2016 ARIZONA STATEWIDE EMERGENCY MEDICAL SERVICES NEEDS ASSESSMENT (ASENA)

by

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As members of the Mel and Enid Zuckerman College of Public Health's Community, Environment and Policy Department, Public Health Policy and Management Program Doctorate in Public Health (DrPH) Dissertation Committee, we certify that we have read the dissertation prepared by Taylor George, titled 2016 Arizona Statewide Emergency Medical Services Needs Assessment and recommend that it be accepted as fulfilling the DrPH dissertation requirement.

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Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copies of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

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This dissertation has been submitted in partial fulfillment of the requirements for an advanced degree at the University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

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DEDICATION

To the real heroes out there... the boots on the ground in a metaphorical war between life and death... the dedicated and determined men and women of Arizona's Emergency Medical Services and Trauma System... this work is dedicated to you. I hope that the information contained herein (and the subsequent conversations and actions kindled by that information) can somehow aid you in accomplishing your missions.

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ABSTRACT

Emergency Medical Services (EMS) is an institution and product of public health, health care, and public safety that is chopped and scattered across multiple jurisdictional deployment methodologies throughout Arizona. To fully-asses the EMS needs of the state, those jurisdictions are considered as a whole; for it is the whole that makes a system, and a system is what truly impacts patient outcomes. Evaluating the "whole" is the genesis and driver of the 2016 Arizona Statewide EMS Needs Assessment (ASENA).

The primary objective of ASENA is to establish a current "snap-shot" of EMS in the state while simultaneously identifying needs and/or areas that can be targeted for further analysis and/or improvement as part of Population Health Management and Emergency Medical Services Integration under the AZ Flex Grant funded by the U.S. Health Resources and Services Administration (HRSA). In addition, the secondary objective of ASENA is to compare and contrast this current "snap-shot" with data obtained in a more narrow needs assessment conducted in 2001, allowing comparison of changes in Arizona's critical access EMS system over 15 years.

To accomplish this, a 105-question needs assessment survey tool was developed and distributed to EMS agencies throughout the state. The fully-vetted survey tool collected information pertaining to sixteen core functional sections. Eighty-six agencies fully-completed the needs assessment survey tool, with respondents evenly distributed across the state's four EMS coordinating regions and representative of the various service-delivery methodologies. The combined service areas of the respondents cover over 85% of the state's population.

Arizona's statewide EMS system is well organized and positioned to deliver advanced levels of prehospital care for the vast majority of its citizens and visitors, with some variation between urban and rural regions. Key needs identified relate to: patient care reporting between EMS providers, emergency departments and receiving hospitals; quality assurance activities; education and skills training programs; dispatch system capabilities; mass casualty and public health preparedness; equipment and supplies; and more robust use of data and analyses to inform continuous EMS system improvement.

INTRODUCTION

EMS is the acronym for Emergency Medical Services, an institution and product of public health, health care, and public safety[1] that serves in many facets, in almost every city/town in this country, and in most other countries in the world. Today, EMS is chopped and scattered across multiple deployment methodologies with unique cultures and clinical protocols; each providing care in their own distinct way(s), with varying budgets and abilities. Because EMS is part of a statewide system in Arizona, it fails to only focus on the needs and performance of fragmented local jurisdictions while ignoring statewide jurisdictional integration. To fully-asses the EMS needs of the state, combined regional and statewide jurisdictions are considered as a whole. It is the whole that makes a system, and a system is what truly impacts patient outcomes. This is the genesis and driver of the 2016 Arizona Statewide EMS Needs Assessment (ASENA).

The primary objective of ASENA is to establish a current "snap-shot" of EMS in the state of Arizona while simultaneously identifying needs and/or areas that can be targeted for further analysis and/or improvement as part of Population Health Management and Emergency Medical Services Integration under Arizona's Medicare Rural Hospital Flexibility Grant (AzFlex),[2] funded by the U.S. Health Resources and Services Administration (HRSA).[3] The secondary objective of ASENA is to compare and contrast the 2016 "snap-shot" with data obtained in a more narrow needs assessment conducted in 2001,[4] allowing comparison of changes in Arizona's critical access EMS system over 15 years.

The ASENA focuses on administrative, logistical, and operational aspects of regional and statewide EMS systems in Arizona. No patient data and/or patient records are involved. ASENA subject areas include: agency information / respondent demographics; billing; medical direction / medical control; staffing; continuing education / training; quality assurance / patient care reporting; relationship with receiving hospitals; dispatch / communications; vehicles; equipment / protocols; preparedness; community paramedicine / community outreach; and priority needs.

HISTORY AND BACKGROUND

National EMS Beginnings

While modern EMS systems are not even a generation old, the initial roots of healing the injured at or near the point of wounding can be traced to biblical times. In the New Testament, we see a parable of the Good Samaritan,[5,6] in which a passer-by from Samaria comes across an injured man lying on the side of the road after being beaten and robbed. Upon finding this man, the Samaritan "went over to him, poured oil and wine on his wounds and bandaged them; then he put the man on his own animal and took him to an inn".

Although this occurred many centuries prior, we must fast-forward to the United States Civil War before any semblance of a domestic EMS framework appears via an informal system of treating the wounded on the battlefield, with the first civilian ambulance service appearing in 1865.[6] From that point until the mid-1960's, a disorganized patchwork of ambulance services popped-up in several metropolitan areas in the United States; although formal regulation and oversight were negligible.

In 1965, President Lyndon B. Johnson established the President's Commission on Highway Safety in an effort to investigate the rising death toll of motor vehicle collisions in the United States.[6] This Commission reported that "care of the injured patient" was an integral factor in limiting fatalities,[7] thus recognizing the need for an organized and regulated EMS system. Shortly thereafter, the National Academy of Sciences published a white paper entitled *Accidental Death and Disability: The Neglected Disease of Modern Society*,[8] which is widely accepted as the catalyst for modern integrated EMS and Trauma systems.

Accidental Death and Disability combined with the President's Commission of Highway Safety findings, led to enactment of the National Traffic and Motor Vehicle Safety Act of 1966,[9,10] and eventually established a federal office of EMS in the United States Department of Transportation's National Highway Traffic Safety Administration, allowing the profession to evolve into what it is today.

Origins of EMS in Arizona

Arizona's EMS origins can be traced back to the Phoenix Fire Department's "inhalator" services in the late 1920's, providing oxygen to patients in respiratory distress.[11-13] It took almost a half century before the Division of Emergency Services was established in 1971 in the office of the Governor, the first

EMS regulatory body in Arizona.[11,14] Over the next ten years, formal EMS regulation evolved rapidly, requiring EMS personnel education and certification, promulgating operational standards for ambulance services, creating the EMS Medical Control framework, and establishing local EMS coordinating systems overseen by the Arizona Department of Health Services (ADHS).[11,15-18]

In 1983, the Arizona Legislature passed legislation requiring ambulance services to obtain a "Certificate of Necessity" from ADHS in order to operate.[11] The Certificate of Necessity process intends to ensure a "public necessity" for a new ambulance service in a region, and verify financial viability of such services in that region.[19] The Certificate of Necessity clearly defines an ambulance service's: (a) service area; (b) level of service; (c) type of service; (d) hours of operation; (e) effective date; (f) expiration date; (g) legal name and address; and (h) any limiting or special provisions.[19]

In 1992, ADHS promulgated its first issue of the "Statewide Medical Standards for Non-Physician Prehospital Treatment and Triage of Patients Requiring Emergency Medical Services".[11] This document set the basic framework of clinical treatment guidelines by all of Arizona's EMS personnel, thus standardizing the minimum level of statewide prehospital care commensurate with an individual provider's Emergency Medical Care Technician (EMCT) certification level.

In 1998, the Arizona legislature mandated exclusive use of the three-digit telephone number "911" for accessing Police, Fire, and EMS.[11,20] This created a single statewide point of entry for all patients, and standardized statewide access to the EMS system.

Current Regulatory Framework of EMS in Arizona

Overview

Today, EMS in Arizona is overseen by the ADHS Bureau of Emergency Medical Services and Trauma System (BEMSTS), via authority granted under Arizona Revised Statutes Title 36 (Public Health and Safety), Chapter 21.1 (Emergency Medical Services).[21] As part of its oversight authority, BEMSTS promulgates rules under Arizona Administrative Code Title 9 (Health Services), Chapter 25 (Department of Health Services Emergency Medical Services).[22]

BEMSTS is led by a Bureau Chief with an appointed Medical Director.[23,24] Operationally, BEMSTS is divided into two overarching “sections”, the Regulatory Section and the Services Section, each overseen by a Section Chief managing a combined staff of approximately 30 personnel.[24]

The Regulatory Section consists of five key functional areas: Trauma System and Base Hospitals; Certificates of Necessity and Ambulance Rates; Emergency Medical Services Training Programs; Emergency Medical Care Technician (EMCT) Certification; and Compliance, Enforcement, and Automation.[24] The Regulatory Section mission is to "serve system stakeholders through: education, outreach, assistance, and action in order to achieve systematic compliance."[25]

The Services Section consists of five key functional areas: Epidemiological Data and Quality Assurance; Strategic Planning and Emergency Medical Services Recognition Programs; Fellowship and Internship Programs; Statutory and Standing Committees; and Time-Sensitive Illness and Injury.[24] The Services Section mission is to "establish, cultivate, and advance strategic initiatives that support and improve bureau and system performance, patient outcomes, and system workforce wellness and safety."[26]

Statutory and Standing Committees

Three statutory committees, three standing committees, and four regional emergency medical coordinating systems supplement/enhance BEMSTS efforts to develop and administer a statewide EMS and trauma system. Statutory committees include: Emergency Medical Services Council; Medical Direction Commission; and State Trauma Advisory Board.[27-29] Standing committees include: Education Committee; Protocols, Medications, and Devices Committee; and Trauma and EMS Performance Improvement Committee.[27-29] Regional emergency medical coordinating systems include: Arizona Emergency Medical Systems; Northern Arizona Emergency Medical Services; Southeastern Arizona EMS Council; and Western Arizona Council of EMS.[30]

The Emergency Medical Services Council (EMSC) is empowered by statute and comprised of thirty-one persons, two of whom are permanently assigned, while the others are appointed by the governor.[31,32] The purpose of EMSC is not clearly defined in statute, although EMSC bylaws state that the duties include making recommendations regarding: (a) training, certification, and evaluation of EMCTs; (b) certification of emergency receiving facilities, including base hospitals; (c) establishment of medical standards for patient triage and treatment; and (d) monitoring expenditures from the EMS operating fund.[33] The Education Standing Committee is a sub-component of EMSC and is composed of thirteen members who provide recommendations regarding EMCT training curriculum.[27,34]

The Medical Direction Commission (MDC) is empowered by statute and comprised of twelve persons, all appointed by the governor.[35,36] Unlike EMSC, the purpose and role of MDC is clearly defined

in statute as assisting in development of EMCT protocols governing "medical treatments, procedures, medications, training and techniques."[37] The Protocols, Medications, and Devices Standing Committee is a sub-component of MDC and is comprised of thirteen members who assist in defining the EMCT scope of practice and associated drugs and devices.[28,38]

The State Trauma Advisory Board (STAB) is empowered by statute and is comprised of twenty-four persons, all but two of whom are appointed by the director of ADHS.[39,40] As with MDC, the purpose and role of STAB is clearly defined in statute as making recommendations regarding: (a) verification and designation of trauma centers; (b) development and implementation of regional EMS and trauma system plans; (c) functionality of the EMS and trauma system QA process; and (d) annual reporting.[41] The Trauma and EMS Performance Improvement (TEPI) Standing Committee is a sub-component of STAB and is comprised of twenty-five members who assist with system-wide quality assurance initiatives.[29,42]

The four regional EMS coordinating systems are contracted through BEMSTS and are statutorily empowered to conduct needs assessments and provide planning and coordination for the EMS and trauma system within their designated region.[43] Arizona Emergency Medical Systems (AEMS) represents the central region, consisting of Maricopa, Pinal, and Gila counties;[44,45] Northern Arizona Emergency Medical Services (NAEMS) represents the northern region, consisting of Yavapai, Coconino, Navajo, and Apache counties;[44,46] Southeastern Arizona EMS Council (SAEMS) represents the southeastern region, consisting of Pima, Graham, Greenlee, Santa Cruz, and Cochise counties;[44,47] and Western Arizona Council of EMS (WACEMS) represents the western region, consisting of Mohave, La Paz, and Yuma counties.[44,48] See Figure 1 for a map of the four regional EMS coordinating systems. For Fiscal Year 2018, each of the regional coordinating systems will receive $125,500 in operational funding from BEMSTS.[49]

EMS Training Programs and EMCT Certification

BEMSTS is statutorily tasked with developing standards and criteria for training, certification, and recertification of all levels of EMCTs in Arizona, which includes: emergency medical technician, advanced emergency medical technician, emergency medical technician I-99, and paramedic.[50-53] EMS training programs are regulated by Arizona Administrative Code, Title 9, Chapter 25, Article 3, § R9-25-301 et seq. EMCT certification is regulated by Arizona Administrative Code, Title 9, Chapter 25, Article 4, § R9-25-401 et seq.

Entities must apply to BEMSTS for certification as an EMS training program and are subject to biannual compliance assessments/inspections.[54] To achieve and maintain EMS training program certification, the entity must secure a program medical director and a training program director, in addition to securing appropriate liability insurance and establishing, documenting, and implementing appropriate policies and procedures for training.[55] The program medical director is responsible for ensuring that course content and examinations are consistent with the applicable level of national education standards.[56] The training program director is responsible for the day-to-day operations of the training program and must have two years of previous experience as a physician, nurse, physician assistant, or EMCT with education in training-related instructional methodology.[57]

Once an EMS training program is certified, the EMS training program must submit a request for approval of each individual class/course to be offered while ensuring that the program has the appropriate and requisite staff, equipment, and facilities to conduct the training.[58-60] The EMS training program must ensure that the training class/course covers the applicable knowledge, skills, and competencies established by the national education standards and adequately prepares the student for national or state certification examination/testing.[61] For emergency medical technician certification, the course length must be at least 130 hours.[61] For advanced emergency medical technician certification, the course length must be at least 244 hours, with at least 100 of those hours being classroom-based and at least 144 of those hours being clinical/field-based.[61] For paramedic certification, the course length must be at least 1,000 hours, with at least 500 of those hours being classroom-based and at least 500 of those hours being clinical/field-based.[61] Upon completion of the required minimum training hours, the EMS training program must administer a program final written examination,[62] and a comprehensive practical skills test or attestation of practical skills proficiency.[63]

If/When a student of a certified EMS training program successfully completes the program as outlined above, the EMS training program must issue an official certificate of completion to the student.[64] At this time, the training program director is responsible for notifying the National Registry of Emergency Medical Technicians (NREMT) of the student's successful course completion,[65] and the student is now eligible to take the appropriate level of NREMT cognitive and psychomotor examinations,[66] or equivocal state examination if so approved (no state exam currently exists).[51,67] Once a student successfully passes the national/state certifying examination, they are eligible to apply to BEMSTS for Arizona EMCT certification at the appropriate level, so long as they meet all additional certification criteria (such as age, education level, criminal history, etc.).[68,69] Arizona does not offer reciprocity for EMS personnel who completed out-of-state training and/or are certified by other states,

unless said personnel are also in current possession of an active NREMT certification and maintain an Arizona address.[70,71]

When an individual becomes certified as an Arizona EMCT, they may only function within the scope of practice of their respective certification level, and only under authorized medical direction.[72,73] Scope of practice and triage and treatment protocol recommendations are defined by the BEMSTS Medical Director in consultation with the Emergency Medical Services Council and the Medical Direction Commission.[73,74] Finalized scope of practice is then promulgated via Arizona Administrative Code Title 9, Chapter 25, Article 5, § R9-25-501 et seq. A table clearly specifies the EMCT skills at each certification level.[75] Other tables summarize the approved medications by the EMCT certification level authorized to administer them, and specify in what environment and/or circumstance.[76-78] Local agency administrative medical directors (see the Base Hospital section below) may choose to draft their own treatment protocols that differ from those recommended by the state, if the protocol interventions fall within the state-established scope of practice.

Base Hospitals

BEMSTS is statutorily tasked with development and administration of a statewide EMS and trauma system, including the certification of advanced life support base hospitals.[50,79,80] An advanced life support base hospital is defined as a "health care institution that offers general medical and surgical services… and that is affiliated by written agreement with a licensed ambulance service, municipal rescue service, fire department, fire district or health services district for medical direction, evaluation and control of emergency medical care technicians."[81] Arizona has 50 advanced life support base hospitals.[82]

Base hospital certification is regulated by Arizona Administrative Code, Title 9, Chapter 25, Article 2, § R9-25-201 et seq. Base hospital certification is a key component of Arizona's EMS system as base hospitals provide both administrative (off-line) and direct (on-line) medical direction/control for regional EMS agencies.[83] Each EMS agency in Arizona must have a designated administrative medical director that is either: (a) board certified in emergency medicine; or (b) board certified in emergency medical services; or (c) has completed an accredited emergency medicine residency program; or (d) is currently practicing as an emergency medicine physician in Arizona and who maintains current Advanced Cardiovascular Life Support (ACLS) certification, Pediatric Advanced Life Support (PALS) certification, and Advanced Trauma Life Support (ATLS) certification.[84] Most often, the administrative

medical director is employed by, and operationally responsible for, a base hospital that is contracted by an EMS agency.

The administrative medical director, in conjunction with the EMS agency, is responsible for establishing, documenting, and implementing: communication protocols, triage protocols, treatment protocols, transfer protocols, and additional policies and procedures that are consistent with an EMCT's scope of practice.[85] This is commonly referred to as "off-line" medical direction.[86] The administrative medical director may choose to delegate these operational responsibilities to certain licensed medical professionals,[87] as is often seen with hospitals employing a nurse-level Base Hospital Manager or Prehospital Coordinator (or other similar position).

In addition to "off-line" medical direction, when EMS personnel are in the field interacting with patients, they must have the capability to receive appropriate live "on-line" medical direction from a physician who meets the same certification criteria as the administrative medical director.[88,89] This "on-line" medical direction must be accessible via operational communications equipment twenty-four hours a day, seven days a week, with plans in place for alternative methods of communication in the event of equipment failure or other disaster.[88] "On-line" medical direction is most often used by field personnel in an emergency and/or when encountering a patient and/or situation not fully covered within the scope of "off-line" medical direction documents. A base hospital may also serve as a centralized medical direction communications center for a given region.[90]

Certificates of Necessity

BEMSTS is statutorily tasked with adopting rules to regulate the operation of ambulances and ambulance services within the state, including the issuance, amendment, transfer, suspension, or revocation of Certificate of Necessity (CON).[50,91] A CON clearly defines an ambulance agency's service area, type, and level of service being rendered, among other things.[92] Unless otherwise expressly exempt, any person wishing to operate an ambulance in Arizona must apply for, and successfully obtain, a CON.[93,94] CON matters are regulated by Arizona Administrative Code, Title 9, Chapter 25, Article 9, § R9-25-901 et seq.

A key threshold to the issuance of a CON is the establishment of "public necessity" for the proposed ambulance service(s), to be determined by the ADHS Director.[95,96] In determining public necessity, the Director must consider: (1) the response times, codes, and tolerances proposed by the applicant; (2) proposed service area population demographics; (3) the geographic distribution of health

care facilities in and around the proposed service area; (4) the presence, or lack thereof, of other ground ambulance services in the proposed service area and associated response time tolerances; (5) all business, financial, and operational related aspects of the proposed ambulance service as outlined in their application; and (6) other relevant matters.[97,98]

Once a CON is issued, the ambulance service may only provide EMS and/or transport services within their CON-designated service area, and must provide services within established response times; unless otherwise expressly permitted.[99,100] All ambulances operated by a CON holder are subject to initial and annual inspection,[101-103] including verification of vehicle operating standards and supplies as outlined in the state-mandated minimum equipment inventory. In addition, a CON holder may only charge a patient for services commensurate with the ambulance charge rates established for that agency by ADHS,[104] and must submit all relevant financial records to ADHS for analysis annually.[105]

Both first-response-only (non-transporting) EMS agencies and air ambulance agencies are not required to apply for, nor obtain, a CON to operate. However, air ambulances must obtain state licensure and aircraft registration and meet other administrative and operational requirements similar to a ground ambulance CON, but do not have to meet public necessity and financial regulations.[106-109]

Recognition Programs

In addition to its regulatory responsibilities, BEMSTS offers four voluntary recognition programs to its stakeholder groups: Premier EMS Agency Program; EMS Medical Director Recognition Program; Treat and Refer Recognition Program; and Public Health Excellence in Law Enforcement Program. Interested agencies/participants may voluntarily apply to BEMSTS for “recognition” by a specific program.

The Premier EMS Agency Program (PEAP) is a quality assurance initiative that recognizes agencies who meet specific criteria for continuous quality and performance improvement.[110] There are currently fifty-three recognized Premier EMS agencies,[111] representing a geographical coverage area of approximately 83% of the state’s population.[26]

The EMS Medical Director Recognition Program (MDRP) recognizes EMS medical directors who meet specific criteria and who demonstrate excellence in the oversight of their respective EMS agency(ies).[112] There are currently fourteen MDRP-recognized EMS medical directors. MDRP recognition is not a requirement to be an administrative medical director of an EMS agency.[83]

The Treat and Refer Recognition Program (T&R) recognizes EMS agencies who demonstrate "optimal patient safety and quality of care by matching treatment, transport, and care destination options to the needs of the patient".[113] Not all 911 calls require ambulance transport to hospital emergency departments. T&R-recognized agencies can provide care in the patient's home and/or facilitate connections to other medical and social services, and be eligible for reimbursement from Arizona's Medicaid program – the Arizona Health Care Cost Containment System (AHCCCS).[114]

The Public Health Excellence in Law Enforcement Program (PHELE) recognizes police agencies who meet criteria and receive the appropriate training and equipment to administer naloxone (an antidote) to people that they encounter in the field with suspected drug (opioid/opiate) overdose.[115] Although the administration of emergency medications in the prehospital field environment has historically been reserved for EMCTs, recent legislation in Arizona authorizes police officers to carry and administer naloxone so long as they have received the appropriate training.[116] This legislation was promulgated in response to rising opioid/opiate-related overdoses and deaths in Arizona. There are twelve PHELE-recognized agencies,[26] however, police officers may carry and administer naloxone without PHELE recognition so long as they meet the statutory criteria and training.

Epidemiological Data and Quality Assurance

BEMSTS houses two primary epidemiological databases for quality assurance (QA) purposes: the Arizona Prehospital Information and EMS Registry System (AzPIERS) and the Arizona State Trauma Registry (ASTR).[117,118] Both are legally protected from public discovery,[119-121] as they are used for the purposes of "reducing morbidity and mortality and for improving the quality of health care."[122]

AzPIERS collects patient care data submitted by Arizona EMS agencies via networked mapping of electronic patient care reports (ePCR) from the field into the AzPIERS system server.[123] The AzPIERS database can be queried by BEMSTS staff to create QA reports for individual agencies or for region- or state-level system-wide analysis and benchmarking. EMS agency participation in AzPIERS is voluntary,[123] with 53 agencies currently submitting data, covering a geographic area where 86.5%-90.7% of the state's population resides.[124]

ASTR collects patient care data submitted by Arizona's 42 designated trauma centers plus one additional participating hospital.[125] Unlike the voluntary AzPIERS, data submission to ASTR is mandated by law for Arizona-designated trauma centers.[126] The ASTR database can be queried by BEMSTS staff to

create QA reports for individual facilities or for region- or state- level system-wide analysis and benchmarking. ASTR QA reports must be issued to participating facilities on a quarterly basis.[127]

METHODS

Development

In 2001, the Rural Health Office, now named the Arizona Center for Rural Health (AzCRH), at the University of Arizona Mel and Enid Zuckerman College of Public Health (MEZCOPH), conducted an Emergency Medical Services Needs Assessment of Selected Arizona Rural Communities[4] that identified the stated needs and issues faced by Arizona's EMS agencies serving rural and Critical Access Hospitals (CAHs).[128] Although the focus of the 2001 assessment was on rural and critical access hospital service areas, the framework of the assessment easily lent itself to expansion, translation, and modernization for the 2016 Arizona Statewide EMS Needs Assessment (ASENA).

The ASENA Principal Investigator (PI), a Paramedic and EMS/Trauma administrator, critically evaluated the 75 questions from the 2001 assessment, noting strengths and weaknesses. The PI updated the wording and answer options to match current EMS trends, added questions relevant to modern EMS operations, and assessed the current EMS system, status, and needs. This brought the ASENA survey tool to 148 questions, organized into sixteen sections: (1) agency information; (2) service-area demographics; (3) billing; (4) medical direction / medical control; (5) staffing; (6) continuing education / training; (7) quality assurance / quality improvement; (8) patient care reports; (9) relationship with receiving facilities; (10) dispatch / communications; (11) EMS vehicles; (12) EMS equipment; (13) preparedness; (14) community outreach / community paramedicine; (15) critical access and needs; (16) feedback.

The 148-question ASENA survey tool was then reviewed by subject matter experts for feedback, including: the ADHS Bureau of EMS and Trauma System (Terry Mullins, Bureau Chief);[129] the University of Arizona Health Sciences (UAHS) College of Medicine Department of Emergency Medicine (Dr. Josh Gaither, EMS Fellowship Director);[130] the UAHS MEZCOPH Community, Environment and Policy Department (Dr. Daniel Derksen, Professor and Chair; Dr. Joseph Tabor, Assistant Professor);[131] the AzCRH (Dr. Daniel Derksen, the Walter H. Pearce Endowed Chair and Director; Jill Bullock, Associate Director; Joyce Hospodar, Senior Advisor, Rural Programs);[132] and representatives at the HRSA FLEX Monitoring Team.[133] Based on that feedback, the tool was edited and pared down to 105 questions divided into sixteen sections (See Appendix A, 2016 Arizona Statewide EMS Needs Assessment Full Unabridged Question Bank).

The purpose and scope of ASENA, and a copy of the tool itself, were both submitted to the University of Arizona (UA) Institutional Review Board (IRB) and Human Subjects Protection Program (HSPP) for review (Protocol # 1512243991).[134] IRB/HSPP determined that review and oversight was not required because ASENA is not research as defined by 45 CFR 46.102(d), and not human subjects research as defined by 45 CFR 46.102(f).

After IRB review and approval, the PI developed an electronic version of ASENA in Qualtrics,[135] a web-based electronic survey and analytics tool, via UA software licensing. As part of the Qualtrics build, skip-logic was introduced into the survey's flow coding so that movement throughout the survey would be predicated on a respondent's answer selection to a prior question. By using skip logic, the actual number of questions seen by a respondent was primarily based on their indicated "EMS Provider/Agency Highest Level of Service" (ASENA Question 4). An example of skip logic follows: If "Basic Life Support First Responder (non-transport)" was selected as the agency type, these respondents did not receive questions pertaining to advanced life support equipment or questions pertaining to transport destinations of patients etc. Additional examples of skip logic can be seen in Appendix A, and/or upon written request to the PI.

Upon completion of the Qualtrics build, the electronic ASENA was piloted by the Rio Rico Medical and Fire District (Chief Les Caid)[136] for user interface testing and for a final layer of question review from an end-user. Some minor feedback was received and incorporated into the final ASENA tool. Distribution of ASENA survey ensued.

Distribution

Distribution of ASENA was targeted to all EMS agencies in Arizona via email, including those that operate on federal lands. A standard form email cover letter was developed by the PI accompanied by a letter of support signed by Dr. Dan Derksen and Joyce Hospodar (AzCRH). Terry Mullins (BEMSTS) also distributed an email of support via his internal listserv. The standard form email with a survey link was sent to all contacts discussed below, including a copy of the letter of support and the unabridged ASENA question bank as attachments.

To begin, BEMSTS was asked to provide the PI with a contact list of all EMS agencies in their database. While BEMSTS maintains current contacts for air and ground transporting EMS agencies, they do not maintain an up-to-date listing of contacts for non-transporting first responder agencies and/or other responder types, as these are not regulated in the same way as transporting agencies. BEMSTS

provided a list of what contact information they had on file with the disclaimer that it may be outdated and/or inaccurate. Upon review of the BEMSTS list, very few non-transporting agencies had any contact information listed, and many of the transporting agency contacts were inaccurate. The PI determined that the regional EMS coordinating councils and state-based industry/trade associations might be a valuable resource for distribution in addition to the BEMSTS list. After reaching-out to the councils and associations, the PI researched all agencies listed by BEMSTS to get current contact information. The primary platform used for research was the internet, via search-engine queries and examination of agency websites and social media accounts. If/when an agency email address was located, the standard form email with attachments were sent. If a phone number was identified, the PI called to get an email address, to which the survey was then emailed.

The four regional EMS councils[45-48] were contacted and queried about their willingness to distribute the ASENA to their membership. The Western Arizona Council of EMS (WACEMS) was the most supportive and tied completion of the ASENA to their member's eligibility for regional grant funding in the upcoming fiscal year. In addition, the four council websites were reviewed to find council participant contact information, and the standard form email with attachments were then sent.

The Arizona Ambulance Association,[137] the Arizona Fire Chiefs Association,[138] the Arizona Fire District Association,[139] the Arizona Center for Fire Service Excellence,[140] and the Arizona Advisory Council on Indian Health Care[141] helped disseminate the ASENA standard form email and attachments to their members.

After the initial survey period, the PI identified few submissions from EMS agencies in the Critical Access Hospitals (CAHs) service areas. The study period was extended thirty days while the AzCRH (Joyce Hospodar) contacted Arizona's fourteen CAH administrators via telephone and email to help identify local EMS agencies. AzCRH then mailed packets to the CAH administrators with paper-based copies of the standard form cover letter, the letter of support, and a copy of the ASENA with flyers that contained the link to the electronic Qualtrics submission tool. The CAH administrators hand-delivered the packets to EMS agencies in their CAH service area. The PI offered to perform manual data entry for EMS agencies willing to complete the paper ASENA but unable to submit via the electronic internet-based tool.

Analysis

At the conclusion of the study period, an initial basic cleaning of submitted assessments was performed by the PI in the Qualtrics system. There were 187 incomplete submissions and/or duplicate submissions excluded from the results. The remaining 86 completed unique submissions were then exported into Microsoft Excel[142] in a Comma Separated Value (CSV)[143] format.

The second step of analysis established the size, scope, relevancy, and validity of the sample population. The ASENA sample population included those agencies that submitted complete assessments, their respective geographic service area, and the populations residing in the area. Responses to ASENA question number six, "Zip Codes in EMS Provider/Agency Service Area", were used to form the basis of the sample population. The PI compiled all indicated zip codes into a running list. Two ASENA respondents used plain language to describe their service area instead of entering the zip code numbers as requested. Because the plain language used identified the service area as a named city, the PI used ZipCode.org[144] to search for the city names and then extrapolate the zip codes within the indicated cities' boundaries. All compiled zip codes were entered into UDS Mapper,[145] a free healthcare-based mapping platform funded by HRSA. UDS Mapper generated a zip code boundary map (See Figure 1 in Results) identifying the combined geographical service area of all respondents, as well as their locations in relation to Arizona's licensed hospitals. In addition, UDS Mapper also generated population-level demographics relating to the identified combined geographical service areas; data which is derived from the United States Census Bureau American Community Survey.[146,147] Based on the resulting service-area demographics, the PI determined that the ASENA respondent sample is valid due to combined service areas providing coverage for over 85% of Arizona's population (see Appendix B for the full break-down of population demographics within the combined respondent service areas). The 85% figure is the quotient when dividing the identified UDS Mapper ASENA respondent service-area estimated population of 5,772,684 (a calendar year 2015 statistic)[148] by 6,758,251 (the calendar year 2015 estimated total population of Arizona)[149]. In addition, the respondents are almost equally divided between the four regional EMS coordinating systems (AEMS, NAEMS, SAEMS, WACEMS - see Figure 2).

Having a valid sample allowed the PI to proceed with analyzing ASENA results. The CSV file was imported into Statistical Analysis Systems (SAS)[150] for coding. For the next steps, the PI enlisted the assistance of two statistical specialists with subject-matter expertise in writing statistical software programming language (Vatsal Chikani and Robyn Blust, both from ADHS). The PI maintained intellectual control of the process while the two statistical specialists created the statistical code language pursuant

to specific framework established by the PI. The first results report generated raw data tables representative of the overall state-wide ASENA descriptive statistics consisting of both quantitative (from selection responses) and qualitative (from free-text responses) variable outcomes. The PI refined these results by categorizing and coding the qualitative responses. After multiple iterations, a secondary state-wide results report was generated. Using this same templated methodology, four additional reports were generated with ASENA results specific to each regional EMS coordinating system, as indicated by responses to ASENA question number five, "EMS Provider/Agency EMS Council" (see Appendix C for full data tables from the statewide and regional levels).

Finalized respondent "Priority Needs" were compiled via a rank-order methodology. Respondents were asked to enter their self-identified priority needs (free text) ranging from Priority Need #1 (most important) to Priority Need #5. The PI qualitatively reviewed all free-text responses and grouped into appropriate standardized categories. A point system was then assigned to responses as follows: items identified as Priority Need #1 were assigned 5 points; items identified as Priority Need #2 were assigned 4 points; items identified as Priority Need #3 were assigned 3 points; items identified as Priority Need #4 were assigned 2 points; and items identified as Priority Need #5 were identified 1 point. All items were then collated and provided in rank-order based upon aggregate categorical scoring (category with highest aggregate score listed as top priority and then descending from there).

For the secondary results analysis, EMS agencies serving CAHs were identified with assistance from AzCRH. ASENA responses of these agencies were isolated and stand-alone tables created. A crosswalk between the 2001 assessment questions and the 2016 assessment questions was performed to identify equivalency, with forty-one questions being identified as being equivalent (either exact wording or similar with minor rephrasing). A side-by-side comparison of respondent answer selection proportions was then created.

PRIMARY RESULTS & DISCUSSION - STATEWIDE

The primary objective of the 2016 Arizona Statewide EMS Needs Assessment (ASENA) is to establish a current "snap-shot" of EMS in Arizona while simultaneously identifying needs and/or areas that can be targeted for further analysis and/or improvement as part of Population Health Management and Emergency Medical Services Integration under the AzFlex initiative funded by HRSA. The primary results and discussion are divided into sections following the order and grouping of the ASENA questionnaire.

Agency Information / Respondent Demographics

Distribution of Respondents

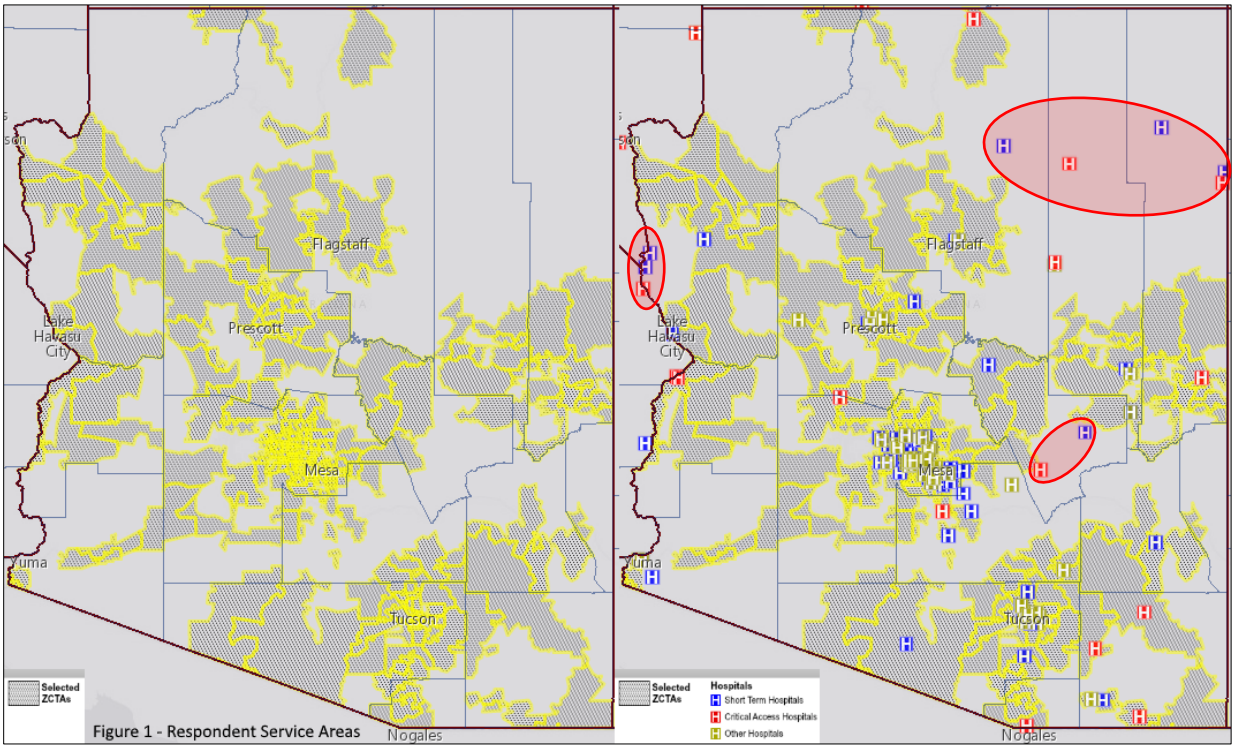

Figure 1 - Respondent Service Areas

The left side of Figure 1 (above) shows the combined service areas of ASENA respondents based on self-identified service area zip codes (mapping provided by UDS Mapper,[145] as described in the Methods section). Arizona is a geographically diverse and dispersed state, with a vast majority of the state's population living in urban areas primarily consisting of Avondale-Goodyear, Casa Grande,

Flagstaff, Lake Havasu City, Phoenix-Mesa Metro, Valley-Prescott, Sierra Vista, Tucson, and Yuma.[151] As described in the Methods section, ASENA respondents are representative of Emergency Medical Services (EMS) agencies with service areas encompassing over 85% of the state's total population.

The right side of Figure 1 shows the combined service areas of ASENA respondents in comparison to the location of Arizona's licensed hospital facilities. Short term hospitals (also known as "acute care hospitals" - blue icons) are typical traditional hospital facilities providing medical and trauma care with brief recovery periods.[152] Critical Access Hospitals (CAHs - red icons) are small facilities with 25 beds or less and located in designated rural areas that are more than 35 miles drive from the next closest hospital.[153] The location of hospital facilities is somewhat correlated with the location of population clusters, and thus, ASENA respondents are representative of almost all of the populated areas of the state. However, certain parts of Arizona had few ASENA respondents. If we were to overlay a clock structure on top of the map with the top-middle being "12-o'clock" and the bottom-middle being "6-o'clock", we see that there are hospital facilities but no respondent service-area coverage from approx. "12:30" to "2:30"; and then at approx. "3:30" to "4:30" near the middle of the map; and then again at the far left edge of the map at approx. "9:30" to "9:45" (the areas highlighted in red). These are tribal lands[154] and sovereign nations that did not participate in the ASENA assessment. Thus the ASENA survey does not have much data on the needs of Arizona's American Indian populations.

