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# Prehospital Emergency Medical Services Personnel in Rural Areas: Results from a Survey in Nine States

## EXECUTIVE SUMMARY

### INTRODUCTION

Prehospital emergency medical service (EMS) providers in rural areas frequently struggle with recruiting and retaining an adequate workforce to meet local population needs. Funding is often insufficient to support the paid and paramedic-level staffing models common in urban areas; many rural EMS agencies rely instead on volunteers and emergency medical technicians (EMTs) and advanced EMTs (AEMTs). These challenges can ultimately deprive rural patients of timely and effective emergency treatment at the scene and en route to definitive care, which is often located at much greater distances than in the urban setting.

This study compares patterns of supply and demand for prehospital emergency response personnel, the involvement of medical directors, and the availability of medical consultation, in rural and urban agencies. Compared with urban agencies, we hypothesized that rural agencies would rely on more EMTs and fewer paramedics, use more volunteers, have higher vacancy ratios, and have less interaction with a medical director and online medical consultation during emergency calls.

### METHODS

All ground-based prehospital EMS agencies in nine states (AR, FL, KS, MA, MT, NM, OR, SC, WI), representing a range of regions and rural/urban population distributions, were surveyed in late 2008 by the Centers for Disease Control and Prevention. Of 1,292 agencies responding to the survey (a 67% response rate), 1,286 had usable personnel data. Survey questions included service area size and population; organization type (hospital, fire department, stand alone, other); funding basis; patient call volumes (total, chest pain, non-trauma cardiac arrest, and suspected stroke); numbers of paid full-time equivalent (FTE) and volunteer EMTs, AEMTs, and paramedics on staff; numbers of FTEs agencies were actively recruiting; medical director staffing (full- or part-time, paid or volunteer), medical director participation in agency activity in the past four weeks, and availability of online access to medical consultation (always, sometimes, never). Urban or rural agency location was determined using the Rural-Urban Commuting Area (RUCA) codes (2004 ZIP code approximation), grouped in four categories: urban, large rural, small rural, and isolated small rural locations. We performed appropriate statistical tests (Chi-square, t-test, analysis of variance) to compare urban with subcategories of rural on each variable.

## RESULTS

Study findings supported the hypotheses that, compared with urban EMS agencies, rural agencies would exhibit lower staff skill levels, rely more on volunteers, have higher vacancy ratios, and have less access to oversight and skill maintenance through regular interaction with a medical director and online medical consultation during emergency calls. Agencies in isolated small rural areas were the most distinct from all others, having the most volunteers (both EMS providers and medical directors) and paid staff vacancies.

## CONCLUSIONS

EMS agencies exhibited tremendous diversity in staffing across rural and urban areas, with the greatest contrasts between urban and isolated small rural agencies. Paid paramedics were most abundant in urban agencies, and volunteer EMTs predominated in rural areas, even after adjusting for differences in patient volumes. Vacancy ratios were higher for EMTs and paramedics with increasing rurality. There was also diversity across rural geographies. The staffing profiles of large rural and small rural agencies were often similar to each other, but they differed from isolated small rural agencies as well as urban agencies. Compared with urban and large rural agencies, small and isolated small rural agencies were similar in their greater reliance on volunteer medical directors, less frequent interaction with medical directors, and less frequent access to online medical consultation during emergency calls.

## IMPLICATIONS FOR POLICY AND PRACTICE

This study's findings show that paramedics are least available in rural communities where they are likely most needed. As educational and quality reporting requirements increase, volunteer staffing with mostly EMTs in rural EMS agencies may be difficult to sustain in the long term. Rural agencies, which reported less public funding than urban agencies, may need to find more robust sources of funding to recruit and retain an adequate workforce, which in turn could require a shift from volunteer to paid staffing. Meanwhile, more evidence is needed to understand how best to deploy EMS personnel resources to ensure high quality, cost-effective prehospital care for rural populations.

## SUGGESTED CITATION

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# Prehospital Emergency Medical Services Personnel in Rural Areas: Results from a Survey in Nine States

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# INTRODUCTION

The Institute of Medicine's landmark 2007 report on the future of emergency care in the U.S. described a fragmented system with great disparities between communities in the timeliness of response and quality of care that patients can expect to receive.[1] Rapid access to high quality emergency care and definitive treatment is critical for time-sensitive conditions such as cardiac and stroke events. Yet rural populations frequently reside great distances from hospital emergency departments or urgent care facilities, underscoring the need for timely and effective prehospital emergency medical services (EMS).

Prehospital EMS responders generally practice at four levels, though there are variations by state, because states have regulatory authority to establish educational, licensing, and scope of practice standards.[2] The four levels are emergency medical responder (or first responder), emergency medical technician (EMT, formerly called "basic" level EMT), advanced emergency medical technician (AEMT, formerly called "intermediate" level EMT), and paramedic. Emergency medical responders provide the most basic level of lifesaving care, typically awaiting response by an EMT or higher level of provider that can provide a more skilled level of care and transportation. This report focuses on these more skilled providers—EMTs, AEMTs, and paramedics—because EMS ambulance crews must typically include a staff member at the EMT level or higher. EMTs are educated to employ basic skills for patient care and transport; AEMTs practice at a somewhat higher level; and paramedics have advanced life support skills to care for and transport the most critical patients. EMS personnel may be paid employees or volunteers.

Numerous reports and anecdotal evidence indicate that rural EMS agencies face significant resource challenges in terms of sustainable funding, staff recruitment and retention, staff oversight, and skill maintenance.[1, 3-5] A national survey of EMS agencies found that rural stand-alone or government agencies, and those relying on volunteers, were less likely than other types of agencies to bill for services.[6] Rural EMS funding is often insufficient to support paid paramedic staffing such that many rural agencies rely disproportionately on volunteers and EMTs or AEMTs.[3-4] In addition, low volume agencies may struggle to maintain staff skills and financial viability.[5] Meanwhile, high volume agencies that are short of staff face potential "burnout" and response delays. There is widespread consensus that prehospital EMS personnel are more abundant and more highly trained in urban than in rural areas.[1, 3-5] Rural EMS agencies may also struggle to obtain adequate medical oversight: compared with urban EMS agencies, rural agencies have more difficulty recruiting medical directors, and that online medical direction is less often available when needed.[4]

Reliable data to quantify the extent of these geographic disparities are generally not available. The only routine national survey of EMS agencies focuses exclusively on urban areas (the Journal of Emergency Medical Services 200-City Survey).[7] The magnitude of the differences between urban and rural EMS personnel supply has not been quantified systematically, and information on staff vacancies is also lacking.

This study aimed to quantify systematically personnel supply and demand disparities between rural and urban EMS systems in a sample of states distributed across the U.S. Understanding distribution patterns of EMS resources and needs can inform EMS provider credentialing, education, quality improvement, and reimbursement policies to ensure the availability of EMS personnel in rural areas.

### HYPOTHESES

We examined several aspects of EMS staffing and organizational characteristics where we expected to find significant rural-urban differences that indicate challenges for rural EMS in terms of personnel supply, demand, quality improvement, and medical oversight. Specifically, compared with urban agencies, we hypothesized that rural agencies would

(1) exhibit lower staff skill levels, that is, more EMTs and fewer paramedics.

(2) rely more on volunteers.

(3) have higher vacancy ratios.

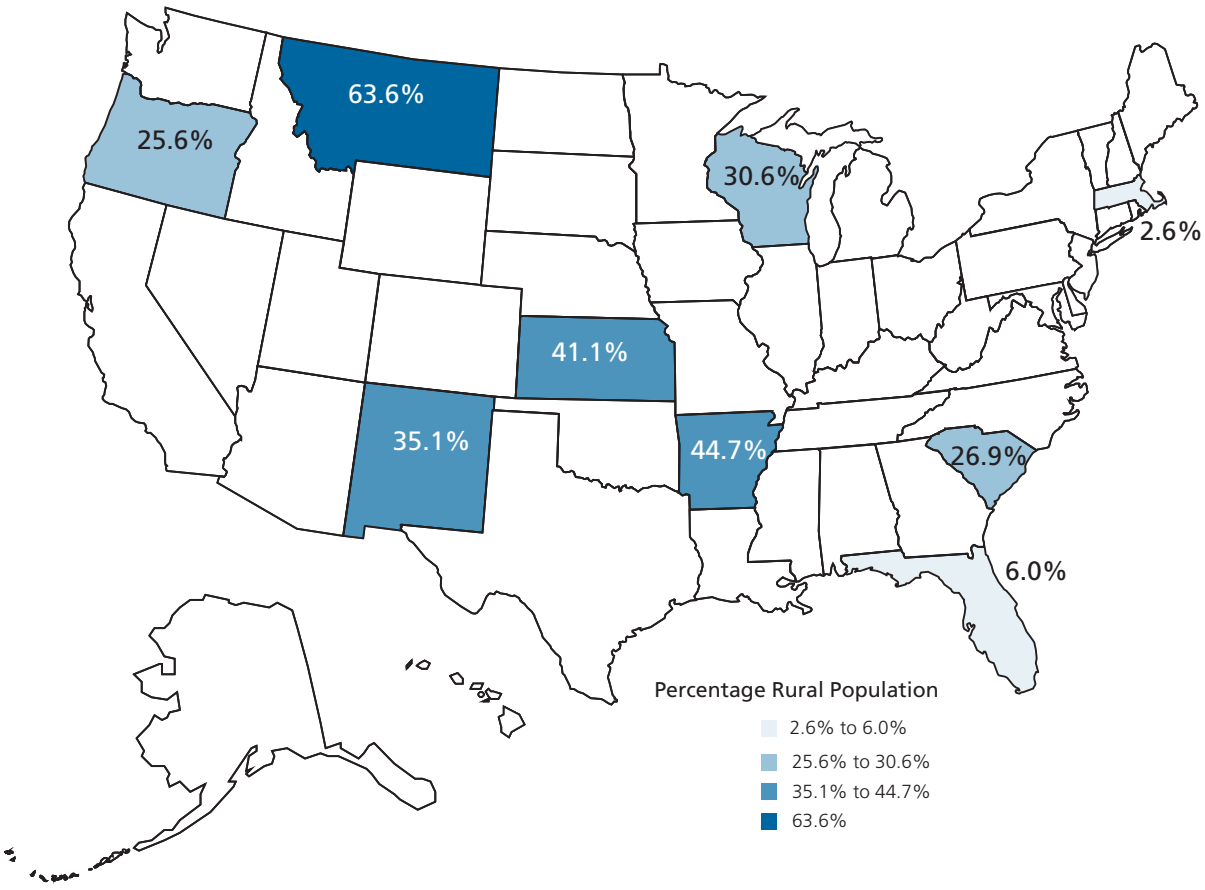
(4) have less access to oversight and skill maintenance through regular interaction with a medical director and online medical consultation during emergency calls.

## METHODS

### DATA SOURCE

The data for this study, which have been described elsewhere,[8-9] were collected in late 2008 by the Centers for Disease Control and Prevention ("Survey of EMS Practices for Heart Disease and Stroke") via a computer-assisted telephone interview of emergency medical services (EMS) managers (the person responsible for EMS operations) at all ground-based prehospital EMS agencies responding to 9-1-1 calls in nine states, including ambulance services and non-transporting emergency responders. This dataset offered the most comprehensive and consistent measures of staffing collected to date in both rural and urban EMS agencies from multiple states of varying geography. The study excluded nonmedical emergency responders, air ambulances, and agencies only providing inter-facility transfers. States were chosen to represent a range of rural-urban population distributions (see Figure 1) and covered all four U.S. Bureau of the Census regions as follows: Northeast – Massachusetts; South – Arkansas, Florida, South Carolina; Midwest – Kansas, Wisconsin; West – Montana, New Mexico, Oregon.

**Figure 1. Percentage rural population of study states, 2011**




Data source: Nielsen/Claritas, 2011; Rural-Urban Commuting Area (RUCA) Codes, 2004 ZIP approximation. Map date: April 2014

Lists of EMS agencies were obtained from state EMS offices. Out of 1,939 eligible agencies, 1,292 agencies responded to the survey for a response rate of 66.6%, ranging from 50.2% to 76.7% across the nine states (see Table 1). The survey consisted of 46 questions on service area characteristics, level and volume of EMS services, staffing, medical direction, transport protocols, and authorization to perform 18 medical interventions related to chest pain and suspected stroke. Usable personnel data were provided by 1,286 agencies, with variable numbers of missing responses on individual items.

**Table 1: Survey response rates for the 9 study states**

| State | Percent Responding |
|---|---|
| Arkansas | 60.9 |
| Florida | 76.7 |
| Kansas | 71.1 |
| Massachusetts | 74.8 |
| Montana | 69.8 |
| New Mexico | 50.2 |
| Oregon | 71.7 |
| South Carolina | 57.4 |
| Wisconsin | 67.6 |

## MEASURES

The survey included the following measures of agency characteristics, personnel supply, personnel demand, and medical direction:

**Service area size and population** measures included self-reported service area in square miles, and service area population (0-10,000, 10,001-50,000, 50,001-100,000, 100,001+).

**Organization type** was categorized as hospital-based, fire department-based, stand-alone (includes "third service"), and other. "Volunteer" organization status is captured as a separate question and can also be assessed through personnel counts by type of personnel.

**Funding basis** categories included private for-profit, private not-for-profit, public/government, public/private partnership, and other.

**Patient call volumes** were measured in several ways: total annual EMS call volume in 2007, and call volumes specifically for the cardiovascular conditions of chest pain, non-trauma cardiac arrest, and suspected stroke in 2007. Fire departments were asked to exclude fire and other non-EMS calls.

