

The Economics of Land Use



Final Report

An Economic Analysis of the U.S. Rotary Wing Air Medical Transport Industry

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Association of Air Medical Services

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1. FORWARD

Following the release of an earlier version of this report dated June 2013, Economic & Planning Systems (EPS) discovered that there were errors and inconsistencies in the underlying survey data used to report the economic benefits. This report is a revision of that study. After attention was brought to the fact that primary data collected and used from air medical transport (AMT) programs throughout the U.S. contained flaws in reported operational costs and volume (i.e. number of patient transports), EPS requested that the link to the existing study be removed from the MedEvac Foundation's website until a revision could be prepared.

Specifically, it was discovered that the flaws in these underlying cost and volume data made reliably reporting average cost per patient transport factors and average patient transports per aircraft factors impossible at the national and regional levels. After closer analysis, it was determined that these flawed data were not essential to the larger purpose of demonstrating or assessing the industry's national economic impact. Thus, this revised study excludes these factors from the report and provides a revised methodology with regard to the estimation of national industry economic impacts.¹

¹ Also a result, EPS believes that the validity and findings of two older studies, referenced in the report, concerning two individual AMT programs' operational costs and activity structures, are also called into question.

2. EXECUTIVE SUMMARY

Overview

Rotary wing air medical transport (AMT) is a substantial part of the larger AMT industry (which includes fixed-wing transport) and an integral part of our national emergency health care system. AMT services speed, optimize, and integrate the critical care received by patients from the start of their emergency through treatment at a hospital. In addition to providing valuable health benefits to patients, AMT makes a significant contribution to the economy by supporting quality jobs and generating spending on goods and services.

The health care industry employs millions of people in a variety of supporting sectors, including AMT. Moreover, the health care industry saw strong growth while total U.S. employment stagnated over the past decade. While many industries suffered substantial job losses during this period, health care added jobs at a rate of 2 percent per year (as did ambulance services at 4 percent per year).

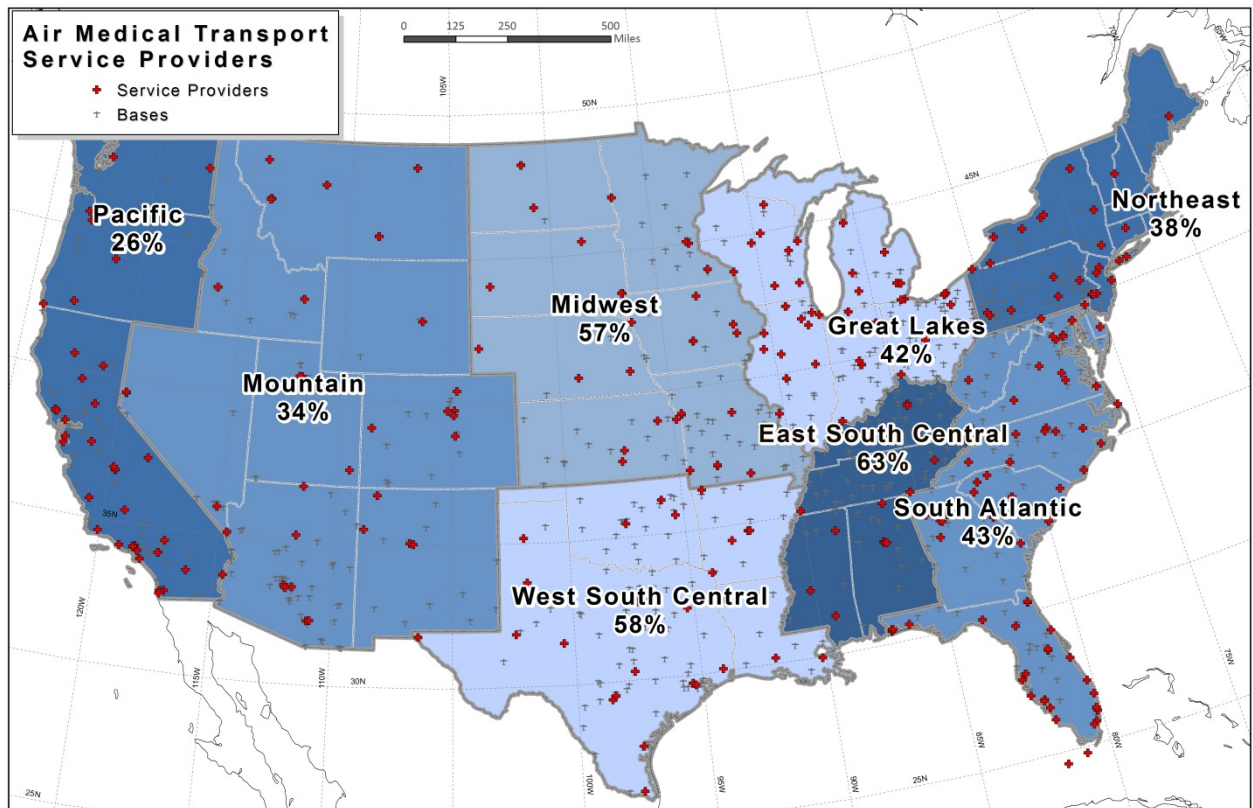
This study details the economic benefit specifically of the rotary wing component of the AMT industry (hereinafter referred to as the “rotary wing industry” or the “industry”), including its spending, jobs, salaries and benefits, and contribution to Gross Domestic Product (GDP). This economic benefit includes the successive “rounds” of activity (also called the “ripple effect”) attributable to the industry’s operations and capital purchases. The study considers direct, indirect, and induced economic benefits.

Specifically, providing patient transports is the rotary wing industry’s direct economic activity, supporting staffed and contract jobs for pilots, nurses, paramedics, and other functions. Industries that supply goods or services to AMT operations, such as helicopter manufacturers, are characterized as indirect activity. Beyond that, induced economic activity results from employee spending on household goods and services.

Data on operational costs, capital purchases, and program structures were collected through a nationwide survey of rotary wing providers. The results, illustrated in **Figure ES-1**, are also representative of the diversity of program types found throughout the U.S. Survey responses ranged from a representation of 26 percent of aircraft in the Pacific region to a representation of 63 percent of aircraft in East South Central.²

² It is important to note that the percentages shown represent survey response rate by region, not air medical transport coverage by region.

Figure ES-1
Study Geographic Representation



Industry Background

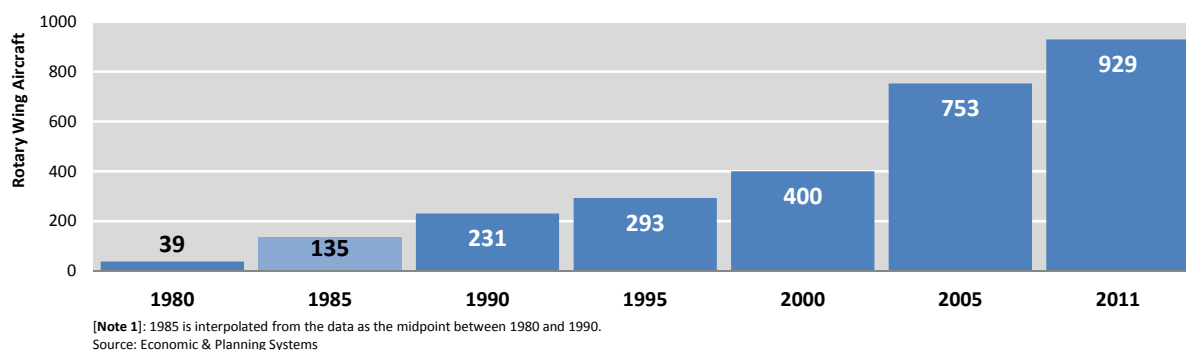
The current practice of providing tertiary facility-type care during transport evolved out of historical practices of mere rapid patient transport. Providing a higher level of care during transport has been shown to improve patient outcomes and has contributed to more prevalent use of air medical services.

Rotary wing AMT services consist of hospital-based, community-based, and hybrid (or alternative-delivery) models. Traditional hospital-based programs account for a significant portion of the rotary wing industry. However, they no longer account for its largest share. Community-based and hybrid models have become more common.

Rotary Wing Aircraft Trends

Figure ES-2 illustrates the growth in the AMT industry between 1980 and 2011, during which the industry added approximately eight new programs a year and grew from 39 to 929 rotary wing aircraft. While this study has not evaluated the statistical significance of the causal relationship between rural hospital closures and the increase in AMT service, according to a General Accounting Office study³ 200 or more rural hospitals and more than 200 urban hospitals closed during the 1980s, and it has been cited that rural hospitals continued to close during the 1990s as well⁴. As such the increase in AMT service not only reflects a response to the degradation of availability of hospital care particularly in rural areas of the country, but an increasingly dispersed population, roadway congestion, and sprawling land use development.

Figure ES-2
Rotary Wing Patient Transport Trends, 1980-2011



Annual Rotary Wing Aircraft Costs

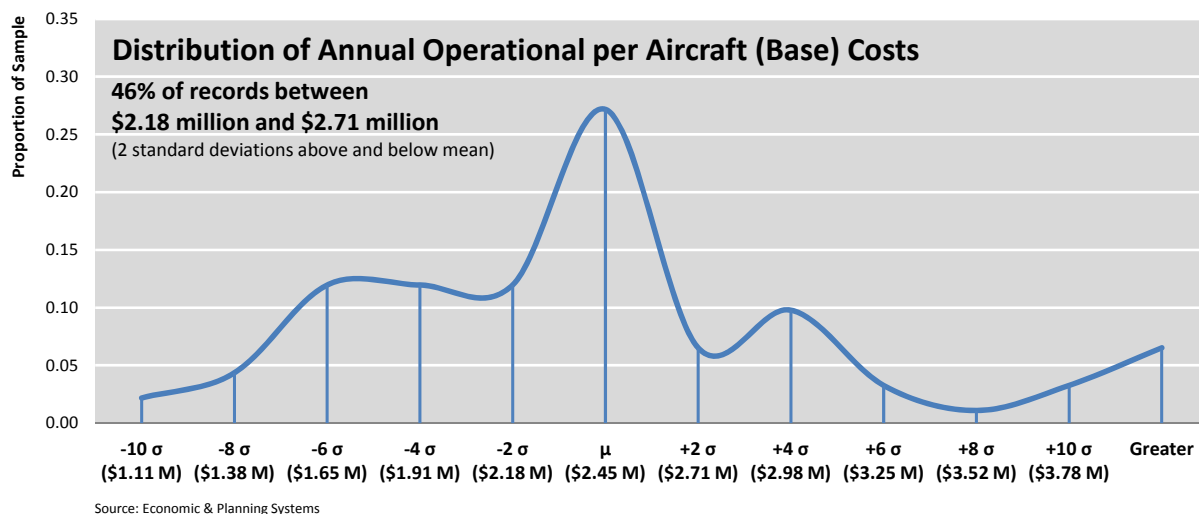
Based on information collected through an industry survey, labor accounts for 56 percent of total annual costs, while other costs such as lease payments, fuel, and insurance account for 30 percent of spending, and average capital purchases account for the remaining 13 percent. Today, many rotary wing programs use contract services for a variety of functions, such as pilots, maintenance, program direction, or specialty care to achieve a range of budgetary goals.

According to the 2011 survey results, annual average operational (not “fully-loaded”) costs per rotary wing aircraft base ranged between approximately \$2.2 and \$2.7 million, as illustrated in **Figure ES-3**, including operational and maintenance expenses, insurance, building and lease payments, and salaries, but excluding annualized capital purchases. While this range generally represents 46 percent of the survey results, annual per-rotary wing aircraft costs can exceed as much as \$8.0 million per year because costs are highly dependent on the type of aircraft used, staffing types and levels, general business and operational model variations, level of administrative support, as well as regional economic factors.

³ General Accounting Office. Rural Hospitals: Federal Hospitals Should Target Areas Where Closures Would Threaten Access to Care. Report GAO/HRD-91-41, February 1991.

⁴ DesHarnais S, Reif S, Bernard S, Randolph R. Effects of Rural Hospital Closure on Access to Care: Data Analysis. Cecil G. Sheps Center for Health Services Research. University of North Carolina, Chapel Hill, 1998.

Figure ES-3
Range of Average Annual Costs per Rotary Wing Base, 2011



Rotary Wing Industry Benefit

National Benefit

Including direct, indirect, and induced economic effects, the rotary wing industry generates \$6.3 billion in economic activity per year and supports more than 43,300 jobs. It supports 19,000 jobs related directly to operations and capital purchases with average salaries (including benefits) of approximately \$71,000. It also creates an employment multiplier of 2.3, meaning that each direct job supports 1.3 additional (indirect and induced) jobs. In total, the industry contributes approximately \$3.7 billion to the U.S. GDP.

Operations

Annual operations support \$5.5 billion in total (including indirect and induced) spending and more than 38,400 jobs. Directly, it employs nearly 17,400 with average salaries of \$73,000. The multiplier effect of its operations primarily stimulates other health care sectors, but indirect and induced demand also is generated for industries such as administration, transportation and warehousing, manufacturing, professional and technical services, retail, and others industries. In total, the rotary wing industry's operations contribute \$3.3 billion to GDP.

Capital Purchases

The purchase of aircraft and major aviation and medical equipment averages approximately \$400 million per year. On average, programs purchase aircraft every nine years and equipment every five years. Aircraft account for two-thirds of this annual expenditure, or an estimated 60 aircraft per year at approximately \$4 million each. This spending directly supports more than 1,600 jobs with average salaries of \$49,100. This activity creates an employment multiplier effect of 3.0, meaning that an additional 2 jobs are supported by every direct activity job.

Regional Benefit

Economic benefits vary with urban and rural settings, operational scale, and local and regional employment industry composition. At a national level, nearly 8 jobs are created for every \$1 million of direct industry spending. On average, each rotary wing aircraft is staffed directly with approximately 18.7 full- and part-time jobs (staffed or contracted labor), and each direct job generates demand for an additional 22.6 indirect and induced jobs—a total of 41.3 jobs per aircraft. Overall, the annual operation of each rotary wing aircraft supports total salaries and benefits of \$2.6 million and \$5.9 million in total spending.

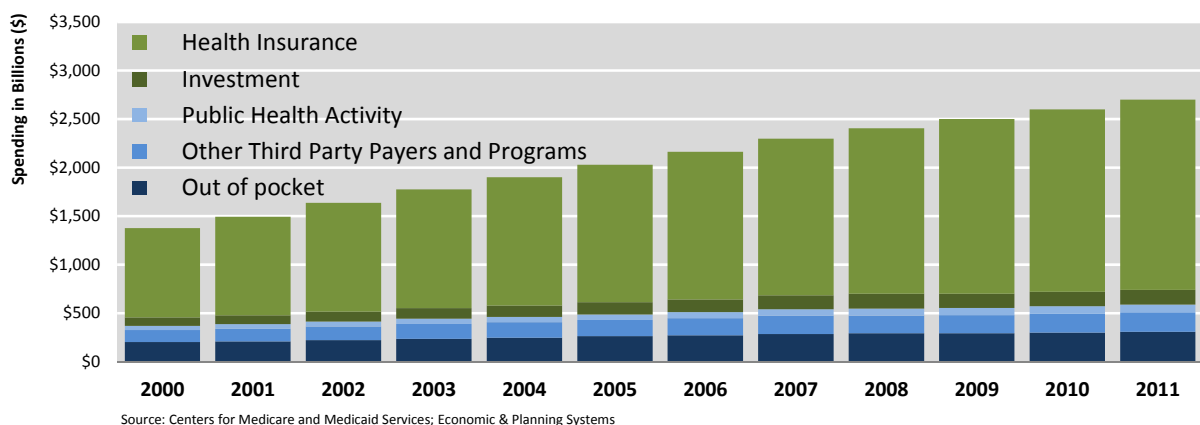
3. ECONOMIC FRAMEWORK

Rotary wing AMT services are a subcomponent of the larger air medical transport (AMT) services sector and part of the very large and growing health care industry. This chapter contains general trends in health care spending, U.S. employment—specifically health care jobs, population, and trends within AMT, specifically rotary wing AMT, programs.

Health Care Spending

Health care job growth during the decade was supported by increases in health care spending. As illustrated in **Figure 1**, total spending increased at a rate of 6.3 percent per year from 2000 to 2011. The share that insurance represents (including private health insurance, Medicare, Medicaid, and others), has increased from 67 percent in 2000 to 73 percent by 2011. Expenditures for insurance have risen at an annual rate of more than 7 percent, and out-of-pocket expenditure on health care has increased at nearly 4.0 percent per year.

Figure 1
Historical Healthcare Spending

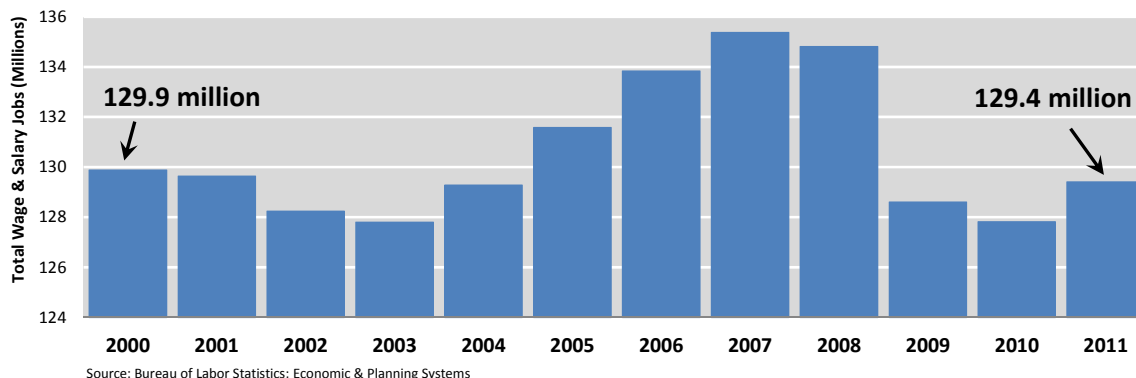


Employment & Population

Employment

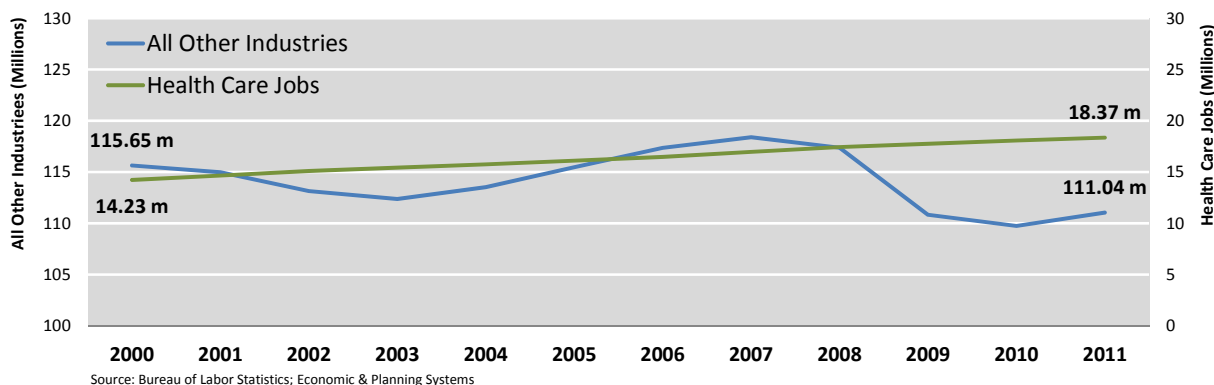
For 2011, the U.S. Bureau of Labor Statistics estimated there were approximately 130 million wage and salary positions in the United States, not including sole proprietors (**Figure 2**). Since employment peaked in 2007, the U.S. economy has sustained significant losses of manufacturing jobs (nearly 6 million), construction jobs (1 million), and information jobs (approximately 1 million). The housing boom and bust contributed to losses in construction, followed by a financial crisis, which precipitated losses in other industries.