Figure 2 - Arizona EMS Regions

Table 1 - Respondent's Regional EMS Coordinating System	N	State
Arizona Emergency Medical Systems (AEMS - Red)	21	24.4%
Northern Arizona Emergency Medical Services (NAEMS - Yellow)	23	26.7%
Southeastern Arizona EMS Council (SAEMS - Blue)	21	24.4%
Western Arizona Council of EMS (WACEMS - Green)	17	19.8%
I don't know / I'm not sure	1	1.2%
None - N/A	3	3.5%

The 86 ASENA respondents are fairly evenly distributed across the four Regional EMS Coordinating Systems.[44-48] Two of the "None-N/A" respondents are federal agencies, while the third is a tribal agency. The "I don't know / I'm not sure" respondent is also a tribal agency. These four agencies were not included in the regional analyses presented throughout the remainder of this report. More information about the coordinating systems can be found in the section entitled "Current Regulatory Framework of EMS in Arizona".

Respondent Agency Type

Table 2 - EMS Provider/Agency Type	N	State	AEMS	NAEMS	SAEMS	WACEMS
Fire District	41	48.8%	47.6%	43.5%	47.6%	58.8%
Municipal Fire Department	22	25.6%	42.9%	26.1%	14.3%	23.5%
Third-Service EMS (i.e. City/County)	0	0.0%	0.0%	0.0%	0.0%	0.0%
Hospital-Based EMS (i.e. Owned/Operated by a hospital)	2	2.3%	4.8%	4.3%	0.0%	0.0%
Private EMS (Independent Corporation)	10	11.6%	4.8%	13%	23.8%	5.9%
Tribal Fire/EMS Agency	2	2.3%	0.0%	4.3%	0.0%	5.9%
Other:	8	9.3%	0.0%	8.7%	14.3%	5.9%

Table 3 - EMS Provider/Agency Highest Level of Service	N	State	AEMS	NAEMS	SAEMS	WACEMS
Basic Life Support First Responder (no transport)	10	11.6%	4.8%	21.7%	4.8%	5.9%
Basic Life Support Ground Ambulance (transport)	0	0.0%	0.0%	0.0%	0.0%	0.0%
Advanced Life Support First Responder (no transport)	32	37.2%	47.6%	30.4%	23.8%	52.9%
Advanced Life Support Ground Ambulance (transport)	40	46.5%	47.6%	47.8%	61.9%	35.3%
Air Ambulance (transport)	1	1.2%	0.0%	0.0%	0.0%	0.0%
Other:	3	3.5%	0.0%	0.0%	9.5%	5.9%

Table 4 - Interfacility Transport	N	State	AEMS	NAEMS	SAEMS	WACEMS
No - We only transport from scene to hospital	25	56.8%	80.0%	72.7%	53.3%	71.4%
Yes - Both emergency and non-emergency interfacility	18	40.9%	10.0%	27.3%	46.7%	28.6%
Yes - Emergency interfacility only	1	2.3%	10.0%	0.0%	0.0%	0.0%

Respondents are majority fire-based agencies (74.4%) and agencies that offer services at the Advanced Life Support level (83.7%). Of the 100 Certificate of Necessity (CON) holders listed on the Bureau of EMS and Trauma System (BEMSTS) website as of June 2017,[155] 65 are fire-based. Sixteen of the CONs listed are subsidiaries of the same parent corporation. If the 16 subsidiaries are combined into one CON, it reduces the total CONs to 85. This parent corporation and its 16 subsidiaries cover a massive geographic EMS service area. For more information on CONs, see the "Current Regulatory Framework of EMS in Arizona" section of this document.

Of those agencies that provide patient transport, the majority (56.8%) only transport from the scene to hospital. The AEMS region has a higher percentage of fire-based agencies, the SAEMS region has a higher proportion of privately-owned ambulance agencies, and the NAEMS region has the highest percentage of non-transporting Basic Life Support agencies. Only 1 of Arizona's 23 air ambulance agencies (0.04%) participated in the ASENA survey. Therefore, air ambulance respondent results are not included in subsequent tables and analyses in the remainder of this report.

Service Area Demographics

Table 5 - Approx. Size of Service Area	N	State	AEMS	NAEMS	SAEMS	WACEMS
1-49 sq mi	17	19.8%	14.3%	8.7%	38.1%	17.6%
50-99 sq mi	19	22.1%	28.6%	26.1%	14.3%	23.5%
100-249 sq mi	19	22.1%	23.8%	21.7%	28.6%	17.6%
250-499 sq mi	8	9.3%	9.5%	13.0%	9.5%	0.0%
500-999 sq mi	7	8.1%	14.3%	4.3%	0.0%	17.6%
1000+ sq mi	16	18.6%	9.5%	26.1%	9.5%	23.5%

Respondent service areas range from under 50 square miles to over 1,000 square miles. Most respondents (64%) have a service area under 250 square miles, just 18.6% have a service area over 1,000 square miles. NAEMS and WACEMS regions have very large service areas. Further investigation would be necessary to correlate service area size, population density, response and transport times, air

ambulance utilization, and patient outcomes. While ASENA question 12 asked respondents to identify the number of calls resulting in air ambulance utilization, few responded.

Table 6 - Population Estimate of Service Area	N	State	AEMS	NAEMS	SAEMS	WACEMS
Varies due to tourism	5	5.8%	9.5%	4.3%	4.8%	0.0%
1-999 people	7	8.1%	0.0%	8.7%	4.8%	17.6%
1,000-9,999 people	23	26.7%	19.0%	21.7%	19.0%	47.1%
10,000-49,999 people	30	34.9%	23.8%	47.8%	47.6%	23.5%
50,000-99,999 people	10	11.6%	19.0%	8.7%	9.5%	11.8%
100,000-499,999 people	6	7.0%	14.3%	8.7%	4.8%	0.0%
500,000-999,999 people	2	2.3%	4.8%	0.0%	4.8%	0.0%
1,000,000+ people	3	3.5%	9.5%	0.0%	4.8%	0.0%

Table 7 - Avg. Age of Service Area	N	State	AEMS	NAEMS	SAEMS	WACEMS
Unknown	4	4.8%	0.0%	8.7%	5.0%	0.0%
0-14	1	1.2%	0.0%	0.0%	0.0%	5.9%
15-29	5	6.0%	0.0%	4.3%	5.0%	17.6%
30-49	40	48.2%	47.4%	47.8%	65.0%	29.4%
50-64	26	31.3%	31.6%	39.1%	10.0%	47.1%
65+	7	8.4%	21.1%	0.0%	15.0%	0.0%

Most respondents (73.2%) were from service areas with populations ranging from 1,000 to 99,999 people, serving a population averaging from 30 to 64 years old (79.5%). AEMS respondent service areas appear to be representative of larger populations while NAEMS and WACEMS respondent service areas appear to be representative of smaller populations. Age distributions appear to be rather constant across the regions although AEMS and SAEMS respondents indicate greater proportions of the geriatric (65+) population, a finding that could possibly impact medical needs of the given communities. See Appendix B for additional break-down of population demographics within the combined respondent service areas.

Additional research would be necessary to study the relationship between population density, age, and other factors affecting agency call and transport volumes by patient age category (e.g., infant, pediatric, adult, and geriatric). Such data could inform interventions such as education and training programs, and equipment and supplies needed to better serve Arizonans. While ASENA questions 10

and 11 asked respondents to enumerate their respective call and transport volumes by age category, very few responded.

Billing

Billing Practices

Table 8 - Agency bills patients for services?	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	52	60.5%	47.6%	60.9%	66.7%	70.6%
No	34	39.5%	52.4%	39.1%	33.3%	29.4%

Table 9 - Who provides billing services?	N	State	AEMS	NAEMS	SAEMS	WACEMS
Self-Bill	25	48.1%	50.0%	21.4%	64.3%	66.7%
Contract Out to Third Party	27	51.9%	50.0%	78.6%	35.7%	33.3%

A majority of respondents indicate that they bill for their services. Payer reimbursement of EMS services is often tied to the actual transport of a patient to a hospital. Private health insurance payers and state Medicaid programs often follow the lead of the Centers for Medicare and Medicaid Services (CMS),[156] Medicare payment policies.

The ASENA survey tool did not assess finite details of the billing and collecting by ambulance and other transport agencies. Some receive public funding through taxes or other sources,[157] such as general usage fees direct-billed to patients when EMS responds to a 911 call but does not transport, as in Los Angeles, CA.[158] Some agencies may be "Treat and Refer" agencies designated by BEMSTS and thus eligible for AHCCCS reimbursement for services rendered in the patient's home without transport, and/or for referring patients to other medical and social services.[159]

Arizona agencies billing for their services are evenly split between self-billing and using a third-party, varying at the regional level - NAEMS primarily uses third-parties, while SAEMS and WACEMS primarily do their own billing. Outsourcing billing operations to a third-party can decrease cost and increase revenue with the right billing partner, but lack internal control and transparency of billing operations.[160-163]

Payer Mix

Table 10 - Mean Proportion of Services Billed/Collected	State	AEMS	NAEMS	SAEMS	WACEMS
Medicare Patients	28.4%	33.4%	28.4%	25.0%	25.0%
Medicaid - AHCCCS Patients	33.9%	27.4%	31.1%	28.5%	35.0%
Dual Eligible Patients (Medicaid + Medicare)	9.2%	11.5%	6.4%	12.5%	10.4%
Private/Commercial Insurance Patients	21.7%	23.2%	24.3%	25.0%	10.0%
Uninsured/Self-Pay Patients	14.1%	15.4%	17.5%	12.5%	7.5%
Annual Collections for Billing	48.5%	45.0%	36.7%	75.0%	35.0%
Expenses Subsidized	55.0%	53.8%	67.9%	50.0%	45.0%

ASENA question number 17 asked respondents to provide the approximate percentage of billed services for each payor type in a free-text entry box. Table 10 shows the mean proportion of each payor in the state and by region. ASENA questions 15 and 16 asked respondents to identify their average annual rate of collections and other sources of revenue. Respondents were asked to choose categories in 10 percentage point increments and used to calculate the mean for the state and each region.

AHCCCS covers eligible individuals and families based on income, as a percentage (133%) of the federal poverty level (FPL) - which for CY2017 is $1,337 per month or less for an individual.[164,165] Respondents indicated that AHCCCS paid for 33.9% of EMS agency services, and 43.1% if dual-eligibles (individuals enrolled on Medicaid and Medicare) are included. Currently, AHCCCS-Medicaid provides health insurance coverage for 25% of Arizonans.[166]

Across the U.S., rural residents tend to be older, of lower income, and have a higher percentage covered by public payers (Medicare and Medicaid). ASENA responses are consistent with national rural demographics, as evidenced by the higher proportion of AHCCCS payment for EMS services in the rural NEAMS and WACEMS regions. Further research could identify AHCCCS cost drivers in rural and urban areas, cross analyzed by primary and secondary diagnoses from EMS transports and Emergency Department (ED) discharges.

The percentage of EMS services paid for by Medicare and Medicaid (AHCCCS) is higher than the percentage of Arizonans covered by Medicare and Medicaid. Conversely, a higher proportion of patients have private health insurance than the proportion of EMS services in Arizona paid for by private insurance. There are plausible explanations for such mismatches – older patients tend to need more medical services and are covered by Medicare, rural areas tend to have higher percentages of their populations that are elderly and that are covered by Medicare and Medicaid. ASENA respondents

indicate that Medicare (covering those age 65 or older)[167] accounts for 28.4% of payment (or 37.6% if including dual-eligibles) for EMS services; although only 14% of Arizonans are Medicare beneficiaries.[166] Respondents indicate that Private/Commercial Insurance pays for only 21.7% of EMS services; although about 45% of Arizonans are Private/Commercial Insurance beneficiaries.[166]

The majority of respondents reported collecting less than half of their billed services. SAEMS respondents reported collecting 75% of their billed EMS services. Additional questions and data analyses would be necessary to understand, correlate factors, or draw conclusions on billing, collection, and cost trends. Respondents may have different definitions, reporting, accounting, knowledge and understanding about the differences between what an entity charges for EMS services (for example a fee schedule or charge master), what a private or a public payer reimburses for EMS services, and what EMS services actually cost. In comparison, the average Arizona hospital collection rate was reported at 21% for Calendar Year 2015.[168]

Medical Direction / Medical Control

Medical Director Specialty

Table 11 - Medical Director Specialty	N	State	AEMS	NAEMS	SAEMS	WACEMS
Emergency Medicine (EM)	66	78.60%	75.0%	73.9%	95.2%	70.6%
Emergency Medical Services (EMS)	49	58.30%	70.0%	73.9%	42.9%	41.2%
Internal Medicine	6	7.10%	5.0%	0.0%	9.5%	11.8%
Family Medicine	5	6.00%	15.0%	4.3%	0.0%	5.9%
General Practice	5	6.00%	10.0%	8.7%	0.0%	5.9%
Other:	3	3.60%	0.0%	0.0%	4.8%	5.9%
Pediatrics	3	3.60%	10.0%	0.0%	4.8%	0.0%
Surgery (General)	3	3.60%	0.0%	8.7%	0.0%	0.0%
Cardiology	1	1.20%	0.0%	4.3%	0.0%	0.0%
Obstetrics and Gynecology	1	1.20%	0.0%	4.3%	0.0%	0.0%
Physical Medicine and Rehabilitation	1	1.20%	0.0%	4.3%	0.0%	0.0%
Preventative Medicine	1	1.20%	0.0%	4.3%	0.0%	0.0%
Surgery (Ortho)	1	1.20%	0.0%	4.3%	0.0%	0.0%

As discussed in the "Current Regulatory Framework of EMS in Arizona" section, Arizona statute requires Advanced Life Support agencies to have an Administrative Medical Director who is either

formally educated in emergency medicine / emergency medical services, or who is educated in another specialty area but who holds Advanced Cardiovascular Life Support, Pediatric Advanced Life Support, and Advanced Trauma Life Support certifications and is currently practicing emergency medicine.[84] While this statue theoretically allows for almost any physician to provide EMS medical direction, respondents indicate that a majority of medical directors come from formal emergency medicine and/or emergency medical services training programs. Thirty-four respondents (39.5%) indicated that their medical director holds both credentials. Over 96% of the respondents that indicated their medical director specialized in an area other than EM and/or EMS (such as Internal Medicine or Family Medicine) indicated that those directors also specialized in EM and/or EMS, with the three "other" respondents citing "unknown" or "n/a". The findings suggest that Arizona's EMS system has appropriately-specialized medical director oversight. For more information about board certification in EMS,[169] visit the American Board of Emergency Medicine website. BEMSTS recently initiated a voluntary Medical Director Recognition Program applying more stringent criteria than required by Arizona statute. BEMSTS "recognition" is not required of EMS Administrative Medical Directors.[112] Currently, there are 14 BEMSTS recognized EMS Administrative Medical Directors (11 from AEMS, 0 from NAEMS, 1 from SAEMS, 2 from WACEMS).[170]

ASENA question 18 asked respondents to identify which hospital serves as their ALS Base Hospital (see "Current Regulatory Framework of EMS in Arizona" for more information on Base Hospitals). Only eight respondents indicated that they do not use a base hospital for medical direction, while 78 (90.7%) do. Respondents identified using 36 (72%) of the 50 certified base hospitals in Arizona[82] for EMS medical direction. Three statutory committees and four Regional EMS Coordinating Systems are tasked with developing clinical protocol recommendations; medical directors are not required to adopt any of them for use. Thus there is variation in the clinical treatment protocols and other guidelines, although additional research would be needed to understand the impact that such variation has on patient outcomes and costs. See the "Current Regulatory Framework of EMS in Arizona" for more information on committees and coordinating systems.

Medical Director Engagement

Table 12 - Meet w/ Medical Director	N	State	AEMS	NAEMS	SAEMS	WACEMS
Daily	1	1.2%	5.0%	0.0%	0.0%	0.0%
Weekly	4	4.8%	15.0%	0.0%	4.8%	0.0%
Monthly	46	54.8%	45.0%	54.5%	57.1%	70.6%
Quarterly	14	16.7%	20.0%	27.3%	14.3%	5.9%
Twice a Year	8	9.5%	5.0%	4.5%	9.5%	11.8%
Once a Year	6	7.1%	5.0%	9.1%	9.5%	5.9%
Never	5	6.0%	5.0%	4.5%	4.8%	5.9%

The majority (60.8%) of ASENA respondents indicate that they meet with their medical director at least monthly. That may not include indirect contact with the medical director via delegated medical control / base hospital staff. Five respondents (6%) indicated they "never" meet with their medical director, while 14 (16.6%) indicated they only meet with their medical director once or twice a year. The level of EMS medical director involvement with an EMS system can be correlated with better functionality and patient outcomes.[171,172]

Staffing

Staffing Demographics

Table 13- EMS Personnel by Compensation	AEMS			NAEMS			SAEMS			WACEMS		
	FT Paid	PT Paid	Vol	FT Paid	PT Paid	Vol	FT Paid	PT Paid	Vol	FT Paid	PT Paid	Vol
Paramedic	42.5%	1.9%	0.1%	36.4%	8.1%	0.5%	35.0%	1.0%	4.0%	24.0%	10.0%	7.4%
AEMT/EMS-I	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.5%	0.0%	0.0%	0.0%	0.3%	0.0%
EMT/EMT-B	51.2%	2.7%	0.4%	31.1%	13.4%	3.9%	45.8%	2.4%	9.3%	21.4%	12.8%	18.9%
First Responder	0.0%	0.0%	0.4%	0.5%	0.5%	5.5%	0.1%	0.4%	0.8%	2.1%	0.3%	1.3%
Nurse	0.5%	0.1%	0.0%	0.1%	0.0%	0.0%	0.5%	0.0%	0.1%	0.0%	0.0%	0.0%

ASENA question 21 asked respondents to provide the number of EMS personnel for each employment type (full-time paid, part-time paid, and volunteer) and by level of certification. Percentages were then calculated based on number of personnel identified in each category divided by total number of personnel per region. Table 13 identifies the percentage of personnel by employment

type and certification level in each region. AEMS has the greatest proportion of full-time paid personnel (94.4%), while WACEMS has the greatest proportion of part-time and volunteer personnel (52.8%). Paramedics represent 40%-45% of personnel across the four regions and EMT/EMT-B represent 48%-58% of personnel across all four regions. SAEMS has the greatest proportion (57.5%) of EMT/EMT-B personnel. Arizona has an advanced EMS workforce when compared to the rest of the nation (40%-45% Paramedic workforce in Arizona versus 24% nationally).[173]

ASENA questions 22 thru 24 asked respondents for the number of years personnel have worked at their agency, the number of years personnel have in the EMS industry, and the highest level of education obtained by EMS personnel per certification level. Because these three questions were "optional", not enough data was collected to draw any valid conclusions. The questions were deemed "optional" because of the amount of additional delegated survey work that would have been placed on the respondent agency to obtain the information. The information is not something that is routinely available at the agency administration level. The intent of these questions was to identify a baseline of education and experience per region and agency for correlation with patient outcomes and additional research. The correlation of experience and education with patient outcomes requires further investigation.

Barriers to Recruitment and Retention

Table 14 - Barriers to Recruitment/Retention	N	State	AEMS	NAEMS	SAEMS	WACEMS
Pay	57	67.9%	40.0%	87.0%	65.0%	76.5%
Geography/Location	49	58.3%	40.0%	73.9%	60.0%	52.9%
Time Commitment	27	32.1%	40.0%	47.8%	25.0%	17.6%
Training Requirements	24	28.6%	30.0%	47.8%	20.0%	11.8%
No Interest	14	16.7%	10.0%	30.4%	5.0%	23.5%
Other:	7	8.3%	5.0%	13.0%	10.0%	0.0%
Stress	5	6.0%	5.0%	4.3%	5.0%	11.8%

While respondents were not asked if they needed additional personnel to meet operational demands (a subsequently-noted limitation of the assessment), they were asked to identify what, if any, barriers they face regarding recruitment and retention of EMS personnel. Pay and Geography/Location were identified as leading barriers by all regions. The median annual pay for EMTs and Paramedics in Arizona is lower than national benchmarks ($28,226 for an Arizona EMT[174] and $37,669 for an Arizona

Paramedic[174] versus national benchmark of $33,533 and $40,440 respectively[175,176]). The more rural regions of NAEMS and WACEMS respondents indicate significantly higher levels of "no interest" when compared to AEMS and SAEMS; and NAEMS respondents report geography/location at a significantly higher proportion than the other three regions.

Continuing Education / Training

Complementary Certifications

Table 15 - Certs Required for Employment (Yes or Other Similar)	State	AEMS	NAEMS	SAEMS	WACEMS
NREMT	17.4%	14.3%	13.0%	14.3%	23.5%
BLS-HCP	98.8%	100%	100%	95.3%	100%
ACLS	87.2%	100%	73.9%	90.5%	94.1%
PALS	76.7%	81.0%	65.2%	85.8%	82.3%
NRP	17.4%	14.3%	13.0%	23.8%	23.5%
PHTLS	39.5%	38.1%	43.4%	28.5%	52.9%

As discussed in the "Current Regulatory Framework of EMS in Arizona" section, EMS personnel in Arizona must be state-certified at a given level (Basic, Advanced/Intermediate, Paramedic) to practice. Arizona certification is achieved by passing the National Registry of Emergency Medical Technicians (NREMT) certification examination. There is no state-mandated requirement to maintain NREMT certification once Arizona certification is received. Certification holders must simply meet state-required continuing education standards.[177] ASENA question 28 asked respondents to indicate if their agency requires personnel to maintain NREMT certification in addition to maintaining state certification - only 17.4% require both. Additional investigation is needed to determine why agencies do not require NREMT certification to be maintained. Maintenance of NREMT certification meets Arizona's recertification requirement.[177]

ASENA questions 29 through 33 asked respondents to indicate if they required personnel to maintain additional complementary/advanced certifications in the following subjects (or their equivalent): American Heart Association Basic Life Support for Healthcare Providers (BLS-HCP); American Heart Association Advanced Cardiovascular Life Support (ACLS); American Heart Association Pediatric Advanced Life Support (PALS); American Academy of Pediatrics Neonatal Resuscitation Provider (NRP); and National Association of Emergency Medical Technicians Pre-Hospital Trauma Life Support (PHTLS). Complementary/advanced certifications can provide improved clinical practice via organizationally-

driven national standards; although the quality of the learning experience depends on the quality of the instructor teaching the standardized curriculum and the quality of hands-on skills scenarios.[178-185]

Almost all respondents (98.8%) indicate that they require personnel to maintain BLS-HCP or another similar basic CPR certification. Only one respondent indicated no requirement to maintain a basic CPR certification (a small, rural first-responder agency). A majority of respondents (87.2%) indicate that they require personnel to maintain ACLS or another similar advanced cardiac certification. Out of the 11 agencies that do not require, nine are basic life support agencies, six of which are located in NAEMS. A majority of respondents (76.7%) indicate they require personnel to maintain PALS or another similar advanced pediatric certification. Of the 22 agencies that do not require advanced pediatric certification, half are advanced life support agencies. Only 14 agencies (17.4%) require personnel to maintain NRP or another similar advanced neonatal certification. Of the 14 that do require advanced neonatal certification, all but one are fire-based agencies. Less than half of respondents (39.5%) require personnel to maintain PHTLS or another advanced trauma certification; with the strongest representation coming from the rural NAEMS and WACEMS regions.

Additional research is needed to investigate correlations between requiring complementary / advanced certification with clinical performance indicators, EMS system indicators, and/or patient outcomes in respective populations.

Continuing Education Personnel and Funding

Table 16 - EMS Training Officer	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	72	84.7%	81.0%	87.0%	85.7%	82.4%
No	13	15.3%	19.0%	13.0%	14.3%	17.6%

Table 17 - Sources of Funding for Continuing Education	N	State	AEMS	NAEMS	SAEMS	WACEMS
Agency/Internal	69	81.2%	100.0%	78.3%	71.4%	76.5%
Base Hospital	22	25.9%	20.0%	26.1%	23.8%	41.2%
Grants	19	22.4%	15.0%	30.4%	19.0%	29.4%
None (EMS personnel must independently pay)	18	21.2%	5.0%	34.8%	14.3%	35.3%
EMS Council	13	15.3%	5.0%	13.0%	4.8%	47.1%
Other:	7	8.2%	0.0%	0.0%	23.8%	5.9%
Tribal/Federal Funding	2	2.4%	0.0%	0.0%	0.0%	11.8%

Most respondents (84.7%) indicate that they staff a designated EMS training officer, with an even distribution across the regions. No patterns were identified in the 13 agencies that do not. Respondents were asked to indicate their funding sources for EMS education/training (CE), 81.2% are self-funded. 100% of AEMS respondents self-fund at least a portion of their EMS education/training. Over a third of NAEMS and WACEMS respondents indicate that their personnel must self-pay for CE. WACEMS appears to maintain the highest level of funding their member agencies' CE needs. For the agencies that indicated "other" sources of funding, the greatest proportion relates to community fundraising/donations.

Quality Assurance / Patient Care Reporting

Quality Program Overview

Table 18 - Active Quality Program	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	66	77.6%	85.0%	73.9%	81.0%	70.6%
No	19	22.4%	15.0%	26.1%	19.0%	29.4%

Most respondents (77.6%) indicate that their agency maintains an active quality program; a key component to a high-performing EMS system.[171,172,186-189] Of the 19 agencies that do not maintain an active quality program, 12 are non-transporting agencies. The remaining seven are all advanced life support transporting agencies, representing fire-based, private, and tribal entities.

Table 19 - Provider of Quality Monitoring	N	State	AEMS	NAEMS	SAEMS	WACEMS
Internal (Self)	59	89.4%	88.2%	94.1%	100.0%	83.3%
Base Station Hospital	45	68.2%	64.7%	70.6%	82.4%	66.7%
Other:	9	13.6%	17.6%	5.9%	5.9%	16.7%
University	3	4.5%	0.0%	5.9%	5.9%	0.0%
Other Hospital	1	1.5%	0.0%	0.0%	0.0%	8.3%

Of the respondents who indicated an active quality program, most manage the program internally (89.4%) and/or via coordination with their base station hospital (68.2%). Six of the nine respondents who selected "other" indicate that their medical director provides the quality monitoring.

Table 20 - Quality Program: Chart/Case Review	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - 100% review of all EMS calls	23	34.8%	35.3%	35.3%	47.1%	25.0%
Yes - Randomized Review of greater than or equal to 50% of EMS calls	16	24.2%	23.5%	17.6%	29.4%	25.0%
Yes - Randomized Review of less than 50% of EMS calls	22	33.3%	41.2%	29.4%	23.5%	41.7%
Yes - Only specific calls when issue(s) arise	5	7.6%	0.0%	17.6%	0.0%	8.3%
No	0	0.0%	0.0%	0.0%	0.0%	0.0%

Table 21 - Quality Program: Other Metrics	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - Clinical Metrics (for example, application of oxygen to SOB patients)	5	7.6%	17.6%	5.9%	0.0%	8.3%
Yes - System Performance Metrics (for example, average response times to scene)	4	6.1%	5.9%	0.0%	5.9%	8.3%
Yes - Combination of System Performance and Clinical Metrics	37	56.1%	58.8%	58.8%	76.5%	33.3%
No	20	30.3%	17.6%	35.3%	17.6%	50.0%

While all respondents (100%) indicate that their quality program includes at least some level of chart/case review (although ideally chart/case review would be a routine ongoing practice and not only reactionary when problems arise), only 69.7% monitor additional general clinical and system performance metrics. Further development of the ability of individual agencies to monitor their own agency-wide performance metrics benchmarked against the greater statewide and regional systems will be key to further integration and development. The Bureau of EMS and Trauma System and associated Statutory and Standing Committees can facilitate using quality programs and data to improve performance.

Type of Patient Care Reporting

Table 22 - Type of Patient Care Report	N	State	AEMS	NAEMS	SAEMS	WACEMS
All Electronic Records (full ePCR)	52	60.5%	71.4%	47.8%	71.4%	52.9%
Paper Field Reports later converted into Electronic Files/Databases (partial ePCR)	17	19.8%	4.8%	34.8%	9.5%	35.3%
All Paper Records	17	19.8%	23.8%	17.4%	19.0%	11.8%

Electronic Patient Care Reporting (ePCR) is an integral part of the transformation and advancement of the healthcare industry and EMS practice;[190,191] and ePCRs allow for real-time or near real-time data sharing and integration and the ability to facilitate streamlined quality assurance activities.[192-195] While 60% of ASENA respondents indicate use of full ePCR platforms, 40% indicate that their agency still uses some level of paper-based patient care reporting. Of the 17 agencies using all

paper records, 11 provide services at the advanced life support level, including five municipal fire departments. AEMS represents the greatest proportion of respondents indicating all paper records (23.8%). ASENA did not ask about barriers to transitioning to ePCR platforms.

Use of System-Level Databases

ASENA questions 36 and 45 asked respondents to indicate if they submit data to the statewide Arizona Prehospital Information and EMS Registry System (AzPIERS) and/or if they participate in an electronic Health Information Exchange (HIE). Note that responses to the AzPIERS question includes only those agencies with a current ePCR charting platform (excludes agencies using paper charting), while responses to the HIE question include all respondents, regardless of their reporting/charting methodology.

Table 23 - Submit Data to AZ-PIERS	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	48	69.6%	81.3%	63.2%	76.5%	66.7%
No	21	30.4%	18.8%	36.8%	23.5%	33.3%

AzPIERS collects patient care data submitted by Arizona EMS agencies via networked mapping of ePCRs from the field into the AzPIERS system server, managed by the Bureau of EMS and Trauma System.[123] Although the intent of AzPIERS is to provide for region- or state- level analysis and benchmarking, participation is currently voluntary (not mandated by code or statute);[123] compared to at least 28 states that require/mandate EMS agencies to submit prehospital patient care data to the state registry/database.[196] Although almost 70% of ASENA respondents indicate participation in AzPIERS, 30% do not participate. Without participation by all EMS agencies in the state, it is difficult to fully assess and subsequently improve the integrated systems of care. AzPIERS is considered a Quality Assurance activity protected by state law.[119-121] AzPIERS cannot be used for regulatory and/or punitive purposes.[123]

Table 24 - Participation in Electronic HIE	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	16	18.8%	20.0%	21.7%	23.8%	5.9%
No - But we are interested	54	63.5%	80.0%	60.9%	47.6%	76.5%
No - And we are not interested	15	17.6%	0.0%	17.4%	28.6%	17.6%

HIE allows for secure real-time electronic transmission of health-related data across multiple organizations and charting platforms, providing more effective continuity of care and data sharing.[197-199] HIEs can link just two entities, or serve as a hub for an entire region or state. EMS participation in HIEs is a national initiative supported by the Office of the National Coordinator for Health Information Technology, with intermittent funding opportunities for implementation.[191,198,199] In 2011, the Arizona Governor's Office of Health Information Exchange (GOHIE) established a strategic plan[200] with a vision to establish a statewide HIE in which all Arizona healthcare partners would participate. The result of this plan is *Health Current* (formerly Arizona Health-e Connection), an HIE designed to facilitate "better care and better outcomes" by "bringing together communities and information across Arizona."[201] Health Current houses data on 8 million patients linked across 347 participating healthcare organizations,[202] including 12 Arizona EMS agencies.[203] While only 18.8% of ASENA respondents indicate current participation in some level of HIE, an additional 63.5% indicate interest in future participation. 100% of AEMS respondents indicate current participation or future interest. For the 15 ASENA respondents that indicated no interest in HIE, 60% use some level/amount of paper patient care reporting, a likely barrier to HIE implementation.

Relationship and Coordination with Receiving Hospitals

Patient Transport Methodology

Table 25 - Critical/High Acuity Medical Transport	N	State	AEMS	NAEMS	SAEMS	WACEMS
More Likely via Ground	33	80.5%	90.0%	90.9%	69.2%	71.4%
More Likely via Air	8	19.5%	10.0%	9.1%	30.8%	28.6%

Table 26 - Critical/High Acuity Trauma Transport	N	State	AEMS	NAEMS	SAEMS	WACEMS
More Likely via Ground	17	39.5%	60.0%	27.3%	33.3%	42.9%
More Likely via Air	26	60.5%	40.0%	72.7%	66.7%	57.1%

ASENA questions number 47 through 51 asked respondents to identify which facilities they transport patients to, based-on patient type and method of transport. Most respondents transport critical medical patients via ground (80.5%) and critical trauma patients via air (60.5%). Fluctuations in transport practices occur across the four regions. The high proportion of ground transports in the AEMS region could be due to close proximity to high-level tertiary care centers. The use and appropriateness

of air transport is widely debated,[204-211] and outside the scope of ASENA. Additional research and investigation are needed to map the service area of ASENA respondents in relation to the receiving facilities they identified, then cross-reference with the acuity of patients, their transport destination determination, their transport methodology, and the outcome of the patient.

Relationship with Receiving Hospital Staff

Table 27 - Relationship with Receiving Hospital	N	State	AEMS	NAEMS	SAEMS	WACEMS
Always Positive	8	18.2%	20.0%	9.1%	20.0%	28.6%
More Positive than Negative	28	63.6%	60.0%	81.8%	66.7%	42.9%
Neutral	7	15.9%	20.0%	9.1%	6.7%	28.6%
More Negative than Positive	0	0.0%	0.0%	0.0%	0.0%	0.0%
Always Negative	1	2.3%	0.0%	0.0%	6.7%	0.0%

ASENA respondents (81.8%) report a majority positive relationship with their receiving facilities. Only one respondent (2.3%) indicated a routinely negative experience.

Exchange of Patient Care Information

Table 28 - PCR Left at Receiving Hospital when Care Transferred	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - Immediate: Transmitted Electronically (not printed/faxed, etc. - Actual full data merger)	8	11.8%	6.3%	26.3%	5.9%	7.1%
Yes - Immediate: Printed (whether printed on site or sent to fax and printed)	26	38.2%	68.8%	15.8%	64.7%	7.1%
Yes - Immediate: Hand-written	9	13.2%	0.0%	21.1%	0.0%	28.6%
No - A report is sent to the facility after time of patient transfer (within 24 hours)	9	13.2%	6.3%	21.1%	11.8%	14.3%
No - A report is sent to the facility after time of patient transfer (after 24 hours)	3	4.4%	0.0%	0.0%	5.9%	14.3%
No - A report is never sent/delivered to the receiving facility	13	19.1%	18.8%	15.8%	11.8%	28.6%

Table 29 - Receiving Hospital Access to ePCR Database	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - All receiving hospitals have access	19	27.9%	43.8%	21.1%	6.3%	40.0%
Yes - Some receiving hospitals have access	26	38.2%	37.5%	47.4%	37.5%	33.3%
No - Receiving hospitals do not have access	23	33.8%	18.8%	31.6%	56.3%	26.7%

ASENA respondents were asked to indicate via what method (if at all) they provide patient care information to receiving hospitals. Unlike some states, Arizona regulations do not require agencies to

leave a patient care report at time of transfer of patient care (or any time thereafter). Arizona's regulation simply delegates the responsibility to the Administrative Medical Director.[212] A majority of respondents (63.2%) indicate providing a patient care report immediately to the receiving facility at time of transfer of patient care. Of the 13 (19.1%) agencies that never provide patient care information to the receiving facility, all but one are non-transporting agencies. Of NAEMS respondents, 26.3% indicate immediate real-time electronic data merger. Of those agencies utilizing an ePCR platform, 66.1% provide direct access to some or all of their receiving facilities for subsequent retrieval of patient care reports. AEMS and WACEMS respondents indicate providing the greatest amount of ePCR access while SAEMS respondents indicate providing the least.

Table 30 - Receiving Hospitals Patient Follow-up/Discharge Information	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - Only individual patients when requested by EMS agency	38	44.2%	23.8%	65.2%	33.3%	58.8%
Yes - Combination of Trauma / STEMI / Stroke Patients	17	19.8%	28.6%	4.3%	23.8%	29.4%
Yes - All Trauma Patients	4	4.7%	14.3%	4.3%	0.0%	0.0%
Yes - All STEMI Patients	2	2.3%	9.5%	0.0%	0.0%	0.0%
Yes - All Stroke Patients	1	1.2%	4.8%	0.0%	0.0%	0.0%
Yes - All Patients	1	1.2%	4.8%	0.0%	0.0%	0.0%
No - No feedback/follow-up is provided by receiving hospitals	23	26.7%	14.3%	26.1%	42.9%	11.8%

Patient outcome feedback from hospitals to EMS agencies can provide loop closure and actionable/critical quality assurance information to improve patient care. Most respondents (73.4%) report receiving at least some feedback from receiving facilities. Of the 23 agencies (26.7%) that receive no feedback from the receiving hospital, all but five (78.3%) are non-transporting agencies.

Dispatch / Communications

Dispatch Methodology

Table 31 - EMD Certified Dispatchers	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - All	39	45.3%	47.6%	39.1%	57.1%	35.3%
Yes - Some	24	27.9%	23.8%	43.5%	9.5%	35.3%
No	23	26.7%	28.6%	17.4%	33.3%	29.4%

Table 32 - Priority Dispatch	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	65	75.6%	85.7%	87.0%	71.4%	52.9%
No	21	24.4%	14.3%	13.0%	28.6%	47.1%

Emergency Medical Dispatcher (EMD) certification is a 24-hour course designed to educate dispatch center call-takers on the basics of telephone-based triage and telephone-assisted interventions for medical/traumatic emergencies.[213-216] Organizations using EMD have better operational performance.[217]

Priority Dispatch is the trade name of the Medical Priority Dispatch System (MPDS), a computer application designed for 911 call centers to provide more streamlined and accurate telephone triage and field asset deployment via standardized protocols and methodology.[218-221] Seventy-one percent of U.S. jurisdictions use MPDS.[217]

Seventy-three percent of ASENA respondents employ at least some EMD-certified dispatchers, and 75.6% use MPDS. WACEMS respondents report the lowest rates of both all-EMD-certified call takers (35.3%) and MPDS use (52.9%). While SAEMS respondents report the highest rate (57.1%) of all call-takers being EMD certified, they also report the highest rate of no call-takers being EMD certified (33.3%), and the second lowest rate of MPDS use (28.6%).