**Personnel supply** was measured as numbers of paid full-time equivalent (FTE) EMTs, AEMTs, and paramedics who were currently on staff (note that the survey used the earlier terminology of "basic" and "intermediate" levels for EMTs and AEMTs). Only paid FTEs, not person counts, were queried on the survey. Since volunteers work in a variety of ways that cannot always be measured in terms of FTEs, volunteers were only counted in terms of numbers of persons at each level—EMTs, AEMTs, and paramedics.

**Personnel demand** was measured as number of paid FTEs at the EMT, AEMT, and paramedic levels that the agency was actively recruiting. Since it was unclear whether or not agencies could report specific targets numbers of volunteers being recruited, respondents were not asked to quantify active recruitment of volunteers.

**Medical direction** questions included whether the agency had a full time paid, part time paid, volunteer, or no medical director; a dichotomous measure of medical director participation ("During the previous 4 weeks, has a medical director or advisor directly observed or participated in your unit's EMS activity, such as through training, testing, or accompanying the unit on an emergency call?" [Yes, No]); and a measure of online access to medical consultation ("How often do your emergency medical responders have online access to medical consultation when they are on an emergency call? [includes real-time consultation during patient care –radio, phone, electronic 2-way communication]" [Always - 24/7, Sometimes - less than 24/7, Never]).

**Urban or rural location** was determined using the ZIP code-based Rural-Urban Commuting Area (RUCA) codes to classify agency locations, based on the verified address, as urban, large rural, small rural, and isolated small rural areas.[10] We grouped RUCA codes as follows: urban (RUCA codes 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1); large rural (RUCA codes 4.0, 4.2, 5.0, 5.2, 6.0, and 6.1); small rural (RUCA codes 7.0, 7.2, 7.3, 7.4, 8.0, 8.2, 8.3, 8.4, 9.0, 9.1, and 9.2); and isolated small rural (RUCA codes 10.0, 10.2, 10.3, 10.4, 10.5, and 10.6). Note that a ZIP code-based definition may not perfectly classify the rural or urban nature of the population served, since service areas may frequently extend beyond an agency's ZIP code, but the data did not contain precise service area descriptions.

## ANALYSES

We performed appropriate statistical tests (Chi-square, t-test, analysis of variance) to compare urban with rural or subcategories of rural on each variable.

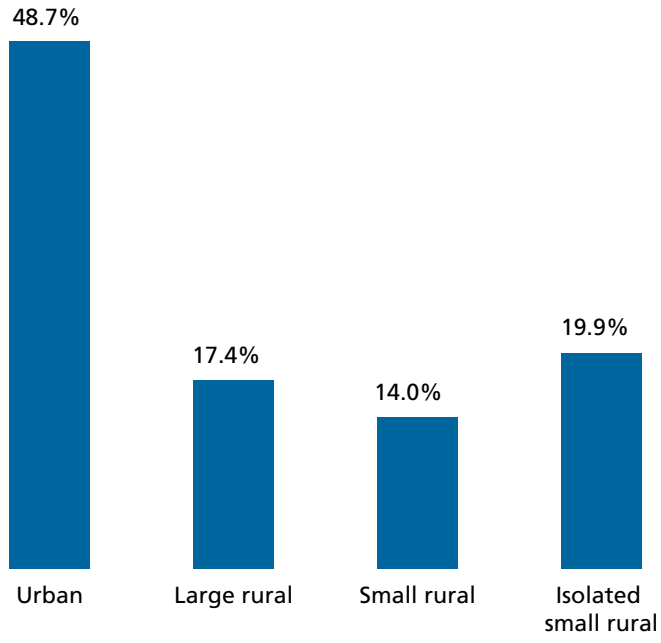
# RESULTS

Results are presented at the aggregate level. The Appendix contains state by state data tables.

## RURAL-URBAN DISTRIBUTION OF THE SAMPLE

As shown in Figure 2, 51.3% of responding agencies were rural according to RUCA codes, with isolated small rural agencies accounting for about one in five agencies, large rural about one in six, and small rural about one in seven.

**Figure 2. Rural-urban distribution* of EMS agencies responding to the survey**




N = 1,286

*According to 2004 RUCA code ZIP approximation

## AGENCY CHARACTERISTICS

Measures of agency characteristics included service area size and population, organization type, funding basis, and patient call volumes (total and for three cardiovascular conditions, chest pain, non-trauma cardiac arrest, and suspected stroke).

### Service area size and population

Respondents were asked to report the size of the service area in square miles (Table 2). Median rural service area sizes in descending order were as follows: isolated small rural (365.0), small rural (310.0), and large rural (180.0). In contrast, large rural agencies had the largest mean service area size, at 1,370.8 square miles, followed by small rural (812.4) and isolated small rural (773.7) agencies. Urban agencies reported the smallest service areas, a median of 36.0 and a mean of 528.5 square miles. The especially large standard deviations in service area size for urban and large rural agencies may have been related to the basing of agencies that provided both air and ground ambulance services in urban and large rural communities, thus covering much larger geographic areas than solely ground-based agencies, but this could not be determined from the data.

**Table 2. Mean and median agency service area size in square miles**

| Urban | | | Large rural | | | Small rural | | | Isolated small rural | | | TOTAL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Median | Mean | SD | Median | Mean | SD | Median | Mean | SD | Median | Mean | SD | Median | Mean | SD |
| 36.0 | 528.5 | 5,022.8 | 180.0 | 1,370.8 | 10,698.6 | 310.0 | 812.4 | 1,513.6 | 365.0 | 773.7 | 1,172.7 | 86.0 | 761.4 | 5,719.7 |

137 agencies did not respond (N = 1,149).

Respondents reported the service area population (Table 3) according to four categories (0-10,000, 10,001 to 50,000, 50,001 to 100,000, 100,001+). Service area population sizes varied in urban areas, with the majority (71.2%) of agencies having service areas of 50,000 or fewer population, but a significant minority (28.8%) serving populations of more than 50,000. With increasing rurality, the service area population decreased. In isolated small rural areas, nine in ten agencies (89.8%) served populations of 10,000 or fewer.

### Table 3. Self-reported service area population

| Service area population | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| 0-10,000 | 197 | 31.6% | 84 | 38.0% | 88 | 48.9% | 229 | 89.8% | 598 | 46.7% |
| 10,001-50,000 | 247 | 39.6% | 98 | 44.3% | 87 | 48.3% | 20 | 7.8% | 452 | 35.3% |
| 50,001-100,000 | 67 | 10.7% | 35 | 15.8% | 3 | 1.7% | 4 | 1.6% | 109 | 8.5% |
| 100,001+ | 113 | 18.1% | 4 | 1.8% | 2 | 1.1% | 2 | 0.8% | 121 | 9.5% |
| Total | 624 | 48.8% | 221 | 17.3% | 180 | 14.1% | 225 | 19.9% | 1,280* | 100.0% |

* 6 agencies did not respond.

## Organization type and funding basis

The vast majority of urban agencies were based in fire departments (71.7%, see Table 4). The proportion of agencies based in fire departments decreased with increasing rurality, to about one third (33.2%) of isolated small rural agencies were in fire departments. Stand-alone services were more common in small rural (45.0%) and isolated small rural areas (57.0%).

### Table 4. EMS agency organization type

| Organization type | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| Hospital-based | 13 | 2.1% | 18 | 8.0% | 28 | 15.6% | 25 | 9.8% | 84 | 6.5% |
| Fire department-based | 449 | 71.7% | 127 | 56.7% | 70 | 38.9% | 85 | 33.2% | 731 | 56.8% |
| Stand-alone service | 159 | 25.4% | 78 | 34.8% | 81 | 45.0% | 146 | 57.0% | 464 | 36.1% |
| Other | 5 | 0.8% | 1 | 0.4% | 1 | 0.6% | 0 | 0.0% | 7 | 0.5% |
| Total | 626 | 48.7% | 224 | 17.4% | 180 | 14.0% | 256 | 19.9% | 1,286 | 100.0% |

Chi-square = 163.286, p = .000.

A large majority of both urban and rural agencies were publicly funded (Table 5). However, urban agencies were more often funded by public or government sources than rural agencies (78.9% for urban compared with a range of 63.8% to 70.5% across rural geographies). The second most common funding basis was private non-profit, ranging from 10.2% of urban agencies to 22.3% of isolated small rural agencies.

### Table 5. EMS agency funding basis

| Funding basis | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| Private for profit | 47 | 7.6% | 17 | 7.7% | 25 | 14.1% | 10 | 4.0% | 99 | 7.8% |
| Private not for profit | 63 | 10.2% | 33 | 15.0% | 23 | 13.0% | 55 | 22.3% | 174 | 13.8% |
| Public/government | 489 | 78.9% | 155 | 70.5% | 113 | 63.8% | 162 | 65.6% | 919 | 72.7% |
| Public/private partnership | 21 | 3.4% | 15 | 6.8% | 16 | 9.0% | 20 | 8.1% | 72 | 5.7% |
| Total | 620 | 49.1% | 220 | 17.4% | 177 | 14.0% | 247 | 19.5% | 1,264* | 100.0% |

*22 agencies did not respond. Chi-square = 51.946, p = .000.

Examining EMS organization types by funding basis, Table 6 shows that public or government funding was the overwhelming funding source (72.7%), particularly in fire departments (91.6%), but it was also the largest category of funding for hospital-based (42.2%) and stand-alone services (48.8%). A substantial minority of hospital-based (37.3%) and stand-alone services (24.7%) were private non-profit agencies, the next largest funding category funding. Private for profit funding was a source for a small minority of all agencies (7.8%), though it was about a fifth of funding for stand-alone services (19.6%). Public/private partnership funding was the least common source (5.7%).

### Table 6. EMS agency funding basis by organization type

| Funding basis | Hospital-based | | Fire department-based | | Stand-alone service | | Other | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| Private for profit | 5 | 6.0% | 5 | 0.7% | 89 | 19.6% | 0 | 0.0% | 99 | 7.8% |
| Private not for profit | 31 | 37.3% | 27 | 3.7% | 112 | 24.7% | 4 | 66.7% | 174 | 13.8% |
| Public/government | 35 | 42.2% | 661 | 91.6% | 221 | 48.8% | 2 | 33.3% | 919 | 72.7% |
| Public/private partnership | 12 | 14.5% | 29 | 4.0% | 31 | 6.8% | 0 | 0.0% | 72 | 5.7% |
| Total | 83 | 6.6% | 722 | 57.1% | 453 | 35.8% | 6 | 0.5% | 1,264* | 100.0% |

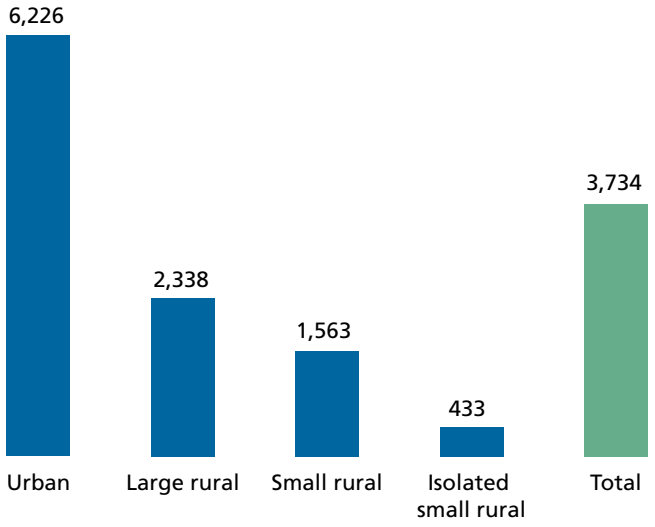
*22 agencies did not respond.

## Patient call volumes

Patient call volumes indicate demand for agency services and were measured in several ways, including total EMS call volume for the year 2007, and call volumes in 2007 specifically for chest pain, non-trauma cardiac arrest, and suspected stroke. Fire departments were asked to exclude fire or other calls with no EMS response. Total mean annual call volume in urban agencies was 6,226, about 14 times the mean call volume of 433 in isolated small rural agencies (Figure 3). Agency call volumes in large rural and small rural locations fell between these two extremes. Adjusting for the size of agency service areas yielded similar

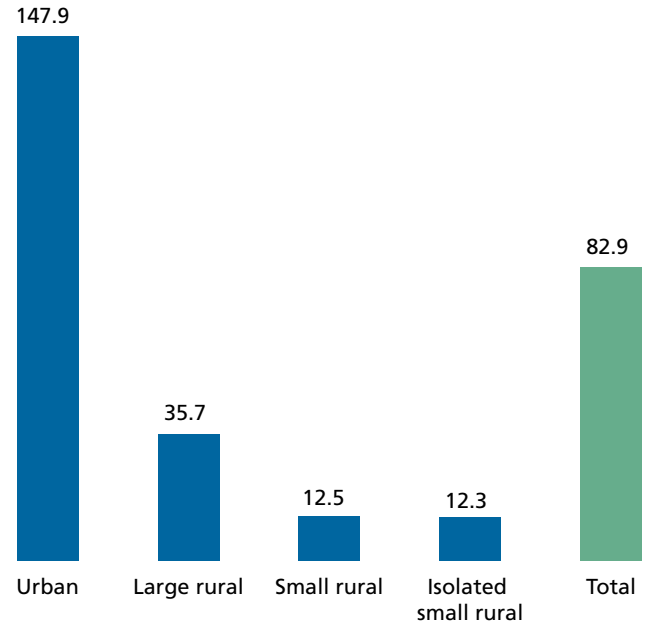
results: urban agencies reported handling more than 4 times as many annual EMS calls per square mile as large rural agencies, and nearly 12 times as many as small rural and isolated small rural agencies (Figure 4).

**Figure 3. Mean total annual EMS call volume (2007) per agency**




Excludes 14 agencies with missing data (N = 1,272). Fire departments were asked to exclude fire or other calls with no EMS response. A one-way analysis of variance (ANOVA) revealed significant differences between urban and each type of rural location, p = .000.

