Air Medical Services Cost Study Report

March 24, 2017

Prepared for:
The Association of Air Medical Services and Members

Xcenda®
AmerisourceBergen

AmerisourceBergen®

TABLE OF CONTENTS

1.0 | EXECUTIVE SUMMARY

Air medical services are covered by Medicare for emergent cases and are reimbursed based on the ambulance service fee schedule. According to the Medicare Payment Advisory Commission (MedPAC), in 2011, the average Medicare payment per air ambulance claim was $4,908, and air ambulance services represented approximately $420 million of the annual Medicare budget (<0.1% of $560 billion in 2011).[1]

Medicare established the current air medical service payment methodology in 2002 based on an estimated 1998 cost pool; since its full implementation, Medicare has increased the payment rates solely by an inflationary factor and has not revalued the payment system to reflect significant market changes. To date, no source exists to provide comprehensive data regarding the true costs of air medical service operation, which creates challenges in determining if current reimbursement is adequately covering the cost of care.

This study aims to quantify the costs associated with providing emergent air medical transports to assess the appropriateness of the 2002 Medicare rate-setting methodology for air medical services and current payment adequacy. An original data collection tool was designed based on existing facility Medicare cost report forms and dispersed to air medical providers currently billing Medicare for emergent transports. Cost data were aggregated and analyzed at a per-transport and per-base level. Differences between program types, tax status, size, and geographic location were examined.

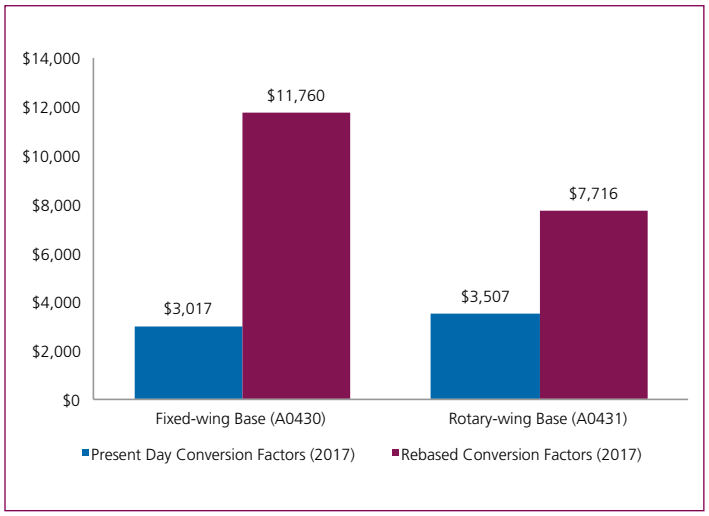
Study respondents represent 51% of all air medical bases nationwide and captured 46% of air medical services billed to Medicare. The median cost per emergent Medicare transport in 2015 (both rotor and fixed-wing) for independent programs, the majority of programs represented, was $10,199 and the per-base cost was $2.9 million. Costs for hospital-based (traditional) programs were investigated, but a small sample size prevented an in-depth comparison of costs.

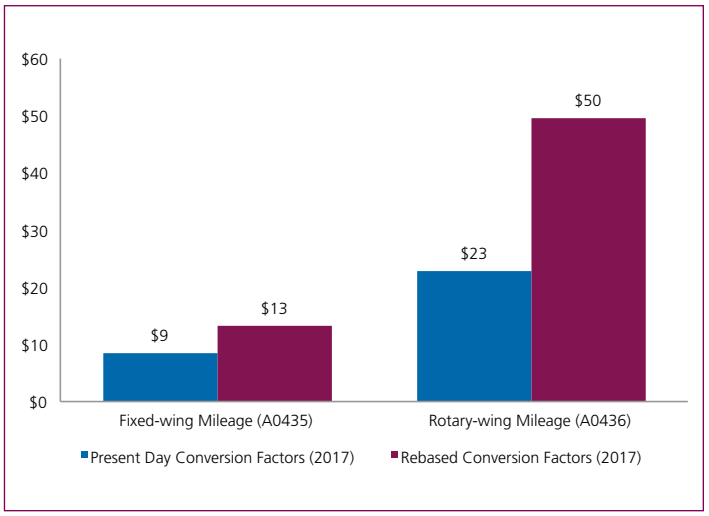
Findings suggest that current reimbursement rates do not adequately cover the costs of air medical emergency transports. As recently as 2015, approximately 59% of reported costs for Medicare transports were covered by the Medicare program and beneficiary payments. Based on reported cost data, a pool of approximately $1.07 billion would be required to rebase air medical service rates in 2017 (Figure 1). This would account for significant growth and increased costs associated with the delivery of these services, such as:

- Air medical services have expanded into previously underserved rural areas. By improving rural access, the number of air medical bases has more than tripled since costs were last assessed nearly 20 years ago, now providing services to those in remote areas who may not have been able to receive the right level of emergency care when needed previously.
- Industry expansion has improved access to air medical care: United States (US) population coverage within a 15- to 20-minute response area has grown from 71.2% in 2003 to 86.4% in 2016.[2,3] This type of emergency air medical service coverage requires higher overhead costs to maintain bases and aircraft and to ensure aircraft availability and adequate staffing needs are met for when emergencies arise compared to other Medicare services.
- Given that most (75%) air medical Medicare transports are designated as rural, revising rates to more accurately reflect costs as a whole would be preferable to the current rural add-on payment policy. This also streamlines billing and payment processes.

[1]Medicare Payment Advisory Commission (MedPAC). June 2013 Report to Congress, Chapter 7: Mandated report: Medicare payment for ambulance services. http://www.medpac.gov/docs/default-source/reports/jun13_ch07_appendix.pdf?sfvrsn=0. Accessed March 2, 2017.
[2]ADAMS Atlas report 2003. http://www.adamsairmed.org/pubs/ITS_SSC.pdf. Accessed March 3, 2017.
[3]ADAMS Atlas report 2016. http://www.adamsairmed.org/pubs/ADAMS_Intro.pdf. Accessed March 3, 2017.

Figure 1. Comparison of Present Day and 2017 Rebased Medicare Conversion Factors





Additionally, as in all healthcare delivery systems, inadequate payment from public payers and the uncompensated care costs of treating uninsured patients have trickle-down economic effects and play an important role in rates for emergency air medical services for private payers and patients. Emergent air medical services are provided to critically-ill or injured patients—regardless of their ability to pay—to the closest appropriate hospital when requested by third-party medical professionals or first responders. Recognizing the importance of these emergent services, and evaluating Medicare payment adequacy to ensure that patients have access to these services when needed, should be a priority for the Medicare program, as the availability and sustainability of air medical services ultimately affects the US population beyond those with Medicare coverage.