Table 33 - Primary Method of Dispatch	N	State	AEMS	NAEMS	SAEMS	WACEMS
Full Computer-Aided Dispatch with GPS Location	37	43.0%	57.1%	34.8%	57.1%	23.5%
Computer-Aided Dispatch (CAD) without GPS Location	20	23.3%	14.3%	26.1%	28.6%	23.5%
Combination of Pager, Telephone, Radio but no CAD	14	16.3%	9.5%	30.4%	4.8%	17.6%
VHF/UHF Radio Only	9	10.5%	9.5%	8.7%	4.8%	23.5%
Pager/Beeper Only	3	3.5%	4.8%	0.0%	0.0%	5.9%
Other:	2	2.3%	4.8%	0.0%	4.8%	0.0%
Telephone Only	1	1.2%	0.0%	0.0%	0.0%	5.9%

Most respondents (66.3%) indicate use of Computer-Aided Dispatch (CAD), although only 43% have integrated Global Positioning System (GPS) technology. CAD assists with address validation, call prioritization, call information communication, and logistical management of field-deployed assets; with GPS integration allowing for routing of the closest appropriate asset to the incident.[222] AEMS and SAEMS respondents report the greatest proportion of GPS-integrated CAD (57.1% each), while NAEMS and WACEMS respondents report the greatest proportions of non-CAD methodologies (39.1% and 52.9%

respectively). WACEMS respondents report the greatest reliance on single-system legacy analog technology for primary dispatch (35.3%).

Dispatch Accessibility

Table 34 - Dispatch Device for the Deaf	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	56	68.3%	73.7%	54.5%	85.0%	58.8%
No	26	31.7%	26.3%	45.5%	15.0%	41.2%

Table 35 - Bilingual Dispatchers	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - staffed 24/7	31	36.9%	50.0%	22.7%	47.6%	23.5%
Yes - staffed less than 24/7	31	36.9%	30.0%	40.9%	28.6%	47.1%
No	22	26.2%	20.0%	36.4%	23.8%	29.4%

Table 36 - Dispatch Language Line for Translation	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - available 24/7	46	54.8%	57.9%	60.9%	57.1%	41.2%
Yes - available less than 24/7	12	14.3%	15.8%	8.7%	9.5%	23.5%
No	26	31.0%	26.3%	30.4%	33.3%	35.3%

An estimated 82,000 Arizonans ages 18 to 64 have a hearing disability (2.1% of total age-range population).[223] In addition, 1.6 million Arizonans over the age of five speak a language other than English in the home (27% of total age-range population); with 18.8% speaking English "not well" or "not at all".[224]

ASENA respondents were asked to indicate provision of dispatch assistance for the deaf (68.3%), bilingual dispatchers (73.8%), and translation-line access (69.1%). NAEMS and WACEMS regions report the lowest rates of devices for the deaf and bilingual dispatchers. Of the 22 agencies that report no bilingual dispatch, only 12 (54.5%) report having access to an outside language line for translation; meaning that approximately 10 of the 82 question respondents (12.2%) have no method of communicating with non-English speakers.

General Communications Methodologies

Table 37 - Contact Receiving ED Directly When Transporting	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - Via cell phone	32	74.4%	90.0%	90.9%	35.7%	100.0%
Yes - Via radio	4	9.3%	0.0%	0.0%	21.4%	0.0%
Yes - Via computer-based text	1	2.3%	0.0%	0.0%	7.1%	0.0%
No - Personnel contact third-party (i.e. call center) who then contacts hospital	4	9.3%	0.0%	9.1%	28.6%	0.0%
No - No pre-notification is made to a receiving facility	2	4.7%	10.0%	0.0%	7.1%	0.0%

A majority of respondents (74.4%) use cell phones to directly make enroute notification to receiving facilities. AEMS, NAEMS, and WACEMS report 90%+ levels of cell phone methodology while SAEMS reports only 35.7% due to the region's high reliance on radio communications and a third-party call center. Of the two respondents that indicate making no notification, one is a non-transporting entity.

Table 38 - Communication Devices in Service	N	State	AEMS	NAEMS	SAEMS	WACEMS
Cellular Telephones	63	73.3%	71.4%	78.3%	66.7%	70.6%
Simple VHF Radios	58	67.4%	76.2%	82.6%	42.9%	58.8%
Trunked Radio System	44	51.2%	71.4%	26.1%	61.9%	52.9%
Simple UHF Radios	38	44.2%	52.4%	43.5%	42.9%	35.3%
Pagers/Beepers	28	32.6%	23.8%	30.4%	28.6%	52.9%
Computer-Based Text Communication (i.e. Instant Messaging)	27	31.4%	38.1%	34.8%	42.9%	11.8%
SATCOM (Satellite-based radio communications equipment)	4	4.7%	4.8%	8.7%	0.0%	0.0%
Satellite Telephones	4	4.7%	4.8%	0.0%	0.0%	5.9%
Self-Contained Deployable Communications System (stand-alone)	4	4.7%	0.0%	8.7%	9.5%	0.0%
Other:	2	2.3%	0.0%	4.3%	9.5%	0.0%

ASENA respondents were asked to identify the types of communication devices in service across their agencies. A majority of respondents indicate use of cellular telephones (73.3%), simple VHF radios (67.4%), and trunked radio systems (51.2%); although only 26.1% of NAEMS respondents report use of trunked systems and only 42.9% of SAEMS respondents report use of simple VHF. The appropriate technology can vary based on system operations, terrain, geography, and cost.[225-227] To optimize performance, communications systems should be interoperable, reliable, portable, scalable, resilient,

and redundant.[227] Satellite-based communications systems, although expensive, are helpful in rural settings and for redundancy.

Communications Dead-Spots

Table 39 - Communication Dead-Spots	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	66	77.6%	61.9%	100.0%	65.0%	76.5%
No	19	22.4%	38.1%	0.0%	35.0%	23.5%

A majority of ASENA respondents (77.6%) report experiencing communications dead spots in their service areas. Even in Arizona's most populated region (AEMS), 61.9% report experiencing dead spots. The vast rural areas in the NAEMS region had 100% of respondents reporting dead spots, and 76.5% of WACEMS respondents report the same. Eliminating dead-spots requires communications equipment upgrades and additional antennas and repeaters throughout the service area.[228-230]

Vehicles

Response-Ready Level of Service

Table 40 - EMS Vehicles by Category	State		AEMS		NAEMS		SAEMS		WACEMS	
	BLS	ALS	BLS	ALS	BLS	ALS	BLS	ALS	BLS	ALS
Ground Ambulance	18%	82%	19%	81%	10%	90%	23%	77%	14%	86%
Fire Apparatus	43%	57%	46%	54%	38%	62%	34%	66%	45%	55%
Utility Vehicle	67%	33%	68%	32%	56%	44%	61%	39%	67%	33%

Table 40 compares the proportion of fully-staffed and response-ready Basic Life Support (BLS) versus Advanced Life Support (ALS) vehicles by category/type. ASENA defines Fire Apparatus as being: engine, quint, ladder truck, HAZMAT, etc.; and Utility Vehicle as being: chief/supervisor, paramedic "fly-car", volunteer personally-owned vehicle, etc.

ASENA respondents indicate that a majority of Utility Vehicles (33%) are staffed/equipped at a BLS level while a majority of Fire Apparatus (57%) and Ground Ambulances (82%) are staffed at an ALS level; a proportionality that remains fairly constant across all four regions. Compare this to a national benchmark of only 55% of ambulances being ALS-capable.[173] There is currently no true consensus as to

the ideal level of response capability (BLS vs ALS) or associated impacts on patient outcome. ALS is likely most beneficial for medical patients and BLS is likely most beneficial for trauma patients.[231-233]

Additional Vehicles Needed

Table 41 - Additional/New EMS Vehicles Needed	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - Ground Ambulance	35	40.7%	38.1%	34.8%	33.3%	64.7%
Yes - Fire Apparatus	31	36.0%	38.1%	47.8%	14.3%	47.1%
Yes - Utility Vehicle	23	26.7%	33.3%	21.7%	14.3%	47.1%
No	30	34.9%	33.3%	30.4%	47.6%	17.6%
Other:	2	2.3%	0.0%	4.3%	4.8%	0.0%

ASENA respondents were asked to indicate if their agency was in need of additional vehicles to adequately provide coverage for their service area (not vehicle replacements, actual increase in deployed unit numbers). Across the state, less than half of the respondents indicate needing additional Ground Ambulances (40.7%), Fire Apparatus (36.0%), and/or Utility Vehicles (26.7%); with 34.9% of respondents indicating no need for any additional vehicles, regardless of type. However, WACEMS respondents (64.7%) indicate needing additional Ground Ambulances and almost half (47.1%) indicate needing both additional Fire Apparatus and Utility Vehicles. Almost half (47.8%) of NAEMS respondents indicate needing additional Fire Apparatus. Additional research is needed to further investigate the deployment of EMS vehicles in relation to population, geography, call volumes, and patient outcomes.

Vehicle Maintenance, Repair, and Replacement

Table 42 - Regular Maintenance/Repair for EMS Vehicles	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	77	89.5%	100.0%	87.0%	90.5%	88.2%
No	9	10.5%	0.0%	13.0%	9.5%	11.8%

A majority (89.5%) of respondents indicate having a regular maintenance and repair plan for their EMS vehicles; with responses being fairly evenly distributed across the four regions.

Table 43 - Ground Ambulances Need Replaced	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	35	40.7%	33.3%	43.5%	42.9%	47.1%
No	17	19.8%	33.3%	21.7%	23.8%	0.0%
N/A - Agency does not have any Ground Ambulances	34	39.5%	33.3%	34.8%	33.3%	52.9%

Table 44 - EMS Fire Apparatus Need Replaced	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	47	55.3%	45.0%	65.2%	38.1%	76.5%
No	17	20.0%	35.0%	8.7%	14.3%	17.6%
N/A - Agency does not have any Fire Apparatus	21	24.7%	20.0%	26.1%	47.6%	5.9%

Table 45 - EMS Utility Vehicle Need Replaced	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	38	44.2%	23.8%	60.9%	33.3%	64.7%
No	31	36.0%	42.9%	13.0%	52.4%	29.4%
N/A - Agency does not have any Utility Vehicle	17	19.8%	33.3%	26.1%	14.3%	5.9%

Although 89.5% of respondents indicate having a regular maintenance/repair plan in place, almost half indicate needing Ground Ambulances and Utility Vehicles replaced (40.7% and 44.2% respectively), and a majority of respondents indicate needing Fire Apparatus replaced (55.3%). NAEMS and WACEMS respondents indicate the highest need for vehicle replacement across all three categories, with a higher need for Fire Apparatus (65.2% and 76.5%) and Utility Vehicle (60.9% and 64.7%) replacement when compared to AEMS and SAEMS. Additional research is needed to investigate if the high rate of need for Fire Apparatus replacement is due to use of this vehicle type in routine EMS responses, and related cost-benefit ratios.[234-237]

Equipment / Protocols

EMS Equipment and Protocols Used

Table 46 - EMS Equipment/Protocols Used	State	AEMS	NAEMS	SAEMS	WACEMS
Automated Chest Compression Device for CPR	11.6%	4.8%	17.4%	9.5%	17.6%
BLS-AEDs	95.3%	95.2%	91.3%	95.2%	100.0%
Portable ALS Cardiac Monitors	89.5%	100.0%	78.3%	90.5%	94.1%
Stand-alone SpO2 Monitors	60.0%	40.0%	65.2%	76.2%	52.9%
Stand-alone ETCO2 Monitors	12.8%	14.3%	13.0%	9.5%	17.6%
CPAP Devices	70.6%	90.5%	52.2%	76.2%	64.7%
Supraglottic Airway Devices	89.5%	100.0%	82.6%	85.7%	94.1%
Protocols Include RSI/PAI Endotracheal Intubation	32.6%	57.1%	13.0%	42.9%	23.5%
Protocols Authorize Surgical Airways	84.9%	100.0%	73.9%	81.0%	94.1%
Transport Ventilators/Portable Ventilators	29.4%	47.6%	26.1%	35.0%	5.9%
Chest-Seals for Open Pneumothorax	89.5%	100.0%	87.0%	81.0%	94.1%
Chest Needle-Decompression for Tension Pneumothorax	86.0%	100.0%	73.9%	85.7%	94.1%
Commercial Tourniquets and/or Junctional Compression Devices	89.3%	89.5%	95.7%	95.2%	76.5%
Hemostatic Agents for Hemorrhage Control	22.4%	30.0%	13.0%	33.3%	17.6%
Pelvic Binders	56.5%	40.0%	60.9%	61.9%	70.6%
Traction Splints	94.1%	95.0%	95.7%	90.5%	94.1%
Cervical Collars	97.6%	95.0%	100.0%	95.2%	100.0%
Backboards	97.6%	100.0%	100.0%	90.5%	100.0%
Field Clearance of Spinal Immobilization/Selective Immobilization	88.2%	100.0%	95.7%	76.2%	82.4%
Intraosseous Devices	87.2%	95.2%	78.3%	90.5%	94.1%
Devices to Maintain Body Temperature	95.3%	95.0%	100.0%	90.5%	94.1%

Table 47 - Capabilities of ALS Cardiac Monitor	State	AEMS	NAEMS	SAEMS	WACEMS
12-lead ECG	98.7%	95.2%	100.0%	100.0%	100.0%
Defibrillation	96.1%	95.2%	100.0%	100.0%	100.0%
Pulse Oximetry (SpO2)	96.1%	95.2%	94.1%	100.0%	100.0%
Blood-Pressure (NiBP)	94.7%	95.2%	100.0%	94.7%	93.8%
External Pacing	94.7%	100.0%	88.2%	100.0%	100.0%
Synchronized Cardioversion	93.4%	95.2%	94.1%	94.7%	100.0%
End-Tidal Carbon Dioxide (ETCO2)	90.8%	95.2%	94.1%	84.2%	93.8%
Data Transmission to Receiving Facility (Vitals/ECG/etc.)	59.2%	66.7%	58.8%	68.4%	43.8%
CPR Quality Feedback	43.4%	47.6%	52.9%	42.1%	31.3%

ASENA questions 71 through 94 asked respondents to indicate if their agency used the equipment and/or protocols outlined in Tables 46 and 47, above. While the original ASENA questions allowed for a "no" response or a selection of multiple "yes" responses based on a given device type/brand; all "yes" responses for identified equipment/protocols were aggregated to be presented in Table 46 (the percentages are representative of those respondents that indicated any "yes" response). Table 47 represents responses only by those agencies which indicated "yes" for Portable ALS Monitor in Table 46 (agencies that indicated "no" in Table 46 were not shown the question that generated results for Table 47). Full evaluation of equipment and/or protocols on patient outcomes is not within the scope of ASENA.

High-quality chest compressions are a key component of the cardiac arrest chain of survival and play a critical role in patient outcomes.[238-240] Although automated/mechanical chest compression devices show no widespread improvement in outcomes over quality manual compressions,[241] their use may be indicated due to certain operational conditions such as limited personnel and the need to move the patient.[242] Only 11.6% of respondents indicate the use of automated/mechanical chest compression devices.

Defibrillation is also a critical component of the cardiac arrest chain of survival.[238-240] Most ASENA respondents indicate use of Basic Life Support Automated External Defibrillators (BLS-AED) or Advanced Life Support (ALS) cardiac monitors (95.3% and 89.5% respectively). Of the nine agencies that do not use ALS cardiac monitors, eight (88.9%) are BLS agencies. Of the four agencies that do not use BLS-AEDs, two (50%) are ALS agencies and instead indicate use of ALS cardiac monitors only; while the other two respondents indicate that they do not use any type of cardiac monitoring or defibrillating device (both are non-transporting first responder agencies, although one is at the ALS level). In total, 97.7% of respondents indicate use of some type of defibrillator.

Twelve-lead electrocardiogram (ECG) capability and transmission of findings (either via paramedic interpretation or direct ECG transmission to receiving facilities) are critical to effective early recognition and intervention of myocardial infarction.[240,243-246] Of those respondents that indicate use of ALS cardiac monitors, almost all (98.7%) indicate 12-lead capability. While only 59.2% of respondents indicate the ability to electronically transmit 12-lead results to a receiving facility, Paramedic-level providers are able to effectively interpret results and verbally transmit them via radio.[247] The one agency that indicated no 12-lead capability is a transporting ALS ground ambulance entity.

Pulse Oximetry (SPO2) capability plays an important role in the evaluation of hypoxia and regulation of oxygen therapy.[240,248,249] Most respondents (96.5%) indicate having SPO2 capability either stand-alone or on an ALS cardiac monitor.

End-Tidal Carbon Dioxide (ETCO2) capability can enhance patient care via relative monitoring of ventilation, circulation, and/or metabolic function.[240,250-254] Most respondents (81.4%) indicate having ETCO2 capability either stand-alone or on an ALS cardiac monitor.

Continuous Positive Airway Pressure (CPAP) devices can provide a safe and effective noninvasive alternative to early advanced airway interventions for patients experiencing acute respiratory distress, especially when only BLS personnel are present,[240,255-257] although the level of improvement in outcomes in ALS systems has been debated.[258,259] Most (70.6%) of respondents indicate having CPAP capability, with affirmative regional responses ranging from 52.2% (NAEMS) to 90.5% (AEMS).

Supraglottic airway devices (SAD) can provide an alternative to endotracheal intubation in certain patient populations - with the additional benefit of being usable by almost any level of trained provider.[240,260-262] However, the impact of these devices in ALS systems has recently been debated.[261,263-266] Most respondents (89.5%) indicate use of SADs; with affirmative regional responses ranging from 82.5% (NAEMS) to 100% (AEMS).

Rapid Sequence Intubation (RSI) includes the use of both sedation and paralysis to intubate a patient while Pharmacologically-Assisted Intubation (PAI) uses only sedation. Endotracheal intubation by EMS personnel is a highly-debated topic,[267-272] especially when including the use of drugs to induce sedation and/or paralysis.[273-276] Few respondents (32.6%) indicate authorization to use RSI/PAI for airway management; with affirmative regional responses ranging from 13.0% (NAEMS) to 57.1% (AEMS).

Although an extremely rare occurrence in the prehospital setting, surgical airway intervention can be a critical lifesaving procedure when performed correctly in patients with severe upper airway edema and/or trauma.[240,262,277-280] A strong majority of respondents (84.9%) indicate the ability to perform surgical airways; with affirmative regional responses ranging from 73.9% (NEAMS) to 100% (AEMS). Maintenance of practical skills training for this procedure is important.

Mechanical ventilators can play a pivotal role in maintaining appropriate oxygenation for intubated patients during extended and/or critical care transport, although specialized training is needed for safe operation.[240,281-283] A minority of respondents (29.4%) indicate the ability to use transport ventilators; with affirmative regional responses ranging from 5.9% (WACEMS) to 47.6% (AEMS). Transport ventilator programs could likely be explored in Arizona's rural areas, although high capital equipment costs may be a limiting factor.[284]

Commercial chest-seals are an easy and effective intervention in the presence of open pneumothorax, although patients should still be monitored for subsequent development of a tension pneumothorax and managed appropriately.[240,262,285-288] A majority (89.5%) of respondents indicate use of chest seals in managing open pneumothorax; with affirmative regional responses ranging from 81.0% (SAEMS) to 100% (AEMS).

Chest needle-decompression (CND) is a critical life-saving intervention in the presence of tension pneumothorax, although the length of the decompression needle can play a crucial role in the actual success of the procedure.[240,262,288-291] Most respondents (86.0%) indicate use of CND; with affirmative regional responses ranging from 73.9% (NAEMS) to 100% (AEMS). However, of the 74 respondents that indicate use of CND, only 42 (48.8% of total respondents) indicate use of a commercial large bore needle decompression catheter that is at least three inches in length. The other respondents indicate use of traditional one to two-inch intravenous catheter, a device that is likely inadequate for successful CND in many patients.[262,288,291]

Effective control of massive hemorrhage is one of the most important interventions in penetrating trauma; with tourniquets, junctional compression devices, and hemostatic agents playing key roles in certain patient populations.[240,262,288,292-295] While most respondents (89.3%) indicate use of tourniquets, few (22.3%) indicate use of hemostatic agents, and only one (1.2%) indicates use of a junctional compression device. Affirmative regional responses for tourniquet use range from 76.5% (WACEMS) to 95.7% (NAEMS); with affirmative regional responses for hemostatic agents ranging from just 13.0% (NAEMS) to 33.3% (SAEMS). While tourniquets are addressed and authorized in the EMS National Education Standards for all EMT-level personnel and above,[296] there is no reference to hemostatic agents or junctional compression devices; although the use of all three by all levels of personnel is discussed in EMS textbooks,[240,262] and authorized for use by all personnel in the tactical/combat environment.[288]

Pelvic binders provide crucial stabilization and compression in the presence of life-threatening pelvic fractures.[240,262,297,298] A slight majority of respondents (56.5%) indicate use of pelvic binders; with affirmative regional responses ranging from 40.0% (AEMS) to 70.6% (WACEMS). Of the 48 respondents that indicated "yes" to use of pelvic binders, half use commercial devices while the other half use only the traditional sheet method.

Traction splints provide elongation of a lower extremity in the presence of femur fracture, mainly for pain management and to possibly avoid additional vascular injury;[240,262,299] although the use and efficacy of traction splinting in EMS is often debated.[300-303] A majority of respondents (94.1%)

indicate use of traction splints; with affirmative regional responses ranging from 90.5% (SAEMS) to 95.7% (NAEMS).

Cervical collars and backboards have long been a primary skillset for all levels of prehospital providers and a standard of care in EMS systems;[240,262] although recent controversy has called their use into question, thus creating the need for selective spinal immobilization protocols.[304-311] Almost all respondents (97.6%) indicate use of both c-collars and backboards; although slightly less (88.2%) indicate the ability to apply selective spinal immobilization and/or perform field clearance. Affirmative regional responses for selective spinal immobilization and/or field clearance ranges from 76.2% (SAEMS) to 100% (AEMS).

Intraosseous (IO) devices provide circulatory access in critical patients when traditional intravenous access is unobtainable or contraindicated.[240,312] Most respondents (87.2%) indicate use of IO devices; with affirmative regional responses ranging from 78.3% (NAEMS) to 95.2% (AEMS). Further analysis reveals that all eleven respondents that indicated "no" to IO use are BLS agencies; meaning that all (100%) of ALS respondents use some type of IO device, an inherently ALS-level skill.[240]

Hypothermia is part of the trauma triad of death, thus requiring intervention via adequate management of patient core temperature.[240,262,288,313-315] Almost all respondents (95.3%) use blankets and/or commercial temperature regulation devices to manage core temperature; with affirmative regional responses ranging from 90.5% (SAEMS) to 100% (NAEMS). Of the 81 respondents that indicate use of one of these devices, 77 (89.5% of total respondents) use traditional blankets only.

Maintenance and Repair of EMS Equipment

Table 48 - Regular Maintenance/Repair for EMS Equipment	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	69	80.2%	85.7%	78.3%	90.5%	70.6%
No	17	19.8%	14.3%	21.7%	9.5%	29.4%

Most respondents (80.2%) indicate having a regular maintenance and repair plan for their EMS equipment; with affirmative regional responses ranging from 70.6% (WACEMS) to 90.5% (SAMES).

Preparedness

CBRNE and MCI Assistance/Needs

Table 49 - CBRNE Event Assistance/Needs	N	State	AEMS	NAEMS	SAEMS	WACEMS
Combination of Specialized Equipment and Specialized Education/Training	70	82.4%	75.0%	87.0%	85.7%	88.2%
Specialized Equipment	0	0.0%	0.0%	0.0%	0.0%	0.0%
Specialized Education/Training	10	11.8%	20.0%	13.0%	0.0%	11.8%
None - Our agency is fully prepared to respond to CBRNE events	5	5.9%	5.0%	0.0%	14.3%	0.0%

Table 50 - Mass Casualty Incident Assistance/Needs	N	State	AEMS	NAEMS	SAEMS	WACEMS
Combination of Specialized Equipment and Specialized Education/Training	64	75.3%	60.0%	87.0%	66.7%	94.1%
Specialized Equipment	6	7.1%	15.0%	4.3%	4.8%	0.0%
Specialized Education/Training	6	7.1%	10.0%	4.3%	4.8%	5.9%
None - Our agency is fully prepared to respond to CBRNE events	9	10.6%	15.0%	4.3%	23.8%	0.0%

ASENA questions 95 and 96 asked respondents to indicate which type of Chemical, Biological, Radiological, Nuclear, Explosive (CBRNE) event assistance and/or non-CBRNE Mass Casualty Incident (MCI) event assistance would benefit their agency the most. Most respondents indicated that a combination of specialized equipment and specialized education/training would benefit them the most for both CBRNE (82.4%) and MCI (75.3%); with the greatest proportion of need being indicated by NAEMS and WACEMS respondents. Overall, only 5.9% of agencies indicate that they are fully prepared to respond to a CBRNE event, and only 10.6% of agencies indicate that they are fully prepared to respond to an MCI event.

Active Shooter Preparedness

Table 51 - Coordinated Active Shooter Plan	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	36	42.9%	42.1%	52.2%	52.4%	17.6%
No	48	57.1%	57.9%	47.8%	47.6%	82.4%

Table 52 - Train/Rehearse Active Shooter Plan	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes - Twice a Year	4	11.1%	25.0%	0.0%	9.1%	33.3%
Yes - Once a year	24	66.7%	37.5%	83.3%	72.7%	66.7%
No	8	22.2%	37.5%	16.7%	18.2%	0.0%

An Active Shooter event is when one or more individuals are actively engaged in the killing of multiple people in a confined and/or populated area; a situation which develops quickly, remains dynamic, and often ends within 15 minutes.[316-318] Ideally, all jurisdictions should create, maintain, and train a coordinated active shooter response plan.[319-321] Less than half of ASENA respondents (42.9%) indicate the presence of a coordinated active shooter response plan in their service area, and only 17.6% of WACEMS respondents indicate such. Of the 36 total respondents that indicate having a plan, 77.8% indicate that they train/rehearse their plan at least once annually, while 22.2% indicate that they do not train/rehearse their plan at all.

Tactical EMS Personnel

Table 53 - Employ Tactical EMS Personnel	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	19	22.4%	35.0%	26.1%	14.3%	11.8%
No	66	77.6%	65.0%	73.9%	85.7%	88.2%

Tactical EMS personnel provide critical life-saving care in areas and situations not traditionally broached by civilian EMS personnel, either fully operationally integrated with law enforcement or as close-proximity on-scene standby.[322-327] Only a few ASENA respondents (22.4%) indicate employment of specially-trained tactical EMS personnel; with affirmative regional responses ranging from 11.8% (WACEMS) to 35.0% (AEMS).

Community Paramedicine/ Community Outreach

Community Paramedicine

Table 54 - Current Community Paramedicine Program	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	23	27.1%	33.3%	21.7%	33.3%	25.0%
No	62	72.9%	66.7%	78.3%	66.7%	75.0%

Table 55 - Interest in Developing a Program	N	State	AEMS	NAEMS	SAEMS	WACEMS
Yes	47	75.8%	85.7%	83.3%	64.3%	66.7%
No	15	24.1%	14.3%	16.7%	35.7%	33.3%

ASENA questions 101 and 102 asked respondents to indicate if they currently have a Community Paramedicine (CP) program, and if not, to indicate if they are interested in developing one. CP programs use EMS personnel in non-traditional roles to meet specific patient-centered healthcare needs of a service area and to connect underutilized resources and underserved populations.[328,329] Nationally, these programs have been shown to reduce total charges and reduce unnecessary ambulance utilization,[330,331] although their long-term impact on health outcomes is less clear.[332] For more information specific to Arizona's community paramedicine programs, see Appendix D (Arizona MIH/CIP Data Crosswalk).

Few respondents (27.1%) indicate that their agency has an ongoing CP program, with the greatest proportion of affirmative responses coming from the more urban regions of AEMS (33.3%) and SAEMS (33.3%). Of the 23 respondents that indicate current CP programs, all (100%) function at the advanced life support level, with 20 (87%) being fire-based agencies. Of the 62 respondents that do not have current programs, 47 (75.8%) are interested in developing one.

Public Awareness and Community Education

Table 56 - Public Awareness and Community Education Programs	N	State	AEMS	NAEMS	SAEMS	WACEMS
CPR	79	91.9%	100.0%	95.7%	81.0%	94.1%
Car Safety Seat Education	46	53.5%	66.7%	52.2%	57.1%	41.2%
Advanced Directives / DNRs	41	47.7%	42.9%	52.2%	47.6%	41.2%
Child Safety (i.e. Risk Watch/Safe Kids)	35	40.7%	66.7%	21.7%	52.4%	17.6%
Water Safety	32	37.2%	57.1%	8.7%	52.4%	29.4%
Seat Belt Awareness	30	34.9%	42.9%	26.1%	47.6%	23.5%
Helmet Safety	29	33.7%	38.1%	30.4%	33.3%	29.4%
Injury Prevention (General)	27	31.4%	33.3%	30.4%	47.6%	11.8%
Domestic Violence Awareness and/or Prevention	26	30.2%	33.3%	30.4%	28.6%	29.4%
Suicide Prevention	25	29.1%	28.6%	39.1%	23.8%	29.4%
Substance Abuse Awareness	23	26.7%	28.6%	21.7%	28.6%	29.4%
Mental Health Awareness	22	25.6%	28.6%	21.7%	33.3%	17.6%
EMS Bystander Education (i.e. First There/First Care)	20	23.3%	47.6%	13.0%	9.5%	29.4%
Disease Management	17	19.8%	28.6%	8.7%	19.0%	29.4%
Poison Prevention	11	12.8%	14.3%	4.3%	23.8%	5.9%
Other:	8	9.3%	14.3%	4.3%	14.3%	0.0%
None	3	3.5%	0.0%	4.3%	4.8%	5.9%

ASENA question 100 asked respondents to indicate all of the types of public awareness and/or education programs that are available in their community. Table 56 displays respondent affirmative responses for each awareness and education program type.

Cardio-Pulmonary Resuscitation (CPR) is by far the most commonly provided program, with 91.9% of respondents indicating program accessibility in the community, although SAEMS respondents indicate a significantly lower proportion that the other three regions at 81.0%. The only other program which is indicated by a majority of total respondents (53.5%) is Car Safety Seat education.

The remainder of programs are indicated by less than half of the total respondents, with three respondents (3.5%) indicating no public awareness and/or education programs being offered in their communities, all three of which are non-transporting agencies, two ALS and one BLS. Other public awareness and education programs available in regions vary widely: Water Safety (regional range 8.7% to 57.1%), Injury Prevention (regional range 11.8% to 47.6%), Mental Health Awareness (regional range

17.6% to 33.3%), EMS Bystander Education (regional range 9.5% to 47.6%), and Disease Management (regional range 8.7% to 28.6%).

Priority Needs

T 57	State		AEMS		NAEMS		SAEMS		WACEMS	
Priority Rank	Need	Points	Need	Points	Need	Points	Need	Points	Need	Points
1	Equipment/Supplies	227.00	Vehicles	44.0	Equipment/Supplies	82.0	Equipment/Supplies	61.0	Equipment/Supplies	69.0
2	Education/Training	137.00	Personnel	44.0	Personnel	45.0	Education/Training	35.0	Vehicles	37.0
3	Vehicles	134.00	Education/Training	41.0	Education/Training	40.0	Personnel	31.0	Funding	33.0
4	Personnel	131.00	Equipment/Supplies	33.0	Funding	37.0	Funding	20.0	Education/Training	30.0
5	Funding	94.00	Community Paramedicine	28.0	Vehicles	28.0	Vehicles	14.0	Personnel	18.0
6	Community Paramedicine	62.00	Funding	23.0	Other	24.0	Community Paramedicine	13.0	Communications Technology	11.0
7	Other	46.00	Information Technology	12.0	Community Paramedicine	12.0	Information Technology	10.0	Community Paramedicine	9.0
8	Information Technology	29.00	Certificate of Necessity	10.0	Certificate of Necessity	2.0	Other	9.0	Information Technology	7.0
9	Facilities	20.00	Facilities	9.0	Public Outreach	1.0	Facilities	7.0	Public Outreach	6.0
10	Communications Technology	18.00	Other	8.0	.	.	Public Outreach	6.0	Other	5.0
11	Certificate of Necessity	17.00	Public Outreach	3.0	.	.	Communications Technology	5.0	Facilities	4.0
12	Public Outreach	16.00	Communications Technology	2.0	.	.	.	.	.	.

ASENA question 103 asked respondents to enter their top five specific priority needs using free text. Responses were coded, collated, and aggregated to produce Table 57 priority needs.

ASENA respondents overwhelmingly identify Equipment/Supplies (227 points) as their greatest need, with Education/Training second (137 points), and Vehicles (134 points) and Personnel (131 points) following closely behind. Equipment/Supplies and Education/Training are identified in every region's top five priorities; with Equipment/Supplies the number one priority for NAEMS, SAEMS, and WACEMS.

SECONDARY RESULTS AND DISCUSSION - CRITICAL ACCESS

The secondary objective of the 2016 Arizona Statewide EMS Needs Assessment (ASENA) is to compare and contrast the current "snap-shot" of Arizona's critical access EMS agencies based on information gathered within the primary results versus data obtained in the 2001 Emergency Medical Services Needs Assessment of Selected Arizona Rural Communities[4] in order to asses changes in Arizona's critical access EMS systems over the last 15 years. The secondary results and discussion follow the order and grouping ASENA questions. While some 2001 vs. 2016 analysis is presented, more comprehensive analysis is limited due the extensive updating of questions between the two assessments ("N/A" indicates no equivalency). The Critical Access results ("2001" and "2016") are benchmarked against the statewide aggregate ("State") from the Primary Results. Please reference the Primary Results section for in-depth definitions/explanations of terms and other specific discussion rationale.

Agency Information / Respondent Demographics

Distribution of Critical Access Respondents

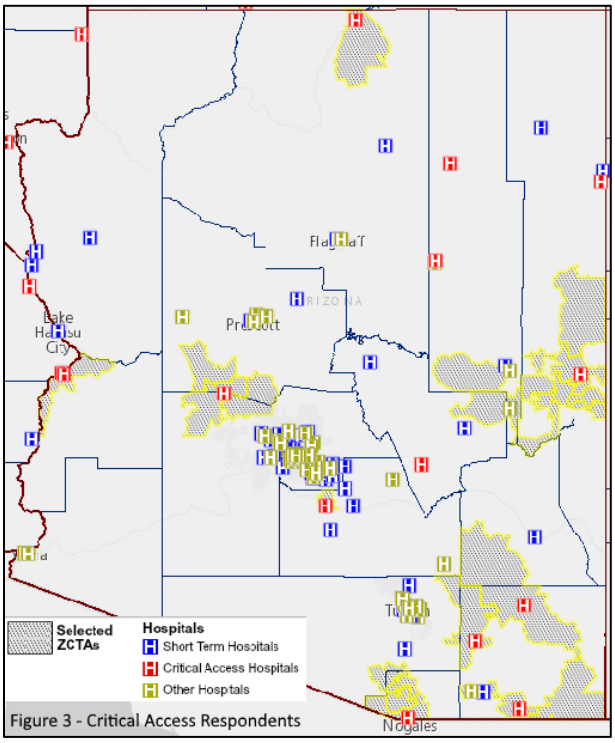

Figure 3 - Critical Access Respondents

Figure 3 above shows the combined service areas of the 11 ASENA critical access respondents based on service area zip codes. Critical access agency identification was made possible via support from the Arizona Center for Rural Health in combination with an overlay of ASENA respondents and the location of Critical Access Hospitals (CAH - seen as red symbols in the figure above). There are 14 federally designated CAHs in Arizona.[333] ASENA respondents were from nine (64.3%) of the 14 CAH service areas. The five CAHs without ASENA respondents are located on or adjacent to tribal lands,[154] that chose not participate in responding to the ASENA survey. ASENA is not fully reflective of the needs of Arizona's Native American / American Indian populations.

Figure 2 - Arizona EMS Regions

Table 58 - Respondent's Regional EMS Coordinating System	2001	2016
Arizona Emergency Medical Systems (AEMS - Red)	9.1%	9.1%
Northern Arizona Emergency Medical Services (NAEMS - Yellow)	31.8%	36.4%
Southeastern Arizona EMS Council (SAEMS - Blue)	50.0%	45.5%
Western Arizona Council of EMS (WACEMS - Green)	9.1%	9.1%

The 11 critical access 2016 ASENA respondents are mainly (81.9%) from the NAEMS and SAEMS regions, and consistent with the respondent distribution from the 2001 assessment. This is due primarily

to the CAH locations, as seen in Figure 3. More information about the coordinating systems can be found in the section entitled "Current Regulatory Framework of EMS in Arizona".

Respondent Agency Type

Table 59 - EMS Provider/Agency Type	2001	2016	State
Fire District	50.0%	36.4%	48.8%
Municipal Fire Department	23.0%	27.3%	25.6%
Private EMS (Independent Corporation)	36.0%	18.2%	11.6%
Hospital-Based EMS (i.e. Owned/Operated by a hospital)	0.0%	9.1%	2.3%
Tribal Fire/EMS Agency	0.0%	9.1%	2.3%

2016 critical access respondents are majority fire-based (67.3%), which is fairly consistent when compared to the 2001 respondents (73%).

Table 60 - EMS Provider/Agency Highest Level of Service	2001	2016	State
Basic Life Support First Responder (no transport)	0.0%	18.2%	11.6%
Basic Life Support Ground Ambulance (transport)	22.7%	0.0%	0.0%
Advanced Life Support First Responder (no transport)	9.1%	18.2%	37.2%
Advanced Life Support Ground Ambulance (transport)	68.2%	63.6%	46.5%

Table 61 - Interfacility Transport	2001	2016	State
Yes	63.6%	62.5%	43.2%

Level of service remains fairly evenly distributed between Basic Life Support and Advanced life support from 2001 to 2016; with the only major changes being reflected in transitioning from transporting to non-transporting agencies. Of those agencies who transport patients, interfacility transport remains constant from 2001 to 2016, although at a rate almost 20% higher than the current statewide benchmark.

Service Area Demographics

Table 62 - Approx. Size of Service Area	2001	2016	State
1-49 sq mi	27.3%	27.3%	19.8%
50-99 sq mi	0.0%	18.2%	22.1%
100-249 sq mi	4.5%	9.1%	22.1%
250-499 sq mi	9.1%	9.1%	9.3%
500-999 sq mi	9.1%	9.1%	8.1%
1000+ sq mi	40.9%	27.3%	18.6%

Table 63 - Population Estimate of Service Area	2001	2016	State
1-999 people	N/A	9.1%	8.1%
1,000-9,999 people	N/A	27.3%	26.7%
10,000-49,999 people	N/A	54.5%	34.9%
50,000-99,999 people	N/A	9.1%	11.6%

Table 64 - Avg. Age of Service Area	2001	2016	State
30-49	31.8%	55.6%	48.2%
50-64	40.9%	22.2%	31.3%
65+	0%	11.1%	8.4%

2016 critical access respondents indicate slightly smaller overall service areas when compared to 2001 respondents; with an 18.2% increase in agencies representative of 50 to 99 square mile service areas, and a 13.6% decrease in agencies representative of 1000 or more square mile service areas. Also, 90.9% of 2016 respondents represent populations of less than 50,000 persons, with a majority (55.6%) indicating the average age to be 30 to 49 years old (a 23.8% increase in this age demographic from 2001, and 7.4% above the statewide benchmark).