**Figure 4. Mean total annual EMS call volume (2007) per square mile of service area**




Excludes 146 agencies with missing data (N = 1,140). Fire departments were asked to exclude fire or other calls with no EMS response. A one-way ANOVA revealed significant differences by urban and each type of rural location, p = .000.

The profiles of agency call volumes by geography for the cardiovascular conditions of chest pain, non-trauma cardiac arrest, and suspected stroke were similar. Chest pain was the most common type of cardiovascular call, followed by suspected stroke and

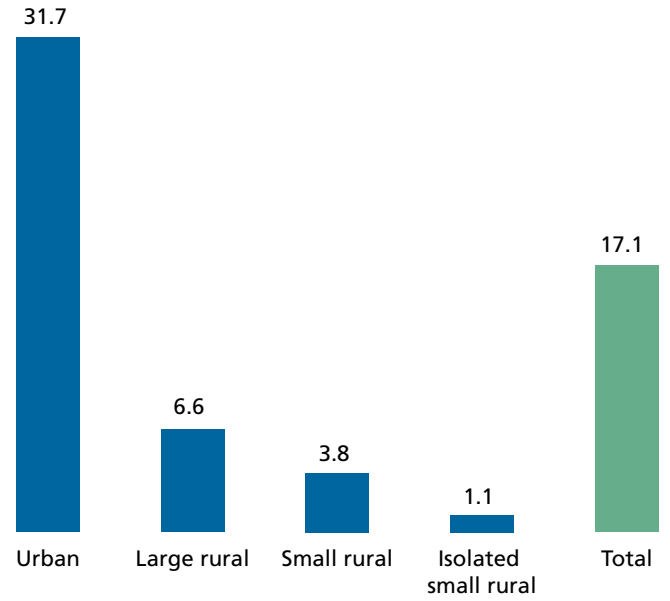
**Table 7. Mean annual cardiovascular condition call volumes (2007)**

| Condition | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Chest pain* | 610.2 | 1,672.0 | 323.1 | 489.3 | 212.5 | 331.5 | 81.8 | 143.1 | 391.6 | 1,194.7 |
| Non-trauma cardiac arrest** | 70.3 | 180.9 | 45.2 | 75.6 | 26.3 | 53.2 | 15.2 | 50.7 | 48.6 | 135.0 |
| Suspected stroke*** | 181.2 | 556.3 | 100.4 | 159.1 | 78.1 | 119.3 | 29.9 | 47.5 | 121.3 | 397.9 |
| All three conditions**** | 870.3 | 2,218.0 | 465.2 | 614.1 | 318.0 | 452.7 | 127.9 | 198.2 | 564.7 | 1,588.6 |

Fire departments were asked to exclude fire or other calls with no EMS response.
* 127 agencies did not report chest pain call volume (N = 1,159). One-way ANOVA was significant, p = .000.
** 78 agencies did not report non-trauma cardiac arrest call volume (N = 1,208). One-way ANOVA was significant, p = .000.
*** 101 agencies did not report suspected stroke call volume (N = 1,185). One-way ANOVA was significant, p = .000.
**** 141 agencies did not report volume for at least one of the three conditions (N = 1,145). One-way ANOVA was significant, p = .000.

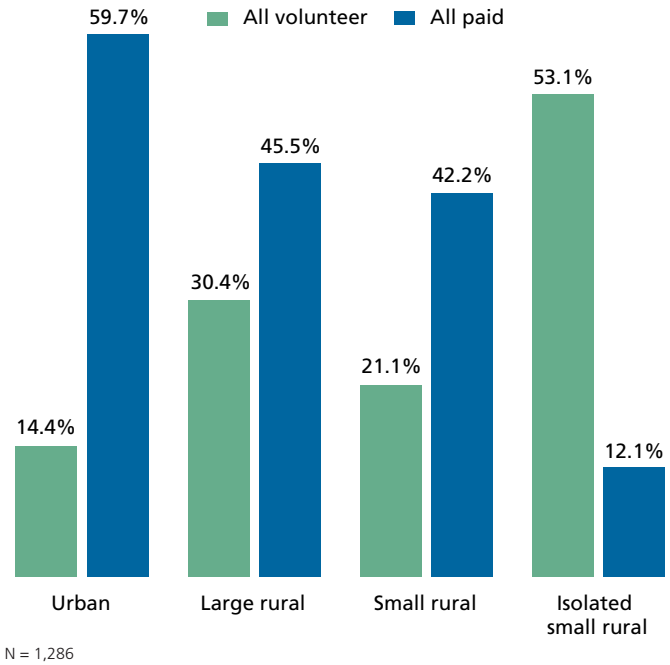
non-trauma cardiac arrest, across all geographic locations. Table 7 shows that agencies in urban areas had the highest volumes, declining precipitously with greater rurality. Adjusting the combined call volume for all three conditions by the size of agency service area revealed even greater contrasts between urban and rural locations (Figure 5). These results show that staff in smaller rural agencies have significantly fewer opportunities to practice the skills for these time-sensitive conditions.

**Figure 5. Mean annual cardiovascular condition call volume (2007) per square mile**




Excludes 141 agencies with missing data (N = 1,145). Fire departments were asked to exclude fire or other calls with no EMS response. Includes chest pain, non-trauma cardiac arrest, and suspected stroke. A one-way analysis of variance revealed significant differences by urban and rural location, p = .004.

**Figure 6. Distribution of all-volunteer vs. all-paid staff agencies (2008)**




N = 1,286

## PERSONNEL SUPPLY

Here we describe agency staffing models (volunteer, paid, or mixed); numbers of paid FTEs at the EMT, AEMT, and paramedic levels, volunteer persons at each level, and derived staffing measures adjusted for patient call volume (total and for three cardiovascular conditions).

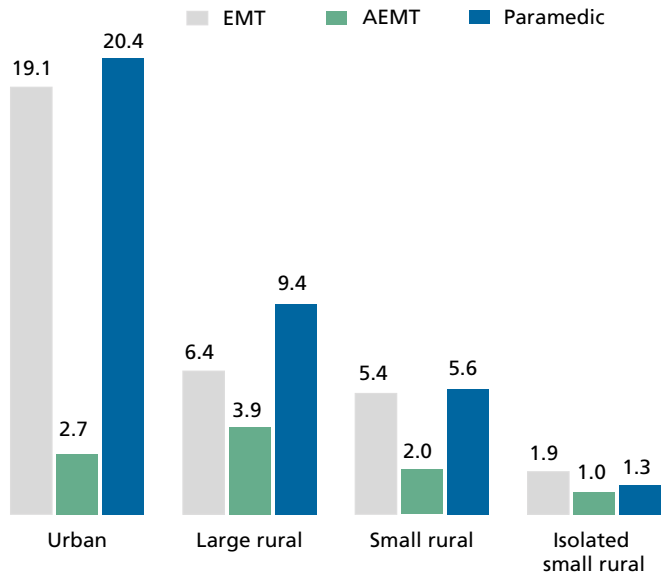
### Volunteer and paid agency staffing models

Figure 6 compares the distributions of all-volunteer and all-paid staff agencies across urban and rural locales (mixed volunteer/paid not shown). All-volunteer staff agencies represent those reporting no paid staff, whether or not they were actively recruiting for a paid staff position. All-paid staff agencies represent those reporting no volunteers. Urban and isolated small rural agencies exhibited opposite patterns in their uses of exclusively paid or volunteer staff: about three fifths (59.7%) of urban agencies had all paid staff, while 14.4% had all volunteers, compared with just 12.1% of isolated small rural agencies employing all paid staff, while over half (53.1%) had all volunteers. Large and small rural agencies were highly similar to each other, in between urban and isolated small rural agencies on these characteristics.

### Paid and volunteer staff per agency

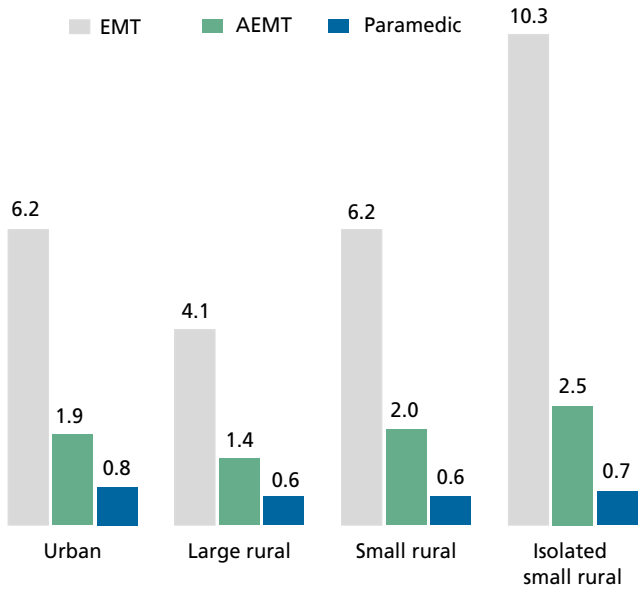
Paid staff were counted in terms of full-time equivalents (FTEs). EMTs and paramedics constituted the vast majority of all paid staff; paid AEMTs were much less common, though they made up a greater proportion of staff in agencies in isolated small rural places than in other locales (Figure 7). Paramedics were the most common type of paid staff in all places except isolated small rural areas. Urban agencies employed roughly ten times as many staff FTEs as isolated small rural agencies.

## Figure 7. Mean paid EMT, AEMT, and paramedic FTEs per agency (2008)




5 agencies did not respond (N = 1,281). One-way ANOVA revealed significant differences between urban and rural subgroups for AEMTs, and paramedics at p = .000.

## Figure 8. Mean volunteer EMT, AEMT, and paramedic persons per agency (2008)

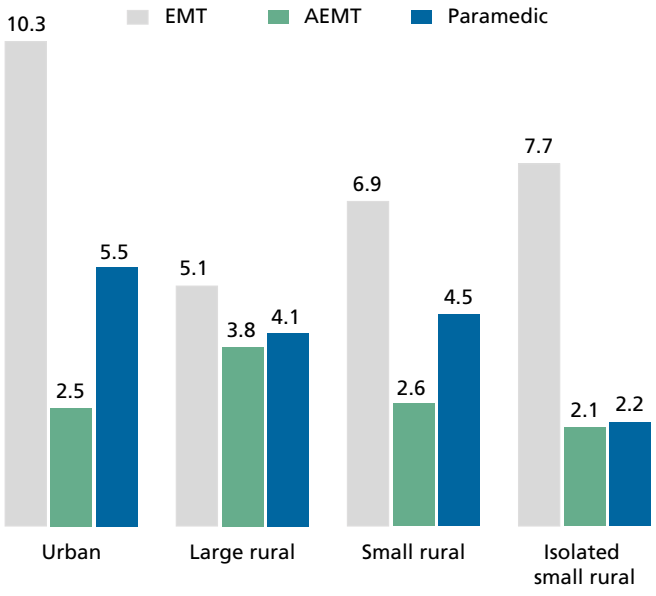



7 agencies did not respond (N = 1, 279). One-way ANOVA revealed significant differences between urban and rural subgroups for EMTs only at p = .000.

Figure 8 shows that volunteers, counted as persons, were overwhelmingly EMTs, with paramedics least common. Urban, large rural, and small rural EMS agencies had fairly similar numbers of volunteers, while isolated small rural agencies relied much more on volunteers than agencies in other areas.

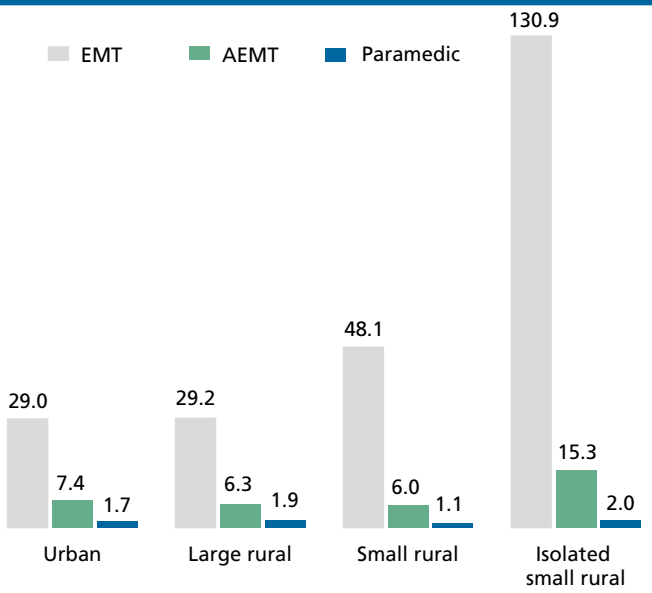
Adjusting for patient call volumes greatly reduced but did not fully erase rural-urban disparities. Figures 9 and 10 show the mean number of paid FTE and volunteer providers per 1,000 EMS calls. Differences between urban and rural subgroups were not significant for paid FTE EMTs and AEMTs, but isolated small rural agencies still employed fewer paid FTE paramedics per 1,000 EMS calls than agencies in other locations. In contrast, adjusting for patient call volumes revealed even greater geographic differences in volunteer staffing, with isolated small rural agencies significantly more likely than other agency types to use volunteer EMTs and AEMTs.

## Figure 9. Mean paid EMT, AEMT, and paramedic FTEs per 1,000 EMS calls (2008)




Excludes 19 cases with missing data (N = 1, 267). Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008. One-way ANOVA revealed significant differences between urban and rural subgroups for paramedics only, p = .003.