Figure 2
U.S. Job Trends, 2000-2011



By comparison, as demand for health care services grew during the 2000s, the health care industry steadily added more than 4 million jobs at an average rate of 2.3 percent per year (**Figure 3**). Non-health care jobs in the U.S. shrank at an average rate of 0.4 percent per year.⁵ In 2000, the health care industry accounted for approximately 11 percent (14.2 million) of all U.S. wage and salary jobs, and by 2011 accounted for slightly more than 14 percent (18.4 million).

Figure 3
U.S. Job Trends, 2000-2011



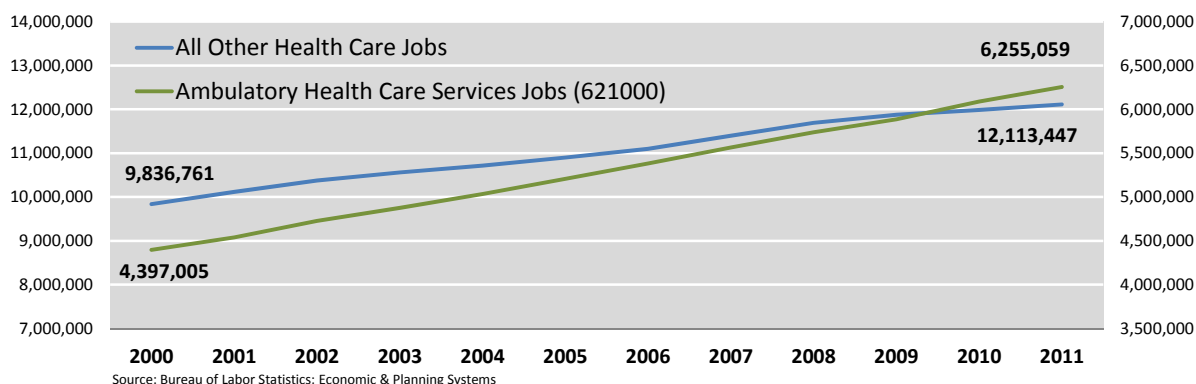
Two sub-sectors of the health care industry that are particularly relevant to this study are: (1) the ambulatory health care services; and (2) ambulance services (**Figure 4**). Ambulatory health care services are a broadly-defined component of health care jobs, which consists primarily of outpatient care services. The ambulance services sector is a specific subset concerned primarily in providing transportation of patients by ground or air, along with medical care.⁶ In 2000, the

⁵ Refer to Appendix **Table B-1** for greater detail on these trends.

⁶ In the North American Industry Classification System (NAICS), Ambulatory Health Care Services (621000) is defined as a subsector that provides health care services directly or indirectly to ambulatory patients and do not usually provide inpatient services. Ambulance Services (621910) refers specifically to establishments primarily engaged in providing transportation of

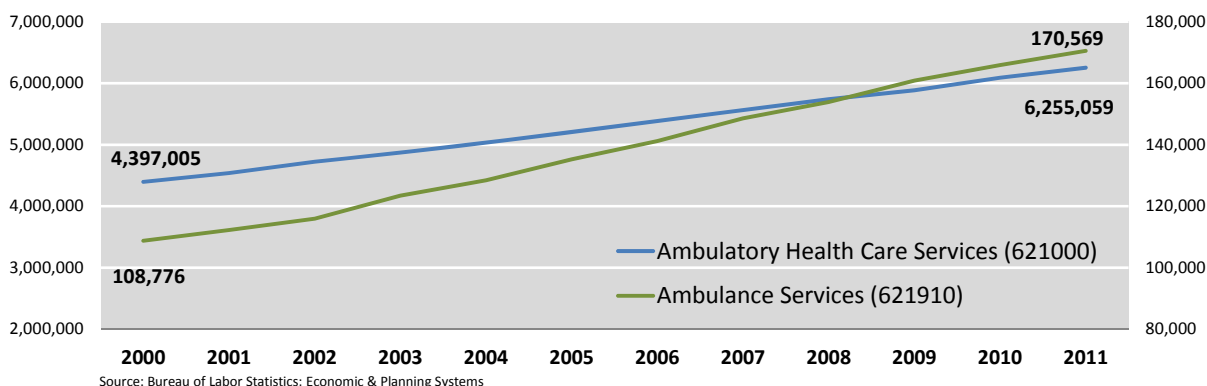
ambulatory health care services industry accounted for 30 percent (approximately 4.4 million) of all health care jobs, and by 2011 accounted for approximately 34 percent (approximately 6.3 million jobs). By comparison to general health care jobs, ambulatory health care services grew at an average rate of 3.3 percent per year over the decade, while other non-ambulatory services grew at 1.9 percent per year.

Figure 4
Ambulatory Health Care Services, 2000-2011



Ambulance services (North American Industry Classification System 621910) accounts for a very small portion (on average, approximately 2 percent) of the ambulatory health care services industry, but it grew by more than 60,000 jobs during the decade (**Figure 5**). On average, the ambulance services sector grew by 4.2 percent per year, adding more than 5,600 jobs per year.

Figure 5
Ambulance Services Trends, 2000-2011

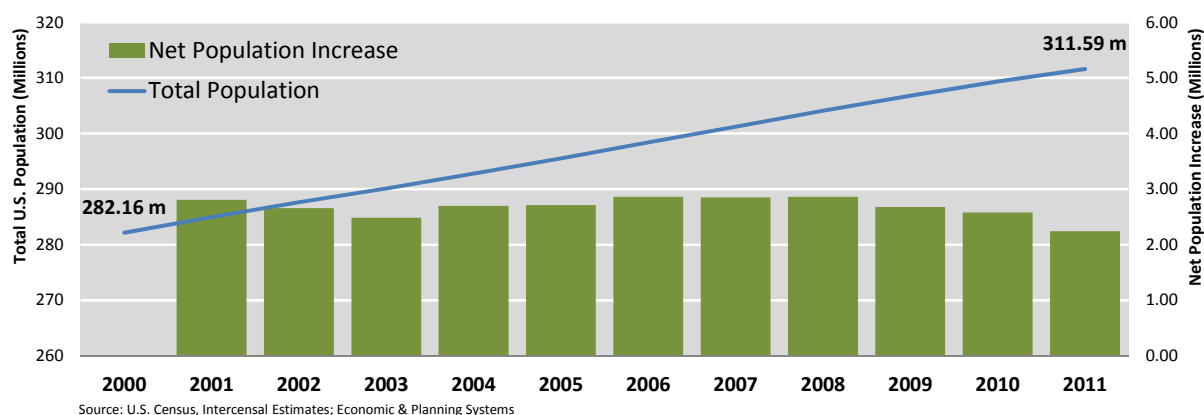


patients by ground or air, along with medical care. For more detail of the definition of these subsectors, refer to **Appendix A**, "Industry Definition."

Population

Overall growth and an aging population have been major drivers of health care job growth in the U.S. (**Figure 6**). In the past decade, the U.S. has experienced a net population increase of more than 29 million, 71 percent of which has come from the aging baby boomer population (45 to 64 years).⁷ In 2000, the population was approximately 282 million and increased to more than 311 million by 2011. On average, more than 2.6 million people are added to the country per year (slightly less than 1 percent per year).

Figure 6
U.S. Population Change, 2000-2011



Overall Air Medical Transport Industry Trends

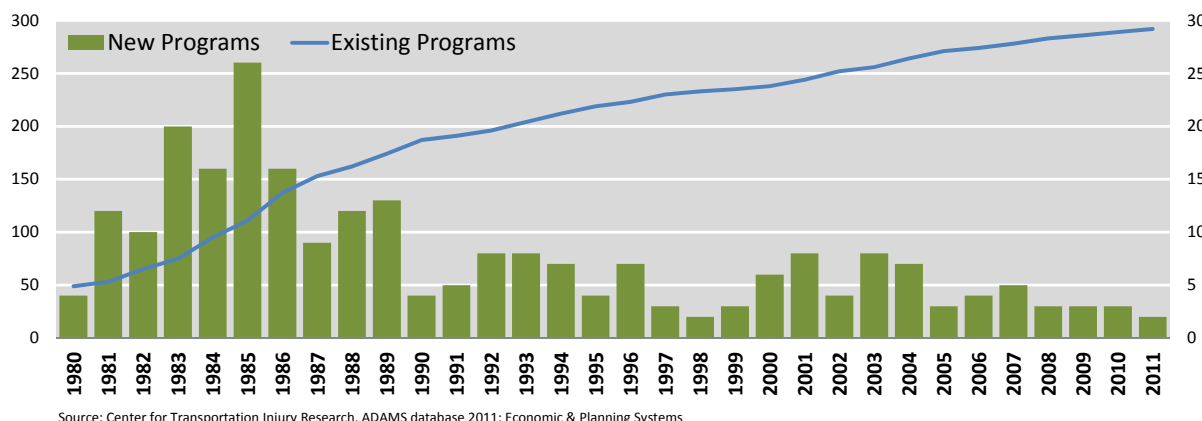
As a share of the 170,000 ambulance services jobs (refer back to **Figure 5**), rotary wing air medical transport services (not including jobs associated with fixed wing transport services) account for approximately 11 percent (detailed later in the report). In total, rotary wing AMT programs in the U.S. are estimated to have approximately 18,082 jobs (2011).

AMT Programs

With the growth in health care, particularly the ambulatory health care and ambulance services industry, the number of overall AMT services (including fixed wing transport services) has also grown (**Figure 7**). Over the past 20 years, growth in the number of programs has been fairly constant at approximately four to five new programs per year on average. During this time, 103 new programs were started, and in the last 10 years, 56 new programs have been established.

⁷ Refer to **Appendix Table B-2** for more detail.

Figure 7
Overall Air Medical Transport Programs, 1990-2011

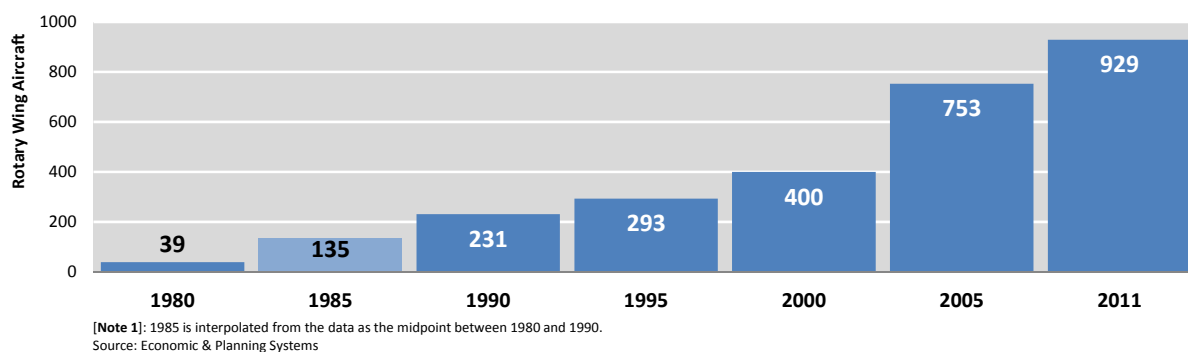


Aircraft Trends

The overall AMT industry has evolved over time to offer increasing levels of tertiary facility-type care during transport.⁸ The capability to provide higher levels of care during transport has been shown to improve patient outcomes, and along with other factors—such as recent changes in the national healthcare system—have likely contributed to more prevalent use of rotary wing (and fixed wing) AMT services, and thus, an increase in the number of service providers.

Among rotary wing service providers in 1980, there were 39 rotary wing aircraft, and by 2011 that count had increased to 929 aircraft, an increase of 29 new aircraft per year (**Figure 8**). Among the factors contributing to this trend has been the expansion of the industry into previously unserved areas, particularly rural and remote parts of the country.

Figure 8
Historical Rotary Wing Aircraft Counts



⁸ Judge T, McGinnis K, Nemitz B. Air Medical Services: Future Development as an Integrated Component of the Emergency Medical Services (EMS) System. *Prehospital Emergency Care*. 2007 Oct-Dec;11(4):353-68.

4. ROTARY WING INDUSTRY STRUCTURE

This chapter provides a picture of the rotary wing industry's composition and cost structure using information collected through a nationwide survey of all AMT programs (including those with fixed wing services). The primary data from the survey represent a full spectrum of program models, information on aircraft, program activity, staffing, and annual operational and capital purchases. It forms a solid platform on which to construct the economic benefit analysis in the following chapter.

Survey

The findings of this study are based on a nationwide survey to members and non-members of the Association of Air Medical Services (AAMS). EPS administered the survey to an estimated 230 programs in 2012 and conducted a targeted follow-up effort with hospital-based programs in early 2013. Follow-up efforts were made to improve the survey response rate. The survey research effort yielded 66 responses (29 percent response rate). To the greatest degree practicable, EPS conducted additional follow-up with respondents to clarify data reported.⁹ Some responses were excluded from the analysis due to insufficient or unintelligible reporting; the analysis is based on 44 of the 66 responses.¹⁰

- **Program Activity** – The survey collected information on program type, ownership of aircraft (i.e. holder of FAA Part 135 Certificate), state(s) of operation, number of aircraft (rotary wing and fixed wing) and vehicles (ground ambulances), number of flight hours, loaded patient miles, patient transports, and payroll vs. contract staff (part-time and full-time). It also collected detailed annual operating and capital costs for the fiscal year 2011.¹¹
- **Labor** – This included contract costs, and wages and benefits for pilots, RNs, EMT-Ps, EMTs, aircraft technicians and mechanics, dispatch or air traffic controllers, and any other position (such as managerial positions, medical direction, respiratory therapists, etc.).
- **Non-labor** – Expenditures included items for all lease payments (i.e. hangar, aircraft, and land lease payments, not including contract expenses), fuel, insurance, aircraft parts, medical supplies, maintenance and equipment update costs, training and development, annual depreciation, and other non-staffing expenditure.
- **Capital** – This included information on the frequency and cost of purchases, such as aircraft, aviation and medical equipment, and any other equipment.

⁹ Entries in the surveys that appeared to be mistyped, inaccurate, or questionable were flagged for follow-up and efforts were made to contact the program director. Data in this analysis represent all corrections and refinements to data originally provided.

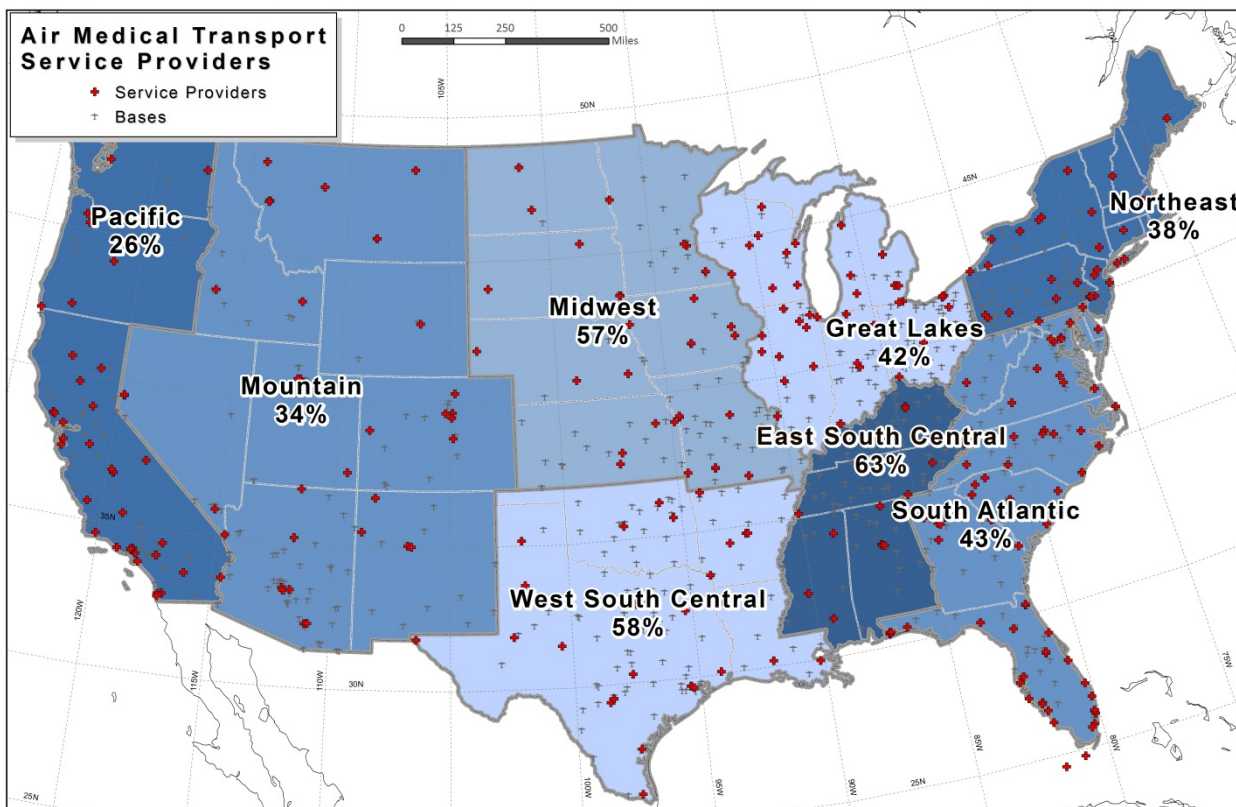
¹⁰ Reasons for not including responses include: incomplete responses; questionable information resulting in cost or staffing factor outliers.

¹¹ Specifically, the flaws in these underlying cost and volume data make reliably reporting average cost per patient transport factors and average patient transports per aircraft factors impossible at the national and regional levels. As a result, EPS excluded these factors from the report and revised the methodology with regard to the estimation of industry economic impacts.

Survey Response by Region

In 2011, the Center for Transportation Injury Research's ADAMS database contained a record of 929 rotary wing aircraft in the U.S., of which 440 are accounted for in this study (47 percent). The analysis utilizes both back-up aircraft (36) and staffed (404) in the analysis for specific purposes.¹² Survey responses ranged from a representation of 26 percent of aircraft in the Pacific region to a representation of 63 percent of aircraft in East South Central (**Figure 9**).¹³

Figure 9
Survey Response by Region



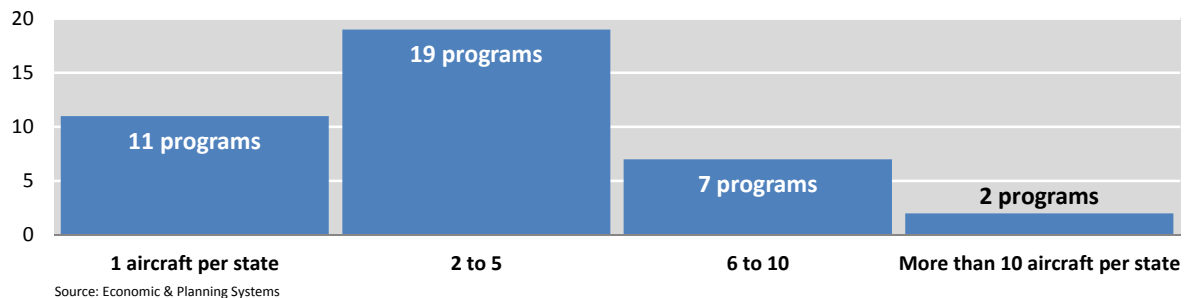
¹² The distinction was made between back up vehicles and staffed vehicles for the purpose of developing average staffing factors per aircraft. Back-up vehicles are often available to programs through a contract or agreement with a base in a neighboring jurisdiction or within some reasonable fly zone. The staffing counts provided by each survey taker are, therefore, representative of only the staffing for "staffed vehicles".

¹³ It is important to note that the percentages shown represent survey response rate by region, not air medical transport coverage by region.

Program Scale

Responses came from programs in 40 states representative of different scales of operation. A majority of programs (33) operate in a single state, while the remaining seven operate in two or more states. Nearly half of all programs operate between two and five rotary wing aircraft per state (**Figure 10**). Less than 30 percent operate a single aircraft, but more than 20 percent operate six or more rotary wing aircraft per state.