Billing

Billing Practices

Table 65 - Agency bills for EMS services?	2001	2016	State
Yes	81.8%	63.6%	60.5%

Table 66 - Who provides billing services?	2001	2016	State
Contract Out to Third Party	18.1%	57.1%	51.9%
Self-Bill	68.2%	42.9%	48.1%

While a majority (63.6%) of 2016 critical access respondents indicate that they bill for EMS services, this represents an 18.2% decline from 2001. Of those 2016 respondents who indicate billing for services, most (57.1%) outsource to a third-party, which is in contrast to 2001 where most (68.2%) did their own billing (self-bill). Outsourcing billing operations to a third-party can decrease costs and increase revenues, but lacks internal transparency and accountability for billing operations.[160-163]

Payer Mix

Table 67 - Mean Proportion of Services Billed	2001	2016	State
Medicare Patients	34.3%	26.0%	28.4%
AHCCCS Patients	28.7%	38.1%	33.9%
Other Patients	35.1%	38.0%	45.0%

2016 critical access respondents indicate an 8.3% decrease in Medicare patients and a 9.4% increase in AHCCCS-Medicaid patients when compared to 2001; while the other payers' aggregate count remained fairly constant. The currently-reported proportion of payer type is in line with statewide trends, with the increase in AHCCCS proportion since 2001 likely due to Arizona's 2014 Medicaid restoration and expansion,[334] with a slightly higher proportion of AHCCCS patients when compared to the statewide benchmark (38.1% vs. 33.9%), and the slightly lower proportion of other payers (38.0% vs 45.0%).

Table 68 - Rate of Collections	2001	2016	State
0	4.5%	0.0%	*Mean of 48.5%*
1-30%	9.1%	0.0%	
31-74%	45.5%	36.4%	
75-100%	22.3%	36.4%	

Table 69 - Percent of Expenses Subsidized	2001	2016	State
0-1%	22.3%	27.3%	*Mean of 55.0%*
<50%	31.8%	36.4%	
51-100%	31.8%	9.1%	

2016 critical access respondents report higher rates of collections on billing but lower proportions of subsidized expenses when compared to 2001. Additional investigation would be needed to evaluate the exact dollar offset of these changes (i.e. if the additional collections create a "wash" for the reduced subsidy).

Medical Direction / Medical Control

Medical Director Specialty

Table 70 - Medical Director Specialty	2001	2016	State
Emergency Medicine (EM)	N/A	81.8%	78.6%
Emergency Medical Services (EMS)	N/A	45.5%	58.3%

Most (81.8%) of the 2016 critical access respondents indicate that their medical director specializes in Emergency Medicine (EM); while only 45.5% indicate medical director specialization in Emergency Medical Services (EMS). Note the slightly lower rate of EMS-specializing medical directors when compared to statewide benchmark (58.3%). All (100%) of respondents indicate that their medical director specializes in EM and/or EMS.

Medical Director Engagement

Table 71 - Meet w/ Medical Director	2001	2016	State
Monthly	22.3%	63.6%	54.8%
Quarterly	36.7%	27.3%	16.7%
Twice a Year	9.1%	0.0%	9.5%
Once a Year	4.5%	0.0%	7.1%
Never	18.2%	9.1%	6.0%

Overall, there appears to be more medical director involvement in operations as indicated by the increased frequency of meetings from 2001 to 2016, with 63.6% of critical access respondents indicating monthly meetings, slightly above the statewide benchmark (54.8%). The level of involvement an EMS medical director has in their EMS system can be correlated with improved functionality and patient outcomes.[171,172]

Staffing

Staffing Demographics

Table 72 - EMS Personnel by Compensation	2001			2016			State		
	FT Paid	PT Paid	Vol	FT Paid	PT Paid	Vol	FT Paid	PT Paid	Vol
All Levels of Provider	41.1%	33.7%	25.2%	67.0%	23.9%	9.1%	83.7%	8.1%	7.4%

ASENA asked respondents to provide the number of EMS personnel for each employment type (full-time paid, part-time paid, and volunteer) and by level of certification. Percentages were then calculated based on number of personnel identified in each category divided by total number of personnel. The table above identifies the percentage of personnel by employment type and certification level for each given benchmark.

2016 critical access respondents indicate a strong trend towards paid full-time personnel since 2001 (increase of 25.9%); although they still rely more heavily on part-time personnel compared to the current statewide benchmark (23.9% vs. 8.1% respectively).

Barriers to Recruitment and Retention

Table 73 - Barriers to Recruitment and Retention	2001	2016	State
Pay	50.0%	72.3%	67.9%
Time Commitment	40.9%	63.6%	32.1%
Geography/Location	72.3%	54.5%	58.3%
No Interest	27.3%	27.3%	16.7%
Training Requirements	40.9%	18.2%	28.6%
Stress	18.2%	0.0%	6.0%
Other:	9.1%	9.1%	8.3%

2016 critical access respondents indicate higher rates of pay barriers (72.3%) and time commitment barriers (63.6%) than 2001 respondents (50.0% and 40.9% respectively); although there have been significant decreases in geography/location barriers and training requirement barriers since 2001. Note that the time commitment barrier (63.6%) is significantly higher than the statewide benchmark (32.1%), which is likely the reason for the significantly higher levels of part-time personnel described in the previous table.

Continuing Education / Training

Complementary Certifications

Table 74 - Certs Required for Employment (Yes or Other Similar)	2001	2016	State
NREMT	N/A	9.1%	17.4%
BLS-HCP	N/A	90.9%	98.8%
ACLS	N/A	81.8%	87.2%
PALS	N/A	72.8%	76.7%
NRP	N/A	9.1%	17.4%
PHTLS	N/A	36.4%	39.5%

2016 critical access respondents report slightly lower rates of complementary certifications across the board when compared to the current statewide benchmark. See the Primary Results section for additional information about complementary certifications.

Continuing Education Personnel and Funding

Table 75 - EMS Training Officer	2001	2016	State
Yes	72.3%	81.8%	84.7%

Table 76 - Sources of Funding for Continuing Education	2001	2016	State
Agency/Internal	N/A	72.7%	81.2%
Base Hospital	45.5%	36.4%	25.9%
Grants	4.5%	18.2%	22.4%
EMS Council	27.3%	9.1%	15.3%
Taxes	31.8%	N/A	N/A
None (EMS personnel must independently pay)	9.1%	18.2%	21.2%
Other:	N/A	18.2%	8.2%

2016 critical access respondents indicate a higher rate (81.8%) of internal training officers employed by their agency than 2001 respondents (72.3%); remaining in-line with the current statewide benchmark. Funding patters have also changed since 2001, with decreases in base hospital funding (from 45.5% to 36.4%) and EMS Council funding (27.3% to 9.1%); although there has been a strong increase in grant funding (from 4.5% to 18.2%). The 2016 critical access respondents rely more heavily on outside sources of funding than the current statewide benchmark.

Quality Assurance / Patient Care Reporting

Quality Program Overview

Table 77 - Active Quality Program	2001	2016	State
Yes	N/A	81.8%	77.6%

Most (81.8%) 2016 critical access respondents indicate that their agency maintains an active quality program; a key component to a high-performing EMS system.[171,172,186-189] This finding slightly out-performs the current statewide benchmark of 77.6%.

Table 78 - Provider of Quality Monitoring	2001	2016	State
Internal (Self)	N/A	88.9%	89.4%
Base Station Hospital	N/A	66.7%	68.2%
Other:	N/A	11.1%	19.6%

Table 79 - Quality Program: Chart/Case Review	2001	2016	State
Yes - 100% review of all EMS calls	N/A	22.2%	34.8%
Yes - Randomized Review of greater than or equal to 50% of EMS calls	N/A	33.3%	24.2%
Yes - Randomized Review of less than 50% of EMS calls	N/A	33.3%	33.3%
Yes - Only specific calls when issue(s) arise	N/A	11.1%	7.6%

Table 80 - Quality Program: Other Metrics	2001	2016	State
Yes - Combination of System Performance and Clinical Metrics	N/A	77.8%	56.1%

2016 critical access respondents report strong quality programs, primarily supported by a combination of internal and/or base station hospital providers that is mostly in-line with current statewide benchmarks. Note that the 2016 critical access respondents outperform the statewide benchmark in evaluating a combination of system performance and clinical metrics (77.8% vs. 56.1%); although they slightly lag behind in review of all EMS calls (22.2% vs. 34.8%), but otherwise balance this with a high rate of randomized review of greater than half of calls.

Type of Patient Care Reporting

Table 81 - Type of Patient Care Report	2001	2016	State
All Electronic Records (full ePCR)	0.0%	63.6%	60.5%
Paper Field Reports later converted into Electronic Files/Databases (partial ePCR)	27.3%	18.2%	19.8%
All Paper Records	36.4%	18.2%	19.8%

2016 critical access respondents indicate proportions of patient care reporting directly comparable to the current statewide benchmark. Note the drastic movement away from paper-related patient care reporting between 2001 (63.7%) and 2016 (36.4%); with a majority of 2016 critical access respondents (63.6%) indicating use of Electronic Patient Care Reporting (ePCR), an integral part of the transformation and advancement of the healthcare industry and EMS practice as a whole.[190,191]

Use of System-Level Databases

Table 82 - Submit Data to AZ-PIERS	2001	2016	State
Yes	N/A	55.6%	69.6%

Table 83 - Participation in electronic HIE	2001	2016	State
Yes	N/A	27.3%	18.8%
No - But we are interested	N/A	54.5%	63.5%
No - And we are not interested	N/A	18.2%	17.6%

A narrow majority (55.6%) of 2016 critical access respondents indicate submission of data to the Arizona Prehospital Information and EMS Registry System (AzPIERS), with this number being slightly below the current statewide benchmark (69.6%). Surprisingly, a greater proportion of 2016 critical access respondents participate in some type of electronic Health Information Exchange (HIE) than the statewide benchmark (27.3% vs. 18.8%). See the Primary Results section for additional information about AzPIERS and HIE.

Relationship and Coordination with Receiving Hospitals

Patient Transport Methodology

Table 84 - Critical/High Acuity Medical Transport	2001	2016	State
More Likely via Ground	N/A	42.9%	80.5%
More Likely via Air	N/A	57.1%	19.5%

Table 85 - Critical/High Acuity Trauma Transport	2001	2016	State
More Likely via Ground	N/A	12.5%	39.5%
More Likely via Air	N/A	87.5%	60.5%

2016 critical access respondents indicate significantly higher rates of air ambulance use compared to current statewide benchmarks; with a 37.6% greater reliance on air ambulance for critical/high acuity medical patients, and a 27.0% greater reliance on air ambulance for critical/high acuity trauma patients. This variation may relate to the rural/remote nature of critical access EMS

operations. Although the use and appropriateness of air transport is widely debated,[204-211] analysis and investigation of medical necessity of air transported patients is outside the scope of ASENA. Additional research and investigation is needed to map the service area of ASENA respondents in relation to the receiving facilities they identified, then cross-referenced with the acuity of patients, their transport destination determination, their transport methodology, and the outcome of the patient.

Relationship with Receiving Hospital Staff

Table 86 - Relationship with Receiving Hospital	2001	2016	State
More Positive than Negative	N/A	75.0%	81.8%
Neutral	N/A	12.5%	15.9%
Always Negative	N/A	12.5%	2.3%

Most 2016 critical access respondents (75.0%) report a majority positive relationship with their receiving facilities; a rate that is only slightly lower than the current statewide benchmark (81.8%). However, note the high proportion of 2016 critical access respondents indicating "always negative" (12.5%) when compared to the statewide benchmark (2.3%).

Exchange of Patient Care Information

Table 87 - PCR Left at Receiving Hospital when Care Transferred	2001	2016	State
Yes - Immediate: Transmitted Electronically (not printed/faxed, etc. - Actual full data merger)	N/A	0.0%	11.8%
Yes - Immediate: Printed (whether printed on site or sent to fax and printed)	N/A	62.5%	38.2%
Yes - Immediate: Hand-written	N/A	12.5%	13.2%
No - A report is sent to the facility after time of patient transfer (within 24 hours)	N/A	25.0%	4.4%
No - A report is never sent/delivered to the receiving facility	N/A	0.0%	19.1%

Table 88 - Receiving Hospital Access to ePCR Database	2001	2016	State
Yes - All receiving hospitals have access	N/A	22.2%	27.9%
Yes - Some receiving hospitals have access	N/A	44.4%	38.2%
No - Receiving hospitals do not have access	N/A	33.3%	33.8%

2016 critical access respondents indicate an overall higher rate of immediately providing a patient care report to the receiving facility upon transfer of patient care than the current statewide benchmark (75.0% vs. 63.2% respectively); and an overall higher rate of providing a patient care report at all (100% vs. 80.9% respectively). For those 2016 critical access respondents that indicated use of an ePCR platform in the "Type of Patient Care Reporting" subsection, 66.6% allow some level of access to their ePCR suite by the receiving hospital staff (which is directly in-line with the current statewide benchmark).

Table 89 - Receiving Hospitals Patient Follow-up/Discharge Information	2001	2016	State
Yes - All or Some	N/A	63.6%	73.4%
No - No feedback/follow-up is provided by receiving hospitals	N/A	36.4%	26.7%

Most (63.6%) 2016 critical access respondents receive some level of follow-up/discharge information from receiving hospitals for some or all of their patients; a little below the current statewide benchmark of 73.4%.

Dispatch / Communications

Dispatch Methodology

Table 90 - EMD Certified Dispatchers	2001	2016	State
Yes - All or Some	36.4%	45.5%	73.2%

Table 91 - Priority Dispatch	2001	2016	State
Yes	45.5%	45.5%	75.6%

2016 critical access respondents indicate very little change in dispatch methodology since 2001; with only 45.5% of 2016 respondents indicating use of Emergency Medical Dispatcher (EMD) certified personnel (compared to 36.4% in 2001) and only 45.5% of 2016 respondents indicating use of the priority dispatch system (equal to 2001 at 45.5%). Both of these statistics fall significantly behind the current statewide benchmarks of 73.2% and 75.6% respectively, indicating an area for improvement.

Emergency Medical Dispatcher (EMD) certification is a 24-hour course designed to educate dispatch center call-takers on the basics of telephone-based triage and telephone-assisted interventions

for medical/traumatic emergencies.[213-216] Organizations using EMD have better operational performance.[217]

Priority Dispatch is the trade name of the Medical Priority Dispatch System (MPDS), a computer application designed for 911 call centers to provide more streamlined and accurate telephone triage and field asset deployment via standardized protocols and methodology.[218-221] Seventy-one percent of U.S. jurisdictions use MPDS.[217]

Table 92 - Primary Method of Dispatch	2001	2016	State
Full Computer-Assisted Dispatch with GPS Location	N/A	9.1%	43.0%
Computer-Assisted Dispatch (CAD) without GPS Location	9.1%	54.5%	23.3%
Combination of Pager, Telephone, Radio but no CAD	72.7%	27.3%	31.5%
Other:	27.3%	9.1%	2.3%

2016 critical access respondents indicate significant advances in dispatch methodology since 2001; with a strong majority (63.6%) of 2016 respondents indicating using some level of Computer-Assisted Dispatch (CAD), compared to only 9.1% in 2001. The 63.6% figure is mostly in-line with the current statewide benchmark (66.3%); although 2016 critical access respondents indicate a 33.9% lower rate of Global Positioning System (GPS) technology use. CAD assists with address validation, call prioritization, call information communication, and logistical management of field-deployed assets; with GPS integration allowing for routing of the closest appropriate asset to the incident.[222]

Dispatch Accessibility

Table 93 - Dispatch Device for the Deaf	2001	2016	State
Yes	22.3%	54.5%	68.3%

Table 94 - Bilingual Dispatchers	2001	2016	State
Yes	68.2%	54.6%	73.8%

Table 95 - Dispatch Language Line for Translation	2001	2016	State
Yes	22.3%	45.5%	69.1%

2016 critical access respondents indicate improvements in dispatch accessibility for the deaf since 2001, with 54.5% indicating access to appropriate devices compared to 22.3%. While 2016 critical access respondents report a decrease in bilingual dispatchers since 2001 (54.6% compared to 68.2% respectively), they show an increase in access to a language line (from 22.3% to 45.5%), which may offset the need; although analysis revealed that 18.2% of 2016 critical access respondents have no access to either bilingual dispatcher or a language line. Overall, 2016 critical access respondents report lower rates of dispatch accessibility for the deaf and non-English speakers when compared to current statewide benchmarks.

General Communications Methodologies

Table 96 - Contact Receiving ED Directly when transporting	2001	2016	State
Yes	77.3%	87.5%	86.0%

A majority (87.5%) of 2016 critical access respondents indicate that they contact the receiving Emergency Department (ED) when enroute with a patient; a 10.2% increase from 2001, and in-line with the current statewide benchmark.

Table 97 - Communication Devices in Service	2001	2016	State
Cellular Telephones	95.5%	54.5%	73.3%
Simple VHF Radios and/or UHF Radios	90.9%	81.8%	77.9%
Trunked Radio System	N/A	45.5%	51.2%
Pagers/Beepers	81.8%	36.4%	32.6%
Computer-Based Text Communication (i.e. Instant Messaging)	N/A	18.2%	31.4%
SATCOM (Satellite-based radio communications equipment)	N/A	0.0%	4.7%
Satellite Telephones	N/A	0.0%	4.7%
Self-Contained Deployable Communications System (i.e. stand-alone system for disaster)	N/A	18.2%	4.7%
Other:	N/A	9.1%	2.3%

2016 critical access respondents indicate a lower rate of cell phone availability (54.5%) when compared to both 2001 (95.5%) and the current statewide benchmark (73.3%). Further investigation would be needed to identify why this is the case. The appropriate technology can vary based on system operations, terrain, geography, and cost.[225-227] Regardless of the technology, optimal communications

systems should be interoperable, reliable, portable, scalable, resilient, and redundant.[227] Satellite-based communications systems, although expensive, can be an asset in rural settings and for redundancy.

Communications Dead-Spots

Table 98 - Communication Dead-Spots	2001	2016	State
Yes	95.5%	72.7%	77.6%

A majority of 2016 critical access respondents (72.7%) indicate experiencing communications dead-spots in their service areas. This in-line with the current statewide benchmark (77.6%) and represents a 22.8% decrease from 2001. Dead-spots can be reduced by communications equipment upgrades, and placing additional antennas and repeaters throughout the service area.[228-230]

Vehicles

Response-Ready Level of Service

Table 99 - EMS Vehicles by Category	2001		2016		State	
	BLS	ALS	BLS	ALS	BLS	ALS
Ground Ambulance	N/A	N/A	47.4%	52.6%	18.1%	81.9%
Fire Apparatus	N/A	N/A	94.9%	5.1%	42.7%	57.3%
Utility Vehicle	N/A	N/A	46.7%	53.3%	66.8%	33.2%

Table 99 compares the proportion of fully-staffed and response-ready Basic Life Support (BLS) versus Advanced Life Support (ALS) vehicles by category/type. It does not compare the proportion of vehicle category/type versus vehicle category/type. ASENA defines Fire Apparatus as being: engine, quint, ladder truck, HAZMAT, etc.; and Utility Vehicle as being: chief/supervisor, paramedic "fly-car", volunteer personally-owned vehicle, etc.

2016 critical access respondents indicate a trend of BLS-level ambulances and apparatus and ALS-level utility vehicles; an indication that is supported by the relatively fewer number of trained ALS personnel in the critical access regions. Note the significant difference in the staffing of fire apparatus between the 2016 critical access respondents and the statewide benchmark (94.9% BLS for critical access versus 57.3% ALS for statewide benchmark).

Additional Vehicles Needed

Table 100 - Additional/New EMS Vehicles Needed	2001	2016	State
Yes - Ground Ambulance	N/A	36.4%	40.7%
Yes - Fire Apparatus	N/A	27.3%	36.0%
Yes - Utility Vehicle	N/A	9.1%	26.7%
No	N/A	27.3%	34.9%

ASENA respondents were asked to indicate if their agency was in need of any additional vehicles to adequately provide coverage for their service area (not vehicle replacements, actual increase in deployed unit numbers). 2016 critical access respondents indicate lower rates of additional vehicle needs across the board than the current statewide benchmarks.

Vehicle Maintenance, Repair, and Replacement

Table 101 - Regular Maintenance/Repair for EMS Vehicles	2001	2016	State
Yes	86.4%	72.7%	89.5%

Fewer 2016 critical access respondents (72.7%) indicate having a regular maintenance and repair plan for their EMS vehicles than compared to both the 2001 respondents (86.4%) and the current statewide benchmark (89.5%).

Table 102 - EMS Ground Ambulances Need Replaced	2001	2016	State
Yes	63.6%	45.5%	40.7%
No	9.1%	18.2%	19.8%
N/A - Agency does not have any EMS Ground Ambulances	18.2%	36.4%	39.5%

Table 103 - EMS Fire Apparatus Need Replaced	2001	2016	State
Yes	N/A	45.5%	55.3%
No	N/A	9.1%	20.0%
N/A - Agency does not have any EMS Fire Apparatus	N/A	45.5%	24.7%

Table 104 - EMS Utility Vehicle Need Replaced	2001	2016	State
Yes	N/A	63.6%	44.2%
No	N/A	18.2%	36.0%
N/A - Agency does not have any EMS Utility Vehicle	N/A	18.2%	19.8%

While almost half (45.5%) of 2016 respondents indicate needing ambulances replaced, this is an 18.1% improvement from 2001, and fairly in-line with the current statewide benchmark (40.7%); although note the difference in 2016 respondents versus 2001 respondents that indicate not having any ground ambulances (36.4% vs. 18.2% respectively).

Equipment / Protocols

EMS Equipment and Protocols Used

Table 105 - EMS Equipment/Protocols Used	2001	2016	State
Automated Chest Compression Device for CPR	N/A	18.2%	11.6%
BLS-AEDs	N/A	81.8%	95.3%
Portable ALS Cardiac Monitors	N/A	72.7%	89.5%
Stand-alone SpO2 Monitors	N/A	72.7%	60.0%
Stand-alone ETCO2 Monitors	N/A	0.0%	12.8%
CPAP Devices	N/A	54.5%	70.6%
Supraglottic Airway Devices	N/A	81.8%	89.5%
Protocols Include RSI/PAI Endotracheal Intubation	N/A	9.1%	32.6%
Protocols Authorize Surgical Airways	N/A	72.7%	84.9%
Transport Ventilators/Portable Ventilators	N/A	27.3%	29.4%
Chest-seals for Open Pneumothorax	N/A	72.7%	89.5%
Chest-needle Decompression for Tension Pneumothorax	N/A	72.7%	86.0%
Commercial Tourniquets and/or Junctional Compression for Hemorrhage Control	N/A	81.8%	89.3%
Hemostatic Agents for Hemorrhage Control	N/A	18.2%	22.4%
Pelvic Binders	N/A	54.5%	56.5%
Traction Splints	N/A	90.9%	94.1%
Cervical Collars	N/A	90.9%	97.6%
Backboards	N/A	90.9%	97.6%
Field Clearance of Spinal Immobilization/Selective Immobilization	N/A	63.6%	88.2%
Intraosseous Devices	N/A	81.8%	87.2%
Devices to Maintain Body Temperature	N/A	90.9%	95.3%

ASENA questions 71 through 94 asked respondents to indicate if their agency used the equipment and/or protocols outlined in Table 105. While the original ASENA questions allowed for a "no" response or a selection of multiple "yes" responses based on a given device type/brand; all "yes" responses for identified equipment/protocols were aggregated to be presented in Table 105 (the percentages are representative of those respondents that indicated any "yes" response). For more detailed description/discussion of each of the above equipment items and protocols, please see the Primary Results section of this report. Full evaluation of equipment and/or protocols on patient outcomes is not within the scope of ASENA.

2016 critical access respondents indicate lower rates of both Basic Life Support Automated External Defibrillators (BLS-AED - 81.8%) and portable Advanced Life Support (ALS) cardiac monitors (72.7%) than the current statewide benchmarks (95.3% and 89.5% respectively). Defibrillation is a critical component of the cardiac arrest chain of survival,[238-240] especially with delayed response times in rural and critical access areas.[335] 2016 critical access respondents indicate slightly lower rates of other equipment and protocols compared to the current statewide benchmarks (except for Automated Chest Compression Device for CPR and Stand-Alone SPO2).

Maintenance and Repair of EMS Equipment

Table 106 - Regular Maintenance/Repair for EMS Equipment	2001	2016	State
Yes	86.4%	72.7%	80.2%

2016 critical access respondents indicate a lower rate (72.7%) of maintenance/repair plans for their EMS equipment when compared to both 2001 respondents (86.4%) and the current statewide benchmark (80.2%).

Preparedness

CBRNE and MCI Assistance/Needs

Table 107 - CBRNE Event Assistance/Needs	2001	2016	State
Combination of Specialized Equipment and Specialized Education/Training	N/A	72.7%	82.4%
Specialized Equipment	N/A	0.0%	0.0%
Specialized Education/Training	N/A	9.1%	11.8%
None - Our agency is fully prepared to respond to CBRNE events	N/A	18.2%	5.9%

Table 108 - Mass Casualty Incident Assistance/Needs	2001	2016	State
Combination of Specialized Equipment and Specialized Education/Training	N/A	63.6%	75.3%
Specialized Equipment	N/A	0.0%	7.1%
Specialized Education/Training	N/A	9.1%	7.1%
None - Our agency is fully prepared to respond to CBRNE events	N/A	27.3%	10.6%

ASENA questions 95 and 96 asked respondents to indicate which type of Chemical, Biological, Radiological, Nuclear, Explosive (CBRNE) event assistance and/or non-CBRNE Mass Casualty Incident (MCI) event assistance would benefit their agency the most.

2016 critical access respondents indicate higher rates of full preparedness for both CBRNE (18.2%) and MCI (27.3%) events than the current statewide benchmarks of 5.9% and 10.6% respectively; although note the still high level of needs for a combination of specialized equipment and specialized education/training for both CBRNE (72.7%) and MCI (63.6%).

Active Shooter Preparedness

Table 109 - Coordinated Active Shooter Plan	2001	2016	State
Yes	N/A	36.4%	42.9%

Table 110 - Train/Rehearse Active Shooter Plan	2001	2016	State
Yes - Twice a Year	N/A	0.0%	11.1%
Yes - Once a year	N/A	25.0%	66.7%
No	N/A	75.0%	22.2%

2016 critical access respondents indicate a slightly lower rate of coordinated active shooter planning (36.4%) than the statewide benchmark (42.9%). Of those respondents that indicate having a coordinated active shooter plan, only 25.0% train/rehearse their plan, all of whom only do so once a year; compared to the current statewide benchmark (88.9%) of respondents who train/rehearse at least once a year. Ideally, all jurisdictions should create, maintain, and train a coordinated active shooter response plan.[319-321]

Tactical EMS Personnel

Table 111 - Employ Tactical EMS Personnel	2001	2016	State
Yes	N/A	9.1%	22.4%

Very few (9.1%) of the 2016 critical access respondents indicate employment of tactical EMS personnel; less than half the rate of the current statewide benchmark (22.4%).

Community Paramedicine / Community Outreach

Community Paramedicine

Table 112 - Current Community Paramedicine Program	2001	2016	State
Yes	N/A	27.3%	27.1%

Table 113 - Interested in Developing a Program	2001	2016	State
Yes	N/A	75.0%	75.8%

2016 critical access respondents are almost exactly representative of the statewide benchmarks for both having a current community paramedicine program and if not, being interested in developing one. For additional information on community paramedicine programs, see the Primary Results section and Appendix D (Arizona MIH/CIP Data Crosswalk).

Public Awareness and Community Education

Table 114 - Public Awareness and Community Education Programs	2001	2016	State
CPR	4.5%	81.8%	91.9%
Car Safety Seat Education	40.9%	54.5%	53.5%
Domestic Violence Awareness and/or Prevention	23.7%	54.5%	30.2%
Suicide Prevention	18.2%	54.5%	29.1%
Substance Abuse Awareness	18.2%	45.5%	26.7%
Advanced Directives / DNRs	27.3%	36.4%	47.7%
Mental Health Awareness	22.7%	36.4%	25.6%
Injury Prevention (General)	N/A	27.3%	31.4%
Seat Belt Awareness	40.9%	27.3%	34.9%
Child Safety (i.e. Risk Watch/Safe Kids)	18.2%	18.2%	40.7%
Disease Management	N/A	18.2%	19.8%
EMS Bystander Education (i.e. First There/First Care)	36.4%	18.2%	23.3%
Poison Prevention	27.3%	0.0%	12.8%
Water Safety	18.2%	18.2%	37.2%
Helmet Safety	4.5%	9.1%	33.7%
Other:	18.2%	18.2%	9.3%
None	27.3%	9.1%	3.5%

2016 critical access respondents indicate improved rates in almost all categories of public awareness and community education programs when compared to 2001 respondents. There is a significant increase in Cardio-Pulmonary Resuscitation (CPR) programs (from 4.5% to 81.8%), perhaps attributable to programs such as the Save Heart in Arizona Registry and Education (SHARE) program.[336] Arizona has experienced a 300% increase in out-of-hospital cardiac arrest survival.[337] However, even with improvements in education programs across the board, 2016 critical access respondents lag behind the current statewide benchmarks for many programs.

Priority Needs

Priority	2001	2016	State
1	Education/Training	Education/Training	Equipment/Supplies
2	Equipment/Supplies	Equipment/Supplies	Education/Training
3	Personnel	Personnel	Vehicles
4	Funding	Vehicles	Personnel
5	Vehicles	Funding	Funding
6	Facilities	Other	Community Paramedicine
7	-	Facilities	Other

2016 critical access respondents indicate almost exactly the same priority of needs as 2001 respondents, with the top three being identical (Education/Training, Equipment/Supplies, and Personnel). Although the order of priorities varies slightly, the top five are the same across each year and the current statewide benchmark.

CONCLUSION

Arizona's Emergency Medical Services (EMS) system is well organized and positioned to deliver advanced levels of prehospital care for the vast majority of its citizens and visitors, with some variation between urban and rural regions. Key needs identified relate to: patient care reporting between EMS providers, emergency departments and receiving hospitals; quality assurance activities; education and skills training programs; dispatch system capabilities; mass casualty and public health preparedness; equipment and supplies; and more robust use of data and analyses to inform continuous EMS system improvement.

Arizona's EMS care is delivered mostly via fire-based agencies, either as stand-alone full service or in partnership with a private ambulance agency. EMS services areas span geography mostly under 250 square miles, serving Arizonans residing in the four EMS coordinating systems, delivering services paid for by the private and publicly sponsored health insurance, and also being subsidized by other community, hospital, and grant funding.

The clinical care provided by Arizona's EMS agencies is guided by medical directors specializing in Emergency Medicine and/or Emergency Medical Services; maintaining direct EMS personnel engagement that has increased considerably since 2001, although there is room for improvement in some regions. Hands-on patient care is delivered by advanced-level Emergency Medical Care Technicians (EMCTs) at almost double the national benchmark, armed with evidence-based protocols and modern equipment commensurate with the national consensus on EMS standards of care.

While a majority of the EMS agencies use electronic patient care reporting, maintain a quality program, provide patient care reports to receiving facilities at time of transfer of care, and submit data to the statewide EMS registry, approximately 24%-30% do not. Dispatch system capacity and training, especially in rural and critical access areas, and preparedness for mass casualty and public health preparedness require additional attention. Data and analyses of EMS system performance can be used to inform legislative, regulatory, and regional coordinating system improvements.

Arizona’s critical access self-identified priority needs overwhelmingly indicate Equipment/Supplies as their greatest need, followed by Education/Training, Vehicles, and Personnel. These are identified in every region's top five priorities in both the 2001 and 2016 critical access respondents.

2016 Arizona Statewide EMS Needs Assessment
FULL UNABRIDGED QUESTION BANK

Agency Information

1. EMS Provider/Agency Name: [Free-Text Entry]
2. Does your agency want to participate in the 2016 Arizona Statewide EMS Needs Assessment? [Yes or No] *If Yes, go to Q3. If No, redirected to Thank You / Exit screen.*
3. EMS Provider/Agency Type:
    a. Fire District
    b. Municipal Fire Department
    c. Third-Service EMS (i.e. City/County)
    d. Hospital-Based EMS (i.e. Owned/Operated by a hospital)
    e. Private EMS (Independent Corporation)
    f. Tribal Fire/EMS Agency
    g. Other: [Please describe]
4. EMS Provider/Agency Highest Level of Service:
    a. Basic Life Support First Responder (no transport)
    b. Advanced Life Support First Responder (no transport)
    c. Basic Life Support Ground Ambulance (transport)
    d. Advanced Life Support Ground Ambulance (transport)
    e. Air Ambulance (transport)
    f. Other (combination of BLS/ALS service depending on Day/Week)
5. EMS Provider/Agency EMS Council:
    a. Arizona Emergency Medical Systems
    b. Northern Arizona Emergency Medical Services
    c. Southeastern Arizona EMS Council
    d. Western Arizona Council of EMS
    e. I don't know / I'm not sure
    f. None - N/A

Service-Area Demographics

6. Zip Codes in EMS Provider/Agency Service-Area: [Free-Text Entry]
7. Approximate Size of Service Area (in square miles): [Free-Text Entry]
8. Population Estimate of Service Area: [Free-Text Entry]
9. Estimated Average Age of the Service Area Population: [Free-Text Entry]
10. Annual Call Volume by Age (total number of EMS calls for service / responses in last 12 months, including non-transports/refusals/transports by another agency):
    a. Infant (< 30 days old): [Free-Text Entry]
    b. Pediatric (30 days - 14 years): [Free-Text Entry]
    c. Adult (15 years - 64 years): [Free-Text Entry]
    d. Geriatric (65+ years): [Free-Text Entry]
    e. Unknown: [Free-Text Entry]
11. Annual Transport Volume by Age (total number of EMS patient transports in last 12 months by your agency):
    a. Infant: [Free-Text Entry]

   b. Pediatric: [Free-Text Entry]
   c. Adult: [Free-Text Entry]
   d. Geriatric: [Free-Text Entry]
   e. Unknown
12. Annual Number of Calls Resulting in Air Ambulance Utilization (actual transfer of patient care to an air ambulance crew for air transport): [Free-Text Entry]

Billing

13. Does your agency bill patients for services? [Yes or No] *If yes, continue to Q14. If no, skip to Q18.*
14. Who provides your billing services?
    a. Self-Bill
    b. Contract Out to Third Party
15. What percentage of your expenses, if any, do you subsidize with other sources of revenue besides billing for services rendered? [selection of increments in 10% points]
16. What is your average annual percent or rate of collections for billing? [selection of increments in 10% points]
17. Approximately what percentage of your billed services are for:
    a. Medicare Patients [Free-Text Entry]
    b. AHCCCS Patients [Free-Text Entry]
    c. Private/Commercial Insurance Patients [Free-Text Entry]
    d. Uninsured/Self-Pay Patients [Free-Text Entry]

Medical Direction / Medical Control

18. What is the name of the hospital used as your EMS Base Station for Medical Direction? [list of EMS base stations]
19. What specialty area(s) is your Medical Director boarded in (check all that apply)? [this should be check boxes]
    a. Emergency Medical Services (EMS)
    b. Emergency Medicine (EM)
    c. Anesthesiology
    d. Cardiology
    e. Family Medicine
    f. General Practice
    g. Internal Medicine
    h. Neurology
    i. Obstetrics and Gynecology
    j. Pediatrics
    k. Physical Medicine and Rehabilitation
    l. Preventative Medicine
    m. Surgery (General)
    n. Surgery (Ortho)
    o. Surgery (Plastics)
    p. Surgery (Trauma)
    q. Toxicology
    r. Other: [have free-text box]

20. On average, how often do you meet with your Medical Director?
    a. Daily
    b. Weekly
    c. Monthly
    d. Quarterly
    e. Twice a Year
    f. Once a Year
    g. Never

Staffing

21. Please complete the following table with number of EMS personnel for each category in regards to how they are compensated, if at all:

	Full-Time Paid	Part-Time Paid	Volunteer	Total
Paramedic				
AEMT/EMT-I				
EMT/EMT-B				
First Responder				
Other				

22. Please complete the following table with number of EMS personnel for each category in regards to number of years employed by your agency *Optional Question*:

	<1 yr	1-5 yrs	5-10 yrs	10-20 yrs	20+ yrs
Paramedic					
AEMT/EMT-I					
EMT/EMT-B					
First Responder					
Other					

23. Please complete the following table with number of EMS personnel for each category in regards to total number of years working in the EMS industry *Optional Question*:

	<1 yr	1-5 yrs	5-10 yrs	10-20 yrs	20+ yrs
Paramedic					
AEMT/EMT-I					
EMT/EMT-B					
First Responder					
Other					

24. Please complete the following table with number of EMS personnel for each category (highest level of education obtained) *Optional Question*:

	Graduate Degree	Bachelor Degree	Associate Degree	Some College	High School / GED
Paramedic					
AEMT/EMT-I					
EMT/EMT-B					
First Responder					
Other					

25. What are the barriers to recruitment and retention that apply to your area (check all that apply)? [this should be check boxes]

   a. Time Commitment
   b. Pay
   c. Geography/Location
   d. Training Requirements
   e. Stress
   f. No Interest
   g. None - N/A
   h. Other: [free text]
26. Does your agency actively utilize Critical Incident Stress Management in practice? [Yes or No]

Continuing Education / Training

27. Does your agency have a designated EMS Training Officer? [Yes or No]
28. Does your agency require personnel to maintain current National Registration (NREMT) for employment? [Yes or No]
29. Does your agency require personnel to maintain current AHA Basic Life Support for Healthcare Providers certification (BLS-HCP) for continued employment?
    a. Yes
    b. No - but requires other similar basic CPR certification
    c. No - does not require any basic CPR certification
30. Does your agency require personnel to maintain current AHA Advanced Cardiac Life Support certification (ACLS) for continued employment?
    a. Yes
    b. No - but requires other similar advanced cardiac certification
    c. No - does not require any advanced cardiac certification
31. Does your agency require personnel to maintain current AHA Pediatric Advanced Life Support certification (PALS) for continued employment?
    a. Yes
    b. No - but requires other similar advanced pediatric certification
    c. No - does not require any advanced pediatric certification
32. Does your agency require personnel to maintain current AAP Neonatal Resuscitation Provider (NRP) for continued employment?
    a. Yes
    b. No - but requires other similar advanced neonatal certification
    c. No - does not require any advanced neonatal certification
33. Does your agency require personnel to maintain a current NAEMT Prehospital Trauma Life Support certification for continued employment?
    a. Yes
    b. No - but requires other similar advanced trauma certification
    c. No - does not require any advanced trauma certification
34. What are your sources of funding for EMS continuing education and training (check all that apply)?
    a. None (EMS personnel must independently pay)
    b. Agency/Internal
    c. Base Hospital
    d. EMS Council
    e. Tribal/Federal Funding
    f. Grants