## Figure 10. Mean volunteer EMT, AEMT, and paramedic persons per 1,000 EMS calls (2008)



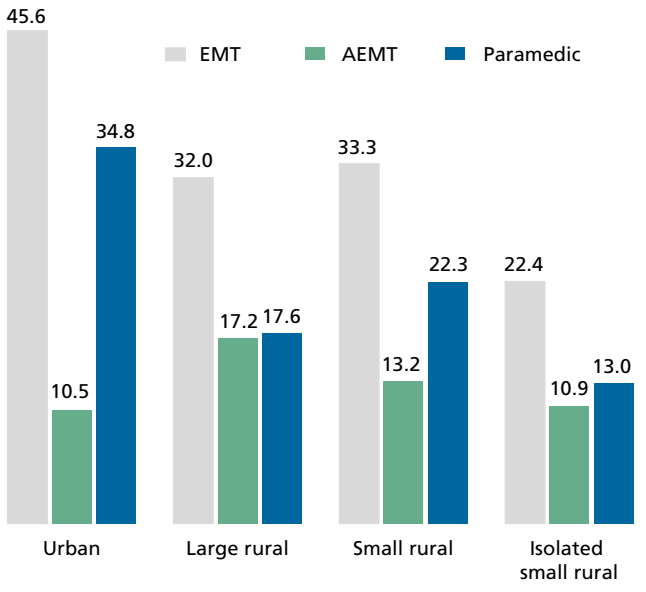

Excludes 20 cases with missing data (N = 1,266). Fire departments were asked to exclude fire or other calls with no EMS response. Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008. One-way ANOVA revealed significant differences between urban and rural subgroups for EMTs (p = .000) and AEMTs (p = .001).

Adjusting by patient calls for cardiovascular conditions revealed similar patterns, though urban-rural differences were significant for paid FTE staffing for both EMTs and paramedics. Isolated small rural agencies had about half as many paid EMT FTEs per 1,000 cardiovascular condition calls as did urban agencies, and fewer than half the paramedics (Figure 11). At the same time, isolated small rural agencies had more volunteer EMT and paramedic staff persons than other agency types (Figure 12).

## PERSONNEL DEMAND

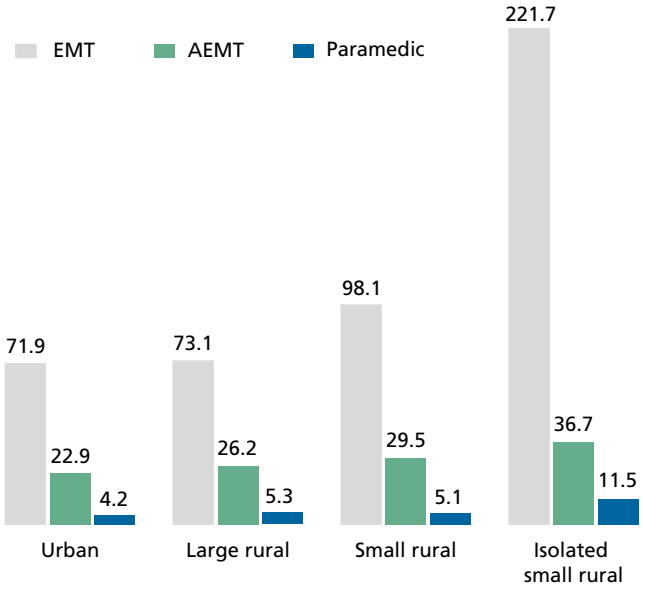
Personnel demand analyses include active recruitment of paid staff FTEs, both raw numbers and adjusted for patient call volumes (total and for three cardiovascular conditions), and vacancy ratios (the ratio of paid FTEs actively recruiting to the sum of paid FTEs employed and actively recruiting).

## Figure 11. Mean paid EMT, AEMT, and paramedic FTEs per 1,000 cardiovascular condition calls (2008)




Excludes 143 cases with missing data (N = 1,143). Fire departments were asked to exclude fire or other calls with no EMS response. Includes chest pain, non-trauma cardiac arrest, and suspected stroke. Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008. One-way ANOVA revealed significant differences between urban and rural subgroups for EMTs (p = .016) and paramedics (p = .000).

## Figure 12. Mean volunteer EMT, AEMT, and paramedic persons per 1,000 cardiovascular condition calls (2008)



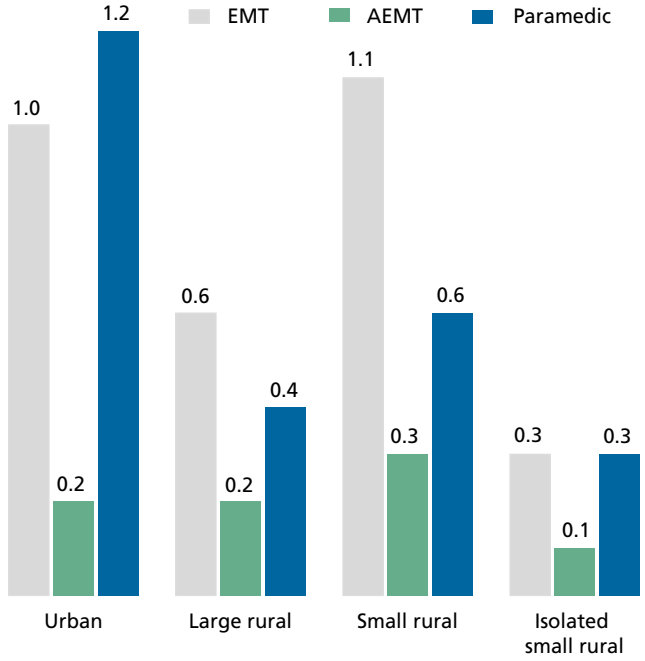

Excludes 147 cases with missing data (N = 1,139). Fire departments were asked to exclude fire or other calls with no EMS response. Includes chest pain, non-trauma cardiac arrest, and suspected stroke. Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008. One-way ANOVA revealed significant differences between urban and rural subgroups for EMTs (p = .000) and paramedics (p = .001).

## Recruitment of paid staff

Urban agencies were actively recruiting a mean of 1.2 paid paramedic FTEs, significantly more than rural agencies, which were recruiting from 0.3 to 0.6 FTEs (Figure 13). Recruitment of EMTs and AEMTs did not differ significantly by geography.

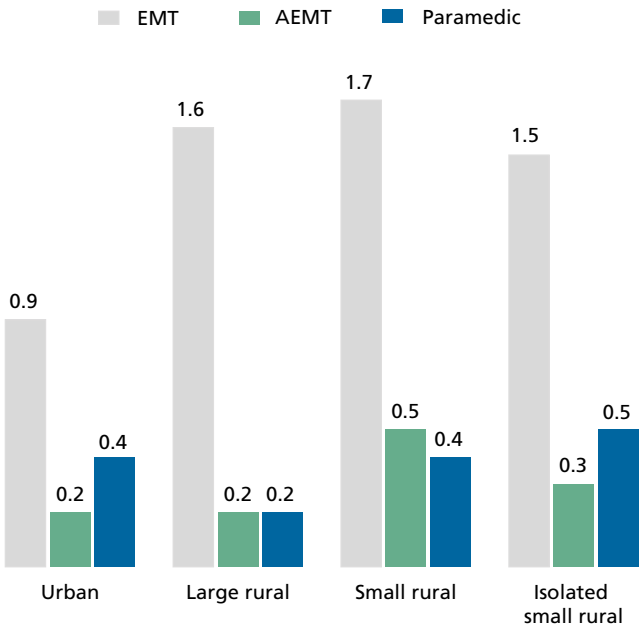
The difference between urban and rural agencies was no longer significant after adjusting for total EMS calls and cardiovascular condition calls (Figures 14 and 15).

### Figure 13. Mean paid EMT, AEMT, and paramedic FTEs actively recruiting (2008)



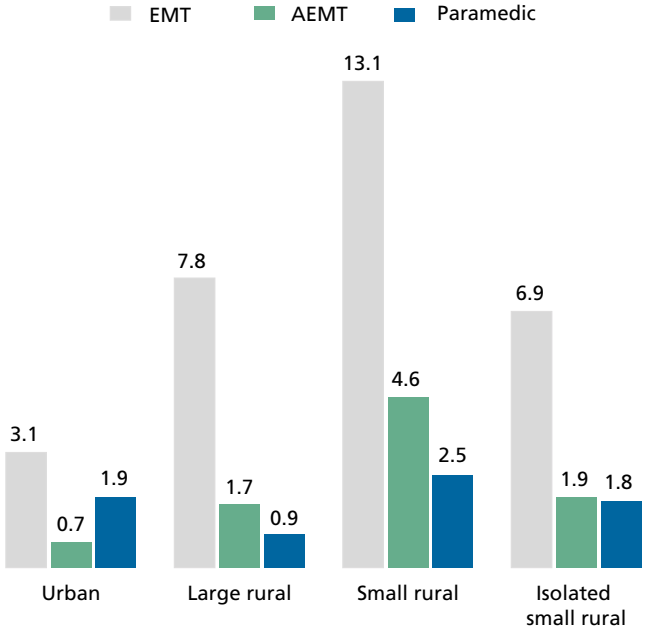

17 agencies did not respond (N = 1,269). One-way ANOVA revealed significant differences between urban and rural subgroups for paramedics only at p = .000.

### Figure 14. Mean paid EMT, AEMT, and paramedic FTEs actively recruiting per 1,000 EMS calls (2008)




Excludes 30 cases with missing data (N = 1, 256). Fire departments were asked to exclude fire or other calls with no EMS response. Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008. One-way ANOVA revealed no significant differences between urban and rural subgroups.

### Figure 15. Mean paid EMT, AEMT, and paramedic FTEs actively recruiting per 1,000 cardiovascular condition calls (2008)



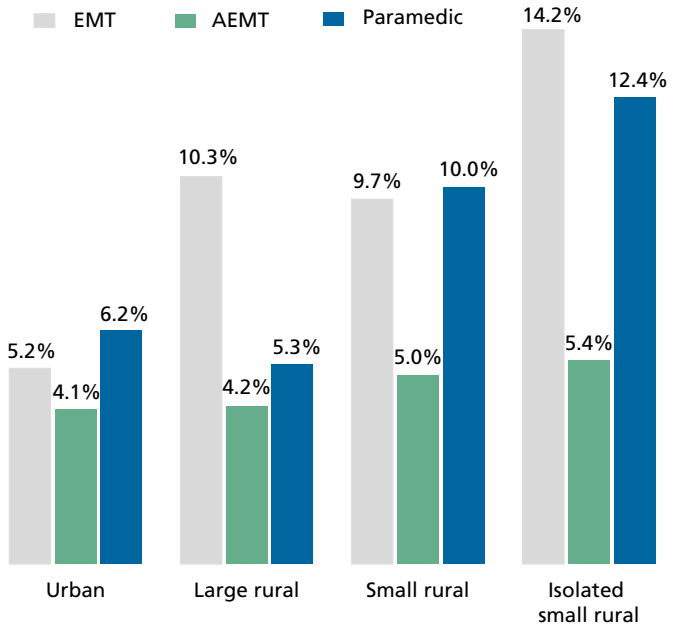

Excludes 152 cases with missing data (N = 1, 134). Fire departments were asked to exclude fire or other calls with no EMS response. Includes chest pain, non-trauma cardiac arrest, and suspected stroke. Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008. One-way ANOVA revealed no significant differences between urban and rural subgroups.

## Vacancy ratios

Job vacancy ratios were calculated as the proportion of vacancies (paid FTEs actively recruiting) out of all paid FTEs employed and actively recruiting (Figure 16). Rural EMS agencies, particularly isolated small rural ones, had higher mean vacancy ratios (9.7% to 14.2%) than urban agencies (5.2%), for EMTs. For paramedics, small and isolated small rural agencies had mean higher vacancy ratios (10.0% and 12.4%) than large rural and urban agencies (5.3% to 6.2%).

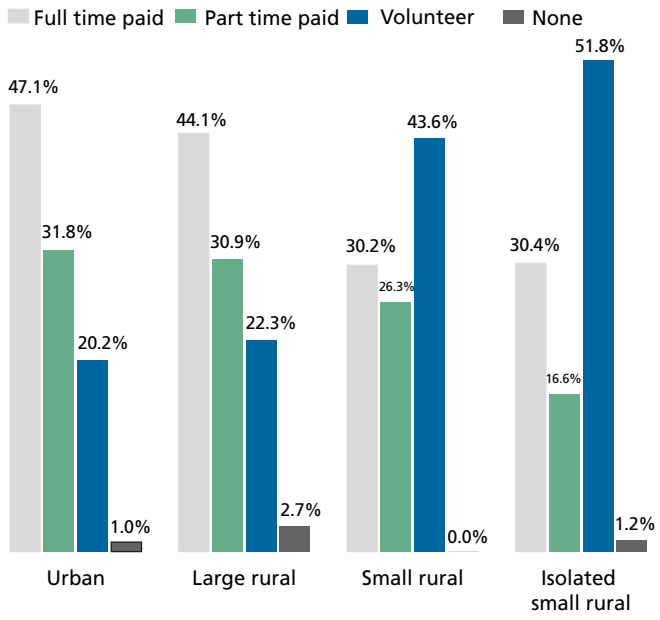
All agencies that were actively recruiting staff sought to hire at least one FTE; no agency was recruiting partial FTEs. As a consequence of hiring only whole FTEs, vacancy ratios in rural agencies seeking to hire are likely to be higher, simply because of smaller numbers of total staff demand in the denominator, when compared with urban vacancy ratios. This pattern also means that rural agencies probably have less flexibility than urban agencies to adjust hiring to precisely match demand. For example, a rural agency with a patient volume that requires 4.5 FTEs to provide adequate response coverage must either make do with 4 staff members or find funds to hire a fifth person, a 25% increase in staffing. In contrast, an urban agency with 40 staff can more easily absorb one additional person, a mere 2.5% increase in staffing. For this reason, it is possible that the vacant positions reported in rural agencies understate the actual number of staff FTEs that would be required to meet patient demand.