Figure 10
Rotary Wing Aircraft per State per Program



Types of Programs

A wide variety of AMT program models operate across the U.S. today. Whereas traditional hospital-based programs still account for a portion of the rotary wing industry, they no longer account for its largest portion. Community-based models and hybrids (or alternative-delivery models) have become more prevalent, where, for example, aircraft under these business models may serve any number of regional facilities and in some cases, may serve a consortium of facilities. Under these different program models, ownership structures differ, staffing structures differ, and, as a result, cost structures can differ.

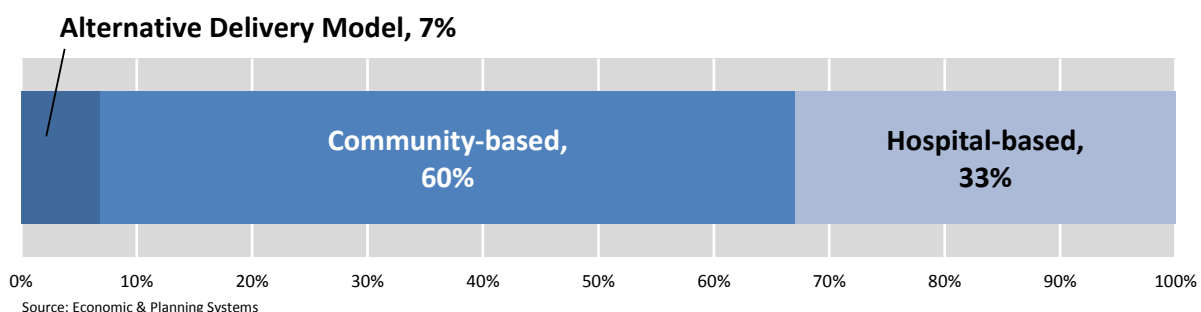
- **Community-Based Model** – Many of the bases to be established in the last decade can be described as community-based programs, i.e. not associated with a particular hospital or facility. Often they are located in independent locations, such as airports or stand-alone locations.
- **Hospital-Based Model** – These are the most traditional of programs, though there are currently multiple models within this program type. Usually, a hospital-based aircraft serves exclusively its parent hospital or consortium of associated regional hospitals. In terms of staffing, the most traditional hospital-based program employ their medical staff based at the hospital, but not necessarily their pilots or mechanics/technicians. Some programs may own and operate their aircraft, but may still not employ their own pilots. In other cases, the medical crew may not be employed by the hospital.
- **Alternative Delivery Model** – Sometimes called “hybrid” models, these programs are commonly a cross between hospital- and community-based models, and include non-profits and government entities, as well as for-profit models. Some describe themselves as consortiums of hospitals in multiple local jurisdictions, i.e. not aligned with a particular facility. With such a program, a patient could be transported to the medically appropriate or

requested facility regardless of where the aircraft is based. Others are independent 501(c)3 organizations or public use or governmental entities.

A majority (60 percent) of programs represent community-based models. Approximately 33 percent are traditional hospital-based operations, and 7 percent are alternative-delivery models, many of which include ownership structures that are associated with consortiums of hospitals, as mentioned previously (**Figure 11**).

In today's environment, there are many different business models. Most of them, at least those identified in this study, could be characterized as some sort of "hybrid" model, where a vendor provides some part of the labor or non-labor components of an operation. In several cases, multiple vendors are used to provide different aspects of the operation. For example, one vendor might provide parts and maintenance, while another provides a specialty medical team, such as respiratory therapists.

Figure 11
Distribution of Programs Responding to Survey



Other Characteristics

The survey instrument included several questions regarding other general characteristics of programs (**Table 1**). From a funding perspective, programs identified whether they received any public funding. Only a handful identified that this was among their sources of funds (7 percent of programs overall and none of the community-based programs). Programs also identified whether they owned their own aircraft, and whether they held the FAA Part 135 certificate. More than three-quarters of programs indicated owning their aircraft with community-based programs at nearly 90 percent, but the portion of those programs also holding Part 135 certificates was usually less. Except for community-based programs, where all own their aircraft and hold the Part 135 certificates, only 75 percent and 20 percent of alternative-delivery models and hospital-based models, respectively, also hold their Part 135 certificates.

Table 1
General Statistics by Rotary Wing Program Type

	Responses	Programs Responding "Yes"		
		Funding from Public Revenue (i.e. taxes)	Programs Owning Aircraft	Part 135 Holder
Rotary Wing Program Types				
Alternative Delivery Model	6	17%	67%	50%
Community-based	9	0%	89%	89%
Hospital-based	26	8%	77%	15%
Total	41	7%	78%	37%

Source: Economic & Planning Systems

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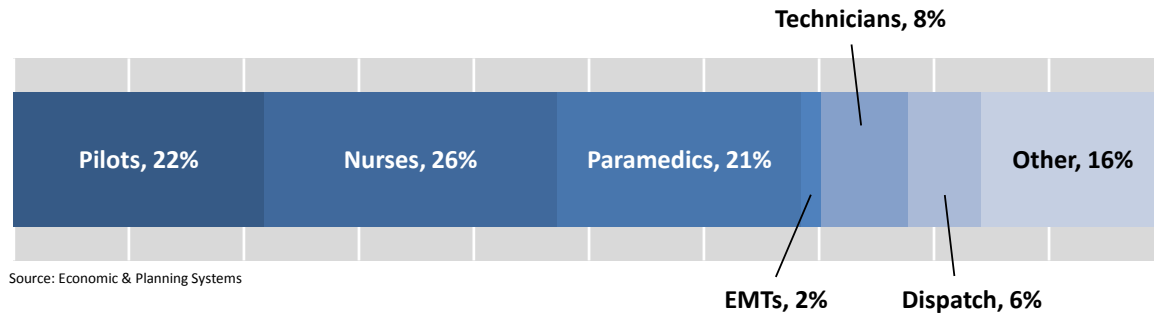
Staffing Models

The survey represents 8,570 jobs (full-time and part-time, as well as payroll versus contract positions) and 8,176 full-time equivalents.¹⁴ The following categories of positions were decided as most representative of an air medical transport program: pilots, nurses, paramedics, EMTs, aircraft technicians or mechanics, dispatch or air traffic control, other.¹⁵ Nurses, pilots, and paramedics generally comprise the largest portion of aircraft staffing (**Figure 12**).

¹⁴ Defined as the sum of full-time jobs and a factor of 0.5 part-time positions. See also Appendix **Table B-3**.

¹⁵ Can include management, administrative support, program direction, flight director, or other medical personnel, such as respiratory therapists.

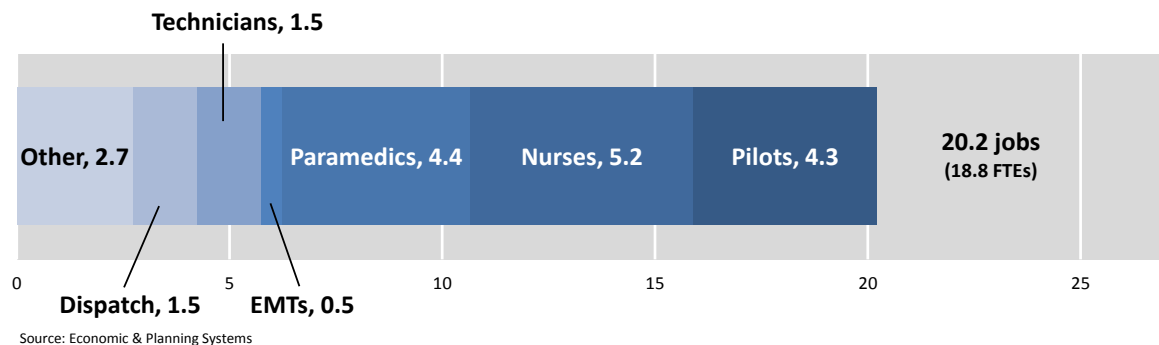
Figure 12
Rotary Wing Program Staffing Portions



On average, each rotary wing aircraft is staffed with an average of 20.2 jobs, including full- and part-time positions, or 18.8 full-time equivalents (FTEs), as shown in **Figure 13**. While staffing models are built around the Federal Aviation Administration's duty requirements, data collected through the survey indicates that some program types staff their aircraft with more pilots, for example, than the required 4, which raises the overall position average to 4.3 as shown.

As illustrated in later in this report, detailing the development of industry activity factors, the median number of jobs per aircraft (18.7) is more representative of the midpoint of staffing factors for the programs surveyed in this study.

Figure 13
Average Jobs per Rotary Wing Aircraft



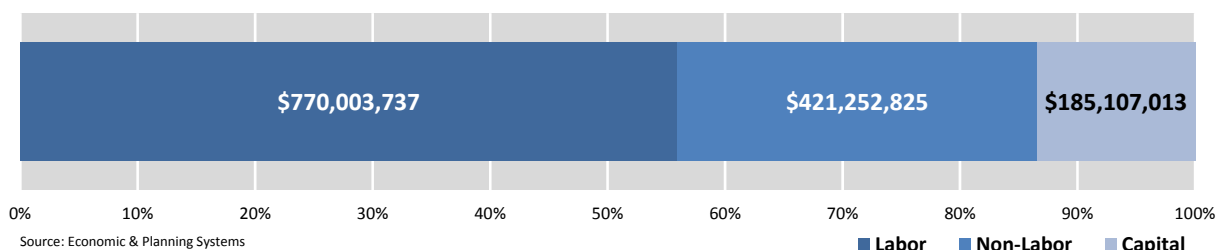
As for contract labor, programs contract for a variety of staffing needs, though typically for pilots and mechanics. Programs in this study also indicated they contract for medical direction, aviation leadership, management, specialty teams (such as respiratory therapists), nurses, paramedics, and dispatch services. Of the 28 programs that identified themselves as utilizing contract services, 18 of them have a contract that covers pilots (or aviation staff), mechanics and maintenance costs (including aircraft parts).

Operational Costs

Annual operational costs of rotary wing programs include labor, the purchase of goods and services (non-labor), and capital purchases.¹⁶ Information presented in this section was gathered from each program in aggregate and apportioned by state of activity and delineated by type of aircraft operations. It was anticipated that estimating costs geographically (for those operations serving multiple states) would be too difficult. (A full description of the methodology is found in Appendix B).

Operational costs are divided into two major categories. Labor, a fairly fixed component of operational costs, accounts for the largest part of a program's budget—on average, 57 percent (**Figure 14**). Non-labor (e.g. lease payments, fuel, insurance, etc.) accounts for 30 percent, and annual average capital purchases account for the remaining 13 percent. In total, operational costs for the 44 rotary wing programs responding was more than \$1.4 billion.¹⁷

Figure 14
Annual Rotary Wing Program Cost Proportions



Regional Cost Variation

This section highlights some features of a regional analysis of the data collected to validate its utility in applying the underlying labor and non-labor cost information to the entire U.S. rotary wing AMT industry later in the report. The following two charts illustrate an evaluation of the variation that exists between regional labor and non-labor costs and illustrate whether these variations comport to independent measures of regional costs. The basis for the analysis is the reality that operational costs can vary regionally depending on availability of labor, production of goods, and the availability of services. The analysis depicts the relative robustness of the data collected from a regional perspective.

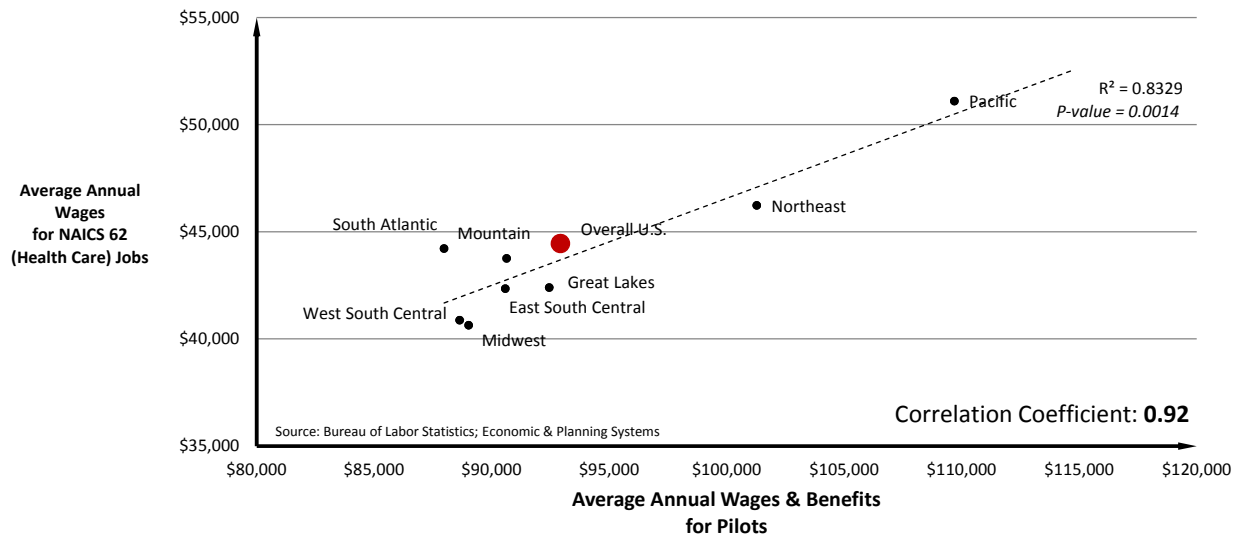
¹⁶ Except for a question on the survey to understand whether a program is funded in part by public revenue sources, this study did not collect information on charges per transport or any other revenue source.

¹⁷ Does not include bad debt or depreciation.

Labor Cost Variation

Salary information provided by individual programs throughout the U.S. generally clustered around averages for each position (i.e. pilots, nurses, mechanics, etc.). Some regional variations existed; however, to ensure these variations were reasonable, regional wages and benefits averages were evaluated using a correlation test against regional average wage data from the U.S. Bureau of Labor Statistics (BLS).¹⁸ For example, pilot wages and benefits, which correlate well to BLS averages, reveal an acceptable degree of variation between labor rates (Figure 15).¹⁹

Figure 15
Average Rotary Wing Pilot Salaries and Regional Labor Costs



Non-Labor Costs

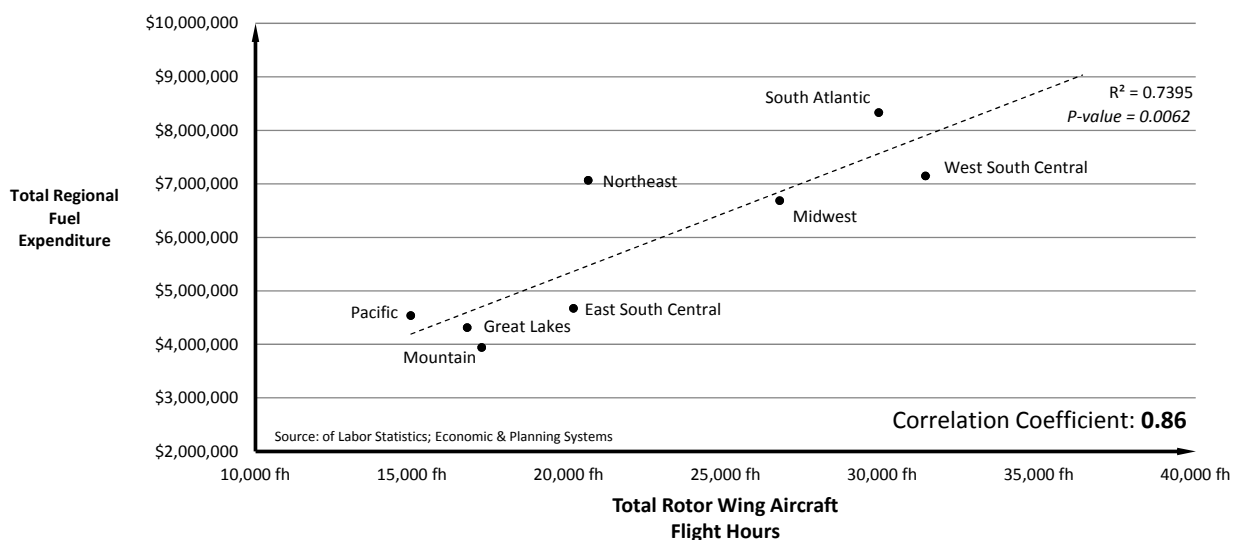
Similarly, there are variations between regional cost averages for non-labor aspects of operations. As with labor costs, while each component is clustered around an average, there is variation that can be evaluated against other metrics to ensure reasonableness of variation. For each component of non-labor cost (e.g. fuel, insurance, aircraft parts, medical supplies, etc.), metrics such as flight activity, hours flown, loaded patient miles, and patient transports were used to measure linearity between regional cost averages and program statistics. As an example, there is a relative linearity between total regional fuel costs and total regional flight hours (Figure 16). The correlation here is strong, although some variation here is likely due also to the scale of contracts by which programs purchase fuel.²⁰

¹⁸ The correlation coefficient, which ranges from 0 to 1, is used to gauge how well a set of values (pilot earnings in this example) fall in line with independent values (regional salaries). The closer the coefficient is to 1, the greater the positive correlation.

¹⁹ In the event that a program contracted for pilots and exact expenditure amounts for contracted positions were unavailable, program directors were either contacted to identify average salaries for these positions or regional industry averages for such positions were applied using secondary sources. The Critical Care Transport Workplace and Salary Survey for 2011 and 2012 were used to identify benchmark salary ranges, as well as NAICS Industry 62 (Health Care and Social Assistance). Benefits are estimated as 25 percent of total wages. Refer to Appendix Table B-4 for more detail.

²⁰ Further variation in this and other non-labor costs is the result of a wide variety of methods by which programs are charged for contracts by vendors. Many programs have some variation on the "power-by-the-hour" fee structure, whereby the program is

Figure 16
Rotary Wing Aircraft Flight Hours and Regional Fuel Costs



Capital Purchases

The survey included questions regarding the type of capital purchases made, including aircraft, ground ambulances, medical equipment, aviation equipment, or other types of capital. Respondents indicated what cost they incur for a variety of capital purchases based on previous purchases made. Costs for aircraft, for example, have increased considerably in the past and are anticipated to continue to do so in the future, according to rotary wing service provider representatives. As a result, these estimates are likely to underestimate future capital purchase amounts.

Aircraft

Overall, estimated annual average capital purchases are approximately \$400 million, of which it is estimated that 90 percent is purchased domestically – approximately \$360 million. Aircraft purchases, which generally account for 67 percent of total capital purchases are estimated to be \$241 million annually for the industry (**Figure 17**). This equates to the purchase of approximately 60 aircraft per year at an average of \$4 million per rotary wing aircraft (in the range of a mid-size single-engine rotary wing aircraft)²¹.

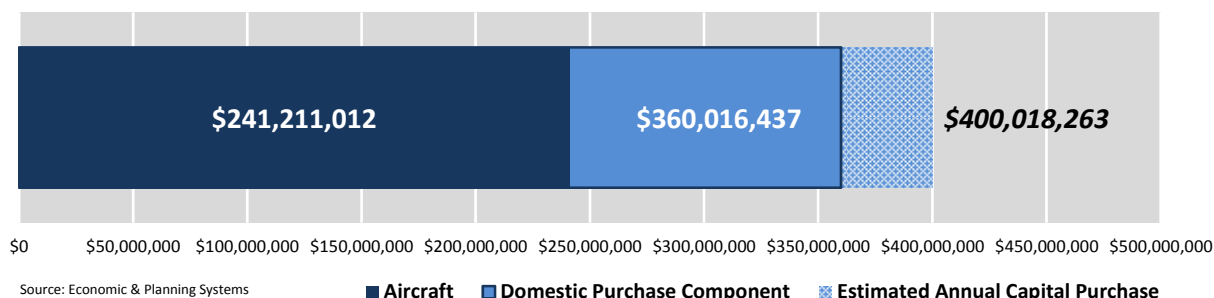
On average, programs purchase aircraft every nine years (**Table 2**), though alternative-delivery models and community-based models indicate they make purchases with slightly greater

charged by the hours it flies per month as well as a monthly fixed-fee. Such a fee generally covers maintenance, parts, and sometimes a pass-through for insurance or overhead. It can also include aircraft hangar lease costs, fuel, and staff training expenses. Overall, most contracts are covered through some type of fee whether based on a fixed-variable fee structure on hours flown per month or on the number of patients transported. Refer to Appendix **Table B-5** for more detail.