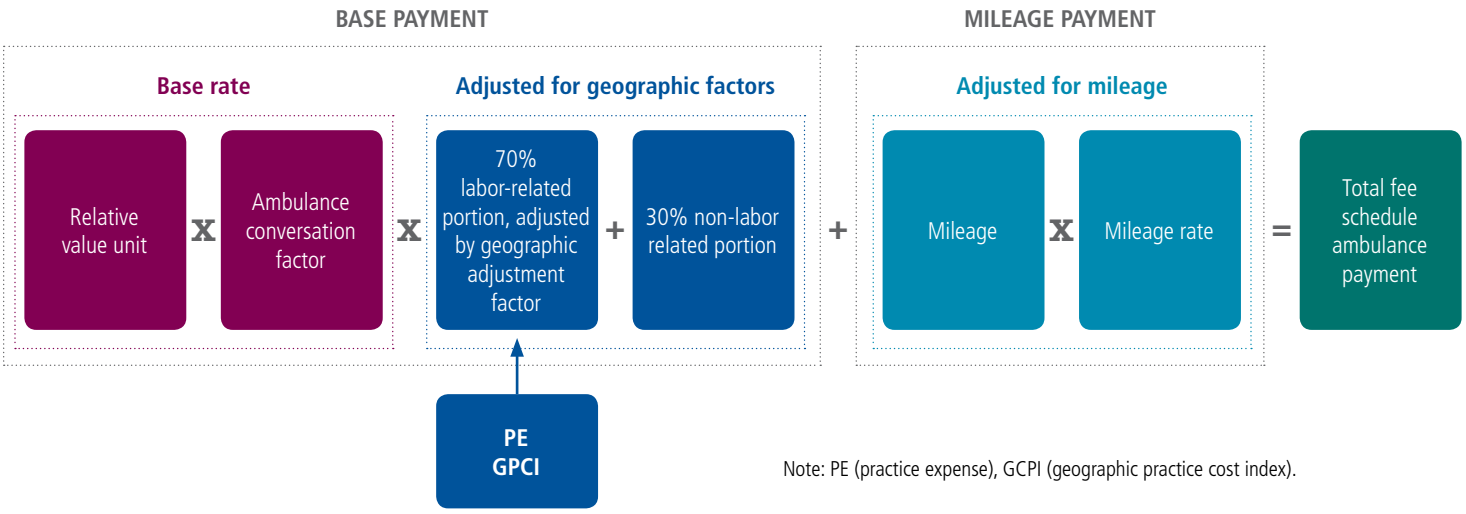
2.0 | INTRODUCTION

Air medical services are covered by Medicare for emergent cases only. These services are paid based on the ambulance service fee schedule. Ambulance services are reimbursed using a standard, base rate component and a patient-loaded mileage component. There are 2 Current Procedural Terminology (CPT®) codes for billing the air medical services base rate component, differentiating between rotary-wing and fixed-wing aircraft. Additionally, there are 2 codes for billing patient-loaded mileage. Air medical services reimbursement is further adjusted for geographic differences, and add-on payments for rural transports are applied. The ground and air ambulance service base rates and mileage rates are updated annually by the ambulance inflation factor. This factor is an amount equal to the percentage increase in the Consumer Price Index for All Urban Consumers (CPI–U) reduced by the 10-year moving average of multi-factor productivity. The update for 2017 was 0.7%.[4]

MedPAC reports that the average Medicare payment per air ambulance claim was $4,908 in 2011. Air medical services represent a small fraction of the Medicare budget. Reimbursed amounts for air ambulance services represent approximately 0.075% of the annual Medicare budget ($560 billion in 2011). For ambulance services, air medical services in 2011 for Medicare patients represented $420 million (8%), while ground ambulance services represented $4.90 billion (92%).[1]

[4]CMS. Medicine Learning Network: Matters ambulance inflation factor for CY 2017 and productivity adjustment. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNMattersArticles/Downloads/MM9811.pdf. Related CR Release Date: October 14, 2016. Accessed March 3, 2017.

Figure 2. Ambulance Fee Schedule Equation[5]



Note: PE (practice expense), GCPI (geographic practice cost index).

Medicare established the current air medical service payment rates in 2002, with a 5-year phased-in approach based on an estimated 1998 cost pool to cover the costs of air medical services. Each year thereafter, Medicare has increased the payment rates solely by an inflationary factor and has not revalued the payment system as a whole. Prior to 2002, reported reasonable charges per transport were used for suppliers (entities independent of providers) and retrospective reasonable costs for providers (ie, hospitals). Like other suppliers, air medical suppliers are not required by law to submit standard cost reports for Medicare reimbursement. When rates were originally established in 2002, minimal information about air medical transport costs in 1998 was utilized to set the conversion factor. Through committee proceedings, Centers for Medicare and Medicaid Services (CMS) estimated the total cost of air medical transports in 1998 was $158 million.[6] This amount has not been re-assessed or validated with reported cost data.

Currently, data to inform stakeholders about the true cost associated with providing air medical services are extremely limited. There are very few published studies on the cost of air medical services, and no publicly available standard cost data of air ambulance providers/suppliers nationwide exist. Without such information, there is little or no evidence to determine if current reimbursement is adequately covering the cost of care. One systematic review found the annual cost of helicopter transportation ranged from $114,777 to $4.5 million per institution; however, it did not report a per-emergent transport cost and was not limited to the US market.[7] In the state of Maryland, the average estimated cost of a helicopter transport was $3,988 in 2006, but this study mainly focused on inter-hospital flights as opposed to all emergent transports.[8]

This study aims to capture costs associated with providing emergent air medical transports in order to assess the original rate-setting methodology and current Medicare payment adequacy. This study also examined the uncompensated care costs of treating uninsured patients and inadequate payment from governmental payers, which can increase the burden onto other payers whose patients require access to these emergency services, such as patients in the commercial insurers and self-pay market. Uncompensated care costs are not included in the per-transport or per-base cost calculations but are addressed separately.

[5]Ambulance Services Payment System, MedPAC Payment Basics. http://www.medpac.gov/docs/default-source/payment-basics/medpac_payment_basics_16_ambulance_final.pdf?sfvrsn=0. October 1, 2016. Accessed February 27, 2017.
[6]CMS. Final Rule: Ambulance schedule for payment of ambulance services and revisions to the physician certification requirements for coverage of nonemergency ambulance services. https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AmbulanceFeeSchedule/Downloads/CMS-1002-FC.pdf. February 27, 2002. Accessed February 27, 2017.
[7]Taylor CB, Stevenson M, Jan S, Middleton PM, Fitzharris M, Myburgh JA. A systematic review of the costs and benefits of helicopter emergency medical services. Injury. 2010;41(1):10-20. Accessed February 27, 2017.
[8]Salamon SJ, Cowdry RW. Air Ambulance Study: Required Under Senate Bill 770. Annapolis: Maryland Health Care Commission; 2006. http://dlslibrary.state.md.us/publications/EXEC/DHMH/MHCC/AirAmbulance_2006.pdf. Accessed February 27, 2017.