Quality Assurance / Quality Improvement

35. Do receiving hospitals provide you with routine patient follow-up / discharge information (check all that apply)?
    a. Yes - All Patients
    b. Yes - All Trauma Patients
    c. Yes - All STEMI Patients
    d. Yes - All Stroke Patients
    e. Yes - Combination of Trauma / STEMI / Stroke Patients
    f. Yes - Only individual patients when requested by EMS agency
    g. No - No feedback/follow-up is provided by receiving hospitals
36. Is your agency currently participating in an electronic Health Information Exchange (HIE - defined as "the mobilization/sharing of healthcare information electronically across organizations" - in this case, real-time shared data between EMS agencies and their receiving hospitals in regards to specific patients and their outcomes)?
    a. Yes
    b. No - But we are interested
    c. No - And we are not interested
37. Does your agency maintain an active quality program (defined as "a system that ensures a desired level of quality in the development, production, or delivery of a product and/or service - benchmarked against other similar products/services")? [Yes or No] *If yes, continue to Q38. If no, skip to Q41.*
38. If yes, who provides the continuous quality monitoring and feedback (check all that apply)?
    a. Internal (Self)
    b. Base Station Hospital
    c. Other Hospital
    d. Community College
    e. University
    f. Area Health Education Center
    g. Private Quality Company
    h. Other: [free text]
39. If yes, does your quality program include chart/case review?
    a. Yes - 100% review of all EMS calls
    b. Yes - Randomized Review of greater than or equal to 50% of EMS calls
    c. Yes - Randomized Review of less than 50% of EMS calls
    d. Yes - Only specific calls when issue(s) arise
    e. No
40. If yes, does your quality program include metrics other than chart/case review?
    a. Yes - System Performance Metrics (for example, average response times to scene)
    b. Yes - Clinical Metrics (for example, application of oxygen to SOB patients)
    c. Yes - Combination of System Performance and Clinical Metrics
    d. No

Patient Care Reports

41. What type of Patient Care Report does your agency utilize? *If a, skip to Q46. If b or c, continue to Q42.*
    a. All Paper Records
    b. Paper Field Reports later converted into Electronic Files/Databases (partial ePCR)
    c. All Electronic Records (full ePCR)
42. If electronic (ePCR) records are used, which platform/vendor does your agency currently deploy?
    a. Emergidata (i.e. RescueMedic)
    b. ESO Solutions (i.e. ESO ePCR)
    c. Golden Hour (i.e. GH Live)
    d. ImageTrend (i.e. EMS Bridge)
    e. Intermedix (i.e. Trip Tix)
    f. Open Inc. (i.e. SafetyPAD)
    g. Xerox (i.e. FIREHOUSE)
    h. Zoll (i.e. RescueNet)
    i. Other: [free text]
43. If your agency utilizes an electronic Patient Care Report system (ePCR), do receiving hospitals have access to your EMS database records (i.e. specific log-in credentials for each hospital)?
    a. Yes - All receiving hospitals have access
    b. Yes - Some receiving hospitals have access
    c. No - Receiving hospitals do not have access
44. Does your agency leave a Patient Care Report at the receiving hospital facility at time of transfer of patient care?
    a. Yes - Immediate: Transmitted Electronically (not printed/faxed, etc. - No paper - Actual full data merger)
    b. Yes - Immediate: Printed (whether printed on site or sent to fax and printed)
    c. Yes - Immediate: Hand-written
    d. No - A report is sent to the facility after time of patient transfer (within 24 hours)
    e. No - A report is sent to the facility after time of patient transfer (after 24 hours)
    f. No - A report is never sent/delivered to the receiving facility
45. Does your agency submit PCR data to the Arizona State EMS Registry (AZ-PIERS)? [Yes or No]

Relationship with Receiving Facilities [*This section not shown to First Responders - No Transport*]

46. In general, in terms of your EMS personnel's relationship with receiving hospital staff, would you say that the relationship is:
    a. Always positive
    b. More positive than negative
    c. Neutral
    d. More negative than positive
    e. Always negative
47. When your agency transports a "routine" patient, what is the nearest hospital that your personnel transport to? [Free-Text Entry]
48. For critical/high-acuity Medical patients, which hospital do your personnel transport to most often? [Free-Text Entry]
49. For critical/high-acuity Trauma patients, which hospital do your personnel transport to most often? [Free-Text Entry]

50. For critical/high-acuity Medical patients, are you more likely to transport via ground or via air? [more likely via ground, more likely via air]
51. For critical/high-acuity Trauma patients, are you more likely to transport via ground or via air? [more likely via ground, more likely via air]
52. When transporting a patient to a receiving hospital, do your personnel contact the receiving Emergency Department directly?
    a. Yes - Via cell phone
    b. Yes - Via radio
    c. Yes - Via computer-based text
    d. No - Personnel contact third-party (i.e. call center) who then contacts hospital
    e. No - No pre-notification is made to a receiving facility
53. Does your agency provide interfacility transport?
    a. Yes - Emergency interfacility only
    b. Yes - Non-emergency interfacility only
    c. Yes - Both emergency and non-emergency interfacility
    d. No - We only transport from scene to hospital

Dispatch / Communications

54. What is the primary method of dispatch used by your dispatch center?
    a. Full Computer-Assisted Dispatch with GPS Location
    b. Computer-Assisted Dispatch (CAD) without GPS Location
    c. Pager/Beeper Only
    d. Telephone Only
    e. VHF/UHF Radio Only
    f. Combination of Pager, Telephone, Radio but no CAD
    g. Other: [free text]
55. Which of the following communication devices does your agency have in service (check all that apply)?
    a. Simple UHF Radios
    b. Simple VHF Radios
    c. Trunked Radio System
    d. SATCOM (Satellite-based radio communications equipment)
    e. Pagers/Beepers
    f. Cellular Telephones
    g. Satellite Telephones
    h. Computer-Based Text Communication (i.e. Instant Messaging)
    i. Self-Contained Deployable Communications System (i.e. stand-alone system for disaster)
56. Are there any communication "dead-spots" in your service area? [Yes or No]
57. Do your dispatchers use a priority dispatch system? [Yes or No]
58. Are your dispatchers Emergency Medical Dispatch (EMD) certified? [Yes All, Yes Some, No]
59. Does your dispatch center have tele-printers or Telecommunications Device for the Deaf available? [Yes or No]
60. Does your dispatch center have bilingual (English/Spanish) dispatchers?
    a. Yes - staffed 24/7
    b. Yes - staffed less than 24/7
    c. No

61. Does your dispatch center have a language line for translation services (defined as "over-the-phone, video remote, and/or onsite interpreting, translation and/or localization")? [Yes or No]
    a. Yes - available 24/7
    b. Yes - available less than 24/7
    c. No

EMS Vehicles

62. Does your agency have a regular maintenance/repair plan for your EMS Vehicles? [Yes or No]
63. Are your vehicles equipped with GPS/Location tracking?
    a. Yes - All
    b. Yes - Some
    c. No
64. Please complete the following table with number of EMS vehicles for each category (consider an "EMS Vehicle" to be any vehicle that is staffed by BLS or ALS personnel in a response-ready state):

	BLS	ALS	Total
Utility Vehicle - Non Ambulance (Chief/Supervisor, Paramedic "Fly-Car", Volunteer POV, etc.)			
Fire Apparatus - Non Ambulance (Engine, Quint, Ladder Truck, HAZMAT, etc.)			
Licensed Ground Ambulance			
Licensed Air Ambulance			

65. Is your agency in need of any additional EMS Vehicles (i.e. need to add more EMS vehicles to service area inventory)? (check all that apply):
    a. EMS Ground Ambulance
    b. EMS Air Ambulance
    c. EMS Fire Apparatus - Non Ambulance
    d. EMS Utility Vehicle - Non Ambulance
    e. Other: [free text]
66. Are any of your EMS Ground Ambulances in need of being replaced?
    a. Yes
    b. No
    c. N/A - Agency does not have any EMS Ground Ambulances
67. Are any of your EMS Air Ambulances in need of being replaced?
    a. Yes
    b. No
    c. N/A - Agency does not have any EMS Air Ambulances
68. Are any of your EMS Fire Apparatus - Non Ambulance in need of being replaced?
    a. Yes
    b. No
    c. N/A - Agency does not have any EMS Fire Apparatus - Non Ambulance
69. Are any of your EMS Utility Vehicle - Non Ambulance in need of being replaced?
    a. Yes
    b. No
    c. N/A - Agency does not have any EMS Utility Vehicle - Non Ambulance

EMS Equipment

70. Does your agency have a regular maintenance/repair plan for your EMS Equipment (i.e. monitors, pulse ox, suction, etc.) [Yes or No]
71. Do you have BLS Automated External Defibrillators (AED)? [Yes or No]
72. Do you have portable ALS Cardiac Monitors (not AEDs)? [Yes or No] *If yes, continue to Q73. If no, skip to Q75.*
73. If yes, what brand/type of ALS Cardiac Monitors do you carry front-line (check all that apply)?
    a. Phillips - Efficia DFM100
    b. Phillips - HeartStart MRx
    c. Phillips - HeartStart XL+
    d. Physio Control - LifePak 10
    e. Physio Control - LifePak 11
    f. Physio Control - LifePak 12
    g. Physio Control - LifePak 15
    h. Zoll - E Series
    i. Zoll - M Series
    j. Zoll - X Series
    k. Other: [free text]
74. Which of the following capabilities do your ALS Cardiac Monitors have (check all that apply)?
    a. 3-lead ECG
    b. 12-lead ECG
    c. External Pacing
    d. Synchronized Cardioversion
    e. Defibrillation
    f. Blood-Pressure (NiBP)
    g. Pulse Oximetry (SpO2)
    h. End-Tidal Carbon Dioxide (ETCO2)
    i. Data Transmission to Receiving Facility
    j. CPR Quality Feedback
    k. Other: [free text]
75. Do you have stand-alone SpO2 monitors (separate from a cardiac monitor)? [Yes or No]
76. Do you have stand-alone ETCO2 monitors (separate from a cardiac monitor)? [Yes or No]
77. Do you use Continuous Positive Airway Pressure (CPAP) devices? [Yes or No]
78. Do you use Supraglottic Airway Devices (check all that apply)?
    a. No
    b. Yes - Combitube
    c. Yes - iGel
    d. Yes - King
    e. Yes - LMA
    f. Yes - Other: [free text]
79. Do your protocols include RSI (sedation and paralysis) and/or PAI (sedation only) for endotracheal intubation?
    a. No
    b. Yes - RSI only
    c. Yes - PAI only
    d. Yes - Both RSI and PAI

80. Do your protocols authorize surgical airways?
    a. No
    b. Yes - Commercial device/kit (pre-packaged)
    c. Yes - Traditional (scalpel, ET tube, etc.)
81. Do you use transport ventilators / portable ventilators? [Yes or No]
82. Do you use chest-seals for open pneumothorax (check all that apply)?
    a. No
    b. Yes - Traditional plastic with 3-sided tape
    c. Yes - Traditional Vaseline dressing
    d. Yes - Asherman Chest Seal
    e. Yes - Bolin Chest Seal
    f. Yes - HALO Chest Seal
    g. Yes - Hyfin Chest Seal
    h. Yes - SAM Chest Seal
    i. Yes - Other: [free text]
83. Do you use chest-needle decompression for tension pneumothorax?
    a. No
    b. Yes - Traditional 1 inch - 2 inch IV catheter
    c. Yes - Commercial 3+ inch needle decompression catheter
84. Do you use automated mechanical chest compression device for CPR (check all that apply)?
    a. No
    b. Yes - Auto-Pulse (Zoll)
    c. Yes - Life-Stat (Michigan Instruments)
    d. Yes - Lucas (Physio-Control)
    e. Yes - Thumper (Michigan Instruments)
    f. Yes - Weil Mini Compressor (Resus International)
    g. Yes - Other: [free text]
85. Do you use tourniquets and/or junctional compression devices for hemorrhage control (check all that apply)?
    a. No
    b. Yes - Traditional makeshift
    c. Yes - Combat Application Tourniquet (CAT)
    d. Yes - Mechanical Advantage Tourniquet (MATResponder)
    e. Yes - Special Operations Forces Tourniquet (SOF-T)
    f. Yes - Special Weapons and Tactics Tourniquet (SWAT-T)
    g. Yes - Combat Ready Clamp (CRoC)
    h. Yes - SAM Junctional Tourniquet (SJT)
    i. Yes - Abdominal Aortic & Junctional Tourniquet (AAJT)
    j. Yes - Other: [free text]
86. Do you use hemostatic agents for hemorrhage control (check all that apply)?
    a. No
    b. Yes - CELOX
    c. Yes - ChitoGauze
    d. Yes - HemCon
    e. Yes - Quick Clot
    f. Yes - Surgicel
    g. Yes - Other: [free text]

87. Do you use Intraosseous (IO) devices (check all that apply)?
    a. No
    b. Yes - Traditional manual device (i.e. Jamshidi)
    c. Yes - B.I.G.
    d. Yes - EZ-IO
    e. Yes - FAST
    f. Yes - Other: [free text]
88. Do you use pelvic binders (check all that apply)?
    a. No
    b. Yes - Traditional Sheet Method
    c. Yes - Commercial Pelvic Binder Device
89. What type of general splints do you use (check all that apply)?
    a. Air splints
    b. Cardboard splints
    c. Vacuum splints
    d. Wooden splints
    e. Other: [free text]
90. Do you use traction splints (check all that apply)?
    a. No
    b. Yes - Hare
    c. Yes - Sager
    d. Yes - Other: [free text]
91. Do you use cervical collars? [Yes or No]
92. Do you use backboards? [Yes or No]
93. Do your protocols allow for "field clearance" of spinal immobilization and/or "selective immobilization"? [Yes or No]
94. Do you carry devices to maintain body temperature?
    a. No
    b. Yes - Traditional Blanket, etc.
    c. Yes - Commercial Device (i.e. HPMK, Bair Hugger)

Preparedness

95. In regards to CBRNE events (Chemical, Biological, Radiological, Nuclear, and Explosive), which of the following assistance, if available, would benefit your agency the most?
    a. Specialized Equipment
    b. Specialized Education/Training
    c. Combination of Specialized Equipment and Specialized Education/Training
    d. None - Our agency is fully prepared to respond to CBRNE events
96. In regards to a generic Mass Casualty Incident (non-CBRNE), which of the following assistance, if available, would benefit your agency the most?
    a. Specialized Equipment
    b. Specialized Education/Training
    c. Combination of Specialized Equipment and Specialized Education/Training
    d. None - Our agency is fully prepared to respond to CBRNE events
97. Does your agency employ specially-trained Tactical EMS Personnel?
98. Does your community have a specific Active Shooter response plan? [Yes or No] *If yes, continue to Q99. If no, skip to Q100.*

99. Does your community routinely train/rehearse your Active Shooter response plan?
    a. No
    b. Yes - More than Quarterly
    c. Yes - Quarterly
    d. Yes - Twice a Year
    e. Yes - Once a year

Community Outreach / Community Paramedicine

100. What public awareness and education programs are available in your community (check all that apply)?
    a. Advanced Directives / DNRs
    b. Car Safety Seat Education
    c. Child Safety (i.e. Risk Watch, Safe Kids)
    d. CPR
    e. Disease Management
    f. Domestic Violence Awareness and/or Prevention
    g. EMS Bystander Education (i.e. First There, First Care)
    h. Helmet Safety
    i. Injury Prevention (General)
    j. Mental Health Awareness
    k. Poison Prevention
    l. Seat Belt Awareness
    m. Substance Abuse Awareness
    n. Suicide Prevention
    o. Water Safety
    p. Other: [free text]
101. Does your agency currently have a Community Paramedicine / Mobile Integrated Health program? [Yes or No] *If yes, skip to Q103. If no, continue to Q102.*
102. If no, is your agency interested in exploring development of one? [Yes or No]

Critical Access & Needs

103. Please list, starting with the most important, your agency's top 5 specific priority needs:
    a. 1: [free text]
    b. 2: [free text]
    c. 3: [free text]
    d. 4: [free text]
    e. 5: [free text]
104. Please provide any questions, comments, concerns, feedback, additional information, input, ideas, etc. etc. about the current status of Emergency Medical Services in the State of Arizona, and/or where you would like to see Arizona EMS go in the future. Feel free to share facts and/or opinions of any sort. Your insights will be used in efforts to progress our state's EMS/Trauma system. The origin of these comments will not be shared outside of University of Arizona study staff (you and your agency will remain anonymous outside of U of A study staff unless you specifically request to be named): [free text]

Feedback

105. Please provide any questions, comments, concerns, feedback, additional information, etc. etc. about the 2016 Arizona Statewide EMS Needs Assessment. This information will be shared directly with the Primary Investigator/Researcher. [free text]

ZCTA	Total Population, 2011-2015	Low-Income Pop, 2011-2015	% Low-Income Pop, 11-15	% Non-White, 11-15	% Hispanic, 11-15	% Black, 11-15	% Asian, 11-15	% American Indian/Alaska Native, 11-15	% Population Uninsured, est. 2015 (Main Map)	% Population with Medicaid and Other Pub Ins, est. 2015 (Main Map)	% Population with Medicare or Priv Ins, est. 2015 (Main Map)	% Under 18, 11-15	% 18 to 64, 11-15	% 65 and Older, 11-15	% Households with Limited English Proficiency, 11-15 (Main Map)	% Pop with Less Than High School Education, 11-15 (Main Map)	% Pop Not Employed, 10-14 (Pop Indicators)
Summary:	5,772,684.00	2,179,533.00	38%	20%	31%	4%	3%	3%	11%	20%	69%	24%	61%	15%	5%	14%	45%
85003	9479	3886	0.47228974	0.52083553	0.3651229	0.12037135	0.02109927	0.016563	0.176098287	0.227848101	0.596053611	0.161936913	0.751134086	0.086929001	0.05627376	0.203918	0.502301276
85004	4610	2202	0.54599554	0.43861171	0.31691974	0.07592191	0.02841649	0.022343	0.181798806	0.237851662	0.580349531	0.080260304	0.80867679	0.111062907	0.05234568	0.166424	0.531325281
85006	26440	18931	0.72418806	0.74065809	0.66947806	0.03668684	0.00416036	0.023563	0.214971932	0.37015409	0.414873978	0.294704992	0.629878971	0.075416036	0.185482	0.385657	0.505410016
85007	14445	9650	0.6764809	0.72952579	0.52391831	0.14074074	0.03586016	0.026237	0.198515126	0.339716903	0.461767971	0.286881274	0.612599515	0.100519211	0.12333265	0.306319	0.552591622
85008	57086	36478	0.64460152	0.74830957	0.58112322	0.11340784	0.01583576	0.024104	0.193601634	0.343725006	0.46267336	0.276390008	0.663858039	0.059751953	0.16485331	0.330237	0.379542649
85009	46782	33565	0.78735632	0.8754863	0.80616476	0.0524347	0.0044034	0.017913	0.208546247	0.419647461	0.371806291	0.313197384	0.61683981	0.069962806	0.23918919	0.508121	0.644077241
85012	6279	1514	0.25103631	0.27552158	0.14317566	0.05717471	0.01751871	0.04953	0.133982588	0.168068467	0.697948945	0.125816213	0.68115942	0.193024367	0.03052234	0.048814	0.424354255
85013	20228	6950	0.34508441	0.38792763	0.21578999	0.05126557	0.04577813	0.055715	0.158826601	0.225660986	0.615512413	0.168775954	0.715394503	0.115829543	0.03036229	0.07727	0.362811387
85014	25553	11320	0.44667166	0.45736313	0.29503385	0.08570422	0.02841154	0.038273	0.159505011	0.242256301	0.598238688	0.186279498	0.695299965	0.118420538	0.04372803	0.14421	0.355703086
85015	39441	24388	0.62176219	0.68859816	0.48348166	0.08511447	0.05636267	0.053751	0.184909358	0.33711416	0.477976482	0.286782789	0.626733602	0.086483608	0.10453011	0.256066	0.468588263
85016	34901	12545	0.36118389	0.43892725	0.26818716	0.05951119	0.03332283	0.046045	0.117305796	0.22382085	0.658873354	0.189965904	0.683590728	0.126443368	0.035612	0.113443	0.366867155
85017	40048	28059	0.71094839	0.80206252	0.64817219	0.08527267	0.04789253	0.020326	0.211072577	0.36349138	0.425436043	0.341964642	0.594886137	0.063149221	0.18359885	0.366365	0.456778109
85018	37978	11216	0.29603041	0.30773079	0.2144926	0.03030702	0.02896414	0.01672	0.100962686	0.196647837	0.702389477	0.199510243	0.660592975	0.139896782	0.02816816	0.088055	0.363108635
85019	24978	19391	0.77663409	0.81872047	0.69889503	0.06605813	0.02882537	0.019577	0.232379169	0.377336211	0.390284621	0.318039875	0.603370966	0.078589158	0.19065926	0.397216	0.528036118
85020	32670	12933	0.3999567	0.37015611	0.27392103	0.0412611	0.02519131	0.010897	0.146836979	0.202121203	0.651041817	0.18711356	0.64426079	0.16862565	0.05431553	0.124859	0.420031965
85021	38994	20577	0.53261376	0.52718367	0.35097707	0.08403857	0.03931374	0.035236	0.163579995	0.280465584	0.555954421	0.259193722	0.621634098	0.11917218	0.07508532	0.179258	0.454422832
85022	49112	19311	0.3954417	0.31878156	0.21341016	0.04218928	0.02746783	0.014477	0.150468395	0.19100448	0.658527124	0.190706956	0.66277081	0.146522235	0.03340262	0.107116	0.38280794
85023	31995	12466	0.39384557	0.329614	0.2150336	0.03694327	0.03691202	0.022597	0.14354051	0.209975246	0.646484244	0.244006876	0.637662135	0.118330989	0.05824418	0.12844	0.37779212
85024	24077	6682	0.27793029	0.21231881	0.11359389	0.0171533	0.04801263	0.015035	0.105879019	0.139201555	0.754919427	0.235079121	0.668687959	0.096232919	0.02996797	0.060497	0.29823333
85027	35834	10996	0.30923254	0.31313836	0.16046213	0.04526427	0.06990568	0.012111	0.113443424	0.150831492	0.735725084	0.219484289	0.697521907	0.082993805	0.03191489	0.107648	0.327043146
85028	19000	2659	0.14017608	0.14631579	0.09026316	0.01757895	0.02284211	0.000526	0.079559748	0.083962264	0.836477987	0.169052632	0.618368421	0.212578947	0.00942211	0.029771	0.384649128
85029	44964	20354	0.45824797	0.40452362	0.28347122	0.05597812	0.02588738	0.014901	0.165672516	0.241177364	0.59315012	0.232163509	0.653300418	0.114536073	0.04644316	0.137978	0.420030415
85031	28338	22189	0.78514561	0.86773943	0.78262404	0.05406168	0.00733997	0.029113	0.274258936	0.399003236	0.326737829	0.323276166	0.603818195	0.072905639	0.17843615	0.442085	0.590951502
85032	72222	30775	0.43186315	0.38214118	0.28088394	0.03615242	0.03526626	0.005428	0.139652116	0.193025704	0.66732218	0.237683808	0.655285093	0.107031099	0.05778641	0.151472	0.358350933
85033	61118	43995	0.72248497	0.88065709	0.80027161	0.05631729	0.00610295	0.013155	0.197367478	0.39958132	0.403051202	0.347131778	0.596812723	0.056055499	0.10743475	0.413256	0.480073214
85034	4171	2994	0.71971154	0.86957564	0.7103812	0.12155358	0.01222728	0.045313	0.215416861	0.370284117	0.414299022	0.317909374	0.605130664	0.076959962	0.14916388	0.39199	0.592160404
85035	55354	39050	0.70975481	0.93348268	0.84608158	0.0502764	0.00504029	0.030748	0.215728428	0.403422389	0.380849183	0.371535932	0.587491419	0.040972649	0.14047874	0.432846	0.453232169
85037	48348	24078	0.50044686	0.78272111	0.63233226	0.09981799	0.0306114	0.014272	0.166083604	0.29345304	0.540463356	0.322991644	0.625961777	0.051046579	0.08442384	0.272049	0.386182755
85040	31850	20895	0.65952276	0.88643642	0.66583987	0.17858713	0.01591837	0.02697	0.195961375	0.357995694	0.446042931	0.312872841	0.621569859	0.0655573	0.10804598	0.37946	0.493998706
85041	59188	34915	0.5917596	0.85900858	0.66371562	0.15707576	0.02238629	0.018636	0.15985598	0.290621166	0.549522854	0.33163817	0.603129013	0.065232817	0.09413353	0.298855	0.45141238
85042	41917	20792	0.50397518	0.78330987	0.56373309	0.15418565	0.01844121	0.052318	0.14030585	0.23980323	0.619890921	0.280912279	0.633036715	0.086051006	0.08434563	0.256058	0.439481586
85043	35301	19283	0.54876348	0.88175972	0.74468145	0.08506841	0.02880938	0.024787	0.163011147	0.2773191	0.559669752	0.35134982	0.604062208	0.044587972	0.08766797	0.323529	0.398646206
85044	38608	5452	0.14167295	0.32653854	0.16437008	0.05905512	0.03747928	0.02932	0.05413779	0.063024868	0.882837342	0.204284086	0.675455864	0.12026005	0.01521778	0.040977	0.313806862
85045	7381	410	0.05554803	0.24725647	0.10933478	0.03590299	0.0804769	0.005013	0.040524228	0.051215727	0.908260045	0.29386262	0.621054058	0.085083322	0.00986972	0.016942	0.321233124
85048	34462	4967	0.14473032	0.27433115	0.13025942	0.0392026	0.07257269	0.001596	0.053085644	0.068026311	0.878888044	0.242847194	0.672450815	0.084701991	0.01983136	0.029839	0.304948598
85050	30083	5276	0.17606621	0.25010803	0.13319815	0.01495861	0.07868231	0.004055	0.080305796	0.099900134	0.81979407	0.280690091	0.595818236	0.123491673	0.02070078	0.058835	0.334679812
85051	42752	23820	0.55903682	0.55466411	0.39658963	0.06631269	0.04666448	0.03546	0.155219094	0.281239587	0.56354132	0.27928518	0.602661864	0.118052957	0.07973811	0.21409	0.448859721
85053	27982	9773	0.35018633	0.30641126	0.19176614	0.04234865	0.0394182	0.012115	0.124959003	0.137021246	0.738019751	0.220320206	0.655099707	0.124580087	0.02897214	0.109941	0.395774513
85054	6049	591	0.09856571	0.17093735	0.08265829	0.01438254	0.03322863	0.001984	0.042770222	0.051360057	0.905869721	0.126467185	0.733013721	0.140519094	0.01348748	0.01896	0.323500872
85083	19195	2120	0.11156133	0.20187549	0.08981506	0.02250586	0.06819484	0.003178	0.081033631	0.064300214	0.854666155	0.291273769	0.632091691	0.07663454	0.00162813	0.020021	0.306703866
85085	19529	3361	0.17246511	0.28460239	0.12355983	0.02847048	0.09754724	0.005121	0.064058771	0.069861027	0.866080202	0.290337447	0.636489324	0.07317323	0.01683087	0.024336	0.288365781
85086	41102	7067	0.17614217	0.18218092	0.11456863	0.01104569	0.0345482	0.003747	0.059535009	0.059781391	0.8806836	0.293708335	0.59092015	0.115371515	0.00782495	0.045069	0.392912209
85087	7900	1352	0.17227319	0.19443038	0.12113924	0.00987342	0.04379747	0	0.057085292	0.057353929	0.885560779	0.195316456	0.631518987	0.173164557	0	0.029733	0.394863576
85118	11857	2712	0.22872565	0.09260353	0.05389222	0.00784347	0.02445813	0.000675	0.03825342	0.079513002	0.882233579	0.077675635	0.466728515	0.455595851	0.00369328	0.036816	0.667203128
85119	20672	7213	0.35180218	0.16074884	0.10719814	0.00986842	0.01973684	0.006531	0.062660299	0.152162377	0.785177324	0.155766254	0.505127709	0.339106037	0.02005641	0.107453	0.58875376
85120	28599	13155	0.46416852	0.20329382	0.15392147	0.00769258	0.00545474	0.014511	0.07932726	0.175508059	0.745164681	0.187733837	0.511031854	0.301234309	0.01817158	0.150444	0.617420018
85122	52817	21753	0.4160228	0.5187345	0.41354109	0.05382737	0.02400742	0.035462	0.099117774	0.246724818	0.654157408	0.289736259	0.543120586	0.167143155	0.03131246	0.144891	0.500745893
85123	9105	3967	0.43593407	0.51037891	0.41021417	0.06578803	0.00208677	0.022295	0.103807229	0.263518072	0.632674699	0.272267985	0.598462383	0.129269632	0.01027691	0.099213	0.448132783
85128	15867	8568	0.55209743	0.58618516	0.36982416	0.03976807	0.00485284	0.160774	0.174029241	0.237384059	0.5885867	0.272389236	0.599357156	0.128253608	0.03948992	0.220123	0.557820857
85138	35003	9667	0.27772351	0.40433677	0.22603777	0.10570523	0.04231066	0.015084	0.096921922	0.180405405	0.722672673	0.282347227	0.62280376	0.094849013	0.0105339	0.086068	0.382674575
85139	18669	8290	0.44550731	0.51813166	0.31951363	0.05677862	0.02897852	0.083722	0.111384192	0.250737318	0.63787849	0.275162033	0.628421447	0.096416519	0.03807018	0.199611	0.454915911
85147	4439	2818	0.67789271	0.96643388	0.0711872	0.00495607	0.00157693	0.879252	0.22075743	0.331735379	0.447507191	0.234287002	0.692723586	0.072989412	0	0.303391	0.712121189
85201	50232	27418	0.54859041	0.52209747	0.36616101	0.05458672	0.02466555	0.054467	0.205528823	0.222744091	0.571727086	0.251771779	0.646460424	0.101767797	0.09079452	0.194124	0.423885286
85202	36909	14831	0.40397135	0.42715869	0.28572977	0.04413558	0.04142621	0.034761	0.165366794	0.186998211	0.647634996	0.224823214	0.679536156	0.09564063	0.05356907	0.103859	0.360404879
85203	35568	15083	0.42723204	0.4033682	0.30760796	0.03562191	0.00913743	0.03357	0.170704104	0.198701194	0.630594702	0.28432861	0.6153565	0.10031489	0.05842414	0.130754	0.401804447
85204	64665	31371	0.48803671	0.53118379	0.45646022	0.02582541	0.01097966	0.015016	0.155291695	0.218360846	0.62634746	0.273007036	0.63063481	0.096358154	0.08738696	0.21052	0.392915189
85205	41270	13208	0.32429778	0.21805185	0.14218561	0.02619336	0.01376302	0.024352	0.113231932	0.125683468	0.761084601	0.190816574	0.525490671	0.283692755	0.02023484	0.097169	0.535436511
85206	33885	10892	0.32622499	0.24293935	0.15098126	0.05152722	0.02375682	0.010211	0.104113395	0.137197336	0.75868927	0.185450789	0.526132507	0.288416704	0.01031844	0.068648	0.531149626
85207	46821	12034	0.25856216	0.20076461	0.14653681	0.01781252	0.01166143	0.009889	0.100120064	0.132937567	0.766942369	0.23457423	0.60024348	0.16518229	0.01595963	0.077216	0.456243455
85208	35852	12185	0.34320077	0.22534308	0.17898583	0.02521477	0.00750307	0.005857	0.100932043	0.138184285	0.760883672	0.185233739	0.525744728	0.289021533	0.01533891	0.135055	0.546545327
85209	41181	10162	0.2474011	0.26575362	0.17636774	0.02697846	0.02532721	0.027537	0.093048186	0.125288096	0.781663719	0.235424103	0.509773925	0.254801972	0.01564686	0.084886	0.525053203
85210	38151	20434	0.53935491	0.55964457	0.44882179	0.05027391	0.01853162	0.021179	0.183523728	0.250214476	0.566261796	0.282692459	0.650153338	0.067154203	0.11473067	0.243442	0.395670444
85212	25829	5015	0.19706079	0.28622866	0.19303883	0.03968408	0.02733362	0.009911	0.092492541	0.127489719	0.780017741	0.329474622	0.600642688	0.06988269	0.01559657	0.073377	0.304193139
85213	33789	9952	0.29624338	0.23664506	0.15715174	0.0329989	0.01701737	0.016307	0.120552035	0.139836705	0.73961126	0.241113972	0.571103022	0.187783006	0.02241151	0.067221	0.464863837
85215	15524	3109	0.20146449	0.10287297	0.05939191	0.00405823	0.02563772	0.003092	0.087589237	0.096650192	0.815760571	0.159623808	0.512818861	0.327557331	0.00487949	0.056067	0.54657048
85224	45291	11446	0.25351614	0.38164315	0.20498554	0.04365106	0.06818132	0.022455	0.109293857	0.096278579	0.794427565	0.229802831	0.680157206	0.090039964	0.02275042	0.064303	0.309993267
85225	73155	25523	0.35085091	0.53774862	0.38272162	0.05608639	0.05519787	0.021202	0.124415018	0.147109658	0.728475324	0.264561547	0.650659558	0.084778894	0.08210149	0.172331	0.329617351
85226	38484	6184	0.16127686	0.37319405	0.16458788	0.06862592	0.09603991	0.015357	0.042383766	0.093783714	0.86383252	0.231031078	0.689663237	0.079305685	0.02961089	0.050534	0.280994475
85233	37463	7427	0.19851389	0.34535408	0.19341751	0.03373996	0.07281851	0.01356	0.054102042	0.099352447	0.846545512	0.251661639	0.645143208	0.103195153	0.03055097	0.066794	0.297737598
85234	52774	10898	0.20731638	0.26181453	0.15369311	0.01832342	0.04860348	0.015424	0.050675799	0.114556243	0.834767957	0.300848903	0.618922197	0.080228901	0.01862164	0.047319	0.33152923
85248	31941	4881	0.15294707	0.21467706	0.06828215	0.01956733	0.07532638	0.026925	0.038506147	0.048281804	0.913212049	0.150715381	0.445915907	0.403368711	0.01355955	0.043749	0.579811752
85249	40432	4211	0.10455618	0.29474179	0.13919668	0.03084191	0.08609517	0.011204	0.035904053	0.042280249	0.921815698	0.312450534	0.543010487	0.144538979	0.0102348	0.041009	0.388836086
85250	16950	4241	0.25134831	0.15221239	0.09286136	0.01663717	0.01982301	0.019823	0.054803602	0.095243357	0.849953041	0.126430678	0.625250737	0.248318584	0.01005613	0.027792	0.40144679
85251	38968	13321	0.34365245	0.27961404	0.19623794	0.0367481	0.02022172	0.006723	0.073304288	0.167607076	0.759088637	0.172372203	0.663082529	0.164545268	0.02566463	0.064968	0.351416886
85253	17115	2537	0.14823254	0.14203915	0.06894537	0.01822962	0.0419515	0.001461	0.040217391	0.074534161	0.885248447	0.187496348	0.553900088	0.258603564	0.00335805	0.022959	0.48574838
85254	46089	6920	0.15136601	0.1607108	0.05552301	0.00729024	0.07637397	0.002582	0.063778447	0.070973169	0.865248384	0.210527458	0.634077546	0.155394997	0.0136733	0.036649	0.337828785
85255	39105	4268	0.10961015	0.13341005	0.05088863	0.00621404	0.05411073	0.004935	0.040889893	0.055308961	0.903801146	0.225290884	0.567932489	0.206776627	0.00816668	0.022773	0.426056325
85256	4656	2637	0.56697484	0.89969931	0.19437285	0.0036512	0.02405498	0.725945	0.14453125	0.142886513	0.712582237	0.333762887	0.584407216	0.081829897	0.02929155	0.291888	0.596553802
85257	30040	10585	0.35587009	0.30685752	0.21274967	0.02083888	0.01840879	0.048435	0.086567829	0.147715704	0.765716467	0.15442743	0.657157124	0.188415446	0.03689199	0.082888	0.383046806
85258	22654	3883	0.17144245	0.10342544	0.04754127	0.01386069	0.02750066	0.002649	0.039998395	0.070609003	0.889392602	0.130087402	0.555089609	0.314822989	0.00617496	0.018165	0.43940863
85259	22417	3065	0.13711806	0.17968506	0.04759781	0.00852032	0.08417719	0.003747	0.046238631	0.053004167	0.900757202	0.189499041	0.625730472	0.184770487	0.02476814	0.012264	0.372756571
85260	36552	6467	0.17866122	0.15821296	0.06913438	0.01359707	0.05616656	0.003584	0.049733762	0.067978485	0.882287753	0.177965638	0.634274458	0.187759904	0.01577641	0.034357	0.367385894
85262	10385	962	0.0927676	0.10274434	0.01136254	0.0237843	0.04487241	0.004622	0.032087479	0.054226046	0.913686475	0.130476649	0.566875301	0.30264805	0	0.022504	0.487879097
85264	1106	600	0.54446461	0.89421338	0.09493671	0.02893309	0.01898734	0.726944	0.134146341	0.145579268	0.72027439	0.358951175	0.550632911	0.090415913	0.03459119	0.2128	0.574842751
85266	11112	1190	0.10719755	0.1287797	0.03977682	0.01592873	0.03383729	0.00234	0.037051076	0.055244954	0.90770397	0.117710583	0.519708423	0.362580994	0.0123839	0.021951	0.552268863
85268	23570	3911	0.16662406	0.07874417	0.03143827	0.01960119	0.02129826	0.002291	0.046637833	0.062306186	0.891055982	0.134153585	0.548154434	0.317691981	0.00659142	0.033999	0.497922271
85281	59492	29339	0.59029818	0.44901836	0.24620117	0.04814093	0.09845021	0.028121	0.093912275	0.216348101	0.689739624	0.11053587	0.844920325	0.044543804	0.05386604	0.131766	0.425369114
85282	51538	20027	0.39253234	0.37556754	0.23411851	0.05933486	0.03052117	0.016066	0.064679106	0.175280863	0.760040031	0.17156273	0.707322752	0.121114517	0.02875134	0.079583	0.353371859
85283	47087	16220	0.34834525	0.51396351	0.28818995	0.06587806	0.05931573	0.088092	0.057819126	0.15089815	0.791282723	0.20761569	0.693015057	0.099369253	0.05124563	0.102497	0.337599695
85284	17655	1616	0.09198543	0.23993203	0.08518833	0.01789861	0.11379213	0.006514	0.034895862	0.062098148	0.90300599	0.230189748	0.640498442	0.12931181	0.0128388	0.026854	0.337055176
85295	42782	5385	0.12621883	0.31258473	0.16376046	0.02580525	0.09043523	0.011757	0.051065378	0.060870093	0.888064529	0.338436726	0.608854191	0.052709083	0.02321627	0.045252	0.260761768
85296	42244	7503	0.17843044	0.2936275	0.15881545	0.04187577	0.06396175	0.002912	0.053141814	0.098769822	0.848088364	0.324708834	0.611518796	0.06377237	0.01902236	0.039437	0.28673774
85297	31061	5031	0.16250525	0.30923022	0.18215769	0.02256849	0.07034545	0.004765	0.04946535	0.06696052	0.88357413	0.386207785	0.569363511	0.044428705	0.01413624	0.033382	0.304030657
85298	28219	4049	0.14383659	0.2110989	0.09702683	0.02891669	0.05545909	0.007335	0.043632214	0.057210582	0.899157205	0.332081222	0.533753854	0.134164924	0.00862565	0.024567	0.427266061
85301	64604	45645	0.7109038	0.7556498	0.64858213	0.06877283	0.01588137	0.01664	0.169394387	0.415937962	0.414667651	0.331775122	0.594421398	0.07380348	0.11557716	0.333912	0.499303609
85302	37356	15594	0.42123177	0.4364493	0.30444908	0.05158475	0.0328729	0.027921	0.09068233	0.223205665	0.686112005	0.242103009	0.636229789	0.121667202	0.04183733	0.13629	0.453393817
85303	30571	14872	0.48781448	0.72902424	0.56560139	0.08357594	0.05891204	0.014164	0.154633008	0.343632231	0.501734761	0.325635406	0.613064669	0.061299925	0.13023417	0.229156	0.411132127
85304	26600	8165	0.31133227	0.32413534	0.19131579	0.04075188	0.04898496	0.015602	0.09591554	0.178353487	0.725730972	0.202030075	0.65906015	0.138909774	0.02856226	0.084959	0.389573932
85305	11482	2866	0.25284517	0.55417175	0.37911514	0.10834349	0.04642048	0.018638	0.122167644	0.199096815	0.678735541	0.249085525	0.688817279	0.062097196	0.06488737	0.119147	0.269980848
85306	24735	8208	0.34035495	0.24916111	0.16595917	0.02579341	0.01932484	0.008854	0.094934168	0.166666667	0.738399165	0.225348696	0.64548211	0.129169193	0.01612717	0.085096	0.42715013
85307	7850	3144	0.40199463	0.49528662	0.28369427	0.12216561	0.0555414	0.025605	0.091210614	0.175898286	0.7328911	0.275159236	0.641273885	0.083566879	0.04082357	0.111244	0.43659386
85308	65154	13503	0.2088728	0.24027688	0.12392179	0.02431163	0.05671179	0.007444	0.083972699	0.112261709	0.803765592	0.210700801	0.664026767	0.125272431	0.01268086	0.06427	0.379278451
85310	19207	2686	0.14015132	0.12495444	0.07429583	0.01463008	0.01780601	0.008382	0.084597401	0.086717773	0.828684826	0.24933618	0.658041339	0.092622481	0.00120664	0.030361	0.334197402
85321	5069	2951	0.58551587	0.68553955	0.33280726	0.00276189	0.03038075	0.339317	0.119976475	0.325622427	0.554401098	0.240481357	0.519234563	0.24028408	0.05094538	0.197293	0.602125466
85323	40306	20632	0.5150146	0.78911328	0.66213467	0.08517342	0.02721679	0.018732	0.09924357	0.257721401	0.643035029	0.324567062	0.615218578	0.06021436	0.11538805	0.293358	0.415947586
85325	928	406	0.4375	0.08297414	0.07219828	0	0.01077586	0	0.077767612	0.26989936	0.652333028	0.099137931	0.353448276	0.547413793	0.04863813	0.215311	0.719736814
85326	55996	20591	0.4108422	0.51657261	0.38229516	0.07677334	0.00948282	0.04411	0.10184576	0.209356725	0.688797515	0.293592399	0.627884135	0.078523466	0.06488421	0.196651	0.50388813
85331	27898	3818	0.13720487	0.08885942	0.04659832	0.0038354	0.02179368	0.001505	0.049874934	0.05953915	0.890585917	0.225643415	0.596888666	0.177467919	0.0078711	0.027782	0.376311243
85332	1363	352	0.25825385	0.17461482	0.13426266	0	0	0.017608	0.096424702	0.177139762	0.726435536	0.123991196	0.332355099	0.543653705	0.03443114	0.114111	0.757625699
85333	471	210	0.44585987	0.54989384	0.54989384	0	0	0	0.182080925	0.302023121	0.515895954	0.167728238	0.685774947	0.146496815	0.10055866	0.326761	0.457420915
85334	1015	426	0.41970443	0.23743842	0.20689655	0	0.03054187	0	0.118494796	0.311449159	0.570056045	0.150738916	0.733004926	0.116256158	0	0.221574	0.472957432
85335	33010	15719	0.47830453	0.59330506	0.48748864	0.06716147	0.00878522	0.017025	0.11165821	0.270934038	0.617407752	0.326840351	0.591335959	0.08182369	0.0449013	0.171554	0.421093881
85336	579	313	0.54058722	0.98445596	0.98445596	0	0	0	0.156838143	0.398996236	0.444165621	0.305699482	0.623488774	0.070811744	0.29545455	0.575949	0.393700778
85337	2626	1497	0.57006855	0.80540746	0.65232292	0.00685453	0.00685453	0.13671	0.129472519	0.266691258	0.603836223	0.303503427	0.600152323	0.09634425	0.17951807	0.441799	0.481060594
85338	46600	13060	0.2839007	0.50508584	0.33815451	0.11025751	0.03225322	0.010558	0.055897758	0.119631259	0.824470983	0.292746781	0.626866953	0.080386266	0.04752475	0.097181	0.355148524
85339	42223	14083	0.33743052	0.7536177	0.39712953	0.20813301	0.04566232	0.073159	0.123284241	0.199449136	0.677266623	0.348009379	0.594770623	0.057219999	0.02747644	0.164758	0.358619153
85340	28890	6807	0.23702079	0.37137418	0.22024922	0.08141225	0.04659052	0.008411	0.057420583	0.12102081	0.821558606	0.293873313	0.603322949	0.102803738	0.02475792	0.069899	0.369872123
85341	34	0	0	1	1	0	0	0	0.111111111	0.288888889	0.6	0	1	0	0	0	
85342	1269	397	0.31284476	0.12923562	0.10401891	0.01497242	0.01497242	0.003152	0.08347726	0.169833045	0.746689695	0.109535067	0.540583136	0.349881797	0.00509338	0.139963	0.460626602
85344	9981	5417	0.55718988	0.57950105	0.30928765	0.00400761	0.01172227	0.25779	0.121202728	0.327547014	0.551250258	0.239755536	0.597034365	0.163210099	0.04462727	0.224321	0.512364268
85345	59693	24474	0.41458167	0.45914931	0.35389409	0.04432681	0.02806024	0.006617	0.082206901	0.257338474	0.660454625	0.261554956	0.613572781	0.124872263	0.04607566	0.155629	0.422937483
85346	4142	1957	0.47281952	0.04780299	0.04297441	0	0	0.004829	0.042767296	0.10490566	0.852327044	0.000724288	0.206180589	0.793095123	0	0.193759	0.805122256
85347	846	619	0.73167849	0.73995272	0.72222222	0.00827423	0	0.010638	0.173370319	0.278779473	0.547850208	0.296690307	0.550827423	0.15248227	0.02166065	0.34103	0.457960635
85348	2875	1649	0.57356522	0.31373913	0.30817391	0	0	0	0.079136691	0.276766822	0.644096488	0.207652174	0.314434783	0.477913043	0.08259109	0.295648	0.745163977
85349	29377	21277	0.73640674	0.99635769	0.99560881	0	0	0.0048	0.198692856	0.400496295	0.400810849	0.336113286	0.600912278	0.062974436	0.42501233	0.598543	0.520970762
85350	22726	12583	0.65166503	0.89487811	0.81545367	0.02358532	0.0071724	0.050031	0.170558273	0.358414443	0.471027283	0.296840623	0.632183402	0.070975975	0.28749567	0.444601	0.589665115
85351	29094	9009	0.31197839	0.06503059	0.03650237	0.01323297	0.00364336	0.004846	0.044355871	0.093099792	0.862544338	0.001099883	0.258816251	0.740083866	0.00827539	0.096728	0.843360901
85352	338	173	0.51183432	0.47928994	0.47928994	0	0	0	0.169734151	0.26993865	0.560327198	0.233727811	0.550295858	0.215976331	0	0.348018	0.5
85353	35574	16688	0.47024346	0.83535728	0.69666048	0.10043852	0.01048519	0.006325	0.140738736	0.231714247	0.627547017	0.344465059	0.606847698	0.048687243	0.08518519	0.26011	0.403048992
85354	6198	2526	0.41133366	0.2939658	0.27250726	0.00645369	0.00161342	0.007744	0.119717294	0.217654695	0.662628011	0.277670216	0.601968377	0.120361407	0.144	0.223539	0.507922351
85356	5114	1904	0.37304075	0.34962847	0.27023856	0.03128666	0.02502933	0.016817	0.103088566	0.18285948	0.714051953	0.210011732	0.414939382	0.375048885	0.03559071	0.17107	0.714215338
85361	5784	1768	0.3068379	0.1381397	0.08558091	0.00587828	0.01573306	0	0.090079041	0.159171436	0.750749523	0.278526971	0.593188105	0.128284924	0	0.075738	0.462613851
85362	553	215	0.38878843	0.10669078	0.05424955	0.01265823	0	0	0.09760274	0.174657534	0.727739726	0.039783002	0.529837251	0.430379747	0	0.086629	0.67615658
85363	6405	3028	0.48988837	0.3882904	0.33957845	0.02919594	0.01405152	0.002342	0.106169746	0.254306295	0.639523959	0.279469165	0.548946136	0.171584699	0.03346543	0.17304	0.543812871
85373	18926	4109	0.21988548	0.14334778	0.05965339	0.03217796	0.03540104	0.00111	0.049321944	0.093238743	0.857439313	0.132251929	0.357233435	0.510514636	0.00585256	0.059106	0.680232584
85374	46394	14938	0.32292793	0.2548821	0.17795405	0.04806656	0.00920378	0.007587	0.065490534	0.144341652	0.790167814	0.189895245	0.452429193	0.357675561	0.0109231	0.090006	0.615102768
85375	27502	5745	0.21091083	0.05141444	0.01745328	0.00974475	0.01632609	0.000945	0.029228323	0.066650361	0.904121316	0.014108065	0.193113228	0.792778707	0.00961479	0.055986	0.870223343
85377	2978	546	0.18584071	0.03727334	0.03660175	0	0	0.000672	0.028742068	0.059350504	0.911907428	0.025520484	0.453324379	0.521155138	0	0.00071	0.65585953
85379	43550	10417	0.24158724	0.33758898	0.21129736	0.0697589	0.01990815	0.006498	0.073878396	0.12662352	0.799498085	0.326544202	0.599035591	0.074420207	0.0188172	0.056829	0.352446169
85381	27154	4937	0.18463667	0.25845179	0.13533918	0.03885247	0.0427193	0.006887	0.05930747	0.136385243	0.804307287	0.207004493	0.62918907	0.163806437	0.01378657	0.047609	0.394033343
85382	41584	7921	0.19195909	0.21467391	0.12045498	0.02599558	0.03645633	0.006685	0.058142212	0.118172608	0.82368518	0.227635629	0.565289534	0.207074836	0.01173624	0.042523	0.421051025
85383	40928	4215	0.10420787	0.1875	0.08681099	0.02338253	0.04788898	0.0086	0.051282646	0.064549798	0.884167556	0.303728499	0.605038116	0.091233385	0.00802691	0.022992	0.332915574
85390	8702	3781	0.43858021	0.15065502	0.13261319	0.00229832	0.00103425	0.007355	0.096388094	0.176252516	0.72735939	0.173293496	0.468627902	0.358078603	0.03026605	0.102126	0.601739585
85395	27465	3702	0.15493429	0.35536137	0.17094484	0.06473694	0.07311123	0.01329	0.050848922	0.092020564	0.857130514	0.186200619	0.572182778	0.241616603	0.02207483	0.066943	0.590973139
85540	3280	875	0.27081399	0.6152439	0.53384146	0.01737805	0.00762195	0.052134	0.104624277	0.221387283	0.673988439	0.352743902	0.621646341	0.025609756	0.01478743	0.091569	0.301579714
85541	21491	7772	0.36669026	0.12000372	0.08575683	0.0034433	0.00214043	0.016472	0.079044508	0.197674912	0.72328058	0.158205761	0.508678051	0.333116188	0.0157196	0.112501	0.591893196
85543	3660	1504	0.41615938	0.32978142	0.28469945	0.00327869	0.0010929	0.003552	0.092972182	0.270863836	0.636163982	0.31010929	0.551912568	0.137978142	0.00995851	0.130828	0.503688514
85545	456	197	0.43201754	0.20614035	0.17763158	0	0	0.015351	0.089775561	0.271820449	0.63840399	0.048245614	0.456140351	0.495614035	0	0.139651	0.663778186
85546	20397	6500	0.38393385	0.44594793	0.38387998	0.02990636	0.00975634	0.02167	0.096245734	0.247610922	0.656143345	0.246997107	0.620728539	0.132274354	0.01846966	0.13877	0.574657738
85552	6507	2650	0.42652503	0.35884432	0.31719686	0.01337022	0.00507146	0.018288	0.097704814	0.268728084	0.633567102	0.302443522	0.578915015	0.118641463	0.00596878	0.108544	0.463755637
85553	1481	534	0.36955017	0.00202566	0.00135044	0.00067522	0	0	0.077455919	0.199622166	0.722921914	0.112761648	0.449696151	0.437542201	0	0.090632	0.658144653
85554	519	127	0.25349301	0.01348748	0.00770713	0	0	0.00578	0.082079343	0.248974008	0.668946648	0.073217726	0.441233141	0.485549133	0	0.074468	0.69749999
85602	8898	4004	0.4525828	0.17644414	0.15700157	0.00314677	0.00112385	0.010002	0.065839366	0.18418936	0.749971274	0.171611598	0.494942684	0.333445718	0.01461428	0.107966	0.613182783
85603	6872	3212	0.48733121	0.45183353	0.41472643	0.00945867	0.00552969	0.006985	0.074719801	0.248910336	0.676369863	0.194412107	0.567229336	0.238358556	0.03200244	0.126432	0.540902078
85607	13492	8268	0.64167637	0.89423362	0.85346872	0.00837533	0.0193448	0.009487	0.089334622	0.326244563	0.584420815	0.290987252	0.569967388	0.13904536	0.19986807	0.33693	0.594857037
85613	5859	1060	0.35487111	0.31592422	0.13944359	0.09148319	0.02833248	0.00768	0.075722983	0.227929985	0.696347032	0.249701314	0.750298686	0	0.01387137	0.007132	0.499227196
85614	22046	5585	0.25552455	0.14510569	0.12401343	0.00766579	0.00884514	0.00195	0.040822249	0.086964933	0.872212817	0.064909734	0.292388642	0.642701624	0.01979629	0.045602	0.77639991
85618	1833	1153	0.63247394	0.75340971	0.65957447	0	0	0.037643	0.085820896	0.315031983	0.599147122	0.308783415	0.511183852	0.180032733	0.11764706	0.364818	0.608058631
85619	151	0	0	0	0	0	0	0	0.038461538	0.076923077	0.884615385	0.57615894	0.42384106	0	0	0	0.754098356