²¹ This comports with the other survey data findings that suggest average annual expenditures on aircraft purchase are approximately \$440,000 and that aircraft are purchase at average intervals of every 9 years.

frequency (8.0 and 7.3 years respectively).²² Hospital-based programs, on the other hand, purchase aircraft an average of every 10.3 years.

Figure 17
Estimated Annual Capital Purchases



Other Capital Purchase

Some programs indicated major capital purchases were made infrequently, e.g. every 20 years or more, and others indicated purchases as frequently as once a year. As with operational costs, the magnitude and frequency of capital purchases are reflective of many factors, such as the scale and type of operation and geographic setting.

A much smaller portion of the survey respondents indicated they purchased ground ambulances. For those that did, the average frequency was slightly less than every five years. Here, there was little variation between hospital-based and community-based programs, but alternative delivery models indicated purchase of ground ambulances less frequently.²³ The purchase of medical equipment had the least amount of divergence in periodicity, averaging approximately every five years.

Table 2
Frequency of Capital Purchase

	Capital Purchase Category				
	Aircraft	Ambulances	Medical Equipment	Aviation Equipment	Other
Average Frequency	Every 9.0 yrs	Every 4.7 yrs	Every 5.1 yrs	Every 4.3 yrs	Every 3.8 yrs
Frequency					
Every 1 to 4 years	10%	40%	40%	40%	40%
Every 5 to 9 years	30%	60%	53%	30%	30%
Every 10 to 14 years	40%	0%	7%	30%	30%
Every 15 or more years	20%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Source: Economic & Planning Systems

H:\23889-Economic Impact of Air Medical Industry\Data\23889-Survey DATA-March 2013.xlsx\F.5 Table (2)

²² These averages are highly influenced by the formation rate of programs described as Alternative Delivery and Community-Based models. As such, these programs seem to have been purchasing aircraft with greater frequency than hospital-based programs.

²³ The data are too thin here to be conclusive on the periodicity of ground ambulance purchase.

Industry Activity Factors

The rotary wing industry's primary (or "direct", as referred to in the following sections) activity is defined as transporting patients with aircraft and supporting jobs per aircraft. The cost of providing this service is defined as the industry's direct spending, also detailed in the following section, which includes labor and non-labor costs, such as management, administration, accounting, legal, maintenance, and capital purchases.

This section presents information regarding the cost of the industry's direct spending, which is used to calibrate industry activity inputs to the economic impact analysis. These metrics are estimated as ranges of costs to account for the variety and differences in programs and geographies represented by the survey data, as well as the distribution of program types, levels of service, and the variations in program ownership structures. Specifically, ranges of direct operational costs were determined on a per rotary wing aircraft (or per base) basis.

Direct Spending (Output)

Annual operational costs per rotary wing aircraft base generally ranges between \$2.2 million and \$2.7 million, including operations and maintenance, insurance, building and lease payments, and salaries, but excluding the costs of annualized capital purchases, as illustrated in the distribution of aggregated data presented in **Figure 18**²⁴. While on average, annual operational costs per aircraft are approximately \$2.45 million, annual operational costs can exceed as much as \$8.0 million per aircraft per year because they are highly dependent on the type of aircraft used, staffing types and levels, general business and operational model variations, level of administrative support, as well as regional economic factors.

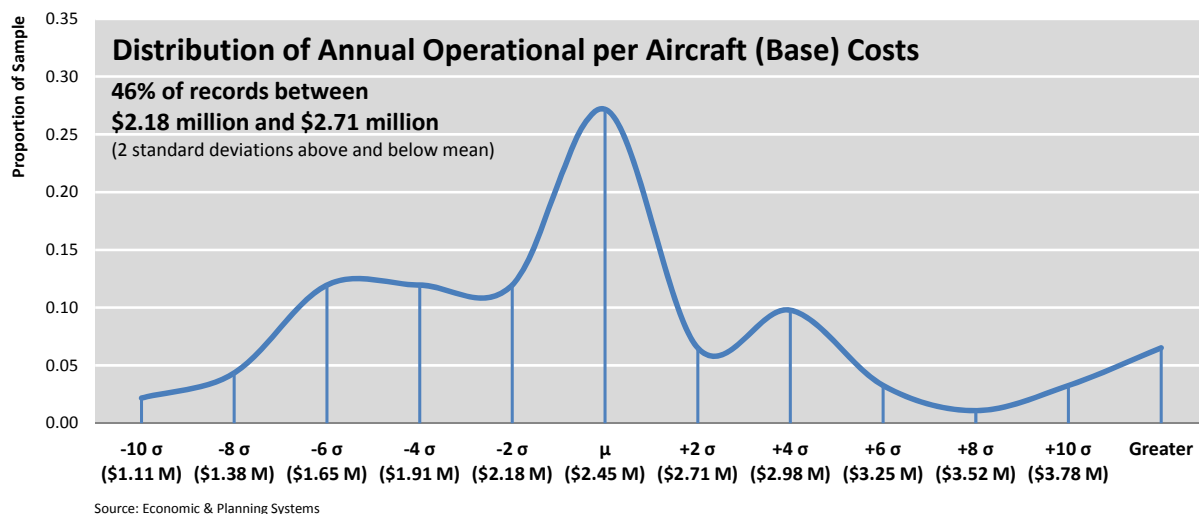
Using this cost information as the basis for extrapolation, it is estimated that total annual direct spending (output) for the rotary wing industry is approximately \$2.28 billion²⁵, ranging between \$2.18 billion and \$2.52 billion. (Note: This estimate excludes bad debt and depreciation.) As a point of comparison, in 1991, total revenues (not costs) for the industry (rotary and fixed wing aircraft) were estimated to be approximately \$422 million (in 2011 dollars).²⁶

²⁴ The range defined here reflects a distribution of annual operational costs that are not normally distributed around the mean, as are data which fit a conventional Bell curve. The distribution of annual costs presented here reflect not only the broad spectrum of program types but also the inconsistency among programs' operational efficiencies and scale, particularly given that programs responding ranged from single aircraft programs to multi-state operations.

²⁵ Based on a total of 929 rotary wing aircraft in the U.S. in 2011.

²⁶ Weil, Thomas P: Health care reform and air medical transport services. *Journal of Emergency Medicine*. 1995; 13:381-387. At the time, there were significantly fewer aircraft operating.

Figure 18
Distribution of Annual Base (per Aircraft) Operational Costs

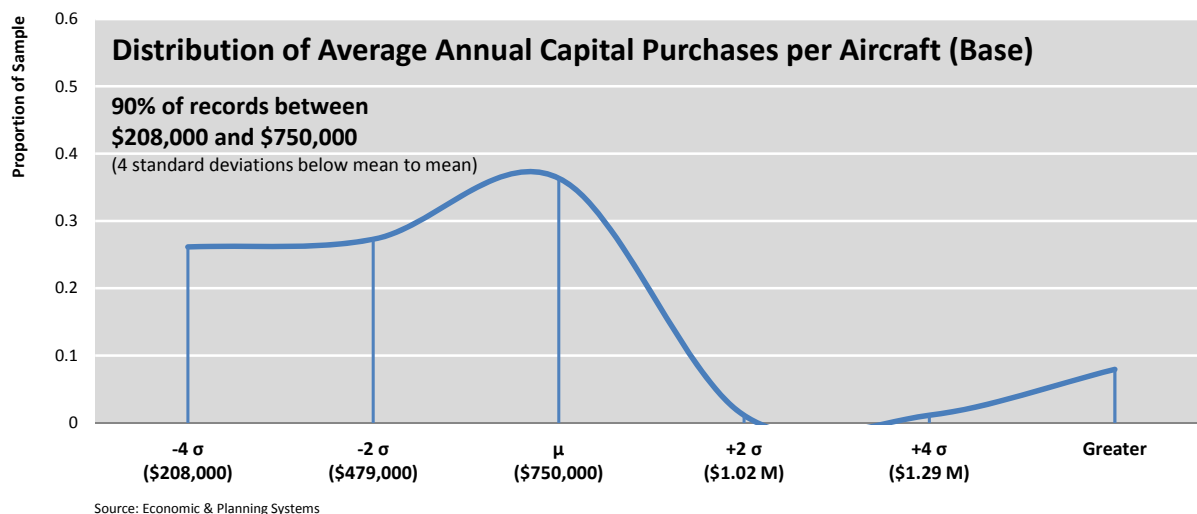


Annual costs associated with capital purchases reflect a variety of factors, including the age of the program (i.e. the extent of its existing capital and equipment), the scale of the program (i.e. the number of bases), and the operational or ownership structure of the program (i.e. whether its pilots and/or aircraft operations are contracted). Furthermore, each type of capital purchase, as detailed in the previous chapter, occurs at different intervals. For example, aircraft are generally purchased every 9 years, according to data collected through this survey. Other aviation equipment is purchased every 5 years, for example.

As such, the aggregated survey results indicate that the average annual average capital purchase amount per base is approximately \$750,000 per year (illustrated in **Figure 19**)²⁷. As illustrated, 90 percent of programs spend less than this amount per year, whereas the median annual average capital purchase amount is approximately \$410,000, a figure more representative of the industry's capital purchase activity. Using this cost information as the basis for extrapolation, it is estimated that total annual direct spending (output) related to capital purchases is approximately \$444.9 million, ranging between \$192.9 million and \$697.0 million.

²⁷ This amount is weighted according to the number of rotary wing aircraft/bases a program has, as well as how frequently each type of capital purchase is made.

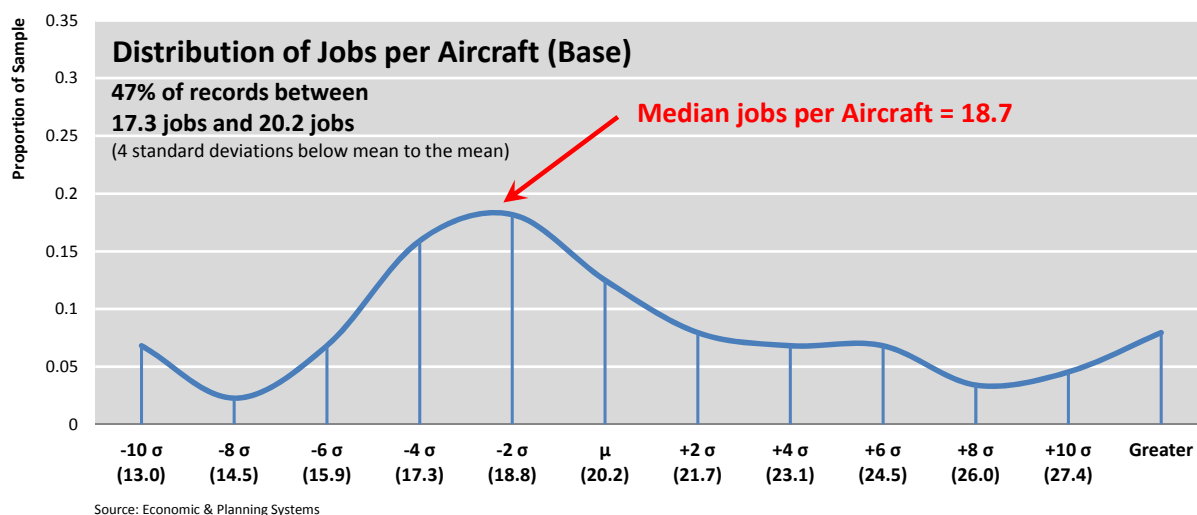
Figure 19
Distribution of Annual Average Capital Purchases per Base



Direct Industry Employment

Based on the information collected from the survey, rotary wing aircraft are staffed with an average of 20.2 jobs per aircraft, as illustrated in **Figure 20**. The median jobs per aircraft, however, is 18.7, a number more accurately representative of the midpoint of the distribution. Using the median, it is estimated that the entire industry has approximately 17,400 full- and part-time employees.

Figure 20
Distribution of Jobs per Aircraft



5. ROTARY WING INDUSTRY BENEFIT

The rotary wing industry is an integral part of the national emergency health care system. Its services speed, optimize, and integrate the critical care received by patients from the start of their emergency through treatment at a hospital. In addition to providing valuable health benefits to patients, the industry makes a significant contribution to the economy by supporting quality jobs and generating spending on goods and services.

The economic benefits of this industry are presented in this chapter in terms of its direct, indirect, and induced economic activity. The benefits are described at a national and regional level, providing guiding information about interpreting the findings at a more localized level.

Definitions

Economic Multiplier Effect

The basic concept of a “multiplier effect” or “ripple effect” is that an initial purchase of a good or service (i.e. a patient transport) generates additional economic activity associated with spending on upstream suppliers (inputs to production) and employee household spending. For example, demand for a patient transport generates demand for purchase of fuel for aircraft, which in turn generates demand for petroleum production, as well as oil and gas exploration. In addition, demand for household purchases (e.g. groceries, clothing, housing, etc.) is generated by the wages and benefits of employee households.

- The “**direct benefit**” is the value of inputs (i.e. labor and non-labor costs) purchased by the final demand industry.
- The “**indirect benefit**” is the value of inputs (i.e. also labor and non-labor costs) purchased by supporting industries.
- The “**induced benefit**” is the value of goods and services purchased by all workers whose wages and benefits are affected by a change in final demand to the industry.

Economic Effects

Economic effects are expressed in multiple terms, such as output (i.e., sales or spending), earnings (salaries plus employer-paid benefits, including proprietor income), employment (jobs), and value-added (equivalent to GDP).

- **Output** – This is the sum of all value-added and intermediate inputs, which are goods and services used by an industry to produce output.
- **Wages and Benefits** – This is the wages and salaries of employees, including employment benefits paid by the employer.
- **Employment** – This includes the number of full- and part-time jobs.
- **Value-Added** – This is comparable to Gross Domestic Product (GDP). It includes the total value of income generated from production, employee compensation, payments to government (taxes), and measures of profit or return on investment.

Total Economic Benefit

The operational and capital purchase activity of the rotary wing industry nationwide is an integral part of health care and social services. While a small portion (19,000 direct jobs related to operations and capital purchases) of the overall health care industry, its economic activity carries a high employment multiplier (i.e. ripple effect) of over 2.3 (**Table 3**). Specifically, demand for more than 24,300 indirect and induced jobs²⁸ is generated.

In total, the rotary wing industry supports wages and benefits of approximately \$2.6 billion, averaging annual salaries (plus benefits) of \$60,600.²⁹ Total value-added (GDP) is nearly \$3.7 billion, and the industry's total output (i.e. total spending) is \$6.3 billion per year. The following are breakdowns of the direct, indirect, and induced benefits of the industry.

- **Direct Benefit:** The operational and capital purchase activity of the rotary wing industry supports more than 19,000 jobs per year with total wages and benefits of approximately \$1.4 billion, averaging salaries (plus benefits) of more than \$71,000 per year. The industry's direct value-added (GDP) is estimated at \$1.5 billion, and total output (spending) is approximately \$2.7 billion.³⁰
- **Indirect Benefit:** Indirectly, the rotary wing industry direct economic activity supports more than 9,300 jobs with wages and benefits of approximately \$520 million with average salaries (plus benefits) of more than \$55,800 per year. Total value-added of the indirect activity is approximately \$772 million, and total indirect output is approximately \$1.3 billion. Breakdowns of indirect employment are provided later in this section.
- **Induced Benefit:** The induced economic activity, which results from employee's spending (i.e. households), results in an additional 15,000 jobs with wages and benefits of approximately \$759 million. In addition to notable portion of these jobs occurring in the retail sector, which encompass a wide range of industries, many of these jobs also fall in other manufacturing industries. Average salaries (plus benefits) of these jobs is approximately \$50,600 per year, and the total indirect value-added is estimate to be \$1.3 billion. Total induced output is approximately \$2.3 billion per year.

²⁸ 43,353 total jobs – 19,037 direct jobs.

²⁹ U.S. median income in 2011 was \$50,054.

³⁰ This estimate excludes the figures of annual total depreciation estimated for the industry. Depreciation is estimated to be approximately \$285 million per year for the rotary wing AMT industry. See also Appendix **Figure B-1** for a breakdown of direct spending by industries.

Table 3
Total Economic Benefit of Rotary Wing Industry Operations & Capital Purchases

	Economic Activity			Total Benefit
	Direct Benefit	Indirect Benefit	Induced Benefit	
Direct Benefit				
Jobs	19,037	9,312	15,004	43,353
Wages & Benefits	\$1,350,603,405	\$519,949,342	\$758,706,716	\$2,629,259,464
Value-Added (See Note 1)	\$1,542,820,545	\$772,488,436	\$1,346,911,918	\$3,662,220,898
Spending / Output	\$2,673,577,860	\$1,345,504,713	\$2,308,612,968	\$6,327,695,541
per Job Factors				
Wages & Benefits	\$70,948	\$55,836	\$50,566	\$60,648
Value-Added	\$81,045	\$82,956	\$89,768	\$84,475
Spending / Output	\$140,445	\$144,491	\$153,863	\$145,958

[Note 1]: Value-added is defined as the total income generated from production. It consists of employee compensation, government payments (i.e. taxes on production and imports), and returns of investments (i.e. operating surplus). This measure is equivalent to GDP.

Source: Economic & Planning Systems

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Operational Benefit

The largest component of the rotary wing industry economic activity is its operations. This section describes the benefit of the industry from that standpoint. Operations are defined as the spending on labor and non-labor activity, excluding annual depreciation and capital purchases. The benefits of the industry's spending on capital purchases are discussed independently.

In total, the rotary wing industry generates more than \$5.5 billion in total annual output (**Table 4**). In addition to its direct employment base of more than 17,400 jobs, the industry supports a total of 38,400 jobs per year. Including its own payroll, wages and benefits for these jobs totals approximately \$2.4 billion, averaging salaries (plus benefits) of \$62,800 per year. Annually, value-added totals approximately \$3.3 billion.³¹

Viewed differently, the industry's economic activity generates a total of nearly 41 jobs per rotary wing aircraft (including the 18.7 directly-staffed jobs per aircraft). Each aircraft in operation supports nearly \$2.6 million in wages and benefits, more than \$3.5 million in value-added, and approximately \$5.9 million in total spending.

- **Direct Benefit:** As stated previously, the direct effects are those that describe the employment, wages and benefits, value-added, and output within the rotary wing industry. With employment of approximately 17,400 direct jobs with wages and benefits of approximately \$1.4 billion, average salaries (plus benefits) are approximately \$73,000 per year. Direct value-added (GDP) is estimated to be approximately \$1.4 billion, and the industry's direct output is approximately \$2.3 billion.^{32,33}

³¹ U.S. GDP is currently approximately \$15 trillion. The Rotary Wing AMT industry contributes approximately 0.02 percent.

³² The industry's output is measured in terms of spending (i.e. purchases or sales) related to patient transports.

³³ Total spending on health care in the U.S., as indicated in Chapter 2 "Economic Framework", was \$2.7 trillion in 2011. Direct spending (i.e. the purchase of patient transports) in the Rotary Wing AMT industry accounts for approximately 0.1 percent of total U.S. healthcare spending.

- Indirect Benefit:** The indirect benefits describe the employment, wages and benefits, output or spending, and value-added of all industries from which the rotary wing industry makes purchases of goods and services (i.e. the supporting or downstream industries). Purchases can include such things as aircraft parts from manufacturers or insurance policies from carriers or through brokers, and it includes the workers those supporting industries employ for their operations, wages and benefits, output and value-added. Approximately 7,800 jobs are indirectly supported by its operations with total wages and benefits of approximately \$445 million, averaging to approximately \$57,200 per year per job.³⁴ Total value-added (GDP) is approximately \$662 million and total output is nearly \$1.1 billion per year.