3.0 | DATA AND METHODS

3.1 | Development of Data Collection Tool

An original Excel-based data collection tool was designed to capture standard costs associated with providing air medical transports for emergent cases. In order to access the tool, participants were first required to acknowledge that they had read and understood a confidentiality statement about Xcenda maintaining the privacy of all individual data and that only deidentified and aggregated data would be reported. The tool contained form-based worksheets for various air medical cost components, transport volume, and mileage (including urban vs rural), reimbursement received from all payers and other income, and uncompensated care charges, in part modeled after facility Medicare cost reports. Each worksheet was tailored and standardized so that all costs could be reported in a consistent manner across all air medical provider types. Participants were asked to provide costs from the most recent complete fiscal year related to emergent transports for the cost components listed in Table 1.

Table 1. Air Medical Services Cost Collection Tool: Cost Components and Descriptions

Cost Component	Description
Vendor costs	Fees that traditional or hybrid programs paid to their vendors for air medical services such as aircraft ownership, maintenance, insurance, fuel, and third-party clinical services
Aircraft ownership	Number of owned and/or leased aircraft for regular and backup operations, and associated aircraft registration, interest, depreciation, property tax, and other ownership expenses; insurance included here or under the insurance component if reported separately
Aircraft maintenance	In-house and outsourced maintenance costs for aircraft parts and labor separated by capitalized and non-capitalized costs, where applicable
Safety enhancements	Capitalized and non-capitalized costs for additional parts or modifications made to aircraft that were not present on aircraft at the time of purchase or lease start date, such as autopilot functionality, night vision googles, and other enhancements, some of which are mandated by the Federal Aviation Administration (FAA); regular maintenance of safety enhancements were to be reported under aircraft maintenance
Fuel	Fuel costs for aircraft and other auxiliary vehicles
Insurance	Premium costs for providing air medical services, such as aircraft hull and liability, war risk, malpractice, and other related insurance expenses
Payroll	Base/regional/corporate payroll costs for salaries and wages, incentive compensation, benefits, and payroll taxes separated by staff level (eg, pilots, clinical, administrative, other personnel)
Training	Pilot aviation, clinical, mechanic, new hire, and other applicable training costs
Supplies and equipment	Medical and non-medical supplies and equipment, as defined by each study participant, including depreciation or lease expense; costs of purchasing, renting, and maintaining flight simulators reported here
Facility	Rent or loan expenses for base/regional/corporate facilities that include hangers, landing pads, crew quarters, control and radio towers, dispatch centers, and associated utilities costs
Marketing	Costs for corporate campaigns, local events, conferences, trade shows, and other marketing-related expenditures
Travel	Personnel travel and lodging costs for training, base site visits, and other business operations
Overhead	All overhead costs, as defined by each study participant, which may be highly variable among air medical providers; common accounts such as accounting and finance, clinical management, human resources, IT, patient billing, compliance and selling, general, dispatch, communication centers, and administrative expenses were listed; participants were asked to add any other overhead categories that contributed to total overhead costs
Uncompensated care	For bad debt, charge amount for services for which study participants expected but did not receive payment; also, charge amount for charity care services for which payment was not expected; contractual discount from charge amounts should be excluded

3.2 | Study Participant Recruitment and Participation

Through various forms of communication (industry conferences, newsletters, and other means), general recruitment of air medical providers was carried out to include both members of the Association for Air Medical Services (AAMS) and non-AAMS members. Targeted recruitment was conducted based on CMS provider data from 2014, which contained the most current billing data available at the time of this study, and was used to help create a list of potential study participants. Specifically, providers who billed emergent Medicare air medical services in 2014 were targeted for inclusion.

While protecting confidentiality, both AAMS members and non-members were identified by their National Provider Identification (NPI) number and matched to their contact information based on their name and address available in the AAMS member database, as well as via other communication streams. The study sample was meant to be inclusive of all air medical program types, as shown in Table 2.

Table 2. Air Medical Program Types

Program Type	Description
Independent	Employ all staff; fully at risk for billing and collections
Hybrid	Same as independent except that clinicians are contracted from a hospital or first responder agency (services are individualized per contract term)
Hospital-based	Hospital owns program and provides clinical staff; at risk for billing; contracting Part 135 certificate for provider of air medical service. Aviation asset might be purchased by this program but put on an operator's FAA Part 135 certificate
Municipal service	Government-funded program; state or county entity; may or may not bill for services; may not bill at all if supported by tax payments
Other	Other program models

3.3 | Rebased Conversion Factor Methodology

Reported costs were used to construct rebased conversion factors using the existing air medical service coding structure. Fixed costs were accounted for under a per-transport (base) rate, while variable costs were attributed to a separate mileage rate, as intended by CMS when the conversion factors were last set in 2002. Costs were separated by rotary-wing services and fixed-wing services. When only total cost was provided for a component, costs by aircraft type were allocated based on an appropriate cost driver. Tables 3 and Table 4 show how each cost component was classified and the allocation method used, as necessary.

Table 3. Fixed Cost Components and Allocation Methodology

Transport (Base) Payment: Fixed-wing (A0430) vs Rotary-wing (A0431)	
Cost Component	**Allocation Method (if applicable)**
Vendor costs	Proportion of flight hours
Aircraft ownership	Ratio of aircraft type
Safety enhancements	Ratio of aircraft type
Insurance	Proportion of transport volume
Payroll	Proportion of transport volume
Training	Proportion of transport volume
Supplies and equipment	Proportion of transport volume
Facility	Proportion of transport volume
Marketing	Proportion of transport volume
Travel	Proportion of transport volume
Overhead	Proportion of transport volume

Table 4. Variable Cost Components and Allocation Methodology[a]

Mileage Payment: Fixed-wing (A0435) vs Rotary-wing (A0436)	
Cost Component	**Allocation Method (if applicable)**
Aircraft maintenance	Proportion of transport volume
Depreciation	Ratio of aircraft type
Fuel	Proportion of transport volume

[a] CMS intends the payment for the mileage component of the ambulance fee schedule to reflect "the costs attributable to the use of the ambulance vehicle (for example, maintenance, fuel, and depreciation)," according to the MedPAC report.

Key: MedPAC – Medicare Payment Advisory Commission.