Needs Assessment - Statewide

Q3-EMS Provider/Agency Type	N	%
Fire District	42	48.8%
Municipal Fire Department	22	25.6%
Private EMS (Independent Corporation)	10	11.6%
Other:	8	9.3%
Hospital-Based EMS (i.e. Owned/Operated by a hospital)	2	2.3%
Tribal Fire/EMS Agency	2	2.3%

Q4-EMS Provider/Agency Highest Level of Service	N	%
Advanced Life Support Ground Ambulance (transport)	40	46.5%
Advanced Life Support First Responder (no transport)	32	37.2%
Basic Life Support First Responder (no transport)	10	11.6%
Other:	3	3.5%
Air Ambulance (transport)	1	1.2%

Q5-Regional EMS Coordinating System	N	%
Northern Arizona Emergency Medical Services (NAEMS)	23	26.7%
Southeastern Arizona EMS Council (SAEMS)	21	24.4%
Arizona Emergency Medical Systems (AEMS)	21	24.4%
Western Arizona Council of EMS (WACEMS)	17	19.8%
None - N/A	3	3.5%
I don't know / I'm not sure	1	1.2%

Q7-Approximate Size of Service Area	N	%
1-49 sq mi	17	19.8%
50-99 sq mi	19	22.1%
100-249 sq mi	19	22.1%
250-499 sq mi	8	9.3%
500-999 sq mi	7	8.1%
1000+ sq mi	16	18.6%

Q8-Population Estimate of Service Area	N	%
Varies due to tourism	5	5.8%
1-999 people	7	8.1%
1,000-9,999 people	23	26.7%
10,000-49,999 people	30	34.9%
50,000-99,999 people	10	11.6%
100,000-499,999 people	6	7.0%
500,000-999,999 people	2	2.3%
1,000,000+ people	3	3.5%

Q9-Average Age of EMS Agency/Provider Service Area	N	%
Unknown	4	4.8%
0-14	1	1.2%
15-29	5	6.0%
30-49	40	48.2%
50-64	26	31.3%

Q9-Average Age of EMS Agency/Provider Service Area	N	%
65+	7	8.4%

Q13-Does your agency bill patients for services?	N	%
Yes	52	60.5%
No	34	39.5%

Q14-Who provides billing services?	N	%
Contract Out to Third Party	27	51.9%
Self-Bill	25	48.1%

Q15-17: Proportion of Services Billed	Mean	Median
Annual Collections for Billing	48.5%	45.0%
Expenses Subsidized	55.0%	55.0%
Medicare Patients	28.4%	29.0%
AHCCCS Patients	33.9%	30.0%
Dual Eligible Patients	9.2%	10.0%
Private/Commercial insurance Patients	21.7%	20.0%
Uninsured/Self-Pay Patients	14.1%	10.0%

Q18-Name of Base Hospital	N	%
Other:	9	10.5%
Kingman Regional Medical Center	8	9.3%
Banner-University Medical Center â€“ Tucson Campus	6	7.0%
Flagstaff Medical Center	6	7.0%
Summit Healthcare	6	7.0%
Yavapai Regional Medical Center	4	4.7%
Banner Casa Grande Medical Center	4	4.7%
None - N/A	4	4.7%
Deer Valley Medical Center	3	3.5%
Yuma Regional Medical Center	3	3.5%
Mountain Vista Medical Center	3	3.5%
Havasu Regional Medical Center	2	2.3%
Cobre Valley Regional Medical Center	2	2.3%
Mount Graham Regional Medical Center	2	2.3%
Canyon Vista Medical Center	2	2.3%
Chandler Regional Medical Center	2	2.3%
Banner Thunderbird Medical Center	2	2.3%
La Paz Regional Hospital	2	2.3%
Northwest Medical Center	2	2.3%
Scottsdale Osborn Medical Center	1	1.2%
Western AZ Regional Medical Center	1	1.2%
Banner Desert Medical Center	1	1.2%
Carondelet St. Josephâ€™s Hospital	1	1.2%
Tucson Medical Center	1	1.2%
Valley View Medical Center	1	1.2%
Abrazo West Campus	1	1.2%
Verde Valley Medical Center	1	1.2%
Banner-University Medical Center â€“ South Campus	1	1.2%
Carondelet St. Mary's Hospital	1	1.2%

Q18-Name of Base Hospital	N	%
Payson Regional Medical Center	1	1.2%
Oro Valley Hospital	1	1.2%
Mercy Gilbert Medical Center	1	1.2%
Whiteriver IHS	1	1.2%

Q19 - Specialty area of Medical Director	N	%
Emergency Medicine (EM)	66	78.60%
Emergency Medical Services (EMS)	49	58.30%
Internal Medicine	6	7.10%
Family Medicine	5	6.00%
General Practice	5	6.00%
Other:	3	3.60%
Pediatrics	3	3.60%
Surgery (General)	3	3.60%
Cardiology	1	1.20%
Obstetrics and Gynecology	1	1.20%
Physical Medicine and Rehabilitation	1	1.20%
Preventative Medicine	1	1.20%
Surgery (Ortho)	1	1.20%

Q20-How often do you meet with medical direction	N	%
Monthly	46	54.8%
Quarterly	14	16.7%
Twice a Year	8	9.5%
Once a Year	6	7.1%
Never	5	6.0%

Q20-How often do you meet with medical direction	N	%
Weekly	4	4.8%
Daily	1	1.2%

Q21-EMS Personnel by compensation	Full-Time Paid		Part-Time Paid		Volunteer		Total
	N	%	N	%	N	%	
Paramedic	2893	89%	236	7%	130	4%	3259
AEMT/EMS-I	24	89%	2	7%	1	4%	27
EMT/EMT-B	3427	83%	362	9%	334	8%	4123
First Responder	19	14%	12	9%	101	77%	132
Nurse	30	83%	4	11%	2	6%	36
Other	11	52%	3	14%	7	33%	21
Total							7598

Q22-EMS Personnel by years with agency	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	68	7%	236	23%	308	30%	346	33%	75	7%	1033
AEMT/EMS-I	2	5%	20	49%	13	32%	5	12%	1	2%	41
EMT/EMT-B	169	13%	452	34%	364	28%	271	21%	60	5%	1316
First Responder	28	31%	39	43%	12	13%	7	8%	5	5%	91
Nurse	2	33%	1	17%	2	33%	1	17%	0	0%	6
Other	39	29%	32	24%	9	7%	31	23%	24	18%	135
Total											2622

Q23-EMS Personnel by years in EMS	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	14	3%	118	23%	104	20%	171	33%	111	21%	518
AEMT/EMS-I	0	0%	0	0%	2	100%	0	0%	0	0%	2
EMT/EMT-B	66	9%	271	37%	160	22%	153	21%	77	11%	727
First Responder	25	27%	29	32%	25	27%	7	8%	6	7%	92
Nurse	1	50%	1	50%	0	0%	0	0%	0	0%	2
Other	7	5%	44	33%	17	13%	34	26%	30	23%	132
Total											1473

Q24-EMS Personnel by Highest Level of Education obtained	Graduate Degree		Bachelor Degree		Associate Degree		Some College		High School / GED		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	11	2%	68	15%	175	38%	147	32%	63	14%	464
AEMT/EMS-I	0	0%	0	0%	3	75%	1	25%	0	0%	4
EMT/EMT-B	11	1%	54	7%	364	45%	271	34%	106	13%	806
First Responder	1	2%	2	3%	2	3%	24	41%	29	50%	58
Nurse	0	0%	0	0%	2	100%	0	0%	0	0%	2
Other	0	0%	1	13%	0	0%	2	25%	5	63%	8
Total											1342

Q25 - Barriers to Recruitment and Retention	N	Percent
Pay	57	67.9%
Geography/Location	49	58.3%
Time Commitment	27	32.1%
Training Requirements	24	28.6%
No Interest	14	16.7%
None - N/A	9	10.7%
Other:	7	8.3%
Stress	5	6.0%

Q26-Critical Incident Stress Management	N	%
Yes	72	85.7%
No	12	14.3%

Q27-Designated EMS Training Officer	N	%
Yes	72	84.7%
No	13	15.3%

Q28-33:Certifications required for employment	Yes	Other Similar	No
NREMT	17.4%	--	82.6%
BLS-HCP	73.3%	25.6%	1.2%
ACLS	61.6%	25.6%	12.8%
PALS	53.5%	23.3%	23.3%
NRP	9.3%	8.1%	82.6%
PHTLS	18.6%	20.9%	60.5%

Q34 - Sources of funding for EMS continuing education/training	N	Percent
Agency/Internal	69	81.2%
Base Hospital	22	25.9%
Grants	19	22.4%
None (EMS personnel must independently pay)	18	21.2%
EMS Council	13	15.3%
Other:	7	8.2%
Tribal/Federal Funding	2	2.4%

Q35-Receiving Hospitals Routine Patient Follow-up/Discharge Information	N	%
Yes - Only individual patients when requested by EMS agency	38	44.2%
No - No feedback/follow-up is provided by receiving hospitals	23	26.7%
Yes - Combination of Trauma / STEMI / Stroke Patients	17	19.8%
Yes - All Trauma Patients	4	4.7%
Yes - All STEMI Patients	2	2.3%

Q35-Receiving Hospitals Routine Patient Follow-up/Discharge Information	N	%
Yes - All Patients	1	1.2%
Yes - All Stroke Patients	1	1.2%

Q36-Participation in electronic HIE	N	%
No - But we are interested	54	63.5%
Yes	16	18.8%
No - And we are not interested	15	17.6%

Q37-Maintain Active Quality Program	N	%
Yes	66	77.6%
No	19	22.4%

Q38 - Provider of Continuous Quality Monitoring and Feedback	N	Percent
Internal (Self)	59	89.4%
Base Station Hospital	45	68.2%
Other:	9	13.6%
University	3	4.5%
Other Hospital	1	1.5%

Q39-Quality Program: Chart/Case Review	N	%
Yes - 100% review of all EMS calls	23	34.8%
Yes - Randomized Review of less than 50% of EMS calls	22	33.3%
Yes - Randomized Review of greater than or equal to 50% of EMS calls	16	24.2%
Yes - Only specific calls when issue(s) arise	5	7.6%

Q40-Quality Program: Other Metrics	N	%
Yes - Combination of System Performance and Clinical Metrics	37	56.1%
No	20	30.3%
Yes - Clinical Metrics (for example, application of oxygen to SOB patients)	5	7.6%
Yes - System Performance Metrics (for example, average response times to scene)	4	6.1%

Q41-Type of PCR	N	%
All Electronic Records (full ePCR)	52	60.5%
Paper Field Reports later converted into Electronic Files/Databases (partial ePCR)	17	19.8%
All Paper Records	17	19.8%

Q42-ePCR Platform/Vendor	N	%
Xerox (i.e. FIREHOUSE)	5	7.2%
Zoll (i.e. RescueNet)	7	10.1%
ImageTrend (i.e. EMS Bridge)	26	37.7%
Starwest Tech (i.e. Zoi)	7	10.1%
Other:	24	34.8%

Q43-ePCR: Receiving Hospital Access	N	%
Yes - Some receiving hospitals have access	26	38.2%
No - Receiving hospitals do not have access	23	33.8%
Yes - All receiving hospitals have access	19	27.9%

Q44-PCR Left at Receiving Hospital when Patient Transferred	N	%
Yes - Immediate: Printed (whether printed on site or sent to fax and printed)	26	38.2%
No - A report is never sent/delivered to the receiving facility	13	19.1%
Yes - Immediate: Hand-written	9	13.2%
No - A report is sent to the facility after time of patient transfer (within 24 hours)	9	13.2%
Yes - Immediate: Transmitted Electronically (not printed/faxed, etc. - No paper - Actual full data merger)	8	11.8%
No - A report is sent to the facility after time of patient transfer (after 24 hours)	3	4.4%

Q45-Submit Data to AZ-PIERS	N	%
Yes	48	69.6%
No	21	30.4%

Q46-Relationship with Receiving Hospital	N	%
More Positive than Negative	28	63.6%
Always Positive	8	18.2%
Neutral	7	15.9%
Always Negative	1	2.3%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
KRMC	2	4.7%
Chandler Regional	2	4.7%
Flagstaff Medical Center	2	4.7%
White Mountain Regional Medical Center	2	4.7%
Oro Valley Hospital	2	4.7%
Northwest Medical Center	1	2.3%
BANNER UNIVERSITY SOUTH CAMPUS	1	2.3%
Gila Health Resources stand alone Urgent Care in Morenci, Arizona	1	2.3%
YRMC-West	1	2.3%
yuma regional medical center	1	2.3%
Abrazo Buckeye Campus	1	2.3%
varies	1	2.3%
Verde Valley Medical Center	1	2.3%
Holy Cross Hospital, Nogales Az.	1	2.3%
Banner Goldfield	1	2.3%
Deer Valley	1	2.3%
Canyon Vista Medical Center	1	2.3%
Dixie Regional Medical Center St. George, Utah	1	2.3%
VVMC	1	2.3%
Banner Page	1	2.3%
CARONDELET HOLY CROSS HOSPITAL	1	2.3%
Summit Health RMC, Show Low, AZ	1	2.3%
YRMC in Yuma AZ.	1	2.3%
Yuma Regional Medical Center	1	2.3%
Payson Regional and Cobra Valley Regional	1	2.3%
Summit	1	2.3%
Kingman Regional Medical Center (avg. transport 49 miles one way)	1	2.3%
Depends on the incident location, there are many.	1	2.3%
Banner Goldfield Hospital	1	2.3%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
ST Mary's Hospital	1	2.3%
Banner Boswell, Banner Thunderbird, Arrowhead, Banner Estrella, Dignity Westgate, Honor Deer Valley	1	2.3%
YRMC W	1	2.3%
Summit Regional	1	2.3%
Banner Golffield	1	2.3%
CON covers a majority of Pima County so the nearest hospital would depend on the response location	1	2.3%
Mt. Graham	1	2.3%
Oro Valley Hosp	1	2.3%
Varies by service location	1	2.3%

Q48-Hospital Critical/High Acuity Medical Patients	N	%
Flagstaff Medical Center	2	4.7%
Mountain Vista Medical Center	2	4.7%
Banner University Medical Center -Main Campus	1	2.3%
KRMC	1	2.3%
BANNER UNIVERSITY SOUTH CAMPUS	1	2.3%
Gila Health Resources stand alone Urgent Care in Morenci, Arizona	1	2.3%
Banner Del Webb	1	2.3%
yuma regional medical center	1	2.3%
Vaires - Banner Estrella, Abrazo West Valley	1	2.3%
UMC Tucson	1	2.3%
Chandler Regional	1	2.3%
Verde Valley Medical Center or we Fly them to where ever they are accepted	1	2.3%
Banner UMC-Tucson	1	2.3%
Deer Valley	1	2.3%
Canyon Vista Medical Center	1	2.3%
Dixie Regional Medical Center St. George, Utah	1	2.3%

Q48-Hospital Critical/High Acuity Medical Patients	N	%
VVMC	1	2.3%
Summit Healthcare Regional Medical Center	1	2.3%
Banner Page or Air transport to Flagstaff Medical Center	1	2.3%
BANNER UNIVERSITY MEDICAL CENTER	1	2.3%
KRMC / UMC	1	2.3%
Summit Health RMC, Show Low	1	2.3%
YRMC in Yuma Az.	1	2.3%
Yuma Regional Medical Center	1	2.3%
Banner Baywood	1	2.3%
Summit	1	2.3%
Closest appropriate - more often than not this is Oro Valley Hospital	1	2.3%
Kingman Regional Medical Center (avg. transport 49 miles one way) or Flight them to Las Vegas, Sunrise Medical Center	1	2.3%
Depends on the incident location, there are many.	1	2.3%
St Mary's Hospital	1	2.3%
Banner Boswell, Banner Thunderbird, Arrowhead, Banner Estrella, Honor Deer valley	1	2.3%
YRMC W	1	2.3%
Summit Regional	1	2.3%
Mountain Vista	1	2.3%
Banner University Main Campus	1	2.3%
Northwest Medical Center	1	2.3%
Mt. Graham	1	2.3%
Banner Medical--Main	1	2.3%
Varies by service location	1	2.3%
Summit Healthcare	1	2.3%
Mercy Gilbert	1	2.3%

Q49-Hospital Critical/High Acuity Trauma Patients	N	%
Banner University Main Campus	3	7.0%
Chandler Regional	2	4.7%
Flagstaff Medical Center	2	4.7%
Banner University Medical Center -Main Campus	1	2.3%
KRMC	1	2.3%
BANNER UNIVERSITY MAIN CAMPUS	1	2.3%
Gila Health Resources stand alone Urgent Care in Morenci, Arizona	1	2.3%
John C Lincoln	1	2.3%
west valley abrazo	1	2.3%
Vaires - Decision is usually made by Air Transport personnel	1	2.3%
UMC Tucson	1	2.3%
Verde Valley Medical Center or we Fly them to where ever they are accepted	1	2.3%
Banner UMC-Tucson	1	2.3%
Scottsdale and Chandler Regional (Split)	1	2.3%
John C Lincoln North Mountain	1	2.3%
Banner University Medical Center - Main Campus	1	2.3%
Dixie Regional Medical Center St. George, Utah	1	2.3%
FMC	1	2.3%
Good Sam	1	2.3%
Banner Page or air transport to Flagstaff Medical Center	1	2.3%
BANNER UNIVERSITY MEDICAL CENTER	1	2.3%
UMC	1	2.3%
Summit Health RMC, Show Low	1	2.3%
YRMC in Yuma Az.	1	2.3%
Yuma Regional Medical Center	1	2.3%
Scottsdale Osborn	1	2.3%
Summit	1	2.3%
Banner - UMC	1	2.3%
Kingman Regional Medical Center (avg. transport 49 miles one way) or Flight them to Las Vegas, Sunrise Medical Center	1	2.3%

Q49-Hospital Critical/High Acuity Trauma Patients	N	%
Chandler Regional or Scottsdale	1	2.3%
University Medical Center	1	2.3%
Honor JCL-North, West Valley	1	2.3%
Flown to Level 1	1	2.3%
Summit Regional or appropriate Air Transport	1	2.3%
Chandler Regional Medical Center / Scottsdale Osborne	1	2.3%
Mt. Graham (or fly to Banner Main)	1	2.3%
Banner Medical--Main	1	2.3%
Varies by service location	1	2.3%
Level I Trauma Center / Flown from scene	1	2.3%

Q50-Critical/High Acuity Medical Patients Mode of Transport	N	%
More Likely via Ground	33	80.5%
More Likely via Air	8	19.5%

Q51-Critical/High Acuity Trauma Patients Mode of Transport	N	%
More Likely via Air	26	60.5%
More Likely via Ground	17	39.5%

Q52-Contact Receiving ED Directly when transporting	N	%
Yes - Via cell phone	32	74.4%
No - Personnel contact third-party (i.e. call center) who then contacts hospital	4	9.3%

Q52-Contact Receiving ED Directly when transporting	N	%
Yes - Via radio	4	9.3%
No - No pre-notification is made to a receiving facility	2	4.7%
Yes - Via computer-based text	1	2.3%

Q53-Interfacility Transport	N	%
No - We only transport from scene to hospital	25	56.8%
Yes - Both emergency and non-emergency interfacility	18	40.9%
Yes - Emergency interfacility only	1	2.3%

Q54-Primary Method of Dispatch	N	%
Full Computer-Assisted Dispatch with GPS Location	37	43.0%
Computer-Assisted Dispatch (CAD) without GPS Location	20	23.3%
Combination of Pager, Telephone, Radio but no CAD	14	16.3%
VHF/UHF Radio Only	9	10.5%
Pager/Beeper Only	3	3.5%
Other:	2	2.3%
Telephone Only	1	1.2%

Q55 - Communication Devices in Service	N	Percent
Cellular Telephones	63	73.3%
Simple VHF Radios	58	67.4%
Trunked Radio System	44	51.2%
Simple UHF Radios	38	44.2%
Pagers/Beepers	28	32.6%

Q55 - Communication Devices in Service	N	Percent
Computer-Based Text Communication (i.e. Instant Messaging)	27	31.4%
SATCOM (Satellite-based radio communications equipment)	4	4.7%
Satellite Telephones	4	4.7%
Self-Contained Deployable Communications System (i.e. stand-alone system for disaster)	4	4.7%
Other:	2	2.3%

Q56-Communication Dead-Spots in your Service Area	N	%
Yes	66	77.6%
No	19	22.4%

Q57-Priority Dispatch System	N	%
Yes	65	75.6%
No	21	24.4%

Q58-Dispatchers EMD Certified	N	%
Yes - All	39	45.3%
Yes - Some	24	27.9%
No	23	26.7%

Q59-Dispatch:Tele-printers or Telecommunication Device for the Deaf	N	%
Yes	56	68.3%
No	26	31.7%

Q60-Dispatch:Bilingual Dispatchers	N	%
Yes - staffed less than 24/7	31	36.9%
Yes - staffed 24/7	31	36.9%
No	22	26.2%

Q61-Dispatch: Language Line for Translation Services	N	%
Yes - available 24/7	46	54.8%
No	26	31.0%
Yes - available less than 24/7	12	14.3%

Q62-Regular Maintenance/Repair for EMS Vehicles	N	%
Yes	77	89.5%
No	9	10.5%

Q63-Vehicles Equipped with GPS/Location Tracking	N	%
No	39	45.3%
Yes -All	34	39.5%
Yes - Some	13	15.1%

Q64-EMS Vehicle by Category	BLS		ALS		Total
	N	%	N	%	
Utility Vehicle - Non Ambulance	149	67%	74	33%	223
Fire Apparatus - Non Ambulance	202	43%	271	57%	473
Licensed Ground Ambulance	102	18%	462	82%	564
Licensed Air Ambulance	0	%	1	100%	1

Q65-EMS Ground Ambulances Need Replaced	N	%
Yes	35	40.7%
N/A - Agency does not have any EMS Ground Ambulances	34	39.5%
No	17	19.8%

Q66-EMS Air Ambulances Need Replaced	N	%
N/A - Agency does not have any EMS Air Ambulances	79	94.0%
No	4	4.8%
Yes	1	1.2%

Q67-EMS Fire Apparatus - Non Ambulance Need Replaced	N	%
Yes	47	55.3%
N/A - Agency does not have any EMS Fire Apparatus - Non Ambulance	21	24.7%
No	17	20.0%

Q68-EMS Utility Vehicle - Non Ambulance Need Replaced	N	%
Yes	38	44.2%
No	31	36.0%
N/A - Agency does not have any EMS Utility Vehicle - Non Ambulance	17	19.8%