Table 4
Economic Benefits of Rotary Wing Industry Operations

	Economic Activity			Total Benefit
	Direct Benefit	Indirect Benefit	Induced Benefit	
Direct Benefit				
Jobs	17,372	7,782	13,208	38,362
Wages & Benefits	\$1,268,820,109	\$444,738,585	\$695,613,792	\$2,409,172,486
Value-Added (See Note 1)	\$1,353,469,041	\$661,951,979	\$1,240,112,567	\$3,255,533,587
Spending / Output	\$2,273,130,005	\$1,111,737,956	\$2,082,749,586	\$5,467,617,547
per Job Factors				
Wages & Benefits	\$73,037	\$57,153	\$52,666	\$62,801
Value-Added	\$77,910	\$85,067	\$93,891	\$84,864
Spending / Output	\$130,848	\$142,869	\$157,689	\$142,528

[Note 1]: Value-added is defined as the total income generated from production. It consists of employee compensation, government payments (i.e. taxes on production and imports), and returns of investments (i.e. operating surplus). This measure is equivalent to GDP.

Source: Economic & Planning Systems

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- Induced Benefit:** Induced benefits can be characterized as the third round of spending. These effects are the result of employees in the direct and indirect industries spending their earnings on purchases of goods and services, also referred to as household spending on a variety of items, such as retail (i.e. groceries, clothing, recreational and sporting goods, restaurants/bars, automobiles, etc.), housing, investment, and also health care.³⁵ The induced benefit is an additional 13,200 jobs, \$696 million in wages and benefits (equating to approximately \$52,700 per job per year), \$1.2 billion in value-added, and approximately \$2.1 billion in total output.³⁶

³⁴ Most of the indirect benefit (44 percent) is felt in other areas of the health care and social services industry, such as hospitals. More than 11 percent of the indirect benefit is created in the administrative services sector, along with approximately 11 percent in transportation and warehousing. Approximately 7 percent of the indirect employment generated is manufacturing jobs, and approximately 6 percent are in the field of professional and technical services. Real estate sale, rental and leasing, management, finance and insurance, and wholesale trade comprise an additional 16 percent, and the remaining 5 percent is made up of other industries. Refer to Appendix **Figure B-2**.

³⁵ To avoid double-counting resulting from spending by households on goods and services, the induced jobs, earnings, value-added, and output attributable to the health care and social services industry (NAICS 62, which comprises 60 percent of the rotary wing AMT industry) is excluded from these "induced benefit" totals.

³⁶ The largest portion (20 percent) of induced jobs is generated in the retail industry specifically, followed by food service/eating and drinking places (approximately 11 percent) (which in NAICS categories are not disaggregated), real estate and rental and leasing (11 percent), and finance and insurance (10 percent). (Refer to Appendix **Figure B-3** for more detail.)

Capital Purchase Benefit

Total capital purchases are estimated to be approximately \$445 million per year, of which it was assumed that 90 percent would be realized domestically, translating to approximately \$400 million per year, as shown in **Table 5**.³⁷ Aircraft purchases, which account for two-thirds of the annual average purchases, totals approximately \$241 million (\$445 million x 90 percent capture x 67 percent) and averages 60 aircraft purchases per year.³⁸ Overall, total capital purchases generate demand for nearly 5,000 jobs with wages and benefits of \$220 million (averaging salaries plus benefits of \$44,100 per year). Total value-added (GDP) is \$407 million, and total spending is approximately \$860 million per year.

- **Direct Benefit:** There are approximately 1,700 direct jobs generated by the purchase of aircraft, ambulances, and other major medical and aviation equipment with total wages and benefits of \$82 million (average salaries of \$49,100 per year). These industries value-added (GDP) is approximately \$189 million, and their total output is approximately \$400 million.
- **Indirect Benefit:** The producers of aircraft, ambulances and other equipment purchase supplies from other downstream suppliers, such as steel, composite materials, electronics and computer equipment. There are an estimated 1,500 indirect (supplier) jobs generated with total wages and benefits of \$75 million, averaging salaries (plus benefits) of approximately \$49,100 per year.³⁹ Total value-added (GDP) is approximately \$111 million and total output is nearly \$234 million per year.

³⁷ This assumes that 10 percent of all capital purchases are made from non-domestic sources.

³⁸ One limitation is called “cross-hauling”, described also in Chapter 6 “Input-Output Model Limitations”, when a good or service is both an import and an export of a region. Specifically, aircraft are not manufactured in all regions of the U.S. If a program purchases an aircraft manufactured outside the region, but an aircraft manufacturer is based in the region, the model assumes that the aircraft is “purchased” in the region rather than outside the region. In this case, multipliers at a regional level are likely to be inflated.

³⁹ Approximately two-thirds of the indirect employment is represented by other manufacturing businesses. Administrative services, professional and technical services, management, and health care and social services comprise another 20 percent of the indirect economic benefit. Another 10 percent is made up of other industries such as wholesale trade, transportation and warehousing, real estate sale, rental and leasing, finance and insurance, and information. The remaining indirect industries are miscellaneous industries such as retail, construction, arts and entertainment, accommodations, agriculture, and educational services. Refer to Appendix **Figure B-4** for more detail.

Table 5
Economic Benefits of Rotary Wind Industry Capital Purchases

	Economic Activity			Total Benefit
	Direct Benefit	Indirect Benefit	Induced Benefit	
Direct Benefit				
Jobs	1,664	1,530	1,796	4,991
Wages & Benefits	\$81,783,296	\$75,210,756	\$63,092,925	\$220,086,977
Value-Added (See Note 1)	\$189,351,504	\$110,536,456	\$106,799,351	\$406,687,311
Spending / Output	\$400,447,855	\$233,766,757	\$225,863,382	\$860,077,994
per Job Factors				
Wages & Benefits	\$49,142	\$49,142	\$35,123	\$44,096
Value-Added	\$113,777	\$72,223	\$59,453	\$81,483
Spending / Output	\$240,620	\$152,740	\$125,734	\$172,323

[Note 1]: Value-added is defined as the total income generated from production. It consists of employee compensation, government payments (i.e. taxes on production and imports), and returns of investments (i.e. operating surplus). This measure is equivalent to GDP.

Source: Economic & Planning Systems

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- **Induced Benefit:** As described previously, induced benefits can be characterized as the third round of spending, also referred to as household spending. The induced benefit of employee household spending from the direct and indirect industries generate demand for an additional 1,800 jobs, \$63 million in wages and benefits (equating to approximately \$35,100 per job per year), \$107 million in value-added, and \$226 million in total output.⁴⁰

Regional Benefit

The following provides a high level guide to understanding how the results of this economic impact analysis can be interpreted at a regional level.⁴¹

Multiplier Effect

There are many ways to view the multiplier effects of an industry. Below are several perspectives on the rotary wing industry's direct-effect jobs, wages and benefits, and output multipliers (e.g. a ratio of indirect jobs generated per one direct industry job). Another commonly used metric in economic impact analysis is the number of jobs (including both full- and part-time jobs) created per \$1 million in final demand changes (i.e. patient transport spending).

⁴⁰ Jobs in retail account for the largest portion (18 percent), followed by arts, entertainment, and recreation (11 percent), real estate sales, rental and leasing (10 percent), and other services (10 percent). Finance and insurance, administrative services, manufacturing, and professional and technical services comprise an additional 25 percent of the induced economic benefit. Refer to Appendix **Figure B-5** for more detail.

⁴¹ Detailed multipliers can be found in Appendix **Table B-6** through **Table B-13**.

Direct-Effect Multipliers

The direct effect multiplier is a metric that quantifies the how many total (direct, indirect, and induced) jobs are supported by the industry's direct employment. At the national level, the direct effect employment multiplier is 2.2, meaning for every one job in the rotary wing industry (and the manufacturing jobs resulting from capital purchases), 1.2 additional jobs are supported elsewhere in the economy.⁴² That is, the industry's 19,000 direct jobs support 24,300 indirect and induced jobs ($19,000 \times 1.3$ jobs). Indirectly, each job related to the industry's direct activity supports 0.5 jobs in other industries. And for each direct and indirect job (approximately 28,300 jobs), demand for an additional 0.5 jobs are induced by employee household spending (approximately 15,000 jobs).

While regional differences exist between direct-effect multipliers⁴³, the regional benefit of any rotary wing AMT base is dependent on its scale of operation, its geography, the presence and distribution of various indirect employment industries in the local and regional economy, and to what extent the program uses contract labor, among other factors.

Final Demand Multipliers

Another metric in economic impact assessment is the final demand multiplier, which characterizes the number of additional jobs generated for each additional \$1 million in final demand change for the rotary wing industry. As for the industry's operational impact, an estimated 7.6 jobs are created for every increase of \$1 million in U.S rotary wing AMT operations. A distribution of jobs per \$1 million in total direct spending, illustrated in **Figure 21**, illustrates a median at 7.7 but a wide range of job factors. As mentioned throughout this report, the differences between industry activity factors are due to differences in geography and scale of the local and regional economies. As for the industry's average capital purchase activity, for every additional \$1 million spent on capital, demand for more than 4 jobs is generated.

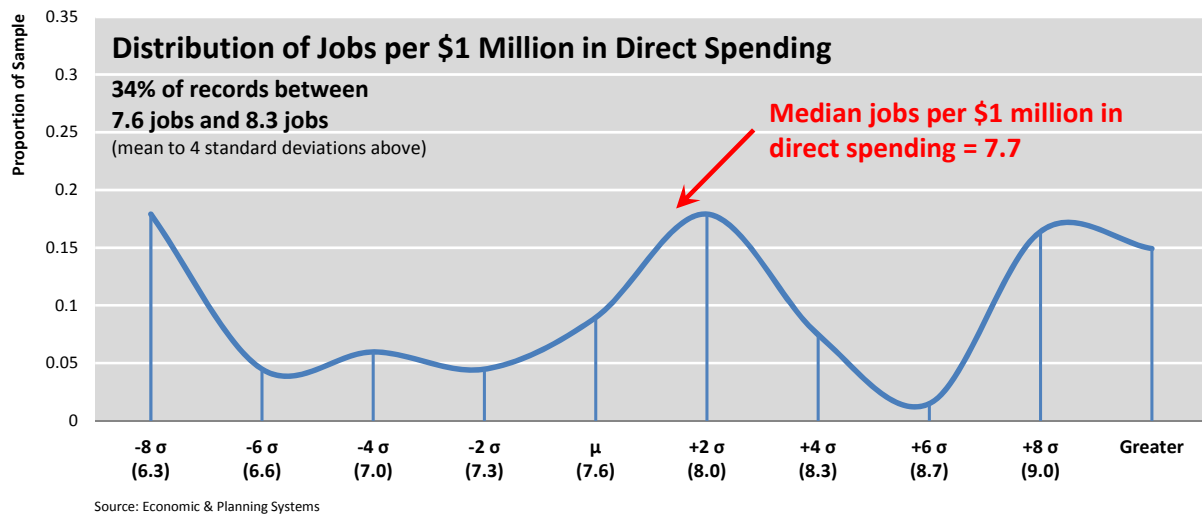
As with other elements of the economic benefit analysis, these multiplier effects are relevant to the rotary wing industry profile from 2011 (labor and non-labor spending components, average patient transports per aircraft, etc.), the distribution of jobs in the national and regional economic areas, as well as other socio-economic and demographic factors.⁴⁴

⁴² A high employment multiplier, however, does not necessarily predict high earnings, value-added, or output multipliers.

⁴³ Refer to Appendix **Table B-14**.

⁴⁴ When any of these conditions change, particularly crucial factors used to develop the economic impact estimates, interpreting these results should be done cautiously.

Figure 21
Distribution of Jobs per Million Dollars in Rotary Wing Industry Final Demand



Variation in Economic Benefit

The regions in this analysis are sufficiently large to eliminate wide variations in economic benefit results, but as applied to smaller geographic areas (states, metro areas, or cities), these factors could yield different results than might actually occur. That is, every region possesses unique types and distributions of employment industries, where some distributions mirror national employment proportions and others have concentrations (or absence) of particular employment sectors.

- **Higher Actual Benefit:** In geographies with a greater presence of manufacturing, for example, the economic benefit of capital purchases may be greater than estimated using the national level multipliers. Similarly, geographies with a greater presence of health care and social services jobs make experience higher economic ripple effects than implied by the national or regional multipliers.
- **Lower Actual Benefit:** On the other hand, if a region has a very low proportion or an absence of manufacturing jobs, the geographies economic benefit as a result of capital purchases could be lower than implied by the national level multipliers.

Economic Benefit per Aircraft

Economic benefit can be estimated at a more “localized” level using per-aircraft benefit factors, but with some caution. As with variation in economic benefit identified above, this approach will be most accurate where local industry presence, types, and distributions mirror those at the regional and national scales.

Total direct employment per aircraft, as presented earlier in the report, is 18.7 full- and part-time jobs, but supports 41.3 full- and part-time jobs in total. Total wages and benefits per aircraft are estimated at approximately \$2.5 million per aircraft, and total spending is approximately \$5.6 million, as shown in **Table 6**.⁴⁵

Table 6
Operational Economic Benefit per Rotary Wing Aircraft by Region

	Economic Activity			Total Benefit
	Direct Benefit	Indirect Benefit	Induced Benefit	
Direct Benefit				
Jobs	17,372	7,782	13,208	38,362
Wages & Benefits	\$1,268,820,109	\$444,738,585	\$695,613,792	\$2,409,172,486
Value-Added (See Note 1)	\$1,353,469,041	\$661,951,979	\$1,240,112,567	\$3,255,533,587
Spending / Output	\$2,273,130,005	\$1,111,737,956	\$2,082,749,586	\$5,467,617,547
per Aircraft Factors				
Wages & Benefits	\$1,365,791	\$478,728	\$748,777	\$2,593,297
Value-Added	\$1,456,910	\$712,542	\$1,334,890	\$3,504,342
Spending / Output	\$2,446,857	\$1,196,704	\$2,241,926	\$5,885,487

[Note 1]: Value-added is defined as the total income generated from production. It consists of employee compensation, government payments (i.e. taxes on production and imports), and returns of investments (i.e. operating surplus). This measure is equivalent to GDP.

Source: Economic & Planning Systems

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⁴⁵ More accurate measures of economic impact at a local level, however, must consider the presence of industries in the area, the presence of suppliers, as well as indirect business (such as the presence of retail or other industries that benefit from household purchases). The most accurate localized benefit would be estimated through a separate analysis.

6. INPUT-OUTPUT MODEL LIMITATIONS

The following is a general overview of the limitations of interpreting the results of an economic impact analysis using an input-output structure.

Source Data

The Bureau of Economic Analysis (BEA) makes two data series available to analysts: an annual series, which includes 62 industries; and a benchmark series, which includes 406 industries. This study uses the benchmark series. The following are brief descriptions of each:

- **Annual Series** – Multipliers from this series are based on more current but less detailed national annual input-output data. In this case, multipliers are based on 2010 benchmark input-output table for the nation and 2010 regional data.
- **Benchmark Series** – Multipliers from this series are based on more detailed but less current national benchmark input-output data. In this case, multipliers are based on 2002 benchmark input-output table for the nation and 2010 regional data.

It was determined that the detail afforded by the benchmark series outweighed the fact that the annual series use more recent input-output data. Moreover, both 2002 and 2010 bear some similarity in that they both followed recessions. These advantages were weighed against the fact that at the beginning of the 2000s, the distribution of employment by sector was different than by the end of the decade (i.e. manufacturing lost nearly 5.6 million jobs during the decade, construction lost 1.1 million, but health care gained 4.1 million jobs).⁴⁶

Overall, choosing the benchmark series allowed for application of more detailed multipliers (with no extra data acquisition cost). On one hand, the estimates of manufacturing impacts could be slightly overstated (though aircraft manufacturing accounts for a very small portion of the overall manufacturing industry employment). On the other hand, the increase in healthcare industry jobs over time implies that the estimates of the rotary wing industry's operating impacts could be understated.

Multipliers

Data from the BEA come in the form of “multipliers”, constructed from a series of national macroeconomic accounts.⁴⁷ First, three tables are used to estimate a domestic direct requirements table, which represents domestic leakage (i.e. imported commodities). From the domestic direct requirements table is created a regional direct requirements table, which accounts for leakage at a regional level. In addition, a regional total requirements table is estimated to account for the purchase of goods and services used by industries and households within a region. With the combination of these tables are generated two types of multipliers:

⁴⁶ Refer to Appendix **Table B-1** for more detail.

⁴⁷ In general, these multipliers are the result of multiple calculations to three national input-output accounts called the “make table”, “use table”, and “import table”.

Type I multipliers for estimating the direct and indirect impacts; and Type II multipliers for estimating direct, indirect, and induced (i.e. household spending) impacts. Between the two types of multipliers available for analysis, there are two subsets of multipliers available:

- **Final Demand Multipliers** – These are ratios of total change in economic activity to a dollar (or million dollar) change in an industry's (i.e. the rotary wing industry) final demand. These multipliers are used to estimate total changes in output, value-added, wages and benefits, and employment.
- **Direct Effect Multipliers** – These are ratios of total change in household earnings per dollar change in the final-demand industry (i.e. the rotary wing industry). For employment, these are ratios of total change in jobs per change in jobs in the final-demand industry.

General Assumptions

RIMS II multipliers are based on the average relationships between the inputs and outputs produced in a local economy. The multipliers are a useful tool for studying the potential impacts of changes in economic activity, but there is always the risk that they can produce “upper-bound” estimates. The BEA encourages analysts to carefully evaluate how closely these assumptions apply to their projects and consider collecting additional information specific to their project to adjust their results.

In this study's case, considerable additional information has been collected to verify all the results generated through the RIMS II multipliers. In this study, EPS has relied on the primary data collected through surveys to make estimates of direct economic benefit, because the rotary wing industry represents a sub-component of the industry identifier (621B00) used to generate the multipliers, which is an aggregation of many ambulatory service sectors and would result in inaccurate measures of wages and benefits, jobs, and output. General model assumptions include:

- **No Supply Constraints** – Multipliers assume that industries can increase demand for inputs and labor as needed to meet additional demand. If a business is already operating at full capacity, then additional inputs may need to come from outside the region, thereby reducing the local impact.
- **Fixed Purchase Patterns** – Multipliers assume that an industry must double its inputs to double its output. If a firm can increase its output without hiring additional employees and without purchasing additional inputs, then the impact of the change on the local economy will be smaller than the impact that is estimated using a full multiplier.
- **Local Inputs** – The method used by RIMS II to develop regional multipliers assumes that firms will purchase inputs from firms in the region before using imports. For example, if a rotary wing AMT base is relocated or opened in a specific region, it is assumed that purchases of most goods and services from supplier (indirect) industries will come from inside the region.
- **Local Supply Conditions, Leakage, and Cross-Hauling** – RIMS II multipliers are adjusted to account for local supply conditions, i.e. the fact that local industries often do not supply all of the intermediate inputs. That is, some purchases must be made from suppliers outside the region, which are called “leakages”, because it represents money that no longer circulates in

the local economy. One limitation is when a good or service is both an import and an export of a region, called “cross-hauling”. For example, aircraft are not manufactured in all regions of the U.S. If a program purchases an aircraft manufactured outside the region, but its own region actually contains an aircraft manufacturer, the model assumes that the aircraft is “purchased” in the region rather than outside the region. In this case, using the capital purchase multipliers at a regional level is likely to produce inflated impact estimates.

- **Regional Feedback** – The model does not account for feedback that may exist among regions. For example, a rotary wing AMT program may purchase aircraft parts from outside its own region, but that aircraft parts manufacturer may contract for accounting or legal services within the first region. As a result, the economic benefit to the first region will be under-stated. The BEA encourages analysts to choose a region that are large enough to encompass a group of interrelated industries.
- **Industry Homogeneity** – Input-output models assume that all businesses in an industry use the same production process. That is, if the production process of a business initially affected by a change in economic activity is not consistent with those implied in the national accounts used to construct RIMS II multipliers, the results will be inaccurate. Such inaccurate results, however, can be avoided with more detailed industry data.