**Figure 16. Mean paid EMT, AEMT, and paramedic FTE vacancy ratios (2008)**




EMTs: N = 794 (471 agencies were not employing or recruiting EMTs; complete data were missing for 21 agencies). One-way ANOVA revealed significant differences, p = .000. The total EMT vacancy ratio was 7.7% (not shown).
AEMTs: N = 505 (761 agencies were not employing or recruiting AEMTs; complete data were missing for 20 agencies). The total AEMT vacancy ratio was 4.5% (not shown).
Paramedics: N = 739 (527 agencies were not employing or recruiting paramedics; complete data were missing for 20 agencies). One-way ANOVA revealed significant differences, p = .001. The total paramedic vacancy ratio was 7.2% (not shown).

**Figure 17. Type of medical direction (2008)**




14 agencies did not respond (N = 1, 272). Chi-square revealed significant differences between urban and rural subgroups, p = .000.

## MEDICAL DIRECTION

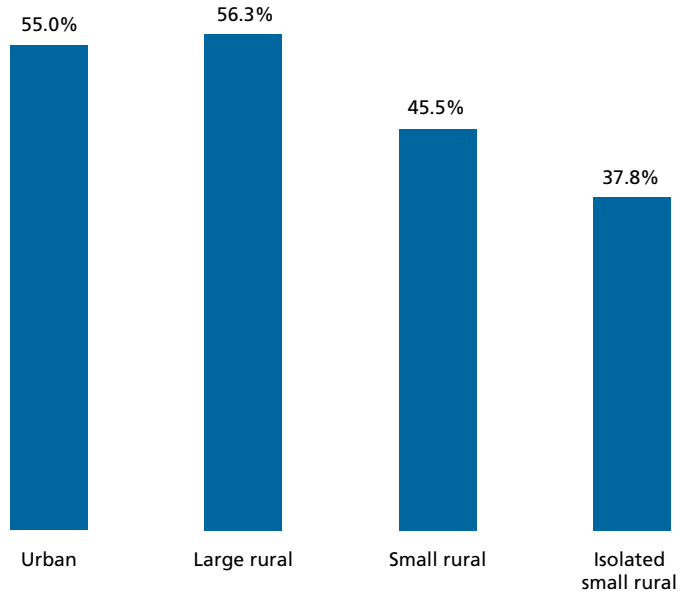
We examined three aspects of medical direction: volunteer versus paid staffing of medical directors, medical director participation in agency activities, and access to online medical consultation.

Not quite half of urban (47.1%) and large rural (44.1%) agencies had full time paid medical directors, compared with about 30% of small and isolated small rural agencies (Figure 17). Small and isolated small rural EMS agencies relied on volunteer medical directors about twice as often (43.6% to 51.8%) as did urban and large rural agencies (20.2% to 22.3%).

Medical directors had directly observed or participated in their activities during the previous four weeks (through training, testing, or accompanying the unit on an emergency call) in 37.8% to 56.3% of agencies, depending on locale (Figure 18). Small and isolated small rural agencies reported medical director participation significantly less often, by about 10% to 18%, than large rural and urban agencies.

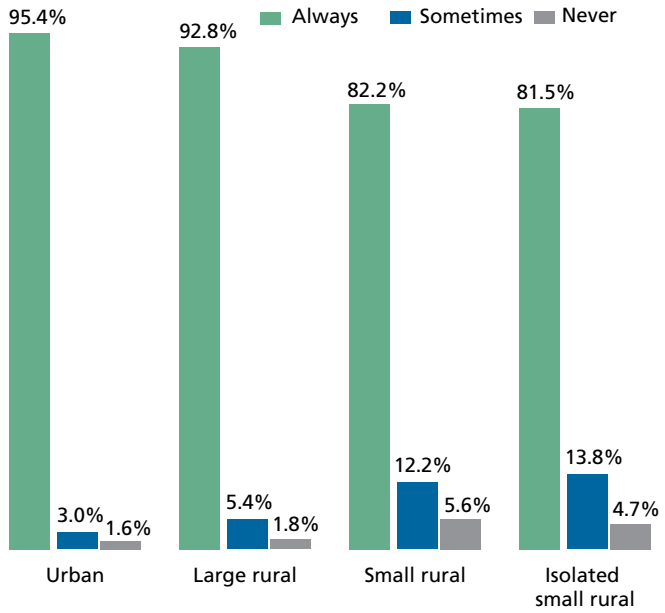
The vast majority of agencies in rural and urban areas always had online access to medical consultation on an emergency call (including radio, phone, or electronic two-way communication); however, nearly one in five small and isolated small rural agencies did not (Figure 19).

**Figure 18. Medical director participation in the past 4 weeks (2008)**




31 agencies did not respond (N = 1,255). Chi-square revealed significant differences between urban and rural subgroups, p = .000.

**Figure 19. Access to online medical consultation (2008)**




7 agencies did not respond (N = 1, 279). Chi-square revealed significant differences between urban and rural subgroups, p = .000.

# CONCLUSIONS

This study's findings showed tremendous variation in EMS agency staffing across rural and urban areas (and indeed, across states: see Appendix). Urban agencies and isolated small rural agencies contrasted sharply in their paid and volunteer staffing profiles. Paid paramedics were the most abundant in urban agencies, and least abundant in isolated small rural agencies, where volunteer EMTs predominated, even after adjusting for differences in patient volumes.

Rural and urban agencies did not differ significantly in the numbers of paid staff being recruited to fill vacancies after adjusting for patient volumes. But vacancy ratios (the proportion of FTEs that agencies were actively recruiting out of total staff FTEs desired) were higher for EMTs and paramedics with increasing rurality.

There were also substantial differences between types of rural places. The staffing profiles of large rural and small rural agencies typically fell between the extremes of urban and isolated small rural agencies. Large rural and small agencies were often similar to each other but different from urban agencies, and they were often different from isolated small rural agencies.

Small and isolated small rural agencies relied disproportionately on volunteer medical directors compared with urban agencies. Consistent with this pattern, medical director participation in the activities of small and isolated small rural agencies in the past four weeks was lower than for urban and large rural agencies. Access to online medical consultation on an emergency call was widely available, but less frequent in small rural than in large rural and urban places.

In summary, this study's findings supported the hypotheses that, compared with urban EMS agencies, rural agencies would exhibit lower staff skill levels, rely more on volunteers, have higher vacancy ratios, and have less access to oversight and skill maintenance through regular interaction with a medical director and online medical consultation during emergency calls. Agencies in isolated small rural areas were the most distinct from all others, having the most volunteers (both EMS providers and medical directors) and paid staff vacancies.

### LIMITATIONS

The analysis has certain limitations. No information was available on non-responders, and response rates varied by state, so it was not possible to assess response bias. Smaller and volunteer agencies, more prevalent in rural areas, may have been underrepresented simply because of the difficulty of reaching available staff to respond to the survey.

Rural EMS personnel demand is likely to be underestimated. Volunteers were counted in terms of persons, since volunteer staffing models often do not easily lend themselves to FTE calculations, and therefore it was not possible to quantify the number of volunteers being actively recruited according to a standard metric. Personnel demand is thus likely underestimated in agencies that rely more on volunteers, more often in rural places. The magnitude of the estimates of personnel demand disparities between urban and rural areas are likely to be conservative.

The survey did not ask for numbers of persons employed or being recruited, only FTEs. We were thus unable to estimate numbers of persons occupying paid staff positions or needed to fill paid vacancies.

Since many agencies cover more than one ZIP code or are county-based, it is possible that a ZIP-based classification may have resulted in RUCA coding that does not perfectly reflect the rural or urban location of the population served.

The data used in this study are from 2008, but this dataset represents the most comprehensive snapshot to date of a diverse sample of states' EMS agencies that includes both urban and rural agencies. .

## IMPLICATIONS FOR POLICY AND PRACTICE

This study's findings provide evidence of persistent disparities between rural and urban prehospital EMS that have often been described anecdotally. Our findings also reveal differences between types of rural places that have not been quantified previously. The wide variability in paid and volunteer prehospital EMS staffing patterns across rural and urban areas raises fundamental questions: what staffing configurations and competencies are required to provide high quality care to populations in different kinds of geographies, and do the patterns we observe meet those requirements? The longer response and transport times in rural areas, with small and spatially dispersed populations, translate into more EMS staff time per patient and the need for a higher skill level to stabilize and treat or transport patients over greater distances. Yet our study's findings confirm the "rural paramedic paradox"[11] that paramedics are least available in the rural communities where they may be most needed. Indeed, other analyses using this study's data have shown that rural EMS agencies and volunteer EMS agencies were more likely than urban and nonvolunteer agencies to authorize EMTs and AEMTs to use a number of interventions for time-sensitive acute cardiovascular conditions.[8]

Volunteers, both EMTs and medical directors, are critical to many small rural agencies. Volunteer availability and skills are undoubtedly quite robust in some communities but may be less adequate in others. Reliance on volunteers has implications for quality of care. A separate study using the same dataset as this one found that agencies with paid medical directors were more likely to implement standard protocols for cardiac and suspected stroke response.[9] Volunteer medical directors likely have less time to devote to oversight and quality improvement than paid medical directors. The higher use of volunteers for medical direction in rural areas also creates a disproportionate burden for rural physicians. Volunteer staffing may be difficult to sustain in the long term, especially as educational requirements increase and performance measurement and quality reporting become standard practice.

Differences between rural and urban agency staffing and sustainability may be related to the kinds of organizations in which they tend to be based: urban EMS agencies were more often in fire departments than rural agencies, whereas rural agencies were more often stand-alone services than urban agencies. Fire department-based agencies, which serve both public safety and healthcare functions, were much more likely to have public or government funding than stand-alone agencies. At the same time, stand-alone agencies had a mean vacancy ratio for EMTs more than double that of agencies based in fire departments or hospitals (analysis not shown). These findings suggest that public sponsorship of the community healthcare function provided by prehospital EMS agencies may offer greater financial stability. Rural agencies may need to find more robust sources of funding to recruit and retain an adequate workforce, and this could require a shift from volunteer to paid staffing.

Meanwhile, volunteers are likely to continue providing essential EMS services in both rural and urban areas, calling for a better methodology to quantify and assess volunteer contributions. A lack of data and appropriate methods for analysis of prehospital EMS outcomes more generally means that we lack evidence on the quality of care across the wide variety of EMS staffing deployments in different organizational and geographic settings. Prehospital EMS systems will increasingly need to generate rigorous evidence demonstrating successful patient outcomes and cost-effectiveness as healthcare systems transition to payment based on value rather than volume.

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# APPENDIX: STATE BY STATE PERSONNEL TABLES

Urban and rural comparisons are based on the 2004 RUCA code ZIP approximation.*

**Table A1. Rural-urban distribution of EMS agencies responding**

| State | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| Arkansas | 15 | 23.1% | 18 | 27.7% | 22 | 33.8% | 10 | 15.4% | 65 | 5.1% |
| Florida | 130 | 82.8% | 10 | 6.4% | 13 | 8.3% | 4 | 2.5% | 157 | 12.2% |
| Kansas | 17 | 15.9% | 23 | 21.5% | 23 | 21.5% | 44 | 41.1% | 107 | 8.3% |
| Massachusetts | 181 | 92.8% | 5 | 2.6% | 5 | 2.6% | 4 | 2.1% | 195 | 15.2% |
| Montana | 17 | 13.4% | 25 | 19.7% | 25 | 19.7% | 60 | 47.2% | 127 | 9.9% |
| New Mexico | 35 | 31.8% | 38 | 34.5% | 9 | 8.2% | 28 | 25.5% | 110 | 8.6% |
| Oregon | 73 | 35.8% | 55 | 27.0% | 30 | 14.7% | 46 | 22.5% | 204 | 15.9% |
| South Carolina | 40 | 51.9% | 20 | 26.0% | 14 | 18.2% | 3 | 3.9% | 77 | 6.0% |
| Wisconsin | 118 | 48.4% | 30 | 12.3% | 39 | 16.0% | 57 | 23.4% | 244 | 19.0% |
| TOTAL | 626 | 48.7% | 224 | 17.4% | 180 | 14.0% | 256 | 19.9% | 1,286 | 100.0% |

*WWAMI Rural Health Research Center, University of Washington. Rural-Urban Commuting Area Codes (RUCAs). Available at: http://depts.washington.edu/uwruca/. Accessed May 31, 2014.