Medicare costs were allocated based on the proportion of Medicare transport volume relative to all other payers reported by each provider. Medicare fee-for-service (FFS) volume was estimated by taking 70% of total Medicare volume, as FFS represents approximately 70% of the Medicare market.[9] Air medical service volume based on CMS claims data from 2014 was inflated to 2017 values using the growth of Part B enrollment as the denominator for assessing the share of Medicare FFS volume captured in the collected cost data.[10]

Variation in costs per transport and costs per base were calculated. NPI public information was used to categorize size and geographic location of the study sample. Fiscal year 2015 reported costs were inflated to 2017 values for the final estimates. The 2016 and 2017 Consumer Price Index for all Urban Consumers (CPI-U) for hospital and related services, reduced by the 10-year moving average multi-factor productivity amounts, was used for inflating costs instead of the general CPI-U currently used for inflating ambulance fee schedule conversion factors.

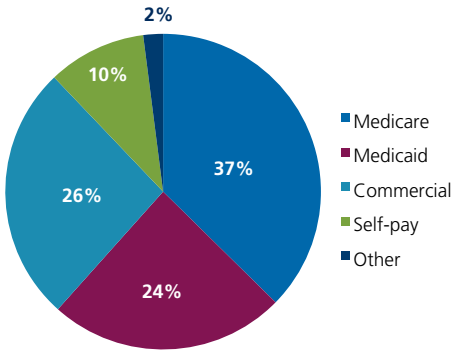
4.0 | MODEL RESULTS

4.1 | Study Sample

Participating providers submitted fiscal year 2015 cost data for a total of 545 (53%) distinct bases, which captured approximately 42,000 (46%) Medicare FFS air medical transports.[3] Fiscal year 2015 crossed into calendar year 2016 for some providers.[11] All providers billed Medicare using NPIs, which totaled 191 and represents 61% of NPIs billing Medicare in 2014, the latest year that total Medicare FFS volume for air medical services is available. Providers submitting cost data ranged in size from 600 to 60,000+ total emergent transports (all payer types) and operated 1 to 200+ bases.

Medicare transports represent 37% of all transports reported by the study sample. Approximately 75% of Medicare transports were designated as rural. Medicare FFS transport volume was estimated as 70% (26%) of reported Medicare volume, and Medicare Advantage transport volume was estimated as 30% (11%). Other payers represented in the sample data were commercial (26%), Medicaid (24%), self-pay (10%), and other (2%), which includes veteran benefits.

Figure 3. Study Sample Payer Mix of Emergent Transports



[9] Kaiser Family Foundation. Medicare Advantage fact sheet. May 11, 2016. http://kff.org/medicare/fact-sheet/medicare-advantage/. Accessed March 2, 2017.
[10] CMS. Physician and Other Supplier Data CY 2014. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/Physician-and-Other-Supplier2014.html. Accessed January 6, 2017.
[11] A small portion of providers submitted fiscal year 2016 financial information; dollars were not adjusted.

The NPIs captured in the study group are mostly representative of the national geographic distribution of NPIs, with greater representation of Southeast providers and lower representation of Midwest and Western providers (Table 5 and Table 6). Independent and hybrid programs comprised 80% of cost data submissions. Approximately 50% of providers submitting cost data were small, nonprofit entities, generally submitting claims to Medicare using a single NPI, and over 80% of NPIs provided between 51 and 200 transports per year.

Table 5. Geographic Location of Participating Providers by NPIs

	STUDY SAMPLE		NATION	
REGION	**# of NPIs**	**% of NPIs**	**# of NPIs**	**% of NPIs**
Midwest	38	20%	77	25%
Northeast	5	3%	15	5%
Southeast	88	46%	109	35%
Southwest	47	25%	73	23%
West	13	7%	38	12%
TOTAL	**191**	**100%**	**312**	**100%**

Key: NPI – National Provider Identification.

Table 6. Medicare FFS Transport Volume of Participating Providers

	STUDY SAMPLE		NATION	
TRANSPORTS	**# of NPIs**	**% of NPIs**	**# of NPIs**	**% of NPIs**
0–50	15	8%	40	13%
51–100	76	40%	100	32%
101–200	78	41%	110	35%
201–400	9	5%	23	7%
>400	13	7%	39	13%
TOTAL	**191**	**100%**	**312**	**100%**

Key: FFS – fee-for-service; NPI – National Provider Identification.

Independent, hybrid, and hospital-based air medical programs are represented in the study sample. Only 1 submission for a municipal air medical program was received. This submission was deemed a statistical cost outlier due to extremely low cost. Upon further research, it was also determined that this entity was not a true air medical program.

4.2 | Cost Data Summary

Cost data received from providers in the study sample was explored for variation at the base and transport level, by cost component, by fixed vs variable costs, and overall. The median cost per base overall for independent air medical programs is $2,969,360 (Table 7). Most costs (77%) incurred by air medical providers are fixed costs associated with operating a base.

The median number of all emergent transports reported per base was 295, or about 5 to 6 transports per week. Although providers reported between 200 and 400 total transports for 63% of bases, not all bases fell in this range. Most bases have 1 aircraft in operation; however, bases with a high volume of transports generally have 2 or 3 aircraft in constant operation. Bases in their first year of operation may perform considerably fewer transports than in subsequent years but still incur the same amount of costs. Bases scheduled to shut down may also be conducting few transports before they close when compared to earlier years but still incur similar expenses.

Table 7. Reported Costs per Base – Independent Programs

All Independent Programs (535 bases)			
Base Summary	**Mean**	**Median**	**SD**
Cost per Base	$3,898,013	$2,969,360	$1,600,706
Transports per Base	298	295	130
Bases per Entity	42	5	66
For-profit (502 bases)			
Base Summary	**Mean**	**Median**	**SD**
Cost per Base	$4,099,666	$2,951,968	$1,735,298
Transports per Base	297	294	126
Bases per Entity	79	66	80
Non-profit (33 bases)			
Base Summary	**Mean**	**Median**	**SD**
Cost per Base	$3,619,481	$2,986,776	$1,538,325
Transports per Base	318	328	186
Bases per Entity	7	3	8

Key: SD – standard deviation.

Descriptive summary statistics of costs per transport were calculated at the individual component level, by fixed costs and variable costs, and overall (see Table 8). The median cost per transport for all independent programs was $10,199. There was considerable variation in reported cost data at the component level, illustrating that there is no standard cost accounting method for air medical providers. Some providers were able to provide an exact cost amount for each individual component; others provided costs that overlapped multiple components. For example, training, marketing, and travel costs were often reported as part of other cost components. Payroll was associated with the largest share of cost, comprising approximately half of per transport costs. This amount includes all staff except maintenance personnel, which was reflected in the aircraft maintenance cost component, to be consistent with the separation of fixed and variable costs.