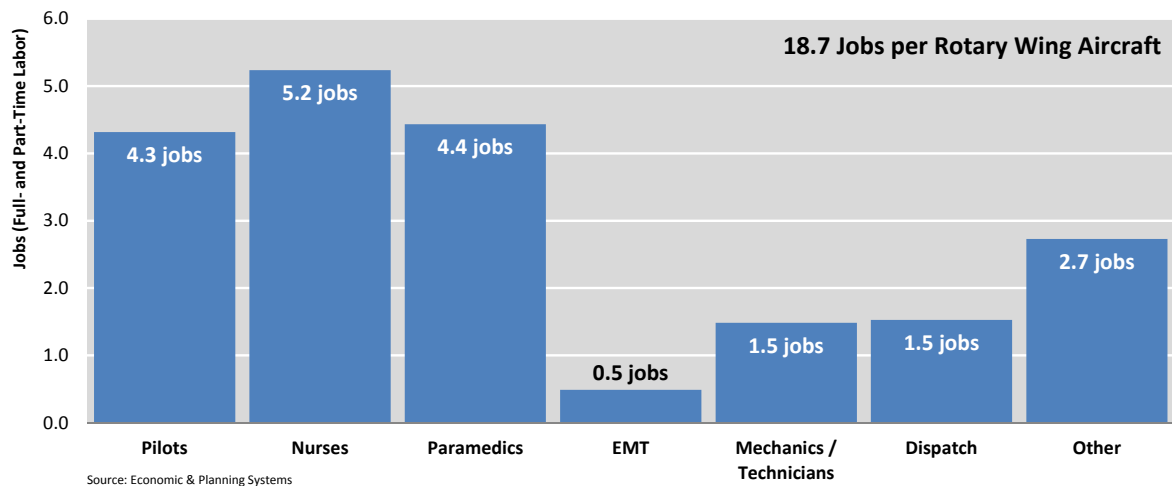
Interpretation of Employment Benefit

The BEA also encourages the analyst to collect sufficiently detailed information in order to interpret results of the impact analysis properly. Specifically, this example illustrates the relevance of understanding the composition of the final demand industry's (i.e. the rotary wing industry) workforce in terms of part-time and full-time jobs, as well as the portion of jobs that may be filled by workforce outside the region.

While it is the case that this study applies a national framework of input-output data to a range of activity metrics collected programs throughout the country, thus ruling out the possibility of operations that "import" labor from outside the U.S., there is good reason to interpret the results cautiously when interpolating the results to a regional level. That is, there are many multi-state operators (i.e. vendors) who have centralized services for a variety of services such as maintenance and dispatch, in particular.

In the event that a new rotary wing aircraft base is opened in one region, but its dispatch functions are contracted and located in the vendor's central location (i.e. a different region), the jobs estimated using the multipliers will need to be adjusted accordingly. That is, out of 18.7 jobs, if 1.5 dispatch jobs are associated with aircraft, these jobs would need to be credited to the appropriate location (**Figure 22**). The same could be true of some of the "Other" positions as well.⁴⁸

Figure 22
Jobs per Rotary Wing Aircraft



⁴⁸ Note that "Other" positions, while not also described by the respondent in the open-ended questions, included a considerable number of various other health-practitioner positions, such as respiratory therapists, medical direction, or program direction. Many respondents indicated some number of jobs in the "Other" category, but a few indicated zero. To the extent that a new operation opens with a full staffing complement, as indicated here, the results of the economic impact assessment would be most relevant.



Appendix A: Rotary Wing Industry Definition

Definition

The following industry subsectors are defined by the Office of Management and Budget's "North American Industry Classification System" (2002). In general, NAICS are built on the conceptual framework of production-oriented or supply-oriented framework that groups establishments into similar categories based on the goods or services they produce. NAICS codes are used by the United States, Canada, and Mexico. The numbering system is hierarchical, the first two digits of a code being associated with one of the 20 high-level sectors:

- 11 – Agriculture, Forestry, Fishing and Hunting
- 21 – Mining
- 22 – Utilities
- 23 – Construction
- 31-33 – Manufacturing
- 42 – Wholesale Trade
- 44-45 – Retail Trade
- 48-49 – Transportation and Warehousing
- 51 – Information
- 52 – Finance and Insurance
- 53 – Real Estate and Rental and Leasing
- 54 – Professional, Scientific, and Technical Services
- 55 – Management of Companies and Enterprises
- 56 – Administrative and Support and Waste Management and Remediation Services
- 61 – Educational Services
- 62 – Health Care and Social Services
- 71 – Arts, Entertainment, and Recreation
- 72 – Accommodation and Food Services
- 81 – Other Services (except Public Administration)
- 92 – Public Administration

Alignment of Industry Categories

The following industries are identified at the six-digit level of detail. Where possible, RIMS II categories (of which there are 406) were identified that were either identical to the NAICS category or properly included it.

NAICS 621910: Air Ambulance Services

This industry accounts for establishment primarily engaged in providing transportation of patients by ground or air, along with medical care. These services are often provided during a medical emergency but are not restricted to emergencies. The vehicles are equipped with lifesaving equipment operated by medically trained personnel.

- RIMS II Category: 621B00
- Costs affected: all labor costs, except mechanics/technicians and dispatch; some non-labor costs, including other capital purchases

NAICS 424720: Business Support Services

This industry comprises establishments primarily engaged in the merchant wholesale distribution of petroleum and petroleum products (except from bulk liquid storage facilities).

- RIMS II Category: 420000
- Costs affected: non-labor costs, including fuel

NAICS 488: Support Activities for Transportation

Industries in the Support Activities for Transportation subsector provide services which support transportation. These services may be provided to transportation carrier establishments or to the general public. This subsector includes a wide array of establishments, including air traffic control services, marine cargo handling, and motor vehicle towing.

NAICS 488190: Other Support Activities for Air Transportation

This industry comprises establishments primarily engaged in providing specialized services for air transportation (except air traffic control and other airport operations). Examples include aircraft services, aircraft maintenance and repair services (except factory conversions, overhauls, rebuilding).

- RIMS II Category: 48A000
- Costs affected: labor costs, including mechanics/technicians and dispatch; non-labor costs, including aircraft hangar rental, maintenance and equipment updates

NAICS 5241: Insurance Carriers

This industry group comprises establishments primarily engaged in underwriting (assuming the risk, assigning premiums, and so forth) annuities and insurance policies and investing premiums to build up a portfolio of financial assets to be used against future claims. Direct insurance carriers are establishments that are primarily engaged in initially underwriting and assuming the risk of annuities and insurance policies.

- RIMS II Category: 524100
- Costs affected: non-labor costs, including a large portion of insurance costs

NAICS 5242: Agencies, Brokerages, and Other Insurance Related Activities

This industry group comprises establishment primarily engaged in (1) acting as agents (i.e. brokers) in selling annuities and insurance policies or (2) providing other employee benefits and insurance related services, such as claims adjustment and third party administration.

- RIMS II Category: 524200
- Costs affected: non-labor costs, including a small portion of insurance costs

NAICS 531000: Real Estate

This industry group comprises establishments that are primarily engaged in renting or leasing real estate to others; managing real estate for others; selling, buying, or renting real estate for others; and providing other real estate related services, such as appraisal services.

- RIMS II Category: 531000
- Costs affected: non-labor costs, including real estate purchase or leasing

NAICS 550000: Management of Companies and Enterprises

This industry group comprises 1) establishments that hold the securities of (or other equity interests in) companies and enterprises for the purpose of owning a controlling interest or influencing management decisions or 2) establishments (except government establishments) that administer, oversee, and manage establishments of the company or enterprise and that normally undertake the strategic or organizational planning and decision-making role of the company or enterprise. Establishments that administer, oversee, and manage may hold the securities of the company or enterprise.

- RIMS II Category: 531000
- Costs affected: labor costs, including management positions

NAICS 561100: Office Administrative Services

This industry comprises establishments primarily engaged in providing a range of day-to-day office administrative services, such as financial planning; billing and recordkeeping; personnel; and physical distribution and logistics for others on a contract or fee basis. These establishments do not provide operating staff to carry out the complete operations of a business.

- RIMS II Category: 561100
- Costs affected: labor costs, including administrative staff

NAICS 561210: Facilities Support Services

This industry comprises establishments primarily engaged in providing operating staff to perform a combination of support service within a client's facilities. Establishments in this industry typically provide a combination of services, such as janitorial; maintenance; trash disposal; guard and security; mail routing; reception; laundry; and related services to support operations within facilities.

- RIMS II Category: 561200
- Costs affected: labor costs, including support staff

NAICS 561410: Business Support Services

This industry comprises establishments primarily engaged in performing activities that are ongoing routine business support functions that businesses and organizations traditionally do for themselves.

- RIMS II Category: 561400
- Costs affected: labor costs, including support staff

NAICS 5324: Commercial and Industrial Machinery and Equipment Rental and Leasing

“This industry group comprises establishments primarily engaged in renting or leasing commercial-type and industrial-type machinery and equipment. The types of establishments included in this industry group are generally involved in providing capital or investment-type equipment that clients use in their business operations. These establishments typically cater to a business clientele and do not generally operate a retail-like or store-front facility.”

- RIMS II Category: 532400
- Costs affected: non-labor costs, including a portion of all lease payments (aircraft, equipment, etc.)

NAICS 532411: Commercial Air, Rail, and Water Transportation Equipment Rental and Leasing

This industry comprises establishments primarily engaged in renting or leasing off-highway transportation equipment without operators, such as aircraft, railroad cars, steamships, or tugboats.

- RIMS II Category: 532400
- Costs affected: non-labor costs, including aircraft leasing

NAICS 541100: Offices of Lawyers

This industry comprises offices of legal practitioners known as lawyers or attorneys (i.e., counselors-at-law) primarily engaged in the practice of law. Establishments in this industry may provide expertise in a range or in specific areas of law, such as criminal law, corporate law, family and estate law, patent law, real estate law, or tax law.

- RIMS II Category: 541100
- Costs affected: labor costs, including legal services

NAICS 541200: Accounting, Tax Preparation, Bookkeeping, and Payroll Services

This industry comprises offices of establishments primarily engaged in providing services, such as auditing of accounting records, designing accounting systems, preparing financial statements, developing budgets, preparing tax returns, processing payrolls, bookkeeping, and billing.

- RIMS II Category: 541100
- Costs affected: labor costs, including accounting services

NAICS 336112: Light Truck and Utility Vehicle Manufacturing

This industry comprises establishment primarily engaged in: 1) manufacturing complete light trucks and utility vehicles (i.e. body and chassis) or 2) manufacturing light truck and utility vehicle chassis only. Vehicles made include light duty vans, pick-up trucks, minivans, and sport utility vehicles. The Federal Highway Administration classifies ambulances as “medium duty” vehicles (see http://ops.fhwa.dot.gov/publications/fhwahop10014/long_f21.htm), but NAICS codes distinguish only between light and heavy duty vehicle manufacturing.

- RIMS II Category: 336112
- Costs affected: non-labor costs, including purchase of ambulances

NAICS 336411: Aircraft Manufacturing

This industry comprises establishment primarily engaged in one or more of the following: 1) manufacturing or assembling complete aircraft; 2) developing and making aircraft prototypes; 3) aircraft conversion (i.e. major modifications to systems); and 4) complete aircraft overhaul and rebuilding (i.e., periodic restoration of aircraft to original design specifications).

- RIMS II Category: 336411
- Costs affected: non-labor costs, including purchase of aircraft

NAICS 336412: Aircraft Engine and Engine Parts Manufacturing

This industry comprises establishment primarily engaged in one or more of the following: 1) manufacturing aircraft engines and engine parts; 2) developing and making prototypes of aircraft engines and engine parts; 3) aircraft propulsion system conversion (i.e., major modifications to systems); and 4) aircraft propulsion systems overhaul and rebuilding (i.e. periodic restoration of aircraft propulsion system to original design specifications).

- RIMS II Category: 336412
- Costs affected: non-labor costs, including purchase of aircraft parts, and aviation equipment capital purchases

NAICS 336413: Other Aircraft Parts and Auxiliary Equipment Manufacturing

This industry comprises establishments primarily engaged in 1) manufacturing aircraft parts or auxiliary equipment (except engines and aircraft fluid power subassemblies) and/or 2) developing and making prototypes of aircraft parts and auxiliary equipment. Auxiliary equipment includes such items as crop dusting apparatus, armament racks, inflight refueling equipment, and external fuel tanks.

- RIMS II Category: 336413
- Costs affected: non-labor costs, including purchase of aircraft parts

NAICS 334511: Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing

This industry comprises establishments primarily engaged in manufacturing search, detection, navigation, guidance, aeronautical, and nautical systems and instruments. Examples of products made by these establishments are aircraft instruments (except engine), flight recorders, navigational instruments and systems, radar systems and equipment, and sonar systems and equipment.

- RIMS II Category: 334511
- Costs affected: non-labor costs, including avionics

NAICS 339112: Surgical and Medical Instrument Manufacturing

This industry comprises establishments primarily engaged in manufacturing medical, surgical, ophthalmic, and veterinary instruments and apparatus (except electrotherapeutic, electromedical and irradiation apparatus). Examples of products made by these establishments are syringes, hypodermic needles, anesthesia apparatus, blood transfusion equipment, catheters, surgical clamps, and medical thermometers.

- RIMS II Category: 339112
- Costs affected: non-labor costs, including medical supplies, and medical equipment capital purchases

NAICS 325412: Pharmaceutical Preparation Manufacturing

This industry comprises establishments primarily engaged in manufacturing in-vivo diagnostic substances and pharmaceutical preparations (except biological) intended for internal and external consumption in dose forms, such as ampoules, tablets, capsules, vials, ointments, powders, solutions, and suspensions.

- RIMS II Category: 325412
- Costs affected: non-labor costs, including pharmaceuticals

NAICS 611430: Professional and Management Development Training

This industry comprises establishments primarily engaged in offering an array of short duration courses and seminars for management and professional development. Training for career development may be provided directly to individuals or through employers' training programs; and courses may be customized or modified to meet the special needs of customers. Instruction may be provided in diverse settings, such as the establishment's or client's training facilities, educational institutions, the workplace, or the home, and through correspondence, television, Internet, or other means."

- RIMS II Category: 611B00
- Costs affected: labor costs, including training and development



Appendix B: Supporting Materials

Table B-1
U.S. Wage and Salary Job Trends, 2000-2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2000-2011		
													Total	Ann. #	Ann. %
Industry Category															
Agriculture, forestry, fishing and hunting	1,201,637	1,178,302	1,163,552	1,163,686	1,162,644	1,170,733	1,167,004	1,172,102	1,175,975	1,149,145	1,154,071	1,167,195	-34,442	-3,131	-0.3%
Mining	511,418	535,322	506,092	500,232	520,092	560,978	617,048	660,276	713,734	641,737	651,918	730,341	218,923	19,902	3.3%
Utilities	847,075	842,104	842,814	829,562	819,996	806,900	803,859	810,884	816,560	821,449	807,673	804,417	-42,658	-3,878	-0.5%
Construction	6,848,386	6,971,224	6,881,948	6,868,738	7,109,982	7,461,913	7,793,430	7,754,947	7,315,195	6,136,403	5,672,913	5,652,439	-1,195,947	-108,722	-1.7%
Manufacturing	17,363,496	16,437,962	15,262,303	14,513,657	14,300,328	14,232,879	14,153,115	13,875,243	13,425,573	11,854,096	11,532,213	11,748,311	-5,615,185	-510,471	-3.5%
Wholesale trade	5,741,228	5,730,553	5,617,612	5,589,242	5,642,764	5,753,058	5,885,436	5,987,452	5,955,341	5,562,324	5,466,844	5,546,159	-195,069	-17,734	-0.3%
Retail trade	15,344,490	15,245,869	15,083,333	14,993,946	15,122,759	15,321,422	15,435,110	15,574,849	15,374,115	14,611,408	14,549,251	14,734,111	-610,379	-55,489	-0.4%
Transportation and warehousing	5,386,807	5,336,691	5,163,227	5,085,388	5,128,053	5,207,741	5,302,583	5,384,734	5,357,858	5,028,657	4,935,603	5,019,736	-367,071	-33,370	-0.6%
Information	3,757,053	3,729,611	3,505,875	3,321,420	3,240,990	3,200,126	3,185,907	3,177,532	3,139,585	2,956,723	2,848,734	2,817,203	-939,850	-85,441	-2.6%
Finance and insurance	5,578,028	5,670,011	5,706,762	5,809,484	5,841,094	5,939,730	6,037,467	6,022,516	5,887,222	5,649,983	5,520,206	5,540,729	-37,299	-3,391	-0.1%
Real estate and rental and leasing	2,074,629	2,089,619	2,082,835	2,099,651	2,130,225	2,176,448	2,203,542	2,200,974	2,157,368	2,017,447	1,961,617	1,955,719	-118,910	-10,810	-0.5%
Professional and technical services	6,919,298	6,966,068	6,770,791	6,744,928	6,886,073	7,171,705	7,502,331	7,738,983	7,918,296	7,586,118	7,567,186	7,783,156	863,858	78,533	1.1%
Management of companies and enterprises	1,783,807	1,716,130	1,695,554	1,660,137	1,696,537	1,743,214	1,785,257	1,839,616	1,895,417	1,855,139	1,854,778	1,914,543	130,736	11,885	0.6%
Administrative and waste services	8,125,498	7,814,981	7,668,220	7,640,043	7,912,042	8,154,658	8,376,060	8,471,253	8,079,181	7,239,599	7,482,610	7,792,540	-332,958	-30,269	-0.4%
Educational services	10,554,237	10,867,485	11,142,579	11,293,097	11,414,685	11,585,660	11,734,366	11,917,643	12,103,006	12,171,846	12,144,279	12,099,791	1,545,554	140,505	1.3%
Health care and social assistance	14,233,766	14,654,566	15,100,815	15,434,396	15,747,988	16,105,507	16,480,734	16,961,966	17,433,674	17,764,982	18,077,213	18,368,506	4,134,740	375,885	2.3%
Arts, entertainment, and recreation	2,071,818	2,132,382	2,157,460	2,183,120	2,229,561	2,252,524	2,286,930	2,348,355	2,380,659	2,323,222	2,300,728	2,314,565	242,747	22,068	1.0%
Accommodation and food services	10,055,329	10,137,542	10,237,965	10,397,431	10,671,681	10,935,115	11,189,512	11,443,712	11,491,913	11,158,761	11,183,469	11,452,980	1,397,651	127,059	1.2%
Other services, except public administration	4,200,336	4,212,868	4,300,198	4,312,477	4,342,607	4,379,843	4,420,427	4,493,606	4,541,233	4,425,121	4,406,249	4,461,141	260,805	23,710	0.5%
Public administration	<u>6,961,574</u>	<u>7,041,074</u>	<u>7,137,200</u>	<u>7,147,222</u>	<u>7,118,635</u>	<u>7,149,265</u>	<u>7,228,408</u>	<u>7,310,897</u>	<u>7,429,907</u>	<u>7,474,515</u>	<u>7,545,067</u>	<u>7,328,607</u>	<u>367,033</u>	<u>33,367</u>	<u>0.5%</u>
Total	129,879,584	129,635,800	128,233,919	127,795,827	129,278,176	131,571,623	133,833,834	135,366,106	134,805,659	128,607,842	127,820,442	129,411,095	-468,489	-42,590	0.0%
All Other Industries	115,645,818	114,981,234	113,133,104	112,361,431	113,530,188	115,466,116	117,353,100	118,404,140	117,371,985	110,842,860	109,743,229	111,042,589	-4,603,229	-418,475	-0.4%
Health Care Jobs	14,233,766	14,654,566	15,100,815	15,434,396	15,747,988	16,105,507	16,480,734	16,961,966	17,433,674	17,764,982	18,077,213	18,368,506	4,134,740	375,885	2.3%
as % of All Jobs	11%	11%	12%	12%	12%	12%	12%	13%	13%	14%	14%	14%			
All Other Health Care Jobs	9,836,761	10,114,139	10,375,057	10,558,915	10,714,900	10,898,551	11,097,702	11,396,662	11,693,754	11,878,528	11,989,227	12,113,447	2,276,686	206,971	1.9%
Ambulatory Health Care Services Jobs (621000)	4,397,005	4,540,427	4,725,758	4,875,481	5,033,088	5,206,956	5,383,032	5,565,304	5,739,920	5,886,454	6,087,986	6,255,059	1,858,054	168,914	3.3%
Ambulance Services (621910)	108,776	112,241	115,949	123,441	128,433	135,245	141,194	148,592	153,850	160,885	165,945	170,569	61,793	5,618	4.2%
as % of Ambulatory Health Care Services	2.47%	2.47%	2.45%	2.53%	2.55%	2.60%	2.62%	2.67%	2.68%	2.73%	2.73%	2.73%			
as % of Health Care Jobs	0.76%	0.77%	0.77%	0.80%	0.82%	0.84%	0.86%	0.88%	0.88%	0.91%	0.92%	0.93%			
as % of All Jobs	0.08%	0.09%	0.09%	0.10%	0.10%	0.10%	0.11%	0.11%	0.11%	0.13%	0.13%	0.13%			