## Table A2. Mean paid EMT, AEMT, and paramedic FTEs per agency (2008)

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 26.2 | 24.3 | 11.9 | 10.7 | 10.2 | 11.5 | 3.8 | 3.9 | 13.4 | 16.2 |
| AEMT | 0.4 | 0.9 | 1.4 | 2.6 | .5 | 1.3 | 0.1 | 0.3 | 0.6 | 1.7 |
| Paramedic | 20.2 | 18.4 | 13.8 | 8.8 | 9.8 | 11.4 | 3.6 | 4.4 | 12.4 | 13.0 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 34.9 | 34.1 | 16.5 | 20.0 | 14.8 | 12.6 | 17.8 | 24.3 | 31.6 | 32.6 |
| AEMT | 1.1 | 8.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 7.3 |
| Paramedic | 50.3 | 35.5 | 26.3 | 15.1 | 14.8 | 11.7 | 17.0 | 16.5 | 45.0 | 34.8 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 21.7 | 34.8 | 7.8 | 12.8 | 3.7 | 4.0 | 1.4 | 3.0 | 6.2 | 15.8 |
| AEMT | 4.9 | 8.3 | 6.2 | 7.6 | 3.8 | 3.7 | 1.5 | 2.5 | 3.5 | 5.5 |
| Paramedic | 19.6 | 34.6 | 12.8 | 9.0 | 4.4 | 4.0 | 0.8 | 1.1 | 6.9 | 15.2 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 18.6 | 23.9 | 9.6 | 10.3 | 6.9 | 9.9 | 1.8 | 2.9 | 17.8 | 23.4 |
| AEMT | 2.3 | 5.3 | 3.0 | 4.1 | 1.6 | 1.7 | 1.0 | 1.2 | 2.3 | 5.2 |
| Paramedic | 12.0 | 16.0 | 11.8 | 13.6 | 2.2 | 3.5 | 1.5 | 1.7 | 11.6 | 15.7 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 13.5 | 24.8 | 3.3 | 7.0 | 4.6 | 7.1 | 2.1 | 7.0 | 4.4 | 11.6 |
| AEMT | 1.2 | 2.3 | 1.3 | 5.5 | 1.5 | 3.5 | 0.2 | 0.6 | 0.8 | 3.0 |
| Paramedic | 5.4 | 8.3 | 3.6 | 8.9 | 3.6 | 9.2 | 0.6 | 1.5 | 2.4 | 6.6 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 9.4 | 21.5 | 6.3 | 11.5 | 2.7 | 5.5 | 1.3 | 2.6 | 5.7 | 14.2 |
| AEMT | 3.9 | 5.8 | 7.8 | 12.7 | 3.9 | 5.3 | 0.9 | 1.6 | 4.5 | 8.8 |
| Paramedic | 6.5 | 12.7 | 3.9 | 7.4 | 2.3 | 2.8 | 0.4 | 0.9 | 3.7 | 8.7 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 8.6 | 20.4 | 3.5 | 6.5 | 1.1 | 2.1 | 0.8 | 1.6 | 4.4 | 13.1 |
| AEMT | 4.4 | 7.7 | 2.4 | 3.5 | 1.2 | 1.4 | 0.6 | 1.2 | 2.5 | 5.2 |
| Paramedic | 16.2 | 28.5 | 7.3 | 12.2 | 2.9 | 5.1 | 1.3 | 2.2 | 8.5 | 19.2 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 12.9 | 21.1 | 9.2 | 15.0 | 12.3 | 20.9 | 6.3 | 1.2 | 11.6 | 19.0 |
| AEMT | 5.6 | 7.6 | 3.5 | 4.7 | 4.8 | 4.4 | 6.3 | 0.6 | 4.9 | 6.3 |
| Paramedic | 17.0 | 25.3 | 18.0 | 16.9 | 11.1 | 7.4 | 9.3 | 3.8 | 15.8 | 20.4 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 13.1 | 24.4 | 4.5 | 6.1 | 2.3 | 5.4 | 1.6 | 4.6 | 7.6 | 18.2 |
| AEMT | 2.6 | 5.6 | 4.9 | 7.9 | 2.2 | 4.3 | 1.9 | 4.8 | 2.7 | 5.6 |
| Paramedic | 10.5 | 17.7 | 7.9 | 10.7 | 3.4 | 6.0 | 0.9 | 4.8 | 6.8 | 13.9 |

## Table A3. Mean volunteer EMT, AEMT, and paramedic persons per agency (2008)

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 1.1 | 2.9 | 0.8 | 2.5 | 0.5 | 1.3 | 5.2 | 5.1 | 1.4 | 3.2 |
| AEMT | 0.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Paramedic | 0.1 | 0.3 | 0.2 | 0.9 | 0.1 | 0.3 | 0.1 | 0.3 | 0.1 | 0.5 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 3.4 | 14.2 | 4.2 | 6.7 | 2.9 | 8.4 | 3.8 | 7.5 | 3.4 | 13.2 |
| AEMT | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 |
| Paramedic | 0.5 | 4.5 | 1.6 | 3.1 | 0.2 | 0.6 | 0.5 | 1.0 | 0.6 | 4.1 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 4.1 | 8.0 | 1.6 | 3.5 | 4.8 | 6.7 | 11.4 | 12.5 | 6.8 | 10.2 |
| AEMT | 0.6 | 1.4 | 1.2 | 2.1 | 1.9 | 4.3 | 3.3 | 4.1 | 2.1 | 3.6 |
| Paramedic | 0.4 | 0.7 | 0.2 | 0.5 | 0.4 | 1.0 | 0.7 | 1.2 | 0.5 | 1.0 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 4.3 | 9.7 | 3.4 | 7.6 | 13.2 | 14.4 | 23.0 | 13.8 | 4.9 | 10.2 |
| AEMT | 0.3 | 0.9 | 0.6 | 1.3 | 3.0 | 5.1 | 1.8 | 1.5 | 0.4 | 1.3 |
| Paramedic | 0.5 | 2.1 | 0.4 | 0.9 | 1.2 | 2.7 | 3.0 | 2.4 | 0.6 | 2.1 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 8.4 | 11.2 | 6.0 | 8.8 | 12.1 | 17.6 | 13.1 | 14.6 | 10.9 | 14.1 |
| AEMT | 1.5 | 4.0 | 0.3 | 0.7 | 0.9 | 3.5 | 1.1 | 2.3 | 1.0 | 2.6 |
| Paramedic | 1.6 | 4.8 | 0.2 | 0.5 | 0.7 | 1.9 | 0.5 | 2.0 | 0.6 | 2.4 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 9.6 | 21.6 | 5.3 | 10.5 | 3.0 | 6.6 | 3.0 | 2.5 | 5.9 | 13.9 |
| AEMT | 2.8 | 6.2 | 2.5 | 4.2 | 1.8 | 2.5 | 1.6 | 2.2 | 2.3 | 4.5 |
| Paramedic | 1.1 | 2.6 | 0.6 | 1.0 | 0.1 | 0.3 | 0.4 | 0.7 | 0.7 | 1.6 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 11.0 | 10.6 | 4.9 | 6.2 | 5.9 | 4.8 | 6.8 | 5.4 | 7.7 | 8.1 |
| AEMT | 3.0 | 4.5 | 1.1 | 1.3 | 1.9 | 1.9 | 2.5 | 3.3 | 2.2 | 3.3 |
| Paramedic | 1.7 | 2.2 | 0.7 | 1.2 | 1.2 | 2.2 | 0.6 | 1.0 | 1.1 | 1.8 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 5.9 | 8.7 | 3.0 | 3.5 | 1.2 | 2.5 | 4.7 | 5.0 | 4.2 | 6.9 |
| AEMT | 1.6 | 2.9 | 1.4 | 2.1 | 0.4 | 1.1 | 3.0 | 3.6 | 1.4 | 2.5 |
| Paramedic | 2.4 | 4.1 | 0.9 | 1.3 | 0.9 | 2.2 | 3.0 | 2.6 | 1.7 | 3.3 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 9.1 | 11.2 | 4.5 | 6.3 | 9.1 | 9.5 | 13.6 | 8.8 | 9.6 | 10.2 |
| AEMT | 6.1 | 9.7 | 3.2 | 6.5 | 5.2 | 6.5 | 4.6 | 9.7 | 5.3 | 8.9 |
| Paramedic | 0.5 | 2.1 | 0.6 | 2.9 | 0.7 | 2.3 | 0.9 | 3.6 | 0.7 | 2.7 |

## Table A4. Mean paid EMT, AEMT, and paramedic FTEs per 1,000 EMS calls (2008)*

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 5.7 | 5.1 | 4.6 | 5.7 | 4.1 | 4.0 | 4.2 | 4.8 | 4.6 | 4.8 |
| AEMT | 0.3 | 0.8 | 0.3 | 0.8 | 0.2 | 0.4 | 0.0 | 0.0 | 0.2 | 0.6 |
| Paramedic | 3.8 | 3.2 | 5.4 | 6.1 | 3.4 | 1.8 | 1.8 | 2.2 | 3.8 | 3.9 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 4.6 | 6.3 | 3.0 | 2.9 | 14.3 | 35.9 | 7.3 | 5.8 | 5.4 | 11.9 |
| AEMT | 0.1 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.7 |
| Paramedic | 7.2 | 8.7 | 5.1 | 3.6 | 4.5 | 2.9 | 9.3 | 2.5 | 6.9 | 8.0 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 10.8 | 18.2 | 2.9 | 3.4 | 4.8 | 5.9 | 4.8 | 12.5 | 5.2 | 11.2 |
| AEMT | 3.2 | 4.4 | 2.9 | 3.3 | 3.9 | 3.7 | 4.1 | 7.4 | 3.7 | 5.5 |
| Paramedic | 3.9 | 3.3 | 4.5 | 2.8 | 4.0 | 3.2 | 2.1 | 2.8 | 3.3 | 3.1 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 11.0 | 14.7 | 3.0 | 2.9 | 4.6 | 6.1 | 4.9 | 8.0 | 10.5 | 14.4 |
| AEMT | 1.9 | 7.7 | 1.0 | 1.2 | 1.3 | 1.7 | 2.2 | 2.7 | 1.8 | 7.4 |
| Paramedic | 5.3 | 5.1 | 3.4 | 3.2 | 1.4 | 2.0 | 3.3 | 4.1 | 5.1 | 5.0 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 118.7 | 312.6 | 9.4 | 34.0 | 15.5 | 38.8 | 11.3 | 38.5 | 24.8 | 116.4 |
| AEMT | 0.4 | 1.3 | 7.6 | 34.0 | 4.2 | 16.8 | 0.6 | 1.9 | 2.7 | 16.8 |
| Paramedic | 4.6 | 12.7 | 8.3 | 33.9 | 12.0 | 50.4 | 3.2 | 15.7 | 6.1 | 29.3 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 9.3 | 36.1 | 3.7 | 7.9 | 2.9 | 5.2 | 21.5 | 101.0 | 10.0 | 55.1 |
| AEMT | 6.5 | 25.8 | 3.2 | 6.9 | 3.0 | 3.8 | 1.6 | 2.8 | 3.9 | 15.3 |
| Paramedic | 3.6 | 8.9 | 1.3 | 2.8 | 1.4 | 1.8 | 0.9 | 2.2 | 2.0 | 5.5 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 5.2 | 16.7 | 3.7 | 13.6 | 1.5 | 2.9 | 3.6 | 9.8 | 3.9 | 13.0 |
| AEMT | 3.5 | 5.4 | 4.7 | 24.2 | 2.6 | 5.3 | 1.8 | 4.0 | 3.3 | 13.3 |
| Paramedic | 5.9 | 13.9 | 2.7 | 3.6 | 2.5 | 3.2 | 3.3 | 6.6 | 3.9 | 9.2 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 5.5 | 16.2 | 3.7 | 7.8 | 16.6 | 52.9 | 2.3 | 0.9 | 7.0 | 25.6 |
| AEMT | 5.4 | 20.3 | 0.7 | 1.6 | 1.6 | 1.3 | 2.2 | 0.5 | 3.4 | 14.7 |
| Paramedic | 7.2 | 21.8 | 3.8 | 4.6 | 7.5 | 16.1 | 3.0 | 0.7 | 6.2 | 17.1 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 7.1 | 15.4 | 10.0 | 23.6 | 3.3 | 10.3 | 4.0 | 12.1 | 6.1 | 15.4 |
| AEMT | 3.7 | 8.8 | 6.5 | 13.1 | 3.3 | 9.0 | 3.3 | 8.8 | 3.9 | 9.4 |
| Paramedic | 3.9 | 6.3 | 5.5 | 8.9 | 2.0 | 3.3 | 0.4 | 1.4 | 3.0 | 5.8 |

* Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008.

## Table A5. Mean volunteer EMT, AEMT, and paramedic persons per 1,000 EMS calls (2008)*

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 1.2 | 4.6 | 13.6 | 39.7 | 0.9 | 3.1 | 25.0 | 42.7 | 8.3 | 27.8 |
| AEMT | 0.1 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |
| Paramedic | 0.1 | 0.5 | 3.0 | 12.6 | 0.2 | 0.6 | 0.3 | 0.9 | 1.0 | 6.7 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.4 | 1.6 | 2.5 | 4.9 | 0.9 | 2.8 | 2.5 | 5.0 | 0.7 | 2.2 |
| AEMT | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |
| Paramedic | 0.0 | 0.1 | 0.9 | 2.4 | 0.0 | 0.1 | 0.3 | 0.7 | 0.1 | 0.6 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 19.5 | 41.1 | 6.6 | 15.5 | 7.0 | 10.0 | 41.8 | 44.1 | 23.5 | 37.3 |
| AEMT | 3.4 | 8.1 | 5.1 | 12.6 | 3.1 | 8.4 | 13.9 | 22.5 | 8.1 | 17.1 |
| Paramedic | 1.3 | 2.6 | 1.0 | 2.7 | 0.6 | 1.5 | 2.2 | 3.8 | 1.5 | 3.0 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 14.9 | 65.6 | 26.2 | 58.5 | 25.1 | 39.4 | 92.0 | 77.3 | 17.0 | 65.7 |
| AEMT | 0.7 | 2.8 | 4.6 | 10.3 | 1.9 | 2.8 | 4.7 | 4.6 | 1.0 | 3.2 |
| Paramedic | 0.9 | 3.4 | 3.1 | 6.9 | 0.6 | 1.3 | 7.9 | 7.5 | 1.1 | 3.7 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 58.8 | 144.3 | 55.7 | 120.3 | 84.0 | 159.8 | 356.8 | 1,029.9 | 206.2 | 732.1 |
| AEMT | 11.7 | 36.7 | 3.1 | 11.7 | 4.4 | 14.4 | 14.2 | 38.2 | 9.7 | 30.6 |
| Paramedic | 1.6 | 2.7 | 0.4 | 1.0 | 2.2 | 6.7 | 1.6 | 5.0 | 1.5 | 4.7 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 20.4 | 53.2 | 67.5 | 308.6 | 27.4 | 70.0 | 111.1 | 176.4 | 60.9 | 205.6 |
| AEMT | 3.5 | 5.7 | 12.6 | 23.7 | 1.6 | 2.8 | 41.9 | 79.1 | 16.6 | 45.4 |
| Paramedic | 0.9 | 2.0 | 2.4 | 5.8 | 0.5 | 1.4 | 2.4 | 6.1 | 1.8 | 4.7 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 20.8 | 25.0 | 22.0 | 38.3 | 167.6 | 727.5 | 56.1 | 66.9 | 51.1 | 285.2 |
| AEMT | 7.5 | 14.1 | 5.6 | 10.1 | 10.8 | 18.7 | 17.8 | 24.3 | 9.8 | 17.3 |
| Paramedic | 3.6 | 6.9 | 2.6 | 5.7 | 1.8 | 3.2 | 2.5 | 5.2 | 2.8 | 5.8 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 214.4 | 710.2 | 15.3 | 37.7 | 1.3 | 3.6 | 1.9 | 2.4 | 114.3 | 516.4 |
| AEMT | 26.8 | 101.6 | 10.2 | 31.5 | 1.0 | 3.6 | 0.9 | 0.9 | 16.7 | 74.9 |
| Paramedic | 11.4 | 39.6 | 2.5 | 6.1 | 1.6 | 5.3 | 1.0 | 0.9 | 6.8 | 28.8 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 28.2 | 45.3 | 19.2 | 34.0 | 21.3 | 25.8 | 67.7 | 61.2 | 35.2 | 49.3 |
| AEMT | 21.0 | 42.3 | 7.2 | 13.9 | 13.3 | 24.0 | 8.1 | 16.3 | 15.0 | 32.8 |
| Paramedic | 0.9 | 3.0 | 0.8 | 2.6 | 1.2 | 4.2 | 1.7 | 8.2 | 1.1 | 4.9 |

* Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008.