Safety enhancement costs and vendor costs were only reported by a subset of providers in the study sample. Air medical programs can choose to outsource aviation services and clinical services to vendors depending on the structure of the program. Most providers that utilize aviation vendors would have safety enhancements covered by the aviation operator. Furthermore, safety enhancements may not be performed every year, especially for programs operating a small fleet of relatively new aircraft. Also, newer aircraft may have up-to-date safety features already installed. Providers may perform safety enhancements but are not able to separately report the cost from aircraft maintenance expenses. Approximately 33% of independent air medical program providers submitted costs for either aviation or clinical vendors, and approximately 50% of independent air medical program providers submitted separate costs for safety enhancements. Reported vendor costs were assigned as fixed costs. Although it is likely that vendor costs contain some variable costs (such as fuel and maintenance), the majority of the costs are considered fixed.

Although uncompensated care cost data were collected, they were not included in per-base or per-transport costs because of the extreme variability in how the study participants calculated the cost of uncompensated care.

Table 8. Reported Costs per Transport by Component – Independent Programs

All Independent Programs					
Component	**Mean**	**Median[a]**	**SD**	**Min**	**Max**
FIXED COSTS	**$9,095**	**$7,741**	**$3,919**	**$3,603**	**$17,343**
Vendor Costs[b]	$372	$0	$966	$0	$3,367
Aircraft Ownership/Lease[c]	$812	$202	$1,413	$0	$4,900
Safety Enhancements[b]	$111	$7	$159	$0	$441
Insurance	$203	$215	$93	$58	$355
Payroll	$4,985	$4,711	$1,888	$2,267	$9,443
Training[c]	$126	$88	$141	$0	$459
Supplies and Equipment	$241	$218	$113	$109	$405
Facility	$238	$242	$87	$88	$370
Marketing[c]	$68	$57	$56	$0	$206
Travel[c]	$132	$115	$122	$0	$337
Overhead	$1,806	$770	$2,149	$22	$6,655
VARIABLE COSTS	**$1,991**	**$2,145**	**$1,033**	**$14**	**$3,433**
Aircraft Maintenance[c]	$975	$973	$578	$0	$1,809
Depreciation[c]	$672	$659	$520	$0	$1,680
Fuel	$344	$298	$196	$14	$631
TOTAL COSTS					
Total Cost per Transport	**$11,086**	**$10,199**	**$4,217**	**$4,669**	**$20,776**

[a] Median cost per transport overall, by fixed and variable costs, and by component were calculated independently. A provider may have had the median cost per transport for one component, but not another component. Due to the independent nature of the calculation, component cost medians will not sum to the subtotal or overall total cost medians.
[b] Safety enhancements and vendor costs were submitted as an expense for only a subset of providers.
[c] Providers reported costs for these components as part of other components, as noted in the submitted cost data collection tool.
Key: SD – standard deviation; Min – minimum; Max – maximum.

Hospital-based (traditional) air medical programs report higher costs per transport and per base ($13,017 and $5,411,605, respectively). All of the hospital-based programs in the sample reported aviation vendor expenses that covered aircraft maintenance (parts, maintenance personnel, etc), pilot fees, and maintenance of the Part 135 certificate. Ownership of aircraft was mixed; some aircraft were leased through a vendor, while others were owned by the reporting provider. The hospital-based cost information collected is limited by small sample size (see Table 9).

Table 9. Hospital-based Program Costs and Transports (10 bases)

	Cost per Transport	Cost per Base	Transports
Average	$13,017	$5,411,605	235
SD	$1,125	$2,071,374	70

Key: SD – standard deviation.

4.3 | Rebased Conversion Factors From Component-level Costs

In order to calculate Medicare FFS conversion factors reflective of actual transport service costs, component-level costs were aggregated to total fixed costs and variable costs, and the per transport cost was calculated. Given the degree of cost variation between providers at the transport level, median per-transport cost was utilized instead of mean per-transport cost. Median is a more conservative summary statistic than mean, and thus less likely to be influenced by more extreme high or low values.

Fixed costs by aircraft type were assigned to the base rate conversion factor and variable costs by aircraft type were used to calculate mileage rates.[12] Average patient-loaded mileage for Medicare transports was reported as 56 miles for rotary-wing and 175 miles for fixed-wing; these averages were used to calculate per-patient loaded mile rates. Rotary-wing transports represented 92% of all transports reported by independent programs in the study sample, which is slightly higher than the Medicare FFS volume in 2014 (85% rotary-wing) (see Table 10).

When the rebased conversion factors were multiplied by projected 2017 Medicare FFS air medical service volume and inflated to 2017 dollars using the CPI-U hospital and related services (reduced by the 10-year moving average of multifactor productivity), a pool of approximately $1.07 billion would be required to cover the costs of providing transports to Medicare FFS beneficiaries in 2017. The revised, rebased payment rates are shown in Table 10.

As shown in Table 11, the rebased conversion factors for the base conversion factors range from 105% to 263% greater than those in the present day Medicare ambulance fee schedule; conversion factors for mileage are 44% to 102% higher. The rebased fixed-wing base rate conversion factor is higher than the rotary-wing base rate, a change from the current conversion factors. Fixed-wing aircraft were observed to be used less frequently than rotary-wing aircraft in the study sample. Fixed-wing transports were mostly performed at remote base locations, such as Alaska. They were associated with significantly greater patient-loaded mileage per transport, but fewer transports overall. Fewer transports lead to higher costs per transport, given that the costs cannot be distributed over as high a volume of services, compared to rotary-wing volume.

Data from the independent air medical programs were used, given the robust sample size. This likely produces a conservative estimate due to the greater costs observed for hospital-based programs.

Table 10. Rebased 2015 and Estimated 2017 Conversion Factors and Cost Pool Using Reported Costs

	Estimated Rebased Conversion Factor (2015)	Estimated Rebased Conversion Factor (in 2017 dollars)[a]	Actual 2014 Service Volume[b]	Estimated 2017 Service Volume[c]	Total Estimated Pool 2017
Fixed-wing Base (A0430)	$10,925	$11,760	13,519	14,346	$168,718,063
Rotary-wing Base (A0431)	$7,169	$7,716	76,870	81,575	$629,458,587
Fixed-wing Mileage (A0435)	$12	$13	2,453,730	2,603,918	$34,384,072
Rotary-wing Mileage (A0436)	$46	$50	4,443,730	4,715,722	$233,615,890
Total Medicare Payment[d]					**$1,066,176,612**

[a] Rebased conversion factors inflated to 2017 dollars using the 2016 and 2017 CPI-U hospital and related services reduced by the 10-year moving average of multifactor productivity.
[b] Reported Medicare FFS air medical service volume billed to carriers and fiscal intermediaries in 2014.
[c] Projected volume of Medicare FFS air medical service volume billed to carriers and fiscal intermediaries in 2015 based on 2% annual Medicare Part B enrollment growth (March 2015 CBO Baseline Report).
[d] Total Medicare payment includes program payment and beneficiary portion.
Key: CBO – Congressional Budget Office; CPI-U – Consumer Price Index for All Urban Consumers; FFS – fee-for-service.