Source: Bureau of Labor Statistics; Economic & Planning Systems

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Table B-2
Population Trends by Age, 2000-2010

	Population		as % of Total		2000-2010		
	2000	2010	2000	2010	Total Change	Ann. #	Ann. %
Age Category							
Under 18 years	72,295,030	74,195,760	26%	24%	1,900,730	190,073	0.3%
18 to 24 years	27,141,150	30,708,214	10%	10%	3,567,064	356,706	1.2%
25 to 44 years	85,042,691	82,228,500	30%	27%	-2,814,191	-281,419	-0.3%
45 to 64 years	61,953,535	81,779,634	22%	26%	19,826,099	1,982,610	2.8%
<u>65 years and older</u>	<u>34,992,194</u>	<u>40,437,581</u>	<u>12%</u>	<u>13%</u>	<u>5,445,387</u>	<u>544,539</u>	<u>1.5%</u>
Total	281,424,600	309,349,689	100%	100%	27,925,089	2,792,509	1.0%

Source: U.S. Census; Economic & Planning Systems

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Table B-3
Rotary Wing Aircraft Staffing by Program Type

	Jobs by Programs Type				as % of Total			
	Alternative Delivery Model	Community-based	Hospital-based	Overall	Alternative Delivery Model	Community-based	Hospital-based	Overall
Total Staff								
Total Jobs (See Note [1])								
Pilots	100	1,345	428	1,873	21%	23%	20%	22%
Nurses	158	1,468	558	2,184	33%	25%	26%	25%
Paramedics	33	1,332	444	1,809	7%	22%	21%	21%
EMTs	25	25	97	147	5%	0%	5%	2%
Mechanics / Technicians	48	468	131	647	10%	8%	6%	8%
Dispatch / Air Traffic Control	14	291	249	554	3%	5%	12%	6%
Other	<u>106</u>	<u>1,039</u>	<u>213</u>	<u>1,357</u>	<u>22%</u>	<u>17%</u>	<u>10%</u>	<u>16%</u>
Subtotal	484	5,966	2,119	8,570	100%	100%	100%	100%
Full-Time Equivalents (See Note [2])								
Pilots	98	1,345	422	1,865	21%	23%	22%	23%
Nurses	150	1,404	515	2,068	33%	24%	27%	25%
Paramedics	25	1,267	367	1,658	5%	22%	19%	20%
EMTs	23	13	70	105	5%	0%	4%	1%
Mechanics / Technicians	48	461	127	636	10%	8%	7%	8%
Dispatch / Air Traffic Control	14	281	232	526	3%	5%	12%	6%
Other	<u>104</u>	<u>1,032</u>	<u>182</u>	<u>1,318</u>	<u>23%</u>	<u>18%</u>	<u>10%</u>	<u>16%</u>
Subtotal	460	5,801	1,915	8,176	100%	100%	100%	100%

[Note 1]: Total jobs includes full-time and part-time staff.

[Note 2]: Part-time staff are assumed on average to be 0.5 full-time positions.

Source: Economic & Planning Systems

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Table B-4
Rotary Wing Industry Non-Staff Expenditure and Regional Metrics Correlation

	Regional Metric	Correlation Coefficient	R-Squared	P-value
Labor Category				
Pilots	NAICS 62	0.917	0.840	0.0014
Nurses	NAICS 62	0.824	0.679	0.0119
EMT-Ps	NAICS 62	-0.166	0.027	0.6949
EMTs (See Note 1)	NAICS 62	N/A	N/A	N/A
Aircraft Technicians / Mechanics	NAICS 62	0.441	0.194	0.2745
Dispatch	NAICS 62	0.494	0.244	0.2131
Other (See Note 2)	NAICS 62	N/A	N/A	N/A

[Note 1]: Data are insufficient to calculate correlation.

[Note 2]: Respondents entered a wide variety of jobs under this heading, making regional comparison impossible.

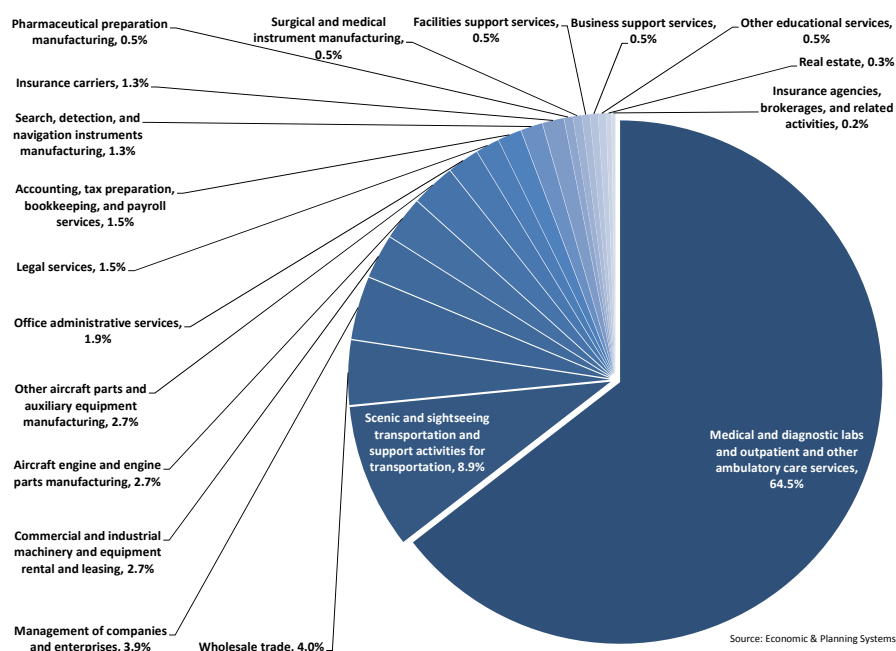
Table B-5
Rotary Wing Industry Non-Staff Expenditure and Regional Metrics Correlation

	Regional Metric	Correlation Coefficient	R-Squared	P-value
Non-Labor Category				
Fuel	Flight Hours	0.860	0.740	0.0062
Insurance	Patient Transports	0.648	0.412	0.0862
Aircraft Parts	Number of Rotor Wing	0.838	0.702	0.0094
Medical Supplies and Drugs	Patient Transports	0.677	0.459	0.0649
Maintenance and Equipment updates	Flight Hours	0.771	0.594	0.0251
Training and Development	Number of Jobs	0.337	0.114	0.4138
Total Annual Depreciation	Number of Rotor Wing	0.570	0.325	0.1401

Source: Economic & Planning Systems

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Figure B-1
Rotary Wing Industry Direct Spending Composition



In the following charts, the asterisk (*) denotes the inclusion of governmental enterprises.

Figure B-2
Indirect Jobs from Rotary Wing Industry Operational Impacts

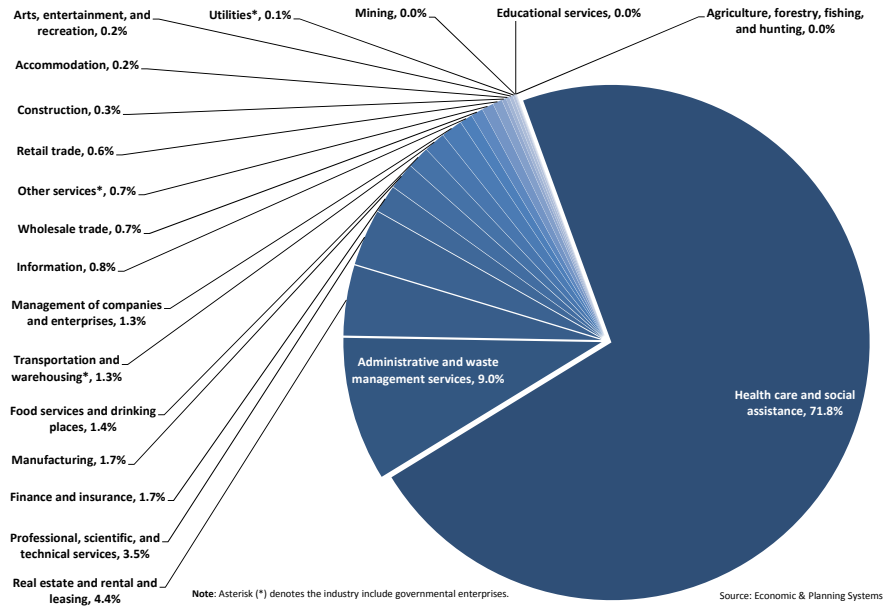


Figure B-3
Induced Jobs from Rotary Wing Industry Operational Impact

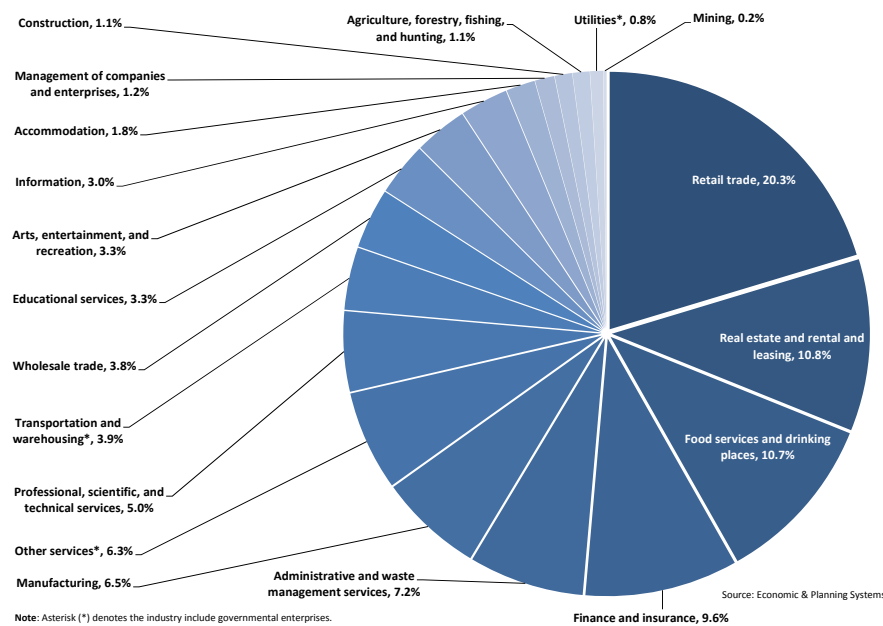


Figure B-4
Indirect Jobs from Rotary Wing Industry Capital Purchase Impacts

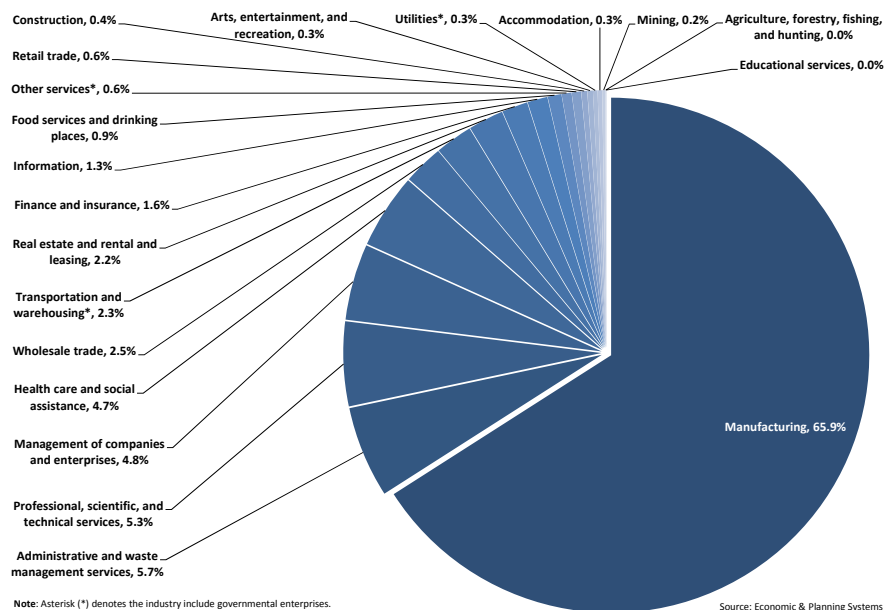


Figure B-5
Induced Jobs from Rotary Wing Industry Capital Purchase Impacts

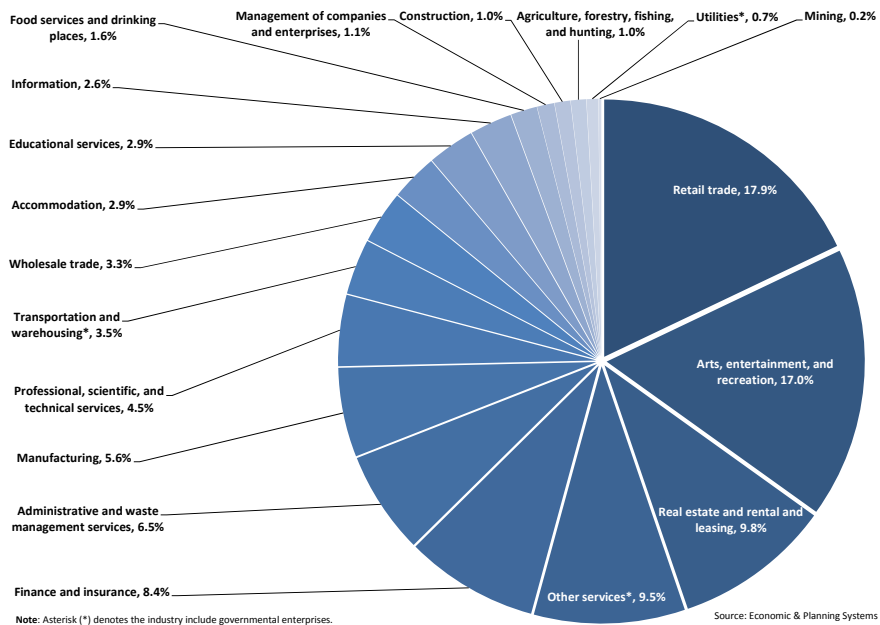


Table B-6
Final Demand Employment Multipliers, Type I

	Final Demand Employment Multiplier (Type I) (See Note [1])							
	Great Lakes	East South Central	Mountain	Northeast	Pacific	South Atlantic	Midwest	West South Central
Industry Category								
Agriculture, forestry, fishing, and hunting	0.0034	0.0069	0.0038	0.0018	0.0047	0.0061	0.0029	0.0074
Mining	0.0042	0.0071	0.0111	0.0024	0.0045	0.0035	0.0032	0.0108
Utilities*	0.0207	0.0235	0.0214	0.0169	0.0156	0.0221	0.0212	0.0214
Construction	0.0322	0.0371	0.0369	0.0299	0.0294	0.0400	0.0299	0.0364
Manufacturing	0.2864	0.2573	0.1685	0.2616	0.2042	0.2311	0.2427	0.1801
Wholesale trade	0.1089	0.1058	0.0920	0.0992	0.0984	0.1067	0.1015	0.0954
Retail trade	0.0867	0.0832	0.0803	0.0766	0.0755	0.0841	0.0752	0.0797
Transportation and warehousing*	0.1946	0.1771	0.1812	0.1746	0.1633	0.2025	0.1678	0.1813
Information	0.1001	0.0884	0.1118	0.1188	0.1045	0.1133	0.1032	0.1006
Finance and insurance	0.2597	0.2324	0.2225	0.2564	0.1889	0.2444	0.2505	0.2455
Real estate and rental and leasing	0.4901	0.4535	0.8019	0.6080	0.5955	0.6934	0.4433	0.5778
Professional, scientific, and technical services	0.5011	0.3493	0.5104	0.5051	0.4688	0.5657	0.3452	0.4759
Management of companies and enterprises	0.1966	0.1458	0.1790	0.1835	0.1647	0.1961	0.1896	0.1648
Administrative and waste management services	1.2963	1.2635	1.2367	1.0607	1.1689	1.4024	0.8911	1.3268
Educational services	0.0054	0.0055	0.0051	0.0047	0.0050	0.0047	0.0049	0.0048
Health care and social assistance	10.5376	9.5494	9.5307	9.4715	8.5728	10.6482	10.0492	9.6561
Arts, entertainment, and recreation	0.0293	0.0213	0.0310	0.0359	0.0348	0.0312	0.0216	0.0242
Accommodation	0.0220	0.0322	0.0336	0.0294	0.0319	0.0391	0.0252	0.0269
Food services and drinking places	0.2055	0.1997	0.1863	0.1664	0.1759	0.1966	0.1627	0.1940
Other services*	<u>0.1057</u>	<u>0.0959</u>	<u>0.0988</u>	<u>0.0953</u>	<u>0.0876</u>	<u>0.1122</u>	<u>0.0924</u>	<u>0.0958</u>
Total	14.4865	13.1349	13.5430	13.1987	12.1949	14.9434	13.2233	13.5057

[Note 1]: The entries in each column represent the total change in number of jobs in all industries for every \$1,000,000 of output delivered to final demand by the industry corresponding to the Ambulatory Health Care Services (621B00).

Source: Economic & Planning Systems

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Table B-7
Final Demand Employment Multipliers, Type II

	Final Demand Employment Multiplier (Type II) (See Note [1])							
	Great Lakes	East South Central	Mountain	Northeast	Pacific	South Atlantic	Midwest	West South Central
Industry Category								
Agriculture, forestry, fishing, and hunting	0.0615	0.0717	0.0751	0.0394	0.0611	0.0735	0.0529	0.0963
Mining	0.0129	0.0181	0.0342	0.0073	0.0154	0.0101	0.0087	0.0352
Utilities*	0.0697	0.0768	0.0733	0.0563	0.0538	0.0743	0.0689	0.0726
Construction	0.0930	0.1068	0.1078	0.0851	0.0846	0.1152	0.0817	0.1076
Manufacturing	0.7846	0.7543	0.4422	0.6142	0.5478	0.6180	0.6072	0.5435
Wholesale trade	0.3521	0.3363	0.2958	0.3063	0.3107	0.3421	0.3085	0.3134
Retail trade	1.3839	1.2823	1.2730	1.2064	1.1903	1.3509	1.1305	1.2890
Transportation and warehousing*	0.4525	0.3882	0.4156	0.3867	0.3701	0.4631	0.3562	0.4233
Information	0.2647	0.2359	0.2965	0.3212	0.2826	0.2988	0.2546	0.2732
Finance and insurance	0.8721	0.7118	0.7732	0.8776	0.6593	0.8181	0.7637	0.8905
Real estate and rental and leasing	1.0278	0.9188	1.6434	1.2560	1.2137	1.4513	0.8720	1.2075
Professional, scientific, and technical services	0.8071	0.5709	0.8214	0.8230	0.7670	0.9149	0.5442	0.7616
Management of companies and enterprises	0.2842	0.2053	0.2447	0.2564	0.2290	0.2770	0.2561	0.2325
Administrative and waste management services	1.7401	1.6530	1.6646	1.4694	1.5622	1.9124	1.1625	1.7912
Educational services	0.2176	0.2156	0.2076	0.1845	0.1920	0.1981	0.1875	0.2065
Health care and social assistance	11.8030	10.6788	10.6325	10.6078	9.5386	11.8621	11.1221	10.8305
Arts, entertainment, and recreation	0.2317	0.1661	0.2509	0.2356	0.2441	0.2366	0.1842	0.2093
Accommodation	0.1004	0.1455	0.1511	0.1308	0.1409	0.1743	0.1117	0.1232
Food services and drinking places	0.9066	0.8612	0.8110	0.7219	0.7584	0.8656	0.6825	0.8610
Other services*	<u>0.5031</u>	<u>0.4559</u>	<u>0.4625</u>	<u>0.4538</u>	<u>0.4091</u>	<u>0.5224</u>	<u>0.4260</u>	<u>0.4691</u>
Total	21.9686	19.8533	20.6764	20.0397	18.6307	22.5788	19.1817	20.7370

[Note 1]: The entries in each column represent the total change in number of jobs in all industries for every \$1,000,000 of output delivered to final demand by the industry corresponding to the Ambulatory Health Care Services (621B00).