Q69 - Additional EMS Vehicles Needed	N	Percent
Yes - EMS Ground Ambulance	35	40.7%
Yes - EMS Fire Apparatus (Non Ambulance)	31	36.0%
No	30	34.9%
Yes - EMS Utility Vehicle (Non Ambulance)	23	26.7%
Other:	2	2.3%

Q70-Regular Maintenance/Repair Plan for EMS Equipment	N	%
Yes	69	80.2%
No	17	19.8%

Q73 - Brand/Type of ALS Cardiac Monitors Front-line	N	Percent
Phillips - HeartStart MRx	25	32.9%
Physio Control - LifePak 12	21	27.6%
Physio Control - LifePak 15	18	23.7%
Zoll - M Series	16	21.1%

Q73 - Brand/Type of ALS Cardiac Monitors Front-line	N	Percent
Zoll - E Series	12	15.8%
Zoll - X Series	9	11.8%
Phillips - HeartStart XL+	3	3.9%
Physio Control - LifePak 10	3	3.9%
Physio Control - LifePak 11	2	2.6%

Q74 - Capabilities of ALS Cardiac Monitors	N	Percent
12-lead ECG	75	98.7%
Defibrillation	73	96.1%
Pulse Oximetry (SpO2)	73	96.1%
Blood-Pressure (NiBP)	72	94.7%
External Pacing	72	94.7%
Synchronized Cardioversion	71	93.4%
End-Tidal Carbon Dioxide (ETCO2)	69	90.8%
3-lead ECG	65	85.5%
Data Transmission to Receiving Facility (Vitals/ECG/etc.)	45	59.2%
CPR Quality Feedback	33	43.4%
Other:	3	3.9%

Q89 - Type of General Splints Used	N	Percent
Air splints	25	29.4%
Cardboard splints	72	84.7%
Other:	26	30.6%
Vacuum splints	22	25.9%

Q89 - Type of General Splints Used	N	Percent
Wooden splints	7	8.2%

Q71-94: EMS Equipment/Protocols Used	Yes	No
BLS-AEDs	95.3%	4.7%
Portable ALS Cardiac Monitors	89.5%	10.5%
Stand-alone SpO2 Monitors	60.0%	40.0%
Stand-alone ETCO2 Monitors	12.8%	87.2%
CPAP Devices	70.6%	29.4%
Supraglottic Airway Devices	89.5%	10.5%
Protocols Include RSI/PAI Endotracheal Intubation	32.6%	67.4%
Protocols Authorize Surgical Airways	84.9%	15.1%
Transport Ventilators/Portable Ventilators	29.4%	70.6%
Chest-seals for Open Pneumothorax	89.5%	10.5%
Chest-needle Decompression for Tension Pneumothorax	86.0%	14.0%
Automated Chest Compression Device for CPR	11.6%	88.4%
Commercial Tourniquets and/or Junctional Compression for Hemorrhage Control	89.3%	10.7%
Hemostatic Agents for Hemorrhage Control	22.4%	77.6%
Intraosseous Devices	87.2%	12.8%
Pelvic Binders	56.5%	43.5%
Traction Splints	94.1%	5.9%
Cervical Collars	97.6%	2.4%
Backboards	97.6%	2.4%
Protocols allow for Field Clearance of Spinal Immobilization/Selective Immobilization	88.2%	11.8%
Devices to Maintain Body Temperature	95.3%	4.7%

Q95-CBRNE Event Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	70	82.4%
Specialized Education/Training	10	11.8%
None - Our agency is fully prepared to respond to CBRNE events	5	5.9%

Q96-Mass Casualty Incident Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	64	75.3%
None - Our agency is fully prepared to respond to CBRNE events	9	10.6%
Specialized Equipment	6	7.1%
Specialized Education/Training	6	7.1%

Q97-Employ Specially-trained Tactical EMS Personnel	N	%
No	66	77.6%
Yes	19	22.4%

Q98-Specific Active Shooter Response Plan/Inter-agancy Coordination	N	%
No	48	57.1%
Yes	36	42.9%

Q99-Community Routinely Train/Rehearse Active Shooter Response Plan	N	%
Yes - Once a year	24	66.7%
No	8	22.2%
Yes - Twice a Year	4	11.1%

Q100 - Public Awareness and Educational Programs in Community	N	Percent
CPR	79	91.9%
Car Safety Seat Education	46	53.5%
Advanced Directives / DNRs	41	47.7%
Child Safety (i.e. Risk Watch/Safe Kids)	35	40.7%
Water Safety	32	37.2%
Seat Belt Awareness	30	34.9%
Helmet Safety	29	33.7%
Injury Prevention (General)	27	31.4%
Domestic Violence Awareness and/or Prevention	26	30.2%
Suicide Prevention	25	29.1%
Substance Abuse Awareness	23	26.7%
Mental Health Awareness	22	25.6%
EMS Bystander Education (i.e. First There/First Care)	20	23.3%
Disease Management	17	19.8%
Poison Prevention	11	12.8%
Other:	8	9.3%
None	3	3.5%

Q101-Currenlty have Community Paramedicine/Mobile Integrated Health Program	N	%
No	62	72.9%
Yes	23	27.1%

Q102-Interested in Developing a Community Paramedicine/Mobile Integrated Health Program	N	%
Yes	47	75.8%
No	15	24.1%

Q103 - Specific Need by priority	Priority Score
Equipment/Supplies	227.00
Education/Training	137.00
Vehicles	134.00
Personnel	131.00
Funding	94.00
Community Paramedicine	62.00
Other	46.00
Information Technology	29.00
Facilities	20.00

Q103 - Specific Need by priority	Priority Score
Communications/Dispatch Technology	18.00
Certificate of Necessity	17.00
Public Outreach	16.00

Needs Assessment – Central Region (AEMS)

Q3-EMS Provider/Agency Type	N	%
Total	21	100.0%
Fire District	10	47.6%
Municipal Fire Department	9	42.9%
Private EMS (Independent Corporation)	1	4.8%
Hospital-Based EMS (i.e. Owned/Operated by a hospital)	1	4.8%
Other:	0	0.0%
Tribal Fire/EMS Agency	0	0.0%

Q4-EMS Provider/Agency Highest Level of Service	N	%
Advanced Life Support First Responder (no transport)	10	47.6%
Advanced Life Support Ground Ambulance (transport)	10	47.6%
Basic Life Support First Responder (no transport)	1	4.8%
Other:	0	0.0%
Air Ambulance (transport)	0	0.0%

Q7-Approximate Size of Service Area	N	%
1-49 sq mi	3	14.3%
50-99 sq mi	6	28.6%
100-249 sq mi	5	23.8%
250-499 sq mi	2	9.5%
500-999 sq mi	3	14.3%
1000+ sq mi	2	9.5%

Q8-Population Estimate of Service Area	N	%
Varies due to tourism	2	9.5%
1-999 people	0	0.0%
1,000-9,999 people	4	19.0%
10,000-49,999 people	5	23.8%
50,000-99,999 people	4	19.0%
100,000-499,999 people	3	14.3%
500,000-999,999 people	1	4.8%
1,000,000+ people	2	9.5%

Q9-Average Age of EMS Agency/Provider Service Area	N	%
Unknown	0	0.0%
0-14	0	0.0%
15-29	0	0.0%
30-49	9	47.4%
50-64	6	31.6%
65+	4	21.1%

Q13-Does your agency bill patients for services?	N	%
No	11	52.4%
Yes	10	47.6%

Q14-Who provides billing services?	N	%
Self-Bill	5	50.0%
Contract Out to Third Party	5	50.0%

Q15-Q17: Proportion of Services Billed	Mean	Median
Annual Collections for Billing	45.0%	40.0%
Expenses Subsidized	53.8%	45.0%
Medicare Patients	33.4%	39.0%
AHCCCS Patients	27.4%	26.5%
Dual Eligible Patients	11.5%	10.5%
Private/Commercial insurance Patients	23.2%	15.0%
Uninsured/Self-Pay Patients	15.4%	11.0%

Q18-Name of Base Hospital	N	%
Banner Casa Grande Medical Center	4	19.0%
Other:	3	14.3%
Mountain Vista Medical Center	3	14.3%
Chandler Regional Medical Center	2	9.5%
Banner Thunderbird Medical Center	2	9.5%
Scottsdale Osborn Medical Center	1	4.8%
Cobre Valley Regional Medical Center	1	4.8%
Banner Desert Medical Center	1	4.8%
Deer Valley Medical Center	1	4.8%
Payson Regional Medical Center	1	4.8%
None - N/A	1	4.8%

Q18-Name of Base Hospital	N	%
Mercy Gilbert Medical Center	1	4.8%

Q19 - Specialty area of Medical Director	N	Percent
Emergency Medicine (EM)	15	75.0%
Emergency Medical Services (EMS)	14	70.0%
Family Medicine	3	15.0%
General Practice	2	10.0%
Pediatrics	2	10.0%
Internal Medicine	1	5.0%

Q20-How often do you meet with medical direction	N	%
Monthly	9	45.0%
Quarterly	4	20.0%
Weekly	3	15.0%
Twice a Year	1	5.0%
Never	1	5.0%
Once a Year	1	5.0%
Daily	1	5.0%

Q21-EMS Personnel by compensation	Full-Time Paid	Part-Time Paid	Volunteer	Total
	N	N	N	
Paramedic	1792	80	6	1878
AEMT/EMS-I	0	0	0	0
EMT/EMT-B	2161	112	17	2290
First Responder	0	0	15	15
Nurse	20	4	1	25
Other	8	0	2	10
Total				4218

Q22-EMS Personnel by years with agency	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	8	3%	45	15%	80	27%	145	50%	13	4%	291
AEMT/EMS-I	0	0%	0	0%	0	0%	0	0%	0	0%	0
EMT/EMT-B	16	6%	86	30%	77	27%	101	36%	2	1%	282
First Responder	3	100%	0	0%	0	0%	0	0%	0	0%	3
Nurse	1	100%	0	0%	0	0%	0	0%	0	0%	1
Other	39	31%	27	22%	6	5%	28	23%	24	19%	124
Total											701

Q23-EMS Personnel by years in EMS	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	1	1%	13	9%	15	10%	62	42%	55	38%	146
AEMT/EMS-I	0	0%	0	0%	0	0%	0	0%	0	0%	0
EMT/EMT-B	0	0%	48	30%	28	17%	51	32%	34	21%	161
First Responder	3	30%	7	70%	0	0%	0	0%	0	0%	10
Nurse	1	100%	0	0%	0	0%	0	0%	0	0%	1
Other	7	6%	38	31%	15	12%	34	27%	30	24%	124
Total											442

Q24-EMS Personnel by Highest Level of Education obtained	Graduate Degree		Bachelor Degree		Associate Degree		Some College		High School / GED		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	0	0%	4	20%	3	15%	13	65%	0	0%	20
AEMT/EMS-I	0	0%	0	0%	0	0%	0	0%	0	0%	0
EMT/EMT-B	2	1%	1	1%	77	42%	101	55%	4	2%	185
First Responder	0	0%	0	0%	0	0%	0	0%	0	0%	0
Nurse	0	0%	0	0%	1	100%	0	0%	0	0%	1
Other	0	0%	0	0%	0	0%	0	0%	0	0%	0
Total											206

Q25 - Barriers to Recruitment and Retention	N	Percent
Geography/Location	8	40.0%
Pay	8	40.0%
Time Commitment	8	40.0%
None - N/A	6	30.0%
Training Requirements	6	30.0%
No Interest	2	10.0%
Other:	1	5.0%
Stress	1	5.0%

Q26-Critical Incident Stress Management	N	%
Yes	18	90.0%
No	2	10.0%

Q27-Designated EMS Training Officer	N	%
Yes	17	81.0%
No	4	19.0%

Q28-33:Certifications required for employment	Yes	Other Similar	No
NREMT	14.3%	--	85.7%
BLS-HCP	57.1%	42.9%	0.0%
ACLS	57.1%	42.9%	0.0%
PALS	42.9%	38.1%	19.0%
NRP	0.0%	14.3%	85.7%
PHTLS	9.5%	28.6%	61.9%

Q34 - Sources of funding for EMS continuing education/training	N	Percent
Agency/Internal	20	100.0%
Base Hospital	4	20.0%
Grants	3	15.0%
EMS Council	1	5.0%
None (EMS personnel must independently pay)	1	5.0%

Q35-Receiving Hospitals Routine Patient Follow-up/Discharge Information	N	%
Yes - Combination of Trauma / STEMI / Stroke Patients	6	28.6%
Yes - Only individual patients when requested by EMS agency	5	23.8%
No - No feedback/follow-up is provided by receiving hospitals	3	14.3%
Yes - All Trauma Patients	3	14.3%
Yes - All STEMI Patients	2	9.5%
Yes - All Patients	1	4.8%
Yes - All Stroke Patients	1	4.8%

Q36-Participation in electronic HIE	N	%
No - But we are interested	16	80.0%
Yes	4	20.0%
No - And we are not interested	0	0.0%

Q37-Maintain Active Quality Program	N	%
Yes	17	85.0%
No	3	15.0%

Q38 - Provider of Continuous Quality Monitoring and Feedback	N	Percent
Internal (Self)	15	88.2%
Base Station Hospital	11	64.7%
Other:	3	17.6%

Q39-Quality Program: Chart/Case Review	N	%
Yes - Randomized Review of less than 50% of EMS calls	7	41.2%
Yes - 100% review of all EMS calls	6	35.3%
Yes - Randomized Review of greater than or equal to 50% of EMS calls	4	23.5%
Yes - Only specific calls when issue(s) arise	0	0.0%

Q40-Quality Program: Other Metrics	N	%
Yes - Combination of System Performance and Clinical Metrics	10	58.8%
No	3	17.6%
Yes - Clinical Metrics (for example, application of oxygen to SOB patients)	3	17.6%
Yes - System Performance Metrics (for example, average response times to scene)	1	5.9%

Q41-Type of PCR	N	%
All Electronic Records (full ePCR)	15	71.4%
All Paper Records	5	23.8%
Paper Field Reports later converted into Electronic Files/Databases (partial ePCR)	1	4.8%

Q42-ePCR Platform/Vendor	N	%
Xerox (i.e. FIREHOUSE)	0	0.0%
Zoll (i.e. RescueNet)	0	0.0%
ImageTrend (i.e. EMS Bridge)	8	50.0%
Starwest Tech (i.e. Zoi)	6	37.5%
Other:	2	12.5%

Q43-ePCR: Receiving Hospital Access	N	%
Yes - All receiving hospitals have access	7	43.8%
Yes - Some receiving hospitals have access	6	37.5%
No - Receiving hospitals do not have access	3	18.8%

Q44-PCR Left at Receiving Hospital when Patient Transferred	N	%
Yes - Immediate: Printed (whether printed on site or sent to fax and printed)	11	68.8%
No - A report is never sent/delivered to the receiving facility	3	18.8%
Yes - Immediate: Transmitted Electronically (not printed/faxed, etc. - No paper - Actual full data merger)	1	6.3%
No - A report is sent to the facility after time of patient transfer (within 24 hours)	1	6.3%
Yes - Immediate: Hand-written	0	0.0%
No - A report is sent to the facility after time of patient transfer (after 24 hours)	0	0.0%

Q45-Submit Data to AZ-PIERS	N	%
Yes	13	81.3%
No	3	18.8%

Q46-Relationship with Receiving Hospital	N	%
More Positive than Negative	6	60.0%
Always Positive	2	20.0%
Neutral	2	20.0%
Always Negative	0	0.0%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
Chandler Regional	2	20.0%
Banner Goldfield	1	10.0%
Deer Valley	1	10.0%
Payson Regional and Cobra Valley Regional	1	10.0%
Banner Goldfield Hospital	1	10.0%
Banner Boswell, Banner Thunderbird, Arrowhead, Banner Estrella, Dignity Westgate, Honor Deer Valley	1	10.0%
Banner Golffield	1	10.0%
Oro Valley Hosp	1	10.0%
Varies by service location	1	10.0%

Q48-Hospital Critical/High Acuity Medical Patients	N	%
Mountain Vista Medical Center	2	20.0%
Chandler Regional	1	10.0%
Deer Valley	1	10.0%
Banner Baywood	1	10.0%
Banner Boswell, Banner Thunderbird, Arrowhead, Banner Estrella, Honor Deer valley	1	10.0%
Mountain Vista	1	10.0%
Banner Medical--Main	1	10.0%
Varies by service location	1	10.0%
Mercy Gilbert	1	10.0%

Q49-Hospital Critical/High Acuity Trauma Patients	N	%
Chandler Regional	2	20.0%
Scottsdale and Chandler Regional (Split)	1	10.0%
John C Lincoln North Mountain	1	10.0%

Q49-Hospital Critical/High Acuity Trauma Patients	N	%
Scottsdale Osborn	1	10.0%
Chandler Regional or Scottsdale	1	10.0%
Honor JCL-North, West Valley	1	10.0%
Chandler Regional Medical Center / Scottsdale Osborne	1	10.0%
Banner Medical--Main	1	10.0%
Varies by service location	1	10.0%

Q50-Critical/High Acuity Medical Patients Mode of Transport	N	%
More Likely via Ground	9	90.0%
More Likely via Air	1	10.0%

Q51-Critical/High Acuity Trauma Patients Mode of Transport	N	%
More Likely via Ground	6	60.0%
More Likely via Air	4	40.0%

Q52-Contact Receiving ED Directly when transporting	N	%
Yes - Via cell phone	9	90.0%
No - No pre-notification is made to a receiving facility	1	10.0%
No - Personnel contact third-party (i.e. call center) who then contacts hospital	0	0.0%
Yes - Via radio	0	0.0%
Yes - Via computer-based text	0	0.0%

Q53-Interfacility Transport	N	%
No - We only transport from scene to hospital	8	80.0%
Yes - Both emergency and non-emergency interfacility	1	10.0%
Yes - Emergency interfacility only	1	10.0%

Q54-Primary Method of Dispatch	N	%
Full Computer-Assisted Dispatch with GPS Location	12	57.1%
Computer-Assisted Dispatch (CAD) without GPS Location	3	14.3%
VHF/UHF Radio Only	2	9.5%
Combination of Pager, Telephone, Radio but no CAD	2	9.5%
Other:	1	4.8%
Pager/Beeper Only	1	4.8%
Telephone Only	0	0.0%

Q55 - Communication Devices in Service	N	Percent
Simple VHF Radios	16	76.2%
Cellular Telephones	15	71.4%
Trunked Radio System	15	71.4%
Simple UHF Radios	11	52.4%
Computer-Based Text Communication (i.e. Instant Messaging)	8	38.1%
Pagers/Beepers	5	23.8%
SATCOM (Satellite-based radio communications equipment)	1	4.8%
Satellite Telephones	1	4.8%

Q56-Communication Dead-Spots in your Service Area	N	%
Yes	13	61.9%
No	8	38.1%

Q57-Priority Dispatch System	N	%
Yes	18	85.7%
No	3	14.3%

Q58-Dispatchers EMD Certified	N	%
Yes - All	10	47.6%
No	6	28.6%
Yes - Some	5	23.8%

Q59-Dispatch:Tele-printers or Telecommunication Device for the Deaf	N	%
Yes	14	73.7%
No	5	26.3%

Q60-Dispatch:Bilingual Dispatchers	N	%
Yes - staffed 24/7	10	50.0%
Yes - staffed less than 24/7	6	30.0%
No	4	20.0%

Q61-Dispatch: Language Line for Translation Services	N	%
Yes - available 24/7	11	57.9%
No	5	26.3%
Yes - available less than 24/7	3	15.8%

Q62-Regular Maintenance/Repair for EMS Vehicles	N	%
Yes	21	100.0%
No	0	0.0%

Q63-Vehicles Equipped with GPS/Location Tracking	N	%
Yes -All	15	71.4%
No	5	23.8%
Yes - Some	1	4.8%

Q64-EMS Vehicle by Category	BLS		ALS		Total
	N	%	N	%	
Utility Vehicle - Non Ambulance	45	68%	21	32%	66
Fire Apparatus - Non Ambulance	102	46%	121	54%	223
Licensed Ground Ambulance	58	19%	253	81%	311
Licensed Air Ambulance	0	0%	0	0%	0

Q65-EMS Ground Ambulances Need Replaced	N	%
Yes	7	33.3%
N/A - Agency does not have any EMS Ground Ambulances	7	33.3%
No	7	33.3%

Q66-EMS Air Ambulances Need Replaced	N	%
N/A - Agency does not have any EMS Air Ambulances	19	90.5%
No	2	9.5%
Yes	0	0.0%

Q67-EMS Fire Apparatus - Non Ambulance Need Replaced	N	%
Yes	9	45.0%
No	7	35.0%
N/A - Agency does not have any EMS Fire Apparatus - Non Ambulance	4	20.0%

Q68-EMS Utility Vehicle - Non Ambulance Need Replaced	N	%
No	9	42.9%
N/A - Agency does not have any EMS Utility Vehicle - Non Ambulance	7	33.3%

Q68-EMS Utility Vehicle - Non Ambulance Need Replaced	N	%
Yes	5	23.8%

Q69 - Additional EMS Vehicles Needed	N	Percent
Yes - EMS Fire Apparatus (Non Ambulance)	8	38.1%
Yes - EMS Ground Ambulance	8	38.1%
No	7	33.3%
Yes - EMS Utility Vehicle (Non Ambulance)	7	33.3%

Q70-Regular Maintenance/Repair Plan for EMS Equipment	N	%
Yes	18	85.7%
No	3	14.3%

Q73 - Brand/Type of ALS Cardiac Monitors Front-line	N	Percent
Phillips - HeartStart MRx	9	42.9%
Physio Control - LifePak 15	8	38.1%
Physio Control - LifePak 12	4	19.0%
Zoll - M Series	4	19.0%
Physio Control - LifePak 11	2	9.5%
Phillips - HeartStart XL+	1	4.8%
Physio Control - LifePak 10	1	4.8%
Zoll - E Series	1	4.8%

Q74 - Capabilities of ALS Cardiac Monitors	N	Percent
External Pacing	21	100.0%
12-lead ECG	20	95.2%
Blood-Pressure (NiBP)	20	95.2%
Defibrillation	20	95.2%
End-Tidal Carbon Dioxide (ETCO2)	20	95.2%
Pulse Oximetry (SpO2)	20	95.2%
Synchronized Cardioversion	20	95.2%
3-lead ECG	16	76.2%
Data Transmission to Receiving Facility (Vitals/ECG/etc.)	14	66.7%
CPR Quality Feedback	10	47.6%

Q89 - Type of General Splints Used	N	Percent
Air splints	4	20.0%
Cardboard splints	18	90.0%
Other:	6	30.0%
Vacuum splints	9	45.0%
Wooden splints	2	10.0%

Q71-94: EMS Equipment/Protocols Used	Yes	No
BLS-AEDs	95.2%	4.8%
Portable ALS Cardiac Monitors	100.0%	0.0%
Stand-alone SpO2 Monitors	40.0%	60.0%
Stand-alone ETCO2 Monitors	14.3%	85.7%
CPAP Devices	90.5%	9.5%
Supraglottic Airway Devices	100.0%	0.0%
Protocols Include RSI/PAI Endotracheal Intubation	57.1%	42.9%
Protocols Authorize Surgical Airways	100.0%	0.0%
Transport Ventilators/Portable Ventilators	47.6%	52.4%
Chest-seals for Open Pneumothorax	100.0%	0.0%
Chest-needle Decompression for Tension Pneumothorax	100.0%	0.0%
Automated Chest Compression Device for CPR	4.8%	95.2%
Commercial Tourniquets and/or Junctional Compression for Hemorrhage Control	89.5%	10.5%
Hemostatic Agents for Hemorrhage Control	30.0%	70.0%
Intraosseous Devices	95.2%	4.8%
Pelvic Binders	40.0%	60.0%
Traction Splints	95.0%	5.0%
Cervical Collars	95.0%	5.0%
Backboards	100.0%	0.0%
Protocols allow for Field Clearance of Spinal Immobilization/Selective Immobilization	100.0%	0.0%
Devices to Maintain Body Temperature	95.0%	5.0%

Q95-CBRNE Event Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	15	75.0%
Specialized Education/Training	4	20.0%
None - Our agency is fully prepared to respond to CBRNE events	1	5.0%

Q96-Mass Casualty Incident Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	12	60.0%
Specialized Equipment	3	15.0%
None - Our agency is fully prepared to respond to CBRNE events	3	15.0%
Specialized Education/Training	2	10.0%

Q97-Employ Specially-trained Tactical EMS Personnel	N	%
No	13	65.0%
Yes	7	35.0%

Q98-Specific Active Shooter Response Plan/Inter-agancy Coordination	N	%
No	11	57.9%
Yes	8	42.1%

Q99-Community Routinely Train/Rehearse Active Shooter Response Plan	N	%
Yes - Once a year	3	37.5%
No	3	37.5%
Yes - Twice a Year	2	25.0%

Q100 - Public Awareness and Educational Programs in Community	N	Percent
CPR	21	100.0%
Car Safety Seat Education	14	66.7%
Child Safety (i.e. Risk Watch/Safe Kids)	14	66.7%
Water Safety	12	57.1%
EMS Bystander Education (i.e. First There/First Care)	10	47.6%
Advanced Directives / DNRs	9	42.9%
Seat Belt Awareness	9	42.9%
Helmet Safety	8	38.1%
Domestic Violence Awareness and/or Prevention	7	33.3%
Injury Prevention (General)	7	33.3%
Disease Management	6	28.6%
Mental Health Awareness	6	28.6%
Substance Abuse Awareness	6	28.6%
Suicide Prevention	6	28.6%
Other:	3	14.3%
Poison Prevention	3	14.3%

Q101-Currenlty have Community Paramedicine/Mobile Integrated Health Program	N	%
No	14	66.7%
Yes	7	33.3%

Q102-Interested in Developing a Community Paramedicine/Mobile Integrated Health Program	N	%
Yes	12	85.7%
No	2	14.3%

Q103 - Specific Need by priority	Priority Score
Vehicles	44.0
Personnel	44.0
Education/Training	41.0
Equipment/Supplies	33.0
Community Paramedicine	28.0
Funding	23.0
Information Technology	12.0
Certificate of Necessity	10.0
Facilities	9.0
Other	8.0
Public Outreach	3.0
Communications/Dispatch Technology	2.0

Needs Assessment – Northern Region (NAEMS)

Q3-EMS Provider/Agency Type	N	%
Total	23	100.0%
Fire District	10	43.5%
Municipal Fire Department	6	26.1%
Private EMS (Independent Corporation)	3	13.0%
Other:	2	8.7%
Hospital-Based EMS (i.e. Owned/Operated by a hospital)	1	4.3%
Tribal Fire/EMS Agency	1	4.3%

Q4-EMS Provider/Agency Highest Level of Service	N	%
Advanced Life Support Ground Ambulance (transport)	11	47.8%
Advanced Life Support First Responder (no transport)	7	30.4%
Basic Life Support First Responder (no transport)	5	21.7%
Other:	0	0.0%
Air Ambulance (transport)	0	0.0%

Q7-Approximate Size of Service Area	N	%
1-49 sq mi	2	8.7%
50-99 sq mi	6	26.1%
100-249 sq mi	5	21.7%
250-499 sq mi	3	13.0%
500-999 sq mi	1	4.3%
1000+ sq mi	6	26.1%

Q8-Population Estimate of Service Area	N	%
Varies due to tourism	1	4.3%
1-999 people	2	8.7%
1,000-9,999 people	5	21.7%
10,000-49,999 people	11	47.8%
50,000-99,999 people	2	8.7%
100,000-499,999 people	2	8.7%
500,000-999,999 people	0	0.0%
1,000,000+ people	0	0.0%

Q9-Average Age of EMS Agency/Provider Service Area	N	%
Unknown	2	8.7%
0-14	0	0.0%
15-29	1	4.3%
30-49	11	47.8%
50-64	9	39.1%
65+	0	0.0%

Q13-Does your agency bill patients for services?	N	%
Yes	14	60.9%
No	9	39.1%

Q14-Who provides billing services?	N	%
Contract Out to Third Party	11	78.6%
Self-Bill	3	21.4%

Q15-Q17: Proportion of Services Billed	Mean	Median
Annual Collections for Billing	36.7%	25.0%
Expenses Subsidized	67.9%	75.0%
Medicare Patients	28.4%	30.0%
AHCCCS Patients	31.1%	30.0%
Dual Eligible Patients	6.4%	7.5%
Private/Commercial insurance Patients	24.3%	20.0%
Uninsured/Self-Pay Patients	17.5%	10.0%

Q18-Name of Base Hospital	N	%
Flagstaff Medical Center	6	26.1%
Summit Healthcare	6	26.1%
Yavapai Regional Medical Center	4	17.4%
Deer Valley Medical Center	2	8.7%
Valley View Medical Center	1	4.3%
Kingman Regional Medical Center	1	4.3%
Verde Valley Medical Center	1	4.3%
Whiteriver IHS	1	4.3%
Cobre Valley Regional Medical Center	1	4.3%

Q19 - Specialty area of Medical Director	N	Percent
Emergency Medical Services (EMS)	17	73.9%
Emergency Medicine (EM)	17	73.9%
General Practice	2	8.7%
Surgery (General)	2	8.7%
Cardiology	1	4.3%
Family Medicine	1	4.3%
Obstetrics and Gynecology	1	4.3%
Physical Medicine and Rehabilitation	1	4.3%
Preventative Medicine	1	4.3%
Surgery (Ortho)	1	4.3%

Q20-How often do you meet with medical direction	N	%
Monthly	12	54.5%
Quarterly	6	27.3%
Once a Year	2	9.1%
Twice a Year	1	4.5%
Never	1	4.5%
Weekly	0	0.0%
Daily	0	0.0%

Q21-EMS Personnel by compensation	Full-Time Paid	Part-Time Paid	Volunteer	Total
	N	N	N	
Paramedic	346	77	5	428
AEMT/EMS-I	0	0	1	1
EMT/EMT-B	296	127	37	460
First Responder	5	4	52	61
Nurse	1	0	0	1
Other	0	0	0	0
Total				951

Q22-EMS Personnel by years with agency	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	17	6%	74	27%	86	32%	84	31%	12	4%	273
AEMT/EMS-I	1	11%	6	67%	1	11%	1	11%	0	0%	9
EMT/EMT-B	35	11%	129	42%	69	23%	54	18%	18	6%	305
First Responder	4	8%	27	53%	11	22%	6	12%	3	6%	51
Nurse	0	0%	0	0%	0	0%	0	0%	0	0%	0
Other	0	0%	0	0%	0	0%	0	0%	0	0%	0
Total											638

Q23-EMS Personnel by years in EMS	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	8	8%	42	40%	16	15%	33	31%	7	7%	106
AEMT/EMS-I	0	0%	0	0%	0	0%	0	0%	0	0%	0
EMT/EMT-B	13	8%	70	41%	40	23%	33	19%	16	9%	172
First Responder	5	10%	14	27%	23	44%	7	13%	3	6%	52
Nurse	0	0%	0	0%	0	0%	0	0%	0	0%	0
Other	0	0%	0	0%	0	0%	0	0%	0	0%	0
Total											330

Q24-EMS Personnel by Highest Level of Education obtained	Graduate Degree		Bachelor Degree		Associate Degree		Some College		High School / GED		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	3	3%	22	26%	27	31%	33	38%	1	1%	86
AEMT/EMS-I	0	0%	0	0%	0	0%	0	0%	0	0%	0
EMT/EMT-B	6	4%	23	15%	69	44%	54	35%	4	3%	156
First Responder	1	2%	1	2%	2	4%	20	38%	29	55%	53
Nurse	0	0%	0	0%	0	0%	0	0%	0	0%	0
Other	0	0%	0	0%	0	0%	0	0%	0	0%	0
Total											295

Q25 - Barriers to Recruitment and Retention	N	Percent
Pay	20	87.0%
Geography/Location	17	73.9%
Time Commitment	11	47.8%
Training Requirements	11	47.8%
No Interest	7	30.4%
Other:	3	13.0%
Stress	1	4.3%

Q26-Critical Incident Stress Management	N	%
Yes	21	91.3%
No	2	8.7%

Q27-Designated EMS Training Officer	N	%
Yes	20	87.0%
No	3	13.0%

Q28-33:Certifications required for employment	Yes	Other Similar	No
NREMT	13.0%	--	87.0%
BLS-HCP	82.6%	17.4%	0.0%
ACLS	56.5%	17.4%	26.1%
PALS	43.5%	21.7%	34.8%
NRP	4.3%	8.7%	87.0%
PHTLS	30.4%	13.0%	56.5%

Q34 - Sources of funding for EMS continuing education/training	N	Percent
Agency/Internal	18	78.3%
None (EMS personnel must independently pay)	8	34.8%
Grants	7	30.4%
Base Hospital	6	26.1%
EMS Council	3	13.0%

Q35-Receiving Hospitals Routine Patient Follow-up/Discharge Information	N	%
Yes - Only individual patients when requested by EMS agency	15	65.2%
No - No feedback/follow-up is provided by receiving hospitals	6	26.1%
Yes - Combination of Trauma / STEMI / Stroke Patients	1	4.3%
Yes - All Trauma Patients	1	4.3%
Yes - All Patients	0	0.0%
Yes - All STEMI Patients	0	0.0%
Yes - All Stroke Patients	0	0.0%

Q36-Participation in electronic HIE	N	%
No - But we are interested	14	60.9%
Yes	5	21.7%
No - And we are not interested	4	17.4%

Q37-Maintain Active Quality Program	N	%
Yes	17	73.9%
No	6	26.1%

Q38 - Provider of Continuous Quality Monitoring and Feedback	N	Percent
Internal (Self)	16	94.1%
Base Station Hospital	12	70.6%
Other:	1	5.9%
University	1	5.9%

Q39-Quality Program: Chart/Case Review	N	%
Yes - 100% review of all EMS calls	6	35.3%
Yes - Randomized Review of less than 50% of EMS calls	5	29.4%
Yes - Randomized Review of greater than or equal to 50% of EMS calls	3	17.6%
Yes - Only specific calls when issue(s) arise	3	17.6%

Q40-Quality Program: Other Metrics	N	%
Yes - Combination of System Performance and Clinical Metrics	10	58.8%
No	6	35.3%
Yes - Clinical Metrics (for example, application of oxygen to SOB patients)	1	5.9%
Yes - System Performance Metrics (for example, average response times to scene)	0	0.0%

Q41-Type of PCR	N	%
All Electronic Records (full ePCR)	11	47.8%
Paper Field Reports later converted into Electronic Files/Databases (partial ePCR)	8	34.8%
All Paper Records	4	17.4%

Q42-ePCR Platform/Vendor	N	%
Xerox (i.e. FIREHOUSE)	4	21.1%
Zoll (i.e. RescueNet)	0	0.0%
ImageTrend (i.e. EMS Bridge)	7	36.8%
Starwest Tech (i.e. Zoi)	0	0.0%
Other:	8	42.1%

Q43-ePCR: Receiving Hospital Access	N	%
Yes - Some receiving hospitals have access	9	47.4%
No - Receiving hospitals do not have access	6	31.6%
Yes - All receiving hospitals have access	4	21.1%

Q44-PCR Left at Receiving Hospital when Patient Transferred	N	%
Yes - Immediate: Transmitted Electronically (not printed/faxed, etc. - No paper - Actual full data merger)	5	26.3%
Yes - Immediate: Hand-written	4	21.1%
No - A report is sent to the facility after time of patient transfer (within 24 hours)	4	21.1%
Yes - Immediate: Printed (whether printed on site or sent to fax and printed)	3	15.8%
No - A report is never sent/delivered to the receiving facility	3	15.8%
No - A report is sent to the facility after time of patient transfer (after 24 hours)	0	0.0%

Q45-Submit Data to AZ-PIERS	N	%
Yes	12	63.2%
No	7	36.8%

Q46-Relationship with Receiving Hospital	N	%
More Positive than Negative	9	81.8%
Always Positive	1	9.1%
Neutral	1	9.1%
Always Negative	0	0.0%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
White Mountain Regional Medical Center	2	18.2%
YRMC-West	1	9.1%
Verde Valley Medical Center	1	9.1%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
Flagstaff Medical Center	1	9.1%
VVMC	1	9.1%
Banner Page	1	9.1%
Summit Health RMC, Show Low, AZ	1	9.1%
Summit	1	9.1%
YRMC W	1	9.1%
Summit Regional	1	9.1%

Q48-Hospital Critical/High Acuity Medical Patients	N	%
Banner Del Webb	1	9.1%
Verde Valley Medical Center or we Fly them to where ever they are accepted	1	9.1%
Flagstaff Medical Center	1	9.1%
VVMC	1	9.1%
Summit Healthcare Regional Medical Center	1	9.1%
Banner Page or Air transport to Flagstaff Medical Center	1	9.1%
Summit Health RMC, Show Low	1	9.1%
Summit	1	9.1%
YRMC W	1	9.1%
Summit Regional	1	9.1%
Summit Healthcare	1	9.1%

Q49-Hospital Critical/High Acuity Trauma Patients	N	%
John C Lincoln	1	9.1%
Verde Valley Medical Center or we Fly them to where ever they are accepted	1	9.1%
Flagstaff Medical Center	1	9.1%
FMC	1	9.1%

Q49-Hospital Critical/High Acuity Trauma Patients	N	%
Good Sam	1	9.1%
Banner Page or air transport to Flagstaff Medical Center	1	9.1%
Summit Health RMC, Show Low	1	9.1%
Summit	1	9.1%
Flown to Level 1	1	9.1%
Summit Regional or appropriate Air Transport	1	9.1%
Level I Trauma Center / Flown from scene	1	9.1%

Q50-Critical/High Acuity Medical Patients Mode of Transport	N	%
More Likely via Ground	10	90.9%
More Likely via Air	1	9.1%

Q51-Critical/High Acuity Trauma Patients Mode of Transport	N	%
More Likely via Air	8	72.7%
More Likely via Ground	3	27.3%

Q52-Contact Receiving ED Directly when transporting	N	%
Yes - Via cell phone	10	90.9%
Yes - Via radio	1	9.1%
No - Personnel contact third-party (i.e. call center) who then contacts hospital	0	0.0%
No - No pre-notification is made to a receiving facility	0	0.0%
Yes - Via computer-based text	0	0.0%

Q53-Interfacility Transport	N	%
Yes - Both emergency and non-emergency interfacility	8	72.7%
No - We only transport from scene to hospital	3	27.3%
Yes - Emergency interfacility only	0	0.0%

Q54-Primary Method of Dispatch	N	%
Full Computer-Assisted Dispatch with GPS Location	8	34.8%
Combination of Pager, Telephone, Radio but no CAD	7	30.4%
Computer-Assisted Dispatch (CAD) without GPS Location	6	26.1%
VHF/UHF Radio Only	2	8.7%
Other:	0	0.0%
Pager/Beeper Only	0	0.0%
Telephone Only	0	0.0%