[12] CMS considers depreciation a variable cost and covered by the loaded mileage payment rate.

Table 11. Comparison of 2017 Rebased and Current Medicare Conversion Factors

	Current 2017 Conversion Factors	Estimated Rebased 2017 Conversion Factors	% Change
Fixed-wing Base (A0430)	$3,017	$11,760	290%
Rotary-wing Base (A0431)	$3,507	$7,716	120%
Fixed-wing Mileage (A0435)	$9	$13	44%
Rotary-wing Mileage (A0436)	$23	$50	117%

4.4 | Cost Pool Estimate and Payment Adequacy

The original cost pool for air medical services was meant to cover close to 100% of air medical service costs; however, over time, the differential between total costs and total payment has grown. To compare the original CMS cost pool estimate with the cost data collected from the study sample, reported 2015 median costs per base were deflated to 1998 levels and multiplied by the approximate number of bases in operation at that time. The resulting figure is $160 million, very close to the original CMS estimate of $158 million (see Table 12). This finding supports the accuracy of the original cost pool estimate.

In the absence of a conversion factor rebase, at most only 73% of estimated Medicare costs were covered by Medicare payment in 2014, the most recent year for which there is available public data from CMS. This amount assumed full beneficiary co-insurance was paid (estimated at 20%, in addition to Medicare provider payments). Total reported costs, estimated Medicare FFS costs, and Medicare payment are shown in Table 13.

Table 12. Comparison of Total Costs, Medicare FFS Cost, and Medicare Payment: 1998 to 2014

	1998 (Deflated 2015 Median Costs)	2014 (Deflated 2015 Median Costs)
Base Count[2,3]	298	984
Median Cost per Base	$2,068,596	$2,924,819
Total Costs	$616,441,723	$2,878,022,151
Medicare FFS Costs (26% of Total)[a]	$160,274,848	$748,285,759
Medicare FFS Payments	$158,000,000	$543,500,106
% Costs Covered by Payment	**99%**	**73%**

[a] Medicare FFS costs were assumed as 26% of total costs for 1998 and 2014, based on reported patient payer mix in the study sample.
Key: FFS – fee-for-service.

In many cases, beneficiary co-insurance may not be paid in full, which could increase payment adequacy for air medical providers further. Claims data can only estimate the beneficiary portion actually paid based on the Medicare allowed amounts. Table 13 shows the study sample reports Medicare revenue covering only 59% of reported costs during fiscal year 2015. This differential (59% reported vs 73% estimated on the claim) may be indicative of true beneficiary behavior in terms of co-insurance payment for air medical services.

Table 13. Median Cost Compared to Median Revenue per Transport[a]

	Reported Median Revenue per Transport (Fiscal Year 2015)	Percentage of Costs Covered[b]
Medicare	$5,998	59%
Medicaid	$3,463	34%
Self-pay (Uninsured)	$354	3%
Commercial	$23,518	231%

[a] Includes independent air medical programs in the study sample only.
[b] Compared to a median cost per transport of $10,199 for all payers.

5.0 | CONCLUSIONS AND POLICY IMPLICATIONS

Extrapolating the collected costs of the study sample to the universe of Medicare FFS air medical services suggests a total cost pool of approximately $1.07 billion would be necessary to cover the costs of air medical services in 2017. This would be an increase of 82% from the current estimated 2017 pool (estimated at $587 million).[13]

In 2015, it is estimated that only 59% of Medicare per-transport costs were covered by Medicare payments for the study sample. While cost data collected from the study sample reveals the original cost estimate from CMS for air medical services in 1998 may have been fairly accurate, it has been nearly 20 years since costs associated with emergent air medical services were assessed. In that time, the air medical industry has experienced significant changes that have increased costs substantially. In general:

The number of air medical bases has grown considerably, providing greatly improved square mile coverage and access to air medical services. US population coverage within a 15- to 20- minute response area has grown from 71.2% in 2003 to 86.4% in 2016.[2,3]

Air medical services improve access to Level 1 trauma centers for an additional 87 million Americans (27% of the population) who would not otherwise be able to receive emergent care in a timely manner.

Aircraft and highly trained personnel must stand at the ready for a mission at all hours, 7 days a week, even if no emergent transports are dispatched. Increased availability of these services, combined with the level of highly trained staff, equipment, and overhead costs, have increased operating costs significantly.

The aviation regulatory landscape has also changed, which has resulted in costs that were not reflected in the 1998 assessment, particularly responsible operator voluntary safety enhancements and FAA-mandated rules related to the development, equipping, and staffing of Operational Control Centers, the addition of night vision goggle systems, implementation of Helicopter Terrain Alert Warning Systems, and installation of Flight Data Monitoring Systems.

[13]The 2016 and 2017 published ambulance fee schedule inflation factors (-0.4% and 0.7% respectively) were used to estimate 2017 total payment to align with current regulation.

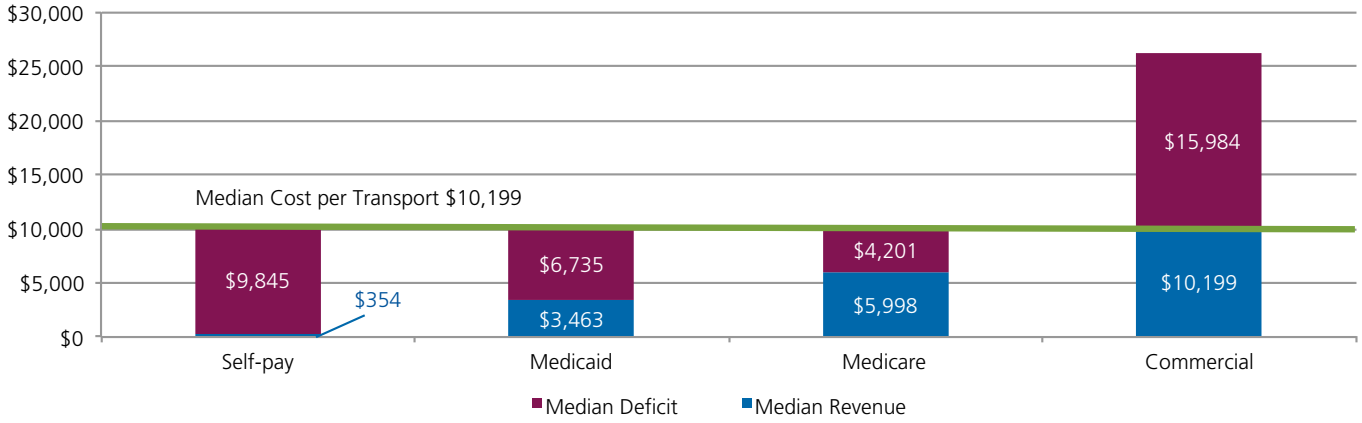
In order to prevent vast differences between payment and incurred costs, CMS should monitor changes in costs and regularly rebase conversion factors, as is done annually for other Medicare payment systems. As a means of comparison, CMS is able to track hospital facility costs annually and set payment rates within 94.2% of reported costs.[14] While data are not currently being collected to inform air medical costs and subsequent payment methodologies, this study demonstrates the potential to successfully collect detailed cost data, in a straight-forward manner, from an industry currently not subject to Medicare cost reporting. Representatives from the air medical community have encouraged regulators and lawmakers to investigate the costs of providing air ambulance services and potentially implement a standard cost reporting requirement for Medicare reimbursement.[15]