Source: Economic & Planning Systems

H:\2\889-Economic Impact of Air Medical Industry\Models\2\889-M ODEL-M arch 2013.xlsx\13_10_US_Emp_II

Table B-8
Final Demand Output Multipliers, Type I

	Final Demand Output Multiplier (Type I) (See Note [1])							
	Great Lakes	East South Central	Mountain	Northeast	Pacific	South Atlantic	Midwest	West South Central
Industry Category								
Agriculture, forestry, fishing, and hunting	0.0007	0.0012	0.0006	0.0002	0.0009	0.0010	0.0007	0.0012
Mining	0.0010	0.0016	0.0033	0.0005	0.0013	0.0010	0.0008	0.0032
Utilities*	0.0096	0.0089	0.0092	0.0086	0.0077	0.0091	0.0088	0.0101
Construction	0.0037	0.0039	0.0042	0.0038	0.0039	0.0043	0.0033	0.0043
Manufacturing	0.0864	0.0688	0.0409	0.0801	0.0625	0.0671	0.0633	0.0563
Wholesale trade	0.0214	0.0188	0.0175	0.0214	0.0196	0.0208	0.0194	0.0199
Retail trade	0.0060	0.0060	0.0061	0.0058	0.0060	0.0062	0.0051	0.0061
Transportation and warehousing*	0.0224	0.0214	0.0208	0.0195	0.0190	0.0224	0.0188	0.0211
Information	0.0248	0.0187	0.0288	0.0350	0.0317	0.0314	0.0264	0.0272
Finance and insurance	0.0474	0.0398	0.0374	0.0546	0.0382	0.0456	0.0449	0.0429
Real estate and rental and leasing	0.0481	0.0393	0.0645	0.0657	0.0647	0.0649	0.0403	0.0631
Professional, scientific, and technical services	0.0615	0.0386	0.0535	0.0698	0.0629	0.0682	0.0393	0.0585
Management of companies and enterprises	0.0454	0.0272	0.0348	0.0462	0.0360	0.0420	0.0428	0.0290
Administrative and waste management services	0.0558	0.0535	0.0586	0.0536	0.0582	0.0614	0.0413	0.0591
Educational services	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004	0.0003	0.0003
Health care and social assistance	1.0377	1.0440	1.0438	1.0421	1.0436	1.0398	1.0336	1.0357
Arts, entertainment, and recreation	0.0016	0.0012	0.0019	0.0027	0.0027	0.0020	0.0012	0.0014
Accommodation	0.0018	0.0027	0.0033	0.0029	0.0032	0.0035	0.0018	0.0023
Food services and drinking places	0.0103	0.0102	0.0106	0.0096	0.0107	0.0109	0.0079	0.0106
Other services*	<u>0.0126</u>	<u>0.0125</u>	<u>0.0137</u>	<u>0.0133</u>	<u>0.0135</u>	<u>0.0137</u>	<u>0.0109</u>	<u>0.0135</u>
Total	1.4986	1.4186	1.4539	1.5358	1.4867	1.5157	1.4109	1.4658

[Note 1]: Gross output is defined as the total market value of industry output (sales). It equals intermediate inputs (i.e. goods purchased and used by an industry to produce output) plus value added (i.e. labor costs, investments, and payments to government such as taxes on production or imports). The entries in each column represent the total dollar change in output that occurs in all industries for each additional dollar of output delivered to the final demand by the Ambulatory Health Care Services industry (621B00).

Source: Economic & Planning Systems

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Table B-9
Final Demand Output Multipliers, Type II

	Final Demand Output Multiplier (Type II) (See Note [1])							
	Great Lakes	East South Central	Mountain	Northeast	Pacific	South Atlantic	Midwest	West South Central
Industry Category								
Agriculture, forestry, fishing, and hunting	0.0102	0.0120	0.0111	0.0038	0.0097	0.0107	0.0130	0.0131
Mining	0.0029	0.0042	0.0101	0.0015	0.0046	0.0029	0.0019	0.0105
Utilities*	0.0325	0.0290	0.0318	0.0290	0.0273	0.0303	0.0291	0.0347
Construction	0.0106	0.0113	0.0124	0.0109	0.0112	0.0123	0.0090	0.0129
Manufacturing	0.2345	0.2017	0.1113	0.1805	0.1628	0.1708	0.1640	0.1596
Wholesale trade	0.0693	0.0596	0.0562	0.0662	0.0620	0.0666	0.0590	0.0655
Retail trade	0.0954	0.0925	0.0959	0.0921	0.0939	0.0998	0.0770	0.0984
Transportation and warehousing*	0.0560	0.0492	0.0512	0.0455	0.0457	0.0544	0.0429	0.0539
Information	0.0652	0.0496	0.0751	0.0931	0.0842	0.0820	0.0648	0.0731
Finance and insurance	0.1507	0.1192	0.1221	0.1790	0.1249	0.1457	0.1324	0.1418
Real estate and rental and leasing	0.1981	0.1705	0.2268	0.2318	0.2265	0.2337	0.1667	0.2290
Professional, scientific, and technical services	0.1003	0.0638	0.0884	0.1151	0.1045	0.1113	0.0625	0.0948
Management of companies and enterprises	0.0657	0.0383	0.0476	0.0645	0.0501	0.0594	0.0578	0.0410
Administrative and waste management services	0.0790	0.0735	0.0825	0.0779	0.0812	0.0875	0.0563	0.0835
Educational services	0.0143	0.0124	0.0133	0.0144	0.0138	0.0143	0.0111	0.0137
Health care and social assistance	1.1518	1.1512	1.1479	1.1547	1.1409	1.1533	1.1315	1.1443
Arts, entertainment, and recreation	0.0121	0.0085	0.0140	0.0151	0.0159	0.0141	0.0096	0.0111
Accommodation	0.0083	0.0124	0.0150	0.0131	0.0141	0.0159	0.0079	0.0107
Food services and drinking places	0.0453	0.0440	0.0460	0.0417	0.0460	0.0481	0.0333	0.0470
Other services*	<u>0.0549</u>	<u>0.0523</u>	<u>0.0596</u>	<u>0.0602</u>	<u>0.0583</u>	<u>0.0603</u>	<u>0.0452</u>	<u>0.0588</u>
Total	2.4571	2.2552	2.3183	2.4901	2.3776	2.4734	2.1750	2.3974

[Note 1]: Gross output is defined as the total market value of industry output (sales). It equals intermediate inputs (i.e. goods purchased and used by an industry to produce output) plus value added (i.e. labor costs, investments, and payments to government such as taxes on production or imports). The entries in each column represent the total dollar change in output that occurs in all industries for each additional dollar of output delivered to the final demand by the Ambulatory Health Care Services industry (621B00).

Source: Economic & Planning Systems

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Table B-10
Final Demand Wages and Benefits Multipliers, Type I

	Final Demand Earnings Multiplier (Type I) (See Note [1])							
	Great Lakes	East South Central	Mountain	Northeast	Pacific	South Atlantic	Midwest	West South Central
Industry Category								
Agriculture, forestry, fishing, and hunting	0.0001	0.0002	0.0001	0.0000	0.0002	0.0002	0.0001	0.0002
Mining	0.0002	0.0003	0.0007	0.0001	0.0003	0.0002	0.0002	0.0007
Utilities*	0.0021	0.0020	0.0020	0.0018	0.0017	0.0021	0.0019	0.0022
Construction	0.0014	0.0015	0.0016	0.0015	0.0015	0.0016	0.0012	0.0017
Manufacturing	0.0173	0.0133	0.0089	0.0165	0.0128	0.0135	0.0135	0.0106
Wholesale trade	0.0069	0.0059	0.0056	0.0069	0.0064	0.0067	0.0062	0.0065
Retail trade	0.0021	0.0021	0.0021	0.0020	0.0021	0.0022	0.0018	0.0021
Transportation and warehousing*	0.0090	0.0082	0.0084	0.0083	0.0080	0.0092	0.0075	0.0085
Information	0.0055	0.0040	0.0063	0.0080	0.0072	0.0070	0.0057	0.0059
Finance and insurance	0.0137	0.0110	0.0105	0.0163	0.0112	0.0128	0.0127	0.0122
Real estate and rental and leasing	0.0071	0.0058	0.0095	0.0095	0.0095	0.0095	0.0059	0.0093
Professional, scientific, and technical services	0.0284	0.0173	0.0252	0.0329	0.0296	0.0316	0.0182	0.0274
Management of companies and enterprises	0.0185	0.0108	0.0143	0.0189	0.0147	0.0170	0.0172	0.0118
Administrative and waste management services	0.0287	0.0270	0.0301	0.0269	0.0302	0.0312	0.0205	0.0304
Educational services	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001
Health care and social assistance	0.4848	0.4809	0.4898	0.4901	0.4913	0.4851	0.4805	0.4869
Arts, entertainment, and recreation	0.0006	0.0004	0.0007	0.0009	0.0010	0.0007	0.0005	0.0005
Accommodation	0.0006	0.0008	0.0010	0.0009	0.0010	0.0011	0.0005	0.0007
Food services and drinking places	0.0033	0.0032	0.0034	0.0031	0.0034	0.0035	0.0025	0.0034
Other services*	0.0040	0.0039	0.0044	0.0042	0.0043	0.0044	0.0035	0.0043
Total	0.6345	0.5987	0.6248	0.6490	0.6366	0.6398	0.6002	0.6254

[Note 1]: The entries in each column represent the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to the final demand by the Ambulatory Health Care Services industry (621B00).

Source: Economic & Planning Systems

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Table B-11
Final Demand Wages and Benefits Multipliers, Type II

	Final Demand Earnings Multiplier (Type II) (See Note [1])							
	Great Lakes	East South Central	Mountain	Northeast	Pacific	South Atlantic	Midwest	West South Central
Industry Category								
Agriculture, forestry, fishing, and hunting	0.0015	0.0020	0.0019	0.0007	0.0019	0.0020	0.0018	0.0020
Mining	0.0006	0.0009	0.0021	0.0003	0.0009	0.0007	0.0004	0.0022
Utilities*	0.0070	0.0063	0.0069	0.0061	0.0057	0.0068	0.0061	0.0074
Construction	0.0041	0.0042	0.0048	0.0042	0.0043	0.0047	0.0034	0.0050
Manufacturing	0.0426	0.0353	0.0211	0.0346	0.0301	0.0314	0.0304	0.0278
Wholesale trade	0.0223	0.0187	0.0182	0.0214	0.0201	0.0214	0.0188	0.0212
Retail trade	0.0332	0.0316	0.0335	0.0322	0.0329	0.0347	0.0265	0.0344
Transportation and warehousing*	0.0207	0.0175	0.0193	0.0179	0.0177	0.0209	0.0158	0.0200
Information	0.0141	0.0104	0.0162	0.0209	0.0189	0.0180	0.0138	0.0156
Finance and insurance	0.0433	0.0325	0.0337	0.0537	0.0366	0.0406	0.0369	0.0395
Real estate and rental and leasing	0.0148	0.0117	0.0193	0.0194	0.0191	0.0196	0.0114	0.0193
Professional, scientific, and technical services	0.0470	0.0291	0.0422	0.0548	0.0498	0.0523	0.0293	0.0451
Management of companies and enterprises	0.0267	0.0152	0.0196	0.0264	0.0204	0.0240	0.0232	0.0167
Administrative and waste management services	0.0388	0.0355	0.0404	0.0372	0.0404	0.0426	0.0268	0.0411
Educational services	0.0059	0.0051	0.0055	0.0059	0.0057	0.0058	0.0045	0.0057
Health care and social assistance	0.5389	0.5310	0.5395	0.5436	0.5375	0.5387	0.5265	0.5387
Arts, entertainment, and recreation	0.0045	0.0030	0.0050	0.0055	0.0058	0.0052	0.0036	0.0042
Accommodation	0.0025	0.0037	0.0045	0.0040	0.0043	0.0048	0.0024	0.0032
Food services and drinking places	0.0145	0.0138	0.0148	0.0134	0.0148	0.0154	0.0106	0.0151
Other services*	0.0175	0.0163	0.0186	0.0185	0.0180	0.0188	0.0142	0.0184
Total	0.9005	0.8238	0.8671	0.9207	0.8849	0.9084	0.8064	0.8826

[Note 1]: The entries in each column represent the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to the final demand by the Ambulatory Health Care Services industry (621B00).

Source: Economic & Planning Systems

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Table B-12
Final Demand Value Added Multipliers, Type I

	Final Demand Value Added Multiplier (Type I) (See Note [1])							
	Great Lakes	East South Central	Mountain	Northeast	Pacific	South Atlantic	Midwest	West South Central
Industry Category								
Agriculture, forestry, fishing, and hunting	0.0002	0.0004	0.0002	0.0001	0.0003	0.0004	0.0002	0.0004
Mining	0.0005	0.0009	0.0017	0.0003	0.0007	0.0005	0.0004	0.0016
Utilities*	0.0062	0.0059	0.0059	0.0054	0.0048	0.0060	0.0056	0.0063
Construction	0.0018	0.0020	0.0021	0.0019	0.0019	0.0021	0.0016	0.0022
Manufacturing	0.0335	0.0245	0.0167	0.0329	0.0256	0.0265	0.0248	0.0193
Wholesale trade	0.0145	0.0127	0.0118	0.0145	0.0133	0.0140	0.0131	0.0135
Retail trade	0.0039	0.0039	0.0040	0.0038	0.0039	0.0041	0.0034	0.0040
Transportation and warehousing*	0.0130	0.0125	0.0120	0.0117	0.0112	0.0132	0.0111	0.0121
Information	0.0134	0.0101	0.0157	0.0190	0.0173	0.0170	0.0145	0.0149
Finance and insurance	0.0281	0.0239	0.0225	0.0324	0.0228	0.0274	0.0267	0.0258
Real estate and rental and leasing	0.0366	0.0296	0.0492	0.0504	0.0495	0.0497	0.0307	0.0481
Professional, scientific, and technical services	0.0425	0.0268	0.0369	0.0482	0.0435	0.0470	0.0272	0.0405
Management of companies and enterprises	0.0282	0.0169	0.0216	0.0286	0.0224	0.0261	0.0266	0.0180
Administrative and waste management services	0.0401	0.0385	0.0418	0.0376	0.0416	0.0436	0.0292	0.0422
Educational services	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Health care and social assistance	0.6150	0.6187	0.6186	0.6176	0.6185	0.6163	0.6126	0.6138
Arts, entertainment, and recreation	0.0010	0.0007	0.0012	0.0016	0.0017	0.0012	0.0007	0.0008
Accommodation	0.0012	0.0018	0.0022	0.0019	0.0021	0.0023	0.0011	0.0015
Food services and drinking places	0.0053	0.0053	0.0055	0.0050	0.0056	0.0057	0.0041	0.0055
Other services*	<u>0.0073</u>	<u>0.0072</u>	<u>0.0079</u>	<u>0.0074</u>	<u>0.0076</u>	<u>0.0078</u>	<u>0.0063</u>	<u>0.0078</u>
Total	0.8925	0.8425	0.8777	0.9205	0.8945	0.9111	0.8401	0.8785

[Note 1]: The entries in each column represent the total dollar change in value added that occurs in all industries for each additional dollar of output delivered to the final demand by the Ambulatory Health Care Services industry (621B00).

Source: Economic & Planning Systems

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Table B-13
Final Demand Value Added Multipliers, Type II

	Final Demand Value Added Multiplier (Type II) (See Note [1])							
	Great Lakes	East South Central	Mountain	Northeast	Pacific	South Atlantic	Midwest	West South Central
Industry Category								
Agriculture, forestry, fishing, and hunting	0.0038	0.0041	0.0042	0.0018	0.0042	0.0043	0.0040	0.0041
Mining	0.0015	0.0022	0.0051	0.0008	0.0023	0.0015	0.0010	0.0053
Utilities*	0.0205	0.0188	0.0198	0.0176	0.0163	0.0198	0.0180	0.0212
Construction	0.0053	0.0056	0.0062	0.0054	0.0056	0.0061	0.0045	0.0064
Manufacturing	0.0809	0.0665	0.0382	0.0709	0.0578	0.0638	0.0556	0.0494
Wholesale trade	0.0468	0.0402	0.0380	0.0447	0.0419	0.0450	0.0399	0.0442
Retail trade	0.0625	0.0606	0.0628	0.0603	0.0615	0.0654	0.0504	0.0645
Transportation and warehousing*	0.0301	0.0269	0.0273	0.0251	0.0246	0.0297	0.0235	0.0284
Information	0.0353	0.0267	0.0411	0.0507	0.0462	0.0445	0.0354	0.0399
Finance and insurance	0.0884	0.0718	0.0716	0.1038	0.0727	0.0866	0.0781	0.0834
Real estate and rental and leasing	0.1459	0.1246	0.1683	0.1725	0.1683	0.1736	0.1226	0.1698
Professional, scientific, and technical services	0.0691	0.0440	0.0608	0.0792	0.0720	0.0767	0.0432	0.0656
Management of companies and enterprises	0.0407	0.0238	0.0295	0.0400	0.0311	0.0368	0.0359	0.0254
Administrative and waste management services	0.0554	0.0517	0.0575	0.0533	0.0568	0.0608	0.0390	0.0583
Educational services	0.0082	0.0071	0.0076	0.0082	0.0079	0.0082	0.0063	0.0078
Health care and social assistance	0.6850	0.6846	0.6825	0.6866	0.6780	0.6859	0.6727	0.6805
Arts, entertainment, and recreation	0.0074	0.0051	0.0086	0.0092	0.0098	0.0087	0.0060	0.0068
Accommodation	0.0054	0.0080	0.0097	0.0084	0.0091	0.0102	0.0051	0.0069
Food services and drinking places	0.0235	0.0229	0.0239	0.0217	0.0240	0.0250	0.0173	0.0245
Other services*	<u>0.0290</u>	<u>0.0273</u>	<u>0.0311</u>	<u>0.0309</u>	<u>0.0302</u>	<u>0.0316</u>	<u>0.0239</u>	<u>0.0308</u>
Total	1.4447	1.3225	1.3938	1.4911	1.4203	1.4842	1.2824	1.4232

[Note 1]: The entries in each column represent the total dollar change in value added that occurs in all industries for each additional dollar of output delivered to the final demand by the Ambulatory Health Care Services industry (621B00).

Source: Economic & Planning Systems

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Table B-14
Direct Effect Multipliers

	Direct Effect Employment Multipliers (Type I) (See Note [1])							
	East South Central	Great Lakes	Midwest	Mountain	Northeast	Pacific	South Atlantic	West South Central
Multipliers								
Direct + Indirect Multiplier	1.4357	1.4260	1.3596	1.4829	1.4517	1.4844	1.4587	1.4482
Direct + Indirect + Induced Multiplier	2.1812	2.1754	1.9841	2.2767	2.2193	2.2860	2.2152	2.2387

[Note 1]: The entries in each column represent the total employment that results from the Ambulatory Health Care Services industry (621B00) direct employment.

Source: Economic & Planning Systems

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