## Table A6. Mean paid EMT, AEMT, and paramedic FTEs per 1,000 cardiovascular condition calls (2008)*

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 34.2 | 48.9 | 13.4 | 13.1 | 23.2 | 20.8 | 13.5 | 16.3 | 21.7 | 29.1 |
| AEMT | 0.9 | 2.6 | 2.4 | 5.8 | 1.7 | 5.3 | 0.4 | 1.3 | 1.5 | 4.4 |
| Paramedic | 21.2 | 26.9 | 17.1 | 11.0 | 24.7 | 24.1 | 9.7 | 14.6 | 19.4 | 21.0 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 45.6 | 77.0 | 22.2 | 27.8 | 62.3 | 92.9 | 56.9 | 96.1 | 45.8 | 76.5 |
| AEMT | 1.4 | 12.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 11.2 |
| Paramedic | 74.2 | 117.1 | 31.1 | 27.2 | 34.5 | 32.7 | 51.2 | 66.8 | 67.1 | 107.7 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 63.2 | 94.0 | 25.6 | 33.7 | 29.8 | 67.6 | 14.0 | 28.4 | 27.0 | 55.1 |
| AEMT | 14.3 | 24.6 | 19.9 | 23.1 | 20.7 | 18.5 | 19.0 | 37.5 | 18.9 | 29.3 |
| Paramedic | 32.4 | 39.1 | 32.3 | 24.4 | 19.6 | 16.6 | 8.7 | 11.9 | 19.2 | 23.3 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 61.9 | 102.9 | 43.6 | 54.4 | 38.3 | 59.6 | 29.2 | 35.4 | 60.0 | 99.8 |
| AEMT | 11.4 | 56.1 | 11.2 | 12.5 | 7.2 | 6.7 | 5.8 | 7.3 | 11.2 | 53.8 |
| Paramedic | 28.6 | 34.7 | 37.6 | 34.6 | 13.0 | 24.1 | 8.7 | 10.9 | 28.0 | 34.2 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 114.7 | 306.5 | 54.1 | 205.2 | 48.8 | 126.1 | 43.8 | 153.1 | 56.1 | 185.3 |
| AEMT | 3.8 | 10.5 | 5.4 | 16.3 | 13.6 | 51.8 | 4.1 | 17.0 | 6.1 | 26.6 |
| Paramedic | 12.4 | 22.2 | 7.6 | 16.5 | 39.8 | 155.9 | 25.4 | 131.2 | 22.9 | 113.6 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 44.0 | 77.8 | 59.0 | 171.5 | 20.3 | 38.5 | 23.5 | 69.7 | 41.6 | 114.6 |
| AEMT | 28.7 | 58.3 | 34.7 | 81.6 | 30.2 | 42.9 | 14.0 | 28.7 | 27.1 | 60.6 |
| Paramedic | 25.7 | 57.8 | 11.9 | 33.7 | 13.7 | 17.7 | 5.5 | 15.5 | 14.8 | 39.5 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 13.2 | 20.5 | 12.5 | 50.0 | 5.2 | 9.2 | 8.1 | 19.6 | 10.5 | 30.0 |
| AEMT | 10.9 | 16.3 | 17.4 | 89.1 | 7.9 | 12.4 | 7.2 | 15.2 | 11.2 | 47.4 |
| Paramedic | 19.4 | 28.7 | 10.0 | 17.1 | 12.9 | 22.4 | 13.8 | 29.0 | 14.5 | 25.2 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 29.5 | 63.3 | 31.5 | 61.6 | 108.9 | 316.4 | 18.9 | 13.3 | 44.1 | 145.4 |
| AEMT | 19.4 | 43.8 | 7.8 | 19.7 | 10.6 | 9.2 | 17.1 | 10.1 | 15.0 | 33.9 |
| Paramedic | 34.5 | 69.5 | 30.2 | 39.8 | 46.9 | 95.7 | 22.3 | 11.5 | 35.2 | 67.3 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 32.3 | 58.3 | 29.2 | 70.4 | 20.7 | 55.7 | 14.6 | 43.4 | 25.8 | 56.6 |
| AEMT | 11.6 | 26.7 | 24.2 | 43.7 | 20.4 | 55.1 | 16.4 | 51.8 | 15.8 | 41.3 |
| Paramedic | 19.9 | 31.4 | 20.7 | 35.8 | 10.1 | 17.6 | 2.8 | 10.9 | 14.4 | 27.5 |

* Includes chest pain, non-trauma cardiac arrest, and suspected stroke. Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008.

## Table A7. Mean volunteer EMT, AEMT, and paramedic persons per 1,000 cardiovascular condition calls (2008)*

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 8.8 | 34.0 | 27.8 | 78.6 | 4.4 | 15.6 | 57.9 | 70.2 | 20.4 | 54.7 |
| AEMT | 0.9 | 3.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 1.7 |
| Paramedic | 0.9 | 3.4 | 6.9 | 27.8 | 0.9 | 3.2 | 1.0 | 3.1 | 2.5 | 14.4 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 3.1 | 17.9 | 38.6 | 91.7 | 6.0 | 20.6 | 3.8 | 7.6 | 5.8 | 29.9 |
| AEMT | 0.1 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.7 |
| Paramedic | 0.2 | 1.0 | 16.7 | 45.9 | 0.0 | 0.0 | 0.5 | 1.0 | 1.3 | 12.2 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 67.4 | 150.8 | 41.8 | 122.1 | 45.1 | 76.1 | 189.2 | 236.7 | 110.3 | 189.8 |
| AEMT | 12.4 | 29.0 | 33.2 | 81.4 | 35.5 | 123.8 | 64.0 | 99.1 | 43.9 | 96.0 |
| Paramedic | 3.7 | 6.8 | 6.6 | 18.9 | 4.0 | 12.3 | 10.8 | 18.1 | 7.4 | 15.9 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 55.1 | 176.9 | 47.2 | 105.6 | 87.9 | 75.5 | 415.3 | 263.2 | 64.1 | 182.5 |
| AEMT | 3.1 | 14.5 | 8.3 | 18.6 | 14.4 | 25.1 | 60.2 | 103.2 | 4.9 | 21.8 |
| Paramedic | 4.3 | 15.9 | 5.6 | 12.4 | 8.3 | 18.6 | 100.7 | 171.7 | 6.6 | 31.1 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 123.6 | 166.0 | 136.4 | 233.6 | 215.2 | 331.9 | 386.9 | 915.3 | 271.1 | 670.0 |
| AEMT | 11.9 | 29.0 | 24.4 | 101.8 | 3.4 | 11.4 | 15.6 | 33.6 | 14.6 | 51.8 |
| Paramedic | 8.6 | 13.5 | 2.7 | 6.4 | 12.5 | 42.4 | 9.0 | 41.4 | 8.3 | 34.5 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 64.8 | 194.7 | 78.9 | 178.9 | 36.9 | 60.6 | 91.2 | 163.2 | 73.7 | 171.5 |
| AEMT | 18.7 | 47.1 | 45.3 | 84.7 | 9.9 | 18.6 | 37.3 | 60.6 | 31.6 | 64.5 |
| Paramedic | 3.6 | 7.8 | 6.6 | 20.1 | 1.5 | 4.6 | 7.5 | 19.7 | 5.4 | 16.0 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 77.2 | 87.9 | 106.1 | 443.2 | 199.9 | 750.6 | 138.5 | 225.5 | 119.8 | 396.9 |
| AEMT | 20.5 | 26.8 | 30.7 | 82.2 | 23.9 | 42.1 | 52.7 | 83.5 | 31.5 | 63.9 |
| Paramedic | 10.2 | 13.2 | 4.8 | 9.1 | 5.6 | 11.8 | 13.8 | 43.0 | 8.9 | 23.5 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 253.2 | 1,085.0 | 14.3 | 24.9 | 4.0 | 8.1 | 15.8 | 24.3 | 141.1 | 800.3 |
| AEMT | 18.4 | 84.3 | 3.8 | 5.8 | 1.5 | 4.4 | 5.0 | 4.5 | 11.3 | 62.0 |
| Paramedic | 8.8 | 21.3 | 2.9 | 4.2 | 3.3 | 7.9 | 7.4 | 9.1 | 6.4 | 16.3 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 107.4 | 205.7 | 52.8 | 83.9 | 107.2 | 185.8 | 234.2 | 299.1 | 130.1 | 225.0 |
| AEMT | 87.0 | 205.7 | 32.1 | 64.1 | 89.6 | 318.9 | 35.8 | 81.0 | 68.2 | 196.7 |
| Paramedic | 3.2 | 10.7 | 2.6 | 9.4 | 5.6 | 24.2 | 11.1 | 44.9 | 5.3 | 25.2 |

* Includes chest pain, non-trauma cardiac arrest, and suspected stroke. Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008.

## Table A8. Mean paid EMT, AEMT, and paramedic FTE vacancies actively recruiting (2008)

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 1.4 | 2.7 | 0.6 | 1.2 | 0.6 | 1.1 | 0.4 | 0.8 | 0.7 | 1.6 |
| AEMT | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Paramedic | 2.8 | 5.1 | 0.4 | 0.7 | 1.1 | 1.6 | 1.0 | 1.4 | 1.3 | 2.7 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 1.5 | 5.0 | 0.5 | 1.3 | 2.2 | 3.5 | 1.0 | 1.4 | 1.4 | 4.6 |
| AEMT | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 |
| Paramedic | 2.4 | 6.1 | 0.1 | 0.3 | 1.7 | 3.2 | 0.8 | 1.5 | 2.1 | 5.7 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 1.7 | 4.3 | 1.3 | 4.8 | 2.9 | 11.9 | 0.5 | 1.6 | 1.3 | 6.2 |
| AEMT | 0.6 | 2.4 | 0.7 | 2.5 | 1.5 | 6.7 | 0.2 | 0.8 | 0.6 | 3.5 |
| Paramedic | 1.1 | 2.5 | 0.5 | 0.8 | 0.5 | 1.2 | 0.3 | 1.5 | 0.5 | 1.5 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.8 | 2.8 | 1.2 | 2.2 | 0.0 | 0.0 | 0.3 | 0.5 | 0.8 | 2.7 |
| AEMT | 0.2 | 2.3 | 0.4 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 2.2 |
| Paramedic | 0.9 | 2.5 | 0.8 | 1.1 | 1.0 | 1.4 | 0.3 | 0.5 | 0.9 | 2.5 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.4 | 1.2 | 0.7 | 2.2 | 1.7 | 5.1 | 0.2 | 0.8 | 0.6 | 2.6 |
| AEMT | 0.0 | 0.0 | 0.1 | 0.4 | 0.0 | 0.2 | 0.1 | 0.6 | 0.1 | 0.5 |
| Paramedic | 0.2 | 0.7 | 0.0 | 0.0 | 0.7 | 1.9 | 0.2 | 0.8 | 0.2 | 1.0 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.3 | 0.9 | 0.6 | 1.8 | 2.6 | 6.9 | 0.6 | 1.8 | 0.7 | 2.5 |
| AEMT | 0.2 | 0.5 | 0.2 | 1.0 | 0.4 | 0.9 | 0.1 | 0.4 | 0.2 | 0.7 |
| Paramedic | 0.5 | 1.3 | 0.2 | 1.0 | 0.2 | 0.7 | 0.2 | 0.6 | 0.3 | 1.0 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.4 | 2.4 | 0.4 | 1.2 | 0.0 | 0.0 | 0.3 | 1.2 | 0.3 | 1.7 |
| AEMT | 0.0 | 0.3 | 0.0 | 0.0 | 0.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.2 |
| Paramedic | 1.0 | 3.5 | 0.3 | 0.9 | 0.1 | 0.3 | 0.3 | 1.5 | 0.5 | 2.3 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 2.9 | 9.0 | 0.4 | 1.0 | 0.7 | 1.1 | 1.0 | 1.7 | 1.8 | 6.6 |
| AEMT | 0.5 | 1.3 | 0.1 | 0.2 | 0.1 | 0.5 | 0.0 | 0.0 | 0.3 | 1.0 |
| Paramedic | 1.8 | 3.5 | 0.7 | 1.0 | 0.7 | 1.6 | 1.0 | 1.0 | 1.3 | 2.7 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.6 | 2.0 | 0.6 | 1.3 | 0.2 | 1.1 | 0.2 | 0.8 | 0.4 | 1.6 |
| AEMT | 0.2 | 0.7 | 0.3 | 0.7 | 0.1 | 0.4 | 0.3 | 1.5 | 0.2 | 1.0 |
| Paramedic | 0.4 | 1.1 | 0.7 | 1.5 | 0.3 | 0.7 | 0.1 | 0.6 | 0.3 | 1.0 |

## Table A9. Mean paid EMT, AEMT, and paramedic FTEs actively recruiting per 1,000 EMS calls (2008)*

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.2 | 0.5 | 0.3 | 0.7 | 0.4 | 0.8 | 0.3 | 0.7 | 0.3 | 0.7 |
| AEMT | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Paramedic | 0.5 | 0.7 | 0.1 | 0.2 | 0.7 | 1.1 | 0.7 | 1.2 | 0.5 | 0.9 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.2 | 1.4 | 0.1 | 0.2 | 2.6 | 6.9 | 0.8 | 1.0 | 0.4 | 2.4 |
| AEMT | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Paramedic | 0.3 | 0.6 | 0.0 | 0.0 | 0.6 | 1.1 | 0.5 | 1.0 | 0.3 | 0.7 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 2.1 | 6.0 | 0.8 | 2.5 | 5.0 | 19.8 | 1.6 | 5.7 | 2.2 | 10.2 |
| AEMT | 1.3 | 5.2 | 0.3 | 0.9 | 2.5 | 11.1 | 0.5 | 2.7 | 1.0 | 5.8 |
| Paramedic | 1.5 | 5.2 | 0.2 | 0.4 | 0.7 | 1.9 | 1.0 | 5.1 | 0.8 | 3.9 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 1.6 | 15.1 | 0.5 | 0.7 | 0.0 | 0.0 | 0.7 | 1.4 | 1.5 | 14.6 |
| AEMT | 0.1 | 1.0 | 0.2 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1.0 |
| Paramedic | 0.4 | 0.9 | 0.3 | 0.5 | 0.7 | 1.0 | 0.7 | 1.4 | 0.4 | 0.9 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.3 | 0.9 | 8.6 | 40.8 | 4.5 | 15.1 | 3.2 | 21.6 | 4.2 | 24.2 |
| AEMT | 0.0 | 0.0 | 0.1 | 0.6 | 0.0 | 0.1 | 0.3 | 1.8 | 0.2 | 1.3 |
| Paramedic | 0.2 | 0.9 | 0.0 | 0.0 | 0.9 | 3.4 | 0.2 | 1.2 | 0.3 | 1.7 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 1.1 | 4.8 | 0.2 | 0.4 | 2.5 | 6.6 | 1.0 | 3.5 | 0.9 | 3.7 |
| AEMT | 0.1 | 0.5 | 0.1 | 0.3 | 0.4 | 0.7 | 0.3 | 1.2 | 0.2 | 0.7 |
| Paramedic | 0.6 | 2.7 | 0.0 | 0.2 | 0.2 | 0.6 | 0.5 | 1.7 | 0.3 | 1.7 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.5 | 2.5 | 1.1 | 4.2 | 0.0 | 0.0 | 1.3 | 4.6 | 0.8 | 3.5 |
| AEMT | 0.1 | 0.9 | 0.0 | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.1 | 1.1 |
| Paramedic | 0.5 | 3.0 | 0.1 | 0.4 | 0.1 | 0.3 | 0.8 | 4.5 | 0.4 | 2.8 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.5 | 1.6 | 0.2 | 0.8 | 0.2 | 0.3 | 0.3 | 0.6 | 0.3 | 1.3 |
| AEMT | 0.1 | 0.5 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.4 |
| Paramedic | 0.2 | 0.5 | 0.1 | 0.1 | 0.2 | 0.4 | 0.3 | 0.3 | 0.2 | 0.4 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.9 | 3.8 | 1.6 | 5.1 | 0.1 | 0.5 | 0.5 | 2.3 | 0.8 | 3.4 |
| AEMT | 0.4 | 2.4 | 0.8 | 2.4 | 0.2 | 1.2 | 0.5 | 2.7 | 0.4 | 2.3 |
| Paramedic | 0.4 | 2.1 | 1.1 | 3.0 | 0.2 | 0.4 | 0.1 | 0.5 | 0.4 | 1.8 |

* Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008.

## Table A10. Mean paid EMT, AEMT, and paramedic FTEs actively recruiting per 1,000 cardiovascular condition calls (2008)*

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 1.1 | 2.0 | 0.6 | 1.2 | 1.4 | 3.1 | 0.8 | 1.7 | 1.0 | 2.2 |
| AEMT | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Paramedic | 1.8 | 2.0 | 0.4 | 0.7 | 3.3 | 5.7 | 2.5 | 3.5 | 2.1 | 3.8 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.9 | 2.8 | 0.3 | 0.6 | 10.7 | 19.9 | 1.5 | 1.8 | 1.8 | 6.9 |
| AEMT | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Paramedic | 2.5 | 7.1 | 0.1 | 0.2 | 4.8 | 9.0 | 0.8 | 1.5 | 2.5 | 7.0 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 11.6 | 32.9 | 4.4 | 12.1 | 59.7 | 248.3 | 3.2 | 10.3 | 17.8 | 120.9 |
| AEMT | 7.9 | 30.7 | 1.4 | 5.0 | 29.7 | 138.9 | 1.9 | 12.3 | 9.2 | 68.3 |
| Paramedic | 9.5 | 30.5 | 2.1 | 3.9 | 5.6 | 21.6 | 1.6 | 6.7 | 3.8 | 16.3 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 4.4 | 22.6 | 9.0 | 18.3 | 0.0 | 0.0 | 1.9 | 3.8 | 4.4 | 21.8 |
| AEMT | 0.5 | 4.3 | 1.3 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 4.1 |
| Paramedic | 2.0 | 5.0 | 2.5 | 3.4 | 5.4 | 9.0 | 1.9 | 3.8 | 2.1 | 5.1 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 1.6 | 5.3 | 42.8 | 171.8 | 19.5 | 57.4 | 12.5 | 68.1 | 18.4 | 92.8 |
| AEMT | 0.0 | 0.0 | 6.9 | 34.0 | 0.2 | 1.0 | 3.5 | 19.1 | 3.1 | 20.0 |
| Paramedic | 0.6 | 2.0 | 0.0 | 0.0 | 2.2 | 7.8 | 2.2 | 12.1 | 1.6 | 9.1 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 6.4 | 23.2 | 2.6 | 8.4 | 18.8 | 48.3 | 18.7 | 63.6 | 9.5 | 38.1 |
| AEMT | 1.0 | 4.8 | 1.7 | 7.6 | 4.2 | 8.7 | 2.3 | 9.5 | 1.9 | 7.5 |
| Paramedic | 1.8 | 5.6 | 0.2 | 0.9 | 1.5 | 4.6 | 3.4 | 14.0 | 1.6 | 7.9 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 0.6 | 3.3 | 2.0 | 7.3 | 0.0 | 0.0 | 3.5 | 13.7 | 1.6 | 8.0 |
| AEMT | 0.3 | 2.2 | 0.0 | 0.0 | 0.3 | 1.7 | 0.0 | 0.0 | 0.2 | 1.5 |
| Paramedic | 0.3 | 1.3 | 0.4 | 1.4 | 0.6 | 2.1 | 1.9 | 9.2 | 0.8 | 4.7 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 2.1 | 4.7 | 1.7 | 5.8 | 2.5 | 4.6 | 3.1 | 5.3 | 2.1 | 4.9 |
| AEMT | 0.6 | 1.9 | 0.0 | 0.1 | 0.1 | 0.4 | 0.0 | 0.0 | 0.3 | 1.4 |
| Paramedic | 1.1 | 2.3 | 0.7 | 1.2 | 1.1 | 1.4 | 2.4 | 3.3 | 1.1 | 2.0 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| EMT | 3.4 | 15.7 | 4.9 | 15.9 | 0.5 | 3.1 | 2.5 | 11.6 | 2.9 | 13.4 |
| AEMT | 0.9 | 4.3 | 2.1 | 6.2 | 0.8 | 4.0 | 1.9 | 8.1 | 1.3 | 5.6 |
| Paramedic | 1.5 | 6.5 | 2.7 | 7.6 | 1.2 | 3.4 | 0.7 | 3.8 | 1.4 | 5.7 |

* Includes chest pain, non-trauma cardiac arrest, and suspected stroke. Patient call volume was based on the full calendar year prior to the survey (2007), while staffing questions were based on current numbers at the time of the survey, fall 2008.

## Table A11. Mean paid EMT, AEMT, and paramedic FTE vacancy ratios* (2008)

| Arkansas | Urban | | Large rural | | Small rural | | Isolated small rural | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD |
| EMT | 4.9 | 7.0 | 5.4 | 7.7 | 5.5 | 11.6 | 10.0 | 16.7 | 5.8 | 10.1 |
| AEMT | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | NA | 0.0 | 0.0 |
| Paramedic | 17.3 | 22.4 | 3.6 | 7.5 | 13.0 | 19.8 | 24.5 | 20.9 | 12.3 | 18.6 |
| **Florida** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD |
| EMT | 2.7 | 6.9 | 2.5 | 7.0 | 11.5 | 17.5 | 16.7 | 23.6 | 3.9 | 9.5 |
| AEMT | 2.0 | 3.7 | NA | NA | NA | NA | NA | NA | NA | NA |
| Paramedic | 3.7 | 7.6 | 0.2 | 0.6 | 8.3 | 12.6 | 3.6 | 7.1 | 3.8 | 8.0 |
| **Kansas** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD |
| EMT | 8.1 | 16.7 | 12.3 | 31.6 | 11.3 | 29.1 | 13.5 | 26.8 | 11.8 | 27.3 |
| AEMT | 11.0 | 29.1 | 7.3 | 20.9 | 8.4 | 24.4 | 4.6 | 14.4 | 7.1 | 20.7 |
| Paramedic | 11.0 | 20.4 | 4.1 | 6.9 | 9.8 | 23.6 | 12.7 | 25.2 | 9.1 | 20.0 |
| **Massachusetts** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD |
| EMT | 4.3 | 14.6 | 12.5 | 14.4 | 0.0 | 0.0 | 7.1 | 10.1 | 4.4 | 14.4 |
| AEMT | 2.8 | 15.1 | 13.3 | 23.1 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 15.0 |
| Paramedic | 6.9 | 14.0 | 12.5 | 16.0 | 33.6 | 9.0 | 12.5 | 17.7 | 7.5 | 14.3 |
| **Montana** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD |
| EMT | 8.3 | 23.6 | 14.1 | 32.7 | 18.5 | 32.1 | 17.6 | 28.2 | 15.3 | 28.8 |
| AEMT | 0.0 | 0.0 | 20.0 | 40.0 | 7.1 | 18.9 | 16.7 | 28.9 | 10.7 | 24.5 |
| Paramedic | 5.2 | 11.7 | 0.0 | 0.0 | 20.9 | 31.7 | 13.7 | 25.4 | 10.9 | 22.6 |
| **New Mexico** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD |
| EMT | 9.9 | 24.0 | 12.4 | 25.5 | 19.1 | 26.6 | 19.6 | 30.3 | 13.1 | 25.4 |
| AEMT | 4.1 | 11.5 | 4.4 | 11.7 | 13.9 | 26.7 | 7.8 | 17.2 | 5.9 | 14.6 |
| Paramedic | 7.8 | 13.6 | 3.8 | 9.2 | 7.1 | 14.3 | 21.7 | 21.7 | 8.3 | 14.3 |
| **Oregon** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD |
| EMT | 3.5 | 9.9 | 13.1 | 26.6 | 0.0 | 0.0 | 16.6 | 31.4 | 8.0 | 20.7 |
| AEMT | 2.3 | 14.3 | 0.0 | 0.0 | 2.8 | 8.6 | 0.0 | 0.0 | 1.5 | 10.3 |
| Paramedic | 2.7 | 5.1 | 6.9 | 19.7 | 1.7 | 4.5 | 5.4 | 16.7 | 4.2 | 13.0 |
| **South Carolina** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD |
| EMT | 10.6 | 12.8 | 4.1 | 7.1 | 10.3 | 16.3 | 10.0 | 17.3 | 9.0 | 12.9 |
| AEMT | 9.1 | 15.5 | 0.4 | 1.5 | 1.5 | 5.5 | 0.0 | 0.0 | 4.7 | 11.5 |
| Paramedic | 11.1 | 18.4 | 4.4 | 4.8 | 6.1 | 12.1 | 7.7 | 7.7 | 8.3 | 14.6 |
| **Wisconsin** | **Urban** | | **Large rural** | | **Small rural** | | **Isolated small rural** | | **TOTAL** | |
| | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD | Mean % | SD |
| EMT | 8.3 | 19.9 | 11.1 | 17.7 | 8.3 | 28.9 | 8.7 | 18.4 | 8.8 | 20.3 |
| AEMT | 5.8 | 18.4 | 6.8 | 14.3 | 4.8 | 13.8 | 6.8 | 18.1 | 6.0 | 16.8 |
| Paramedic | 6.3 | 16.1 | 10.4 | 17.4 | 10.5 | 15.5 | 21.2 | 39.2 | 8.6 | 18.5 |

* Vacancy ratios were calculated as follows: (Paid FTE vacancies / (paid FTE supply + paid FTE vacancies)