Q55 - Communication Devices in Service	N	Percent
Simple VHF Radios	19	82.6%
Cellular Telephones	18	78.3%
Simple UHF Radios	10	43.5%
Computer-Based Text Communication (i.e. Instant Messaging)	8	34.8%
Pagers/Beepers	7	30.4%
Trunked Radio System	6	26.1%
SATCOM (Satellite-based radio communications equipment)	2	8.7%
Self-Contained Deployable Communications System (i.e. stand-alone system for disaster)	2	8.7%
Satellite Telephones	1	4.3%

Q56-Communication Dead-Spots in your Service Area	N	%
Yes	23	100.0%
No	0	0.0%

Q57-Priority Dispatch System	N	%
Yes	20	87.0%
No	3	13.0%

Q58-Dispatchers EMD Certified	N	%
Yes - Some	10	43.5%
Yes - All	9	39.1%
No	4	17.4%

Q59-Dispatch:Tele-printers or Telecommunication Device for the Deaf	N	%
Yes	12	54.5%
No	10	45.5%

Q60-Dispatch:Bilingual Dispatchers	N	%
Yes - staffed less than 24/7	9	40.9%
No	8	36.4%
Yes - staffed 24/7	5	22.7%

Q61-Dispatch: Language Line for Translation Services	N	%
Yes - available 24/7	14	60.9%
No	7	30.4%
Yes - available less than 24/7	2	8.7%

Q62-Regular Maintenance/Repair for EMS Vehicles	N	%
Yes	20	87.0%
No	3	13.0%

Q63-Vehicles Equipped with GPS/Location Tracking	N	%
No	12	52.2%
Yes -All	7	30.4%
Yes - Some	4	17.4%

Q64-EMS Vehicle by Category	BLS		ALS		Total
	N	%	N	%	
Utility Vehicle - Non Ambulance	24	56%	19	44%	43
Fire Apparatus - Non Ambulance	26	38%	43	62%	69
Licensed Ground Ambulance	9	10%	78	90%	87
Licensed Air Ambulance	0	0%	0	0%	0

Q65-EMS Ground Ambulances Need Replaced	N	%
Yes	10	43.5%
N/A - Agency does not have any EMS Ground Ambulances	8	34.8%
No	5	21.7%

Q66-EMS Air Ambulances Need Replaced	N	%
N/A - Agency does not have any EMS Air Ambulances	22	100.0%
No	0	0.0%
Yes	0	0.0%

Q67-EMS Fire Apparatus - Non Ambulance Need Replaced	N	%
Yes	15	65.2%
N/A - Agency does not have any EMS Fire Apparatus - Non Ambulance	6	26.1%
No	2	8.7%

Q68-EMS Utility Vehicle - Non Ambulance Need Replaced	N	%
Yes	14	60.9%
N/A - Agency does not have any EMS Utility Vehicle - Non Ambulance	6	26.1%
No	3	13.0%

Q69 - Additional EMS Vehicles Needed	N	Percent
Yes - EMS Fire Apparatus (Non Ambulance)	11	47.8%
Yes - EMS Ground Ambulance	8	34.8%
No	7	30.4%
Yes - EMS Utility Vehicle (Non Ambulance)	5	21.7%
Other:	1	4.3%

Q70-Regular Maintenance/Repair Plan for EMS Equipment	N	%
Yes	18	78.3%
No	5	21.7%

Q73 - Brand/Type of ALS Cardiac Monitors Front-line	N	Percent
Zoll - E Series	8	47.1%
Zoll - M Series	7	41.2%
Physio Control - LifePak 15	5	29.4%
Zoll - X Series	5	29.4%
Physio Control - LifePak 12	4	23.5%
Phillips - HeartStart MRx	2	11.8%
Phillips - HeartStart XL+	1	5.9%

Q74 - Capabilities of ALS Cardiac Monitors	N	Percent
12-lead ECG	17	100.0%
Blood-Pressure (NiBP)	17	100.0%
Defibrillation	17	100.0%
3-lead ECG	16	94.1%
End-Tidal Carbon Dioxide (ETCO2)	16	94.1%
Pulse Oximetry (SpO2)	16	94.1%
Synchronized Cardioversion	16	94.1%
External Pacing	15	88.2%
Data Transmission to Receiving Facility (Vitals/ECG/etc.)	10	58.8%
CPR Quality Feedback	9	52.9%
Other:	1	5.9%

Q89 - Type of General Splints Used	N	Percent
Air splints	8	34.8%
Cardboard splints	20	87.0%
Other:	7	30.4%
Vacuum splints	7	30.4%
Wooden splints	3	13.0%

Q71-94: EMS Equipment/Protocols Used	Yes	No
BLS-AEDs	91.3%	8.7%
Portable ALS Cardiac Monitors	78.3%	21.7%
Stand-alone SpO2 Monitors	65.2%	34.8%
Stand-alone ETCO2 Monitors	13.0%	87.0%
CPAP Devices	52.2%	47.8%
Supraglottic Airway Devices	82.6%	17.4%
Protocols Include RSI/PAI Endotracheal Intubation	13.0%	87.0%
Protocols Authorize Surgical Airways	73.9%	26.1%
Transport Ventilators/Portable Ventilators	26.1%	73.9%
Chest-seals for Open Pneumothorax	87.0%	13.0%
Chest-needle Decompression for Tension Pneumothorax	73.9%	26.1%
Automated Chest Compression Device for CPR	17.4%	82.6%
Commercial Tourniquets and/or Junctional Compression for Hemorrhage Control	95.7%	4.3%
Hemostatic Agents for Hemorrhage Control	13.0%	87.0%
Intraosseous Devices	78.3%	21.7%
Pelvic Binders	60.9%	39.1%
Traction Splints	95.7%	4.3%
Cervical Collars	100.0%	0.0%
Backboards	100.0%	0.0%
Protocols allow for Field Clearance of Spinal Immobilization/Selective Immobilization	95.7%	4.3%
Devices to Maintain Body Temperature	100.0%	0.0%

Q95-CBRNE Event Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	20	87.0%
Specialized Education/Training	3	13.0%
None - Our agency is fully prepared to respond to CBRNE events	0	0.0%

Q96-Mass Casualty Incident Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	20	87.0%
Specialized Equipment	1	4.3%
None - Our agency is fully prepared to respond to CBRNE events	1	4.3%
Specialized Education/Training	1	4.3%

Q97-Employ Specially-trained Tactical EMS Personnel	N	%
No	17	73.9%
Yes	6	26.1%

Q98-Specific Active Shooter Response Plan/Inter-agancy Coordination	N	%
Yes	12	52.2%
No	11	47.8%

Q99-Community Routinely Train/Rehearse Active Shooter Response Plan	N	%
Yes - Once a year	10	83.3%
No	2	16.7%
Yes - Twice a Year	0	0.0%

Q100 - Public Awareness and Educational Programs in Community	N	Percent
CPR	22	95.7%
Advanced Directives / DNRs	12	52.2%
Car Safety Seat Education	12	52.2%
Suicide Prevention	9	39.1%
Domestic Violence Awareness and/or Prevention	7	30.4%
Helmet Safety	7	30.4%
Injury Prevention (General)	7	30.4%
Seat Belt Awareness	6	26.1%
Child Safety (i.e. Risk Watch/Safe Kids)	5	21.7%
Mental Health Awareness	5	21.7%
Substance Abuse Awareness	5	21.7%
EMS Bystander Education (i.e. First There/First Care)	3	13.0%
Disease Management	2	8.7%
Water Safety	2	8.7%
None	1	4.3%
Other:	1	4.3%
Poison Prevention	1	4.3%

Q101-Currenlty have Community Paramedicine/Mobile Integrated Health Program	N	%
No	18	78.3%
Yes	5	21.7%

Q102-Interested in Developing a Community Paramedicine/Mobile Integrated Health Program	N	%
Yes	15	83.3%
No	3	16.7%

Q103 - Specific Need by priority	Priority Score
Equipment/Supplies	82.0
Personnel	45.0
Education/Training	40.0
Funding	37.0
Vehicles	28.0
Other	24.0
Community Paramedicine	12.0
Certificate of Necessity	2.0
Public Outreach	1.0

Needs Assessment – Southeastern Region (SAEMS)

Q3-EMS Provider/Agency Type	N	%
Total	21	100.0%
Fire District	10	47.6%
Private EMS (Independent Corporation)	5	23.8%
Municipal Fire Department	3	14.3%
Other:	3	14.3%
Hospital-Based EMS (i.e. Owned/Operated by a hospital)	0	0.0%
Tribal Fire/EMS Agency	0	0.0%

Q4-EMS Provider/Agency Highest Level of Service	N	%
Advanced Life Support Ground Ambulance (transport)	13	61.9%
Advanced Life Support First Responder (no transport)	5	23.8%
Other:	2	9.5%
Basic Life Support First Responder (no transport)	1	4.8%
Air Ambulance (transport)	0	0.0%

Q7-Approximate Size of Service Area	N	%
1-49 sq mi	8	38.1%
50-99 sq mi	3	14.3%
100-249 sq mi	6	28.6%
250-499 sq mi	2	9.5%
500-999 sq mi	0	0.0%
1000+ sq mi	2	9.5%

Q8-Population Estimate of Service Area	N	%
Varies due to tourism	1	4.8%
1-999 people	1	4.8%
1,000-9,999 people	4	19.0%
10,000-49,999 people	10	47.6%
50,000-99,999 people	2	9.5%
100,000-499,999 people	1	4.8%
500,000-999,999 people	1	4.8%
1,000,000+ people	1	4.8%

Q9-Average Age of EMS Agency/Provider Service Area	N	%
Unknown	1	5.0%
0-14	0	0.0%
15-29	1	5.0%
30-49	13	65.0%
50-64	2	10.0%
65+	3	15.0%

Q13-Does your agency bill patients for services?	N	%
Yes	14	66.7%
No	7	33.3%

Q14-Who provides billing services?	N	%
Self-Bill	9	64.3%
Contract Out to Third Party	5	35.7%

Q15-Q17: Proportion of Services Billed	Mean	Median
Annual Collections for Billing	64.3%	75.0%
Expenses Subsidized	53.6%	50.0%
Medicare Patients	27.0%	25.0%
AHCCCS Patients	32.3%	28.5%
Dual Eligible Patients	12.5%	12.5%
Private/Commercial insurance Patients	22.0%	25.0%
Uninsured/Self-Pay Patients	13.4%	12.5%

Q18-Name of Base Hospital	N	%
Banner-University Medical Center â€“ Tucson Campus	6	28.6%
Other:	3	14.3%
Mount Graham Regional Medical Center	2	9.5%
Canyon Vista Medical Center	2	9.5%
Northwest Medical Center	2	9.5%
Western AZ Regional Medical Center	1	4.8%
Carondelet St. Josephâ€™s Hospital	1	4.8%
Tucson Medical Center	1	4.8%
Banner-University Medical Center â€“ South Campus	1	4.8%
Carondelet St. Mary's Hospital	1	4.8%
Oro Valley Hospital	1	4.8%

Q19 - Specialty area of Medical Director	N	Percent
Emergency Medicine (EM)	20	95.2%
Emergency Medical Services (EMS)	9	42.9%
Internal Medicine	2	9.5%
Other:	1	4.8%
Pediatrics	1	4.8%

Q20-How often do you meet with medical direction	N	%
Monthly	12	57.1%
Quarterly	3	14.3%
Twice a Year	2	9.5%
Once a Year	2	9.5%
Weekly	1	4.8%
Never	1	4.8%
Daily	0	0.0%

Q21-EMS Personnel by compensation	Full-Time Paid	Part-Time Paid	Volunteer	Total
	N	N	N	
Paramedic	592	17	68	677
AEMT/EMS-I	9	0	0	9
EMT/EMT-B	775	41	157	973
First Responder	1	6	14	21
Nurse	9	0	1	10
Other	3	0	0	3
Total				1693

Q22-EMS Personnel by years with agency	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	19	7%	70	26%	101	37%	60	22%	21	8%	271
AEMT/EMS-I	1	5%	8	42%	6	32%	4	21%	0	0%	19
EMT/EMT-B	64	13%	163	34%	163	34%	67	14%	22	5%	479
First Responder	7	44%	6	38%	1	6%	0	0%	2	13%	16
Nurse	1	20%	1	20%	2	40%	1	20%	0	0%	5
Other	0	0%	0	0%	0	0%	3	100%	0	0%	3
Total											793

Q23-EMS Personnel by years in EMS	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	4	4%	19	19%	31	31%	36	36%	11	11%	101
AEMT/EMS-I	0	0%	0	0%	0	0%	0	0%	0	0%	0
EMT/EMT-B	26	15%	94	54%	26	15%	23	13%	6	3%	175
First Responder	7	78%	0	0%	2	22%	0	0%	0	0%	9
Nurse	0	0%	1	100%	0	0%	0	0%	0	0%	1
Other	0	0%	0	0%	0	0%	0	0%	0	0%	0
Total											286

Q24-EMS Personnel by Highest Level of Education obtained	Graduate Degree		Bachelor Degree		Associate Degree		Some College		High School / GED		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	6	4%	29	18%	94	59%	19	12%	11	7%	159
AEMT/EMS-I	0	0%	0	0%	2	100%	0	0%	0	0%	2
EMT/EMT-B	1	0.4%	18	7%	163	62%	67	26%	12	5%	261
First Responder	0	0%	0	0%	0	0%	4	100%	0	0%	4
Nurse	0	0%	0	0%	1	100%	0	0%	0	0%	1
Other	0	0%	0	0%	0	0%	0	0%	0	0%	0
Total											427

Q25 - Barriers to Recruitment and Retention	N	Percent
Pay	13	65.0%
Geography/Location	12	60.0%
Time Commitment	5	25.0%
Training Requirements	4	20.0%
None - N/A	2	10.0%
Other:	2	10.0%
No Interest	1	5.0%
Stress	1	5.0%

Q26-Critical Incident Stress Management	N	%
Yes	15	75.0%
No	5	25.0%

Q27-Designated EMS Training Officer	N	%
Yes	18	85.7%
No	3	14.3%

Q28-33:Certifications required for employment	Yes	Other Similar	No
NREMT	14.3%	--	85.7%
BLS-HCP	81.0%	14.3%	4.8%

ACLS	76.2%	14.3%	9.5%
PALS	81.0%	4.8%	14.3%
NRP	19.0%	4.8%	76.2%
PHTLS	19.0%	9.5%	71.4%

Q34 - Sources of funding for EMS continuing education/training	N	Percent
Agency/Internal	15	71.4%
Base Hospital	5	23.8%
Other:	5	23.8%
Grants	4	19.0%
None (EMS personnel must independently pay)	3	14.3%
EMS Council	1	4.8%

Q35-Receiving Hospitals Routine Patient Follow-up/Discharge Information	N	%
No - No feedback/follow-up is provided by receiving hospitals	9	42.9%
Yes - Only individual patients when requested by EMS agency	7	33.3%
Yes - Combination of Trauma / STEMI / Stroke Patients	5	23.8%
Yes - All Patients	0	0.0%
Yes - All STEMI Patients	0	0.0%
Yes - All Trauma Patients	0	0.0%
Yes - All Stroke Patients	0	0.0%

Q36-Participation in electronic HIE	N	%
No - But we are interested	10	47.6%
No - And we are not interested	6	28.6%

Q36-Participation in electronic HIE	N	%
Yes	5	23.8%

Q37-Maintain Active Quality Program	N	%
Yes	17	81.0%
No	4	19.0%

Q38 - Provider of Continuous Quality Monitoring and Feedback	N	Percent
Internal (Self)	17	100.0%
Base Station Hospital	14	82.4%
Other:	1	5.9%
University	1	5.9%

Q39-Quality Program: Chart/Case Review	N	%
Yes - 100% review of all EMS calls	8	47.1%
Yes - Randomized Review of greater than or equal to 50% of EMS calls	5	29.4%
Yes - Randomized Review of less than 50% of EMS calls	4	23.5%
Yes - Only specific calls when issue(s) arise	0	0.0%

Q40-Quality Program: Other Metrics	N	%
Yes - Combination of System Performance and Clinical Metrics	13	76.5%

Q40-Quality Program: Other Metrics	N	%
No	3	17.6%
Yes - System Performance Metrics (for example, average response times to scene)	1	5.9%
Yes - Clinical Metrics (for example, application of oxygen to SOB patients)	0	0.0%

Q41-Type of PCR	N	%
All Electronic Records (full ePCR)	15	71.4%
All Paper Records	4	19.0%
Paper Field Reports later converted into Electronic Files/Databases (partial ePCR)	2	9.5%

Q42-ePCR Platform/Vendor	N	%
Xerox (i.e. FIREHOUSE)	0	0.0%
Zoll (i.e. RescueNet)	7	41.2%
ImageTrend (i.e. EMS Bridge)	3	17.6%
Starwest Tech (i.e. Zoi)	1	5.9%
Other:	6	35.3%

Q43-ePCR: Receiving Hospital Access	N	%
No - Receiving hospitals do not have access	9	56.3%
Yes - Some receiving hospitals have access	6	37.5%
Yes - All receiving hospitals have access	1	6.3%

Q44-PCR Left at Receiving Hospital when Patient Transferred	N	%
Yes - Immediate: Printed (whether printed on site or sent to fax and printed)	11	64.7%

Q44-PCR Left at Receiving Hospital when Patient Transferred	N	%
No - A report is sent to the facility after time of patient transfer (within 24 hours)	2	11.8%
No - A report is never sent/delivered to the receiving facility	2	11.8%
Yes - Immediate: Transmitted Electronically (not printed/faxed, etc. - No paper - Actual full data merger)	1	5.9%
No - A report is sent to the facility after time of patient transfer (after 24 hours)	1	5.9%
Yes - Immediate: Hand-written	0	0.0%

Q45-Submit Data to AZ-PIERS	N	%
Yes	13	76.5%
No	4	23.5%

Q46-Relationship with Receiving Hospital	N	%
More Positive than Negative	10	66.7%
Always Positive	3	20.0%
Always Negative	1	6.7%
Neutral	1	6.7%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
Oro Valley Hospital	2	14.3%
Northwest Medical Center	1	7.1%
BANNER UNIVERSITY SOUTH CAMPUS	1	7.1%
Gila Health Resources stand alone Urgent Care in Morenci, Arizona	1	7.1%
Abrazo Buckeye Campus	1	7.1%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
varies	1	7.1%
Holy Cross Hospital, Nogales Az.	1	7.1%
Canyon Vista Medical Center	1	7.1%
CARONDELET HOLY CROSS HOSPITAL	1	7.1%
Depends on the incident location, there are many.	1	7.1%
ST Mary's Hospital	1	7.1%
CON covers a majority of Pima County so the nearest hospital would depend on the response location	1	7.1%
Mt. Graham	1	7.1%

Q48-Hospital Critical/High Acuity Medical Patients	N	%
Banner University Medical Center -Main Campus	1	7.1%
BANNER UNIVERSITY SOUTH CAMPUS	1	7.1%
Gila Health Resources stand alone Urgent Care in Morenci, Arizona	1	7.1%
Vaires - Banner Estrella, Abrazo West Valley	1	7.1%
UMC Tucson	1	7.1%
Banner UMC-Tucson	1	7.1%
Canyon Vista Medical Center	1	7.1%
BANNER UNIVERSITY MEDICAL CENTER	1	7.1%
Closest appropriate - more often than not this is Oro Valley Hospital	1	7.1%
Depends on the incident location, there are many.	1	7.1%
St Mary's Hospital	1	7.1%
Banner University Main Campus	1	7.1%
Northwest Medical Center	1	7.1%
Mt. Graham	1	7.1%

Q49-Hospital Critical/High Acuity Trauma Patients	N	%
Banner University Main Campus	3	21.4%
Banner University Medical Center -Main Campus	1	7.1%
BANNER UNIVERSITY MAIN CAMPUS	1	7.1%
Gila Health Resources stand alone Urgent Care in Morenci, Arizona	1	7.1%
Vaires - Decision is usually made by Air Transport personnel	1	7.1%
UMC Tucson	1	7.1%
Banner UMC-Tucson	1	7.1%
Banner University Medical Center - Main Campus	1	7.1%
BANNER UNIVERSITY MEDICAL CENTER	1	7.1%
Banner - UMC	1	7.1%
University Medical Center	1	7.1%
Mt. Graham (or fly to Banner Main)	1	7.1%

Q50-Critical/High Acuity Medical Patients Mode of Transport	N	%
More Likely via Ground	9	69.2%
More Likely via Air	4	30.8%

Q51-Critical/High Acuity Trauma Patients Mode of Transport	N	%
More Likely via Air	10	66.7%
More Likely via Ground	5	33.3%

Q52-Contact Receiving ED Directly when transporting	N	%
Yes - Via cell phone	5	35.7%
No - Personnel contact third-party (i.e. call center) who then contacts hospital	4	28.6%
Yes - Via radio	3	21.4%
No - No pre-notification is made to a receiving facility	1	7.1%
Yes - Via computer-based text	1	7.1%

Q53-Interfacility Transport	N	%
No - We only transport from scene to hospital	8	53.3%
Yes - Both emergency and non-emergency interfacility	7	46.7%
Yes - Emergency interfacility only	0	0.0%

Q54-Primary Method of Dispatch	N	%
Full Computer-Assisted Dispatch with GPS Location	12	57.1%
Computer-Assisted Dispatch (CAD) without GPS Location	6	28.6%
VHF/UHF Radio Only	1	4.8%
Other:	1	4.8%
Combination of Pager, Telephone, Radio but no CAD	1	4.8%
Pager/Beeper Only	0	0.0%
Telephone Only	0	0.0%

Q55 - Communication Devices in Service	N	Percent
Cellular Telephones	14	66.7%
Trunked Radio System	13	61.9%
Computer-Based Text Communication (i.e. Instant Messaging)	9	42.9%

Q55 - Communication Devices in Service	N	Percent
Simple UHF Radios	9	42.9%
Simple VHF Radios	9	42.9%
Pagers/Beepers	6	28.6%
Other:	2	9.5%
Self-Contained Deployable Communications System (i.e. stand-alone system for disaster)	2	9.5%

Q56-Communication Dead-Spots in your Service Area	N	%
Yes	13	65.0%
No	7	35.0%

Q57-Priority Dispatch System	N	%
Yes	15	71.4%
No	6	28.6%

Q58-Dispatchers EMD Certified	N	%
Yes - All	12	57.1%
No	7	33.3%
Yes - Some	2	9.5%

Q59-Dispatch:Tele-printers or Telecommunication Device for the Deaf	N	%
Yes	17	85.0%
No	3	15.0%

Q60-Dispatch:Bilingual Dispatchers	N	%
Yes - staffed 24/7	10	47.6%
Yes - staffed less than 24/7	6	28.6%
No	5	23.8%

Q61-Dispatch: Language Line for Translation Services	N	%
Yes - available 24/7	12	57.1%
No	7	33.3%
Yes - available less than 24/7	2	9.5%

Q62-Regular Maintenance/Repair for EMS Vehicles	N	%
Yes	19	90.5%
No	2	9.5%

Q63-Vehicles Equipped with GPS/Location Tracking	N	%
Yes -All	9	42.9%
Yes - Some	7	33.3%
No	5	23.8%

Q64-EMS Vehicle by Category	BLS		ALS		Total
	N	%	N	%	
Utility Vehicle - Non Ambulance	37	61%	24	39%	61
Fire Apparatus - Non Ambulance	35	34%	68	66%	103
Licensed Ground Ambulance	32	23%	108	77%	140
Licensed Air Ambulance	0	0%	0	0%	0

Q65-EMS Ground Ambulances Need Replaced	N	%
Yes	9	42.9%
N/A - Agency does not have any EMS Ground Ambulances	7	33.3%
No	5	23.8%

Q66-EMS Air Ambulances Need Replaced	N	%
N/A - Agency does not have any EMS Air Ambulances	18	90.0%
No	1	5.0%
Yes	1	5.0%

Q67-EMS Fire Apparatus - Non Ambulance Need Replaced	N	%
N/A - Agency does not have any EMS Fire Apparatus - Non Ambulance	10	47.6%

Q67-EMS Fire Apparatus - Non Ambulance Need Replaced	N	%
Yes	8	38.1%
No	3	14.3%

Q68-EMS Utility Vehicle - Non Ambulance Need Replaced	N	%
No	11	52.4%
Yes	7	33.3%
N/A - Agency does not have any EMS Utility Vehicle - Non Ambulance	3	14.3%

Q69 - Additional EMS Vehicles Needed	N	Percent
No	10	47.6%
Yes - EMS Ground Ambulance	7	33.3%
Yes - EMS Fire Apparatus (Non Ambulance)	3	14.3%
Yes - EMS Utility Vehicle (Non Ambulance)	3	14.3%
Other:	1	4.8%

Q70-Regular Maintenance/Repair Plan for EMS Equipment	N	%
Yes	19	90.5%
No	2	9.5%

Q73 - Brand/Type of ALS Cardiac Monitors Front-line	N	Percent
Physio Control - LifePak 12	7	36.8%
Phillips - HeartStart MRx	6	31.6%
Zoll - X Series	3	15.8%
Physio Control - LifePak 15	2	10.5%
Phillips - HeartStart XL+	1	5.3%
Physio Control - LifePak 10	1	5.3%
Zoll - E Series	1	5.3%
Zoll - M Series	1	5.3%

Q74 - Capabilities of ALS Cardiac Monitors	N	Percent
12-lead ECG	19	100.0%
Defibrillation	19	100.0%
External Pacing	19	100.0%
Pulse Oximetry (SpO2)	19	100.0%
Blood-Pressure (NiBP)	18	94.7%
Synchronized Cardioversion	18	94.7%
3-lead ECG	17	89.5%
End-Tidal Carbon Dioxide (ETCO2)	16	84.2%
Data Transmission to Receiving Facility (Vitals/ECG/etc.)	13	68.4%
CPR Quality Feedback	8	42.1%
Other:	1	5.3%

Q89 - Type of General Splints Used	N	Percent
Air splints	7	33.3%

Q89 - Type of General Splints Used	N	Percent
Cardboard splints	17	81.0%
Other:	9	42.9%
Vacuum splints	3	14.3%
Wooden splints	2	9.5%

Q71-94: EMS Equipment/Protocols Used	Yes	No
BLS-AEDs	95.2%	4.8%
Portable ALS Cardiac Monitors	90.5%	9.5%
Stand-alone SpO2 Monitors	76.2%	23.8%
Stand-alone ETCO2 Monitors	9.5%	90.5%
CPAP Devices	76.2%	23.8%
Supraglottic Airway Devices	85.7%	14.3%
Protocols Include RSI/PAI Endotracheal Intubation	42.9%	57.1%
Protocols Authorize Surgical Airways	81.0%	19.0%
Transport Ventilators/Portable Ventilators	35.0%	65.0%
Chest-seals for Open Pneumothorax	81.0%	19.0%
Chest-needle Decompression for Tension Pneumothorax	85.7%	14.3%
Automated Chest Compression Device for CPR	9.5%	90.5%
Commercial Tourniquets and/or Junctional Compression for Hemorrhage Control	95.2%	4.8%
Hemostatic Agents for Hemorrhage Control	33.3%	66.7%
Intraosseous Devices	90.5%	9.5%
Pelvic Binders	61.9%	38.1%
Traction Splints	90.5%	9.5%
Cervical Collars	95.2%	4.8%
Backboards	90.5%	9.5%
Protocols allow for Field Clearance of Spinal Immobilization/Selective Immobilization	76.2%	23.8%
Devices to Maintain Body Temperature	90.5%	9.5%

Q95-CBRNE Event Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	18	85.7%

Q95-CBRNE Event Assistance	N	%
None - Our agency is fully prepared to respond to CBRNE events	3	14.3%
Specialized Education/Training	0	0.0%

Q96-Mass Casualty Incident Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	14	66.7%
None - Our agency is fully prepared to respond to CBRNE events	5	23.8%
Specialized Equipment	1	4.8%
Specialized Education/Training	1	4.8%

Q97-Employ Specially-trained Tactical EMS Personnel	N	%
No	18	85.7%
Yes	3	14.3%

Q98-Specific Active Shooter Response Plan/Inter-agancy Coordination	N	%
Yes	11	52.4%
No	10	47.6%

Q99-Community Routinely Train/Rehearse Active Shooter Response Plan	N	%
Yes - Once a year	8	72.7%
No	2	18.2%
Yes - Twice a Year	1	9.1%

Q100 - Public Awareness and Educational Programs in Community	N	Percent
CPR	17	81.0%
Car Safety Seat Education	12	57.1%
Child Safety (i.e. Risk Watch/Safe Kids)	11	52.4%
Water Safety	11	52.4%
Advanced Directives / DNRs	10	47.6%
Injury Prevention (General)	10	47.6%
Seat Belt Awareness	10	47.6%
Helmet Safety	7	33.3%
Mental Health Awareness	7	33.3%
Domestic Violence Awareness and/or Prevention	6	28.6%
Substance Abuse Awareness	6	28.6%
Poison Prevention	5	23.8%
Suicide Prevention	5	23.8%
Disease Management	4	19.0%
Other:	3	14.3%
EMS Bystander Education (i.e. First There/First Care)	2	9.5%
None	1	4.8%

Q101-Currenlty have Community Paramedicine/Mobile Integrated Health Program	N	%
No	14	66.7%
Yes	7	33.3%

Q102-Interested in Developing a Community Paramedicine/Mobile Integrated Health Program	N	%
Yes	9	64.3%
No	5	35.7%

Q103 - Specific Need by priority	Priority Score
Equipment/Supplies	61.0
Education/Training	35.0
Personnel	31.0
Funding	20.0
Vehicles	14.0
Community Paramedicine	13.0
Information Technology	10.0
Other	9.0
Facilities	7.0
Public Outreach	6.0
Communications/Dispatch Technology	5.0

Needs Assessment – Western Region (WACEMS)

Q3-EMS Provider/Agency Type	N	%
Total	17	100.0%
Fire District	10	58.8%
Municipal Fire Department	4	23.5%
Other:	1	5.9%
Private EMS (Independent Corporation)	1	5.9%
Tribal Fire/EMS Agency	1	5.9%
Hospital-Based EMS (i.e. Owned/Operated by a hospital)	0	0.0%

Q4-EMS Provider/Agency Highest Level of Service	N	%
Advanced Life Support First Responder (no transport)	9	52.9%
Advanced Life Support Ground Ambulance (transport)	6	35.3%
Other:	1	5.9%
Basic Life Support First Responder (no transport)	1	5.9%
Air Ambulance (transport)	0	0.0%

Q7-Approximate Size of Service Area	N	%
1-49 sq mi	3	17.6%
50-99 sq mi	4	23.5%
100-249 sq mi	3	17.6%
250-499 sq mi	0	0.0%
500-999 sq mi	3	17.6%
1000+ sq mi	4	23.5%

Q8-Population Estimate of Service Area	N	%
Varies due to tourism	0	0.0%
1-999 people	3	17.6%
1,000-9,999 people	8	47.1%
10,000-49,999 people	4	23.5%
50,000-99,999 people	2	11.8%
100,000-499,999 people	0	0.0%
500,000-999,999 people	0	0.0%
1,000,000+ people	0	0.0%

Q9-Average Age of EMS Agency/Provider Service Area	N	%
Unknown	0	0.0%
0-14	1	5.9%
15-29	3	17.6%
30-49	5	29.4%
50-64	8	47.1%
65+	0	0.0%

Q13-Does your agency bill patients for services?	N	%
Yes	12	70.6%
No	5	29.4%

Q14-Who provides billing services?	N	%
Self-Bill	8	66.7%
Contract Out to Third Party	4	33.3%

Q15-Q17: Proportion of Services Billed	Mean	Median
Annual Collections for Billing	45.0%	35.0%
Expenses Subsidized	46.8%	45.0%
Medicare Patients	26.3%	25.0%
AHCCCS Patients	46.2%	35.0%
Dual Eligible Patients	11.1%	10.4%
Private/Commercial insurance Patients	13.5%	10.0%
Uninsured/Self-Pay Patients	8.9%	7.5%

Q18-Name of Base Hospital	N	%
Kingman Regional Medical Center	7	41.2%
Yuma Regional Medical Center	3	17.6%
Havasu Regional Medical Center	2	11.8%
None - N/A	2	11.8%
La Paz Regional Hospital	2	11.8%
Other:	1	5.9%

Q19 - Specialty area of Medical Director	N	Percent
Emergency Medicine (EM)	12	70.6%
Emergency Medical Services (EMS)	7	41.2%

Q19 - Specialty area of Medical Director	N	Percent
Internal Medicine	2	11.8%
Family Medicine	1	5.9%
General Practice	1	5.9%
Other:	1	5.9%

Q20-How often do you meet with medical direction	N	%
Monthly	12	70.6%
Twice a Year	2	11.8%
Quarterly	1	5.9%
Never	1	5.9%
Once a Year	1	5.9%
Weekly	0	0.0%
Daily	0	0.0%

Q21-EMS Personnel by compensation	Full-Time Paid	Part-Time Paid	Volunteer	Total
	N	N	N	
Paramedic	146	61	45	252
AEMT/EMS-I	0	2	0	2
EMT/EMT-B	130	78	115	323
First Responder	13	2	8	23
Nurse	0	0	0	0
Other	0	3	5	8
Total				608

Q22-EMS Personnel by years with agency	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	24	12%	47	24%	41	21%	57	29%	29	15%	198
AEMT/EMS-I	0	0%	6	46%	6	46%	0	0%	1	8%	13
EMT/EMT-B	44	19%	73	31%	53	23%	46	20%	18	8%	234
First Responder	6	67%	2	22%	0	0%	1	11%	0	0%	9
Nurse	0	0%	0	0%	0	0%	0	0%	0	0%	0
Other	0	0%	5	63%	3	38%	0	0%	0	0%	8
Total											462

Q23-EMS Personnel by years in EMS	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	1	1%	44	27%	42	25%	40	24%	38	23%	165
AEMT/EMS-I	0	0%	0	0%	2	100%	0	0%	0	0%	2
EMT/EMT-B	22	11%	58	29%	62	31%	42	21%	19	9%	203
First Responder	2	22%	4	44%	0	0%	0	0%	3	33%	9
Nurse	0	0%	0	0%	0	0%	0	0%	0	0%	0
Other	0	0%	6	75%	2	25%	0	0%	0	0%	8
Total											387

Q24-EMS Personnel by Highest Level of Education obtained	Graduate Degree		Bachelor Degree		Associate Degree		Some College		High School / GED		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	2	1%	13	7%	51	26%	82	41%	51	26%	199
AEMT/EMS-I	0	0%	0	0%	1	50%	1	50%	0	0%	2
EMT/EMT-B	2	1%	10	5%	53	27%	46	24%	83	43%	194
First Responder	0	0%	1	100%	0	0%	0	0%	0	0%	1
Nurse	0	0%	0	0%	0	0%	0	0%	0	0%	0
Other	0	0%	1	13%	0	0%	2	25%	5	63%	8
Total											404

Q25 - Barriers to Recruitment and Retention	N	Percent
Pay	13	76.5%
Geography/Location	9	52.9%
No Interest	4	23.5%
Time Commitment	3	17.6%
Stress	2	11.8%
Training Requirements	2	11.8%
None - N/A	1	5.9%

Q26-Critical Incident Stress Management	N	%
Yes	14	82.4%
No	3	17.6%

Q27-Designated EMS Training Officer	N	%
Yes	14	82.4%
No	3	17.6%

Q28-33:Certifications required for employment	Yes	Other Similar	No
NREMT	23.5%	--	76.5%
BLS-HCP	64.7%	35.3%	0.0%
ACLS	64.7%	29.4%	5.9%
PALS	52.9%	29.4%	17.6%
NRP	17.6%	5.9%	76.5%
PHTLS	17.6%	35.3%	47.1%

Q34 - Sources of funding for EMS continuing education/training	N	Percent
Agency/Internal	13	76.5%
EMS Council	8	47.1%
Base Hospital	7	41.2%
None (EMS personnel must independently pay)	6	35.3%
Grants	5	29.4%
Tribal/Federal Funding	2	11.8%
Other:	1	5.9%

Q35-Receiving Hospitals Routine Patient Follow-up/Discharge Information	N	%
Yes - Only individual patients when requested by EMS agency	10	58.8%
Yes - Combination of Trauma / STEMI / Stroke Patients	5	29.4%
No - No feedback/follow-up is provided by receiving hospitals	2	11.8%
Yes - All Patients	0	0.0%
Yes - All STEMI Patients	0	0.0%
Yes - All Trauma Patients	0	0.0%
Yes - All Stroke Patients	0	0.0%

Q36-Participation in electronic HIE	N	%
No - But we are interested	13	76.5%
No - And we are not interested	3	17.6%
Yes	1	5.9%

Q37-Maintain Active Quality Program	N	%
Yes	12	70.6%
No	5	29.4%

Q38 - Provider of Continuous Quality Monitoring and Feedback	N	Percent
Internal (Self)	10	83.3%
Base Station Hospital	8	66.7%
Other:	2	16.7%
Other Hospital	1	8.3%

Q39-Quality Program: Chart/Case Review	N	%
Yes - Randomized Review of less than 50% of EMS calls	5	41.7%
Yes - Randomized Review of greater than or equal to 50% of EMS calls	3	25.0%
Yes - 100% review of all EMS calls	3	25.0%
Yes - Only specific calls when issue(s) arise	1	8.3%

Q40-Quality Program: Other Metrics	N	%
No	6	50.0%
Yes - Combination of System Performance and Clinical Metrics	4	33.3%
Yes - System Performance Metrics (for example, average response times to scene)	1	8.3%
Yes - Clinical Metrics (for example, application of oxygen to SOB patients)	1	8.3%

Q41-Type of PCR	N	%
All Electronic Records (full ePCR)	9	52.9%
Paper Field Reports later converted into Electronic Files/Databases (partial ePCR)	6	35.3%
All Paper Records	2	11.8%

Q42-ePCR Platform/Vendor	N	%
Xerox (i.e. FIREHOUSE)	1	6.7%
Zoll (i.e. RescueNet)	0	0.0%
ImageTrend (i.e. EMS Bridge)	7	46.7%
Starwest Tech (i.e. Zoi)	0	0.0%
Other:	7	46.7%

Q43-ePCR: Receiving Hospital Access	N	%
Yes - All receiving hospitals have access	6	40.0%
Yes - Some receiving hospitals have access	5	33.3%
No - Receiving hospitals do not have access	4	26.7%

Q44-PCR Left at Receiving Hospital when Patient Transferred	N	%
Yes - Immediate: Hand-written	4	28.6%
No - A report is never sent/delivered to the receiving facility