CMS should consider replacing the annual update factor for air medical services with an inflation factor that reflects changes in cost over time specific to air medical services. The current ambulance inflation factor is based on the general CPI-U and does not accurately reflect the complexity of cost inflation for air medical providers. In this cost study, the hospital and related services CPI-U was used in place of the general CPI-U, given that air medical providers have cost structures, capital investment, and financial risk most similar to hospital facilities. CMS could create a unique market basket amount for air medical Medicare services based on complex economic forecasting, similar to models currently in place for facility payment rate updates.

CMS should continue to apply a geographic adjustment factor to air medical service payment based on locality. Wages comprise nearly 50% of air medical service costs and vary by geographic location. However, using collected cost information for revising conversion factors to more accurately reflect costs as a whole may be preferable to the current rural add-on payment policy. CMS could dissolve the current rural add-on payment policy, streamlining payment policy and avoiding an arbitrary differential in co-insurance amounts for rural vs urban patients.

Inadequate payment from public payers and the uncompensated care costs providers incur while treating uninsured patients have a trickle-down economic effect and play an important role in rates for air medical services for private payers and patients. While Medicare may be covering between 59% and 73% of costs, per-transport cost deficits for Medicaid and uninsured patients are even greater. These deficits in aggregate would require private payers to cover at least $15,984, in addition to the cost of the transport to allow providers to break even, taking into consideration the patient payer mix observed in the study sample (see Figure 4). The median reported commercial revenue per transport fell short of this amount at $23,518; indicating that in many cases, total operating costs are not covered by payers in the aggregate. Evidence of this issue was observed in the study sample, as over one-third of providers reported negative margins in fiscal year 2015 for emergent air medical services.

Figure 4. *Cost Deficit Illustration Experienced by Providers, Based on Reported Payer Mix*[a]



[a] Cumulative deficit shown for commercial insurance payers is based on the median cost deficit experienced by Medicare, Medicaid, and self-pay, weighted according to the overall study sample payer-mix. Analysis does not include other payers not shown (eg, Veterans Affairs).

[14] MedPAC. Chapter 3: Hospital inpatient and outpatient services MedPAC Report. http://medpac.gov/docs/default-source/reports/chapter-3-hospital-inpatient-and-outpatient-services-march-2016-report-.pdf. Accessed March 5, 2017.

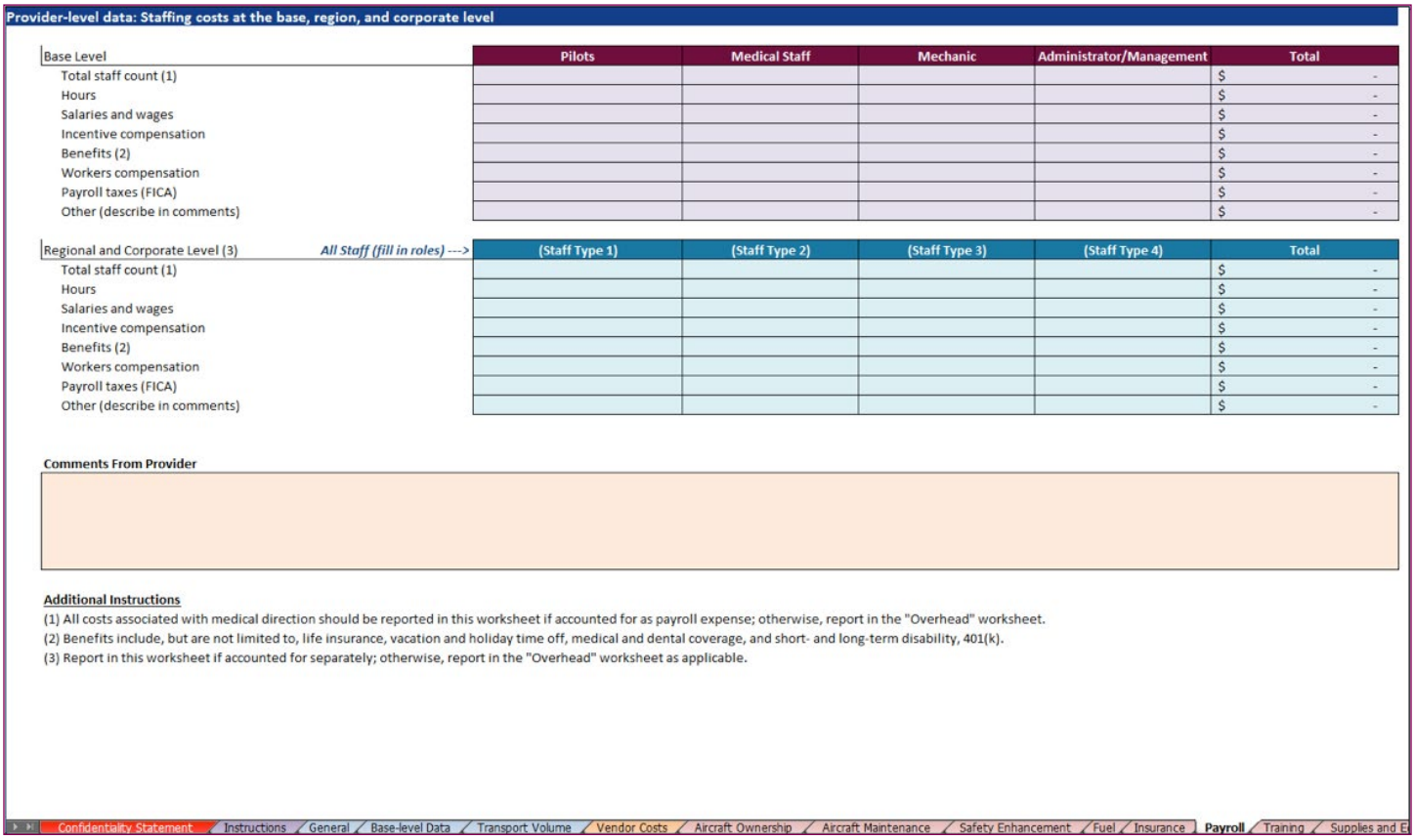
[15] Rotor & Wing International. US Air Ambulance Fee Changes Hinge on 'Scoring.' September 15, 2015. http://www.rotorandwing.com/2015/09/15/us-air-ambulance-fee-changes-hinge-on-scoring/. Accessed March 3, 2017.

Air medical emergent services are provided to critically-ill or injured patients—regardless of their ability to pay—to the closest appropriate hospital when requested by third-party medical professionals or first responders. Recognizing the importance of these emergent services, and evaluating Medicare payment adequacy to ensure that patients have access to these services when needed, should be a priority for the Medicare program, as the availability and sustainability of air medical services ultimately affects the US population beyond those with Medicare coverage.

6.0 | APPENDIX

Study participants were given the option to provide total costs and/or more granular data for each cost component. For example, costs for several components such as aircraft ownership and maintenance were requested based on aircraft type (eg, rotary-wing, fixed-wing), while others were component-specific like staff mix for payroll expense. Some participants were able to provide detailed data, while others did not either due to time constraints or their accounting systems were not set up to capture and report information at the levels being requested. All participants provided comprehensive data either at the total cost level or at detailed levels that could be summed to arrive at total costs for each component. Formal auditing of the submitted cost information was not conducted; however, data was reviewed for incomplete or erroneous information.

Figure i. Payroll Tab of Excel-based Cost Data Collection tool



Provider-level data: Staffing costs at the base, region, and corporate level

Base Level	Pilots	Medical Staff	Mechanic	Administrator/Management	Total
Total staff count (1)					$ -
Hours					$ -
Salaries and wages					$ -
Incentive compensation					$ -
Benefits (2)					$ -
Workers compensation					$ -
Payroll taxes (FICA)					$ -
Other (describe in comments)					$ -

Regional and Corporate Level (3) *All Staff (fill in roles) --->*	(Staff Type 1)	(Staff Type 2)	(Staff Type 3)	(Staff Type 4)	Total
Total staff count (1)					$ -
Hours					$ -
Salaries and wages					$ -
Incentive compensation					$ -
Benefits (2)					$ -
Workers compensation					$ -
Payroll taxes (FICA)					$ -
Other (describe in comments)					$ -

Comments From Provider

Additional Instructions

(1) All costs associated with medical direction should be reported in this worksheet if accounted for as payroll expense; otherwise, report in the "Overhead" worksheet.
(2) Benefits include, but are not limited to, life insurance, vacation and holiday time off, medical and dental coverage, and short- and long-term disability, 401(k).
(3) Report in this worksheet if accounted for separately; otherwise, report in the "Overhead" worksheet as applicable.

Confidentiality Statement | Instructions | General | Base-level Data | Transport Volume | Vendor Costs | Aircraft Ownership | Aircraft Maintenance | Safety Enhancement | Fuel | Insurance | Payroll | Training | Supplies and E

7.0 | WORKS CITED AND NOTES

1. Medicare Payment Advisory Commission (MedPAC). June 2013 Report to Congress, Chapter 7: Mandated report: Medicare payment for ambulance services. http://www.medpac.gov/docs/default-source/reports/jun13_ch07_appendix.pdf?sfvrsn=0. Accessed March 2, 2017.

2. ADAMS Atlas report 2003. http://www.adamsairmed.org/pubs/ITS_SSC.pdf. Accessed March 3, 2017.

3. ADAMS Atlas report 2016. http://www.adamsairmed.org/pubs/ADAMS_Intro.pdf. Accessed March 3, 2017.

4. CMS. Medicine Learning Network: Matters ambulance inflation factor for CY 2017 and productivity adjustment. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNMattersArticles/Downloads/MM9811.pdf. Related CR Release Date: October 14, 2016. Accessed March 3, 2017.

5. Ambulance Services Payment System, MedPAC Payment Basics. http://www.medpac.gov/docs/default-source/payment-basics/medpac_payment_basics_16_ambulance_final.pdf?sfvrsn=0. October 1, 2016. Accessed February 27, 2017.

6. Requirements for coverage of nonemergency ambulance services. https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AmbulanceFeeSchedule/Downloads/CMS-1002-FC.pdf. February 27, 2002. Accessed February 27, 2017.

7. Taylor CB, Stevenson M, Jan S, Middleton PM, Fitzharris M, Myburgh JA. A systematic review of the costs and benefits of helicopter emergency medical services. Injury. 2010;41(1):10-20. Accessed February 27, 2017.

8. Salamon SJ, Cowdry RW. Air Ambulance Study: Required Under Senate Bill 770. Annapolis: Maryland Health Care Commission; 2006. http://dlslibrary.state.md.us/publications/EXEC/DHMH/MHCC/AirAmbulance_2006.pdf. Accessed February 27, 2017.

9. KFF. Medicare Advantage fact sheet. May 11, 2016. http://kff.org/medicare/fact-sheet/medicare-advantage/. Accessed March 2, 2017.

10. CMS. Physician and Other Supplier Data CY 2014. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/Physician-and-Other-Supplier2014.html. Accessed January 6, 2017.

11. A small portion of providers submitted fiscal year 2016 financial information; dollars were not adjusted.

12. CMS considers depreciation a variable cost and covered by the loaded mileage payment rate.

13. The 2016 and 2017 published ambulance fee schedule inflation factors (-0.4% and 0.7% respectively) were used to estimate 2017 total payment to align with current regulation.

14. MedPAC. Chapter 3: Hospital inpatient and outpatient services MedPAC Report. http://medpac.gov/docs/default-source/reports/chapter-3-hospital-inpatient-and-outpatient-services-march-2016-report-.pdf. Accessed March 5, 2017.

15. Rotor & Wing International. US Air Ambulance Fee Changes Hinge on 'Scoring.' September 15, 2015. http://www.rotorandwing.com/2015/09/15/us-air-ambulance-fee-changes-hinge-on-scoring/. Accessed March 3, 2017.

PREPARED BY:

Xcenda, LLC
4114 Woodlands Parkway, Suite 500
Palm Harbor, FL 34685
Phone: 727.771.4100

Marla Kugel, MPH
Associate Director, Reimbursement Policy Insights

Herman Chen, CPA
Associate Director, Reimbursement Policy Insights

Amanda Forys, MSPH
Director, Reimbursement Policy Insights

Xcenda®
AmerisourceBergen

AmerisourceBergen®