://www.ok.gov/health2/documents/EMS%20Regulations%209-11-2016.pdf>
- [17] City of Philadelphia, Fire Department. "Minimum Staffing for a Basic Life Support (BLS) Ambulance." Available: [https://www.phila.gov/regionalems/PDF/BLS-ALS\\_STAFFING\\_071105.pdf](https://www.phila.gov/regionalems/PDF/BLS-ALS_STAFFING_071105.pdf)
- [18] *San Francisco EMS Agency Policy Manual*. 2017. Available: [https://sfdem.org/sites/default/files/EMS%20AGENCY%20POLICY%20MANUAL\\_eff\\_%20Jan%2030-2017v2\\_0.pdf](https://sfdem.org/sites/default/files/EMS%20AGENCY%20POLICY%20MANUAL_eff_%20Jan%2030-2017v2_0.pdf)
- [19] Center for Medicare & Medicaid Services. *Medicare Coverage of Ambulance Services*. Available: <https://www.medicare.gov/Pubs/pdf/11021-Medicare-Coverage-of-Ambulance-Services.pdf>
- [20] C. Garmon and B. Chartock, "One in five inpatient emergency department cases may lead to surprise bills." *Health Affairs*. vol. 36, no. 1, 2016, pp. 177-181.
- [21] National Highway Traffic Safety Administration. *National EMS Scope of Practice Model*. Available: <https://www.ems.gov/education/EMSScope.pdf>
- [22] (2017). *ICN 903194, MEDICARE AMBULANCE TRANSPORTS*. Available: <https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/Medicare-Ambulance-Transports-Booklet-ICN903194TextOnly.pdf>
- [23] K. Jacobs et al. *Emergency Medical Services in California: Wages, Working Conditions, and Industry Profile*. February 2017. UCLA labor Center, pp. 10-6. Available: <http://laborcenter.berkeley.edu/pdf/2017/emergency-medical-services-in-california.pdf>
- [24] J. D. Washko and M. G. Ragone. "2015 JEMS Salary Survey." Available: <https://www.jems.com/articles/print/volume-41/issue-1/features/2015-salary-survey.html>
- [25] V. A. Freedman et al. *Rural Volunteer EMS: Reports from the Field*. North Carolina Rural Health Research and Policy Institute, 99. 2010. Available: <https://www.shepscenter.unc.edu/rural/pubs/report/FR99.pdf>.
- [26] Fitch and Associates. *EMS Trend Report: The Forces Shaping the Present and Future of EMS*. National EMS Management Association, 2016. Available: <https://www.fitchassoc.com/2016-ems-trend-report-forces-shaping-present-future-ems/>.
- [27] International Association of Firefighters. (2019). *IAFF - Interational Association of Firefighters*. Available: <https://client.prod.iaff.org/>
- [28] National Volunteer Fire Council. 2019. Available: <https://www.nvfc.org/>
- [29] National Association of Emergency Medical Technicians. 2019. *NAEMT Home*. Available: <http://www.naemt.org/>
- [30] American Ambulance Association. *Vendor Guide*. 2019. Available: <https://ambulance.org/resources/directory/vendor-guide/>
- [31] JEMS Staff. "How Ambulance Billing Services Can Increase Revenue and Maximize Compliance." *The Journal of Emergency Medical Studies*. 2017. Available: <https://www.jems.com/ems-insider/articles/2017/04/how-ambulance-billing-services-can-increase-revenue-and-maximize-compliance.html>

- [32] The Moran Company. "FINAL REPORT Detailing 'Hybrid Data Collection Method' for the Ambulance Industry: Beta Test Results of the Statistical & Financial Data Survey & Recommendations." 2014. Available: <https://s3.amazonaws.com/americanambulance-advocacy/AAA+Final+Report+Detailing+Hybrid+Data+Collection+Method.pdf>.
- [33] American Ambulance Association. "Recommendations to CMS for Ground Ambulance Industry Data Collection." 2018.
- [34] State of California. "Ground Emergency Medical Transportation Services Cost Report General Instruction for Completing Cost Report Forms," SPA 09-024, 2013, Available: [https://www.dhcs.ca.gov/provgovpart/documents/gemt/gemt\\_cstrptinstr.pdf](https://www.dhcs.ca.gov/provgovpart/documents/gemt/gemt_cstrptinstr.pdf).
- [35] E. B. Lerner et al. "A Comprehensive Framework for Determining the Cost of an Emergency Medical Services System." *Annals of Emergency Medicine*, vol. 49, no. 3, 2007. pp. 304-313.
- [36] Health Resources and Services Administration. *Rural Ambulance Service Budget Model*. 2019. Available: <https://www.ruralcenter.org/resource-library/rural-ambulance-service-budget-model>
- [37] D. Torbic. *NCHRP Report 500: A Guide for Enhancing Rural Medical Emergency Services*. Transportation Research Board, 2005. Available: <http://healthandwelfare.idaho.gov/Portals/0/Medical/EMS/Rural%20EMS%20Enhancement%20Guide.pdf>.
- [38] National Fire Protection Association. *NFPA 1917, Standard for Automotive Ambulances*. 2019. Available: <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1917>
- [39] C. Hennig and T. F. Liao "How to find an appropriate clustering for mixed-type variables with application to socio-economic stratification," *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, vol. 62, no. 3, 2013. pp. 309-369.
- [40] L. Kaufman and P. J. Rousseeu. *Finding Groups in Data: An Introduction to Cluster Analysis*. John Wiley & Sons, 1990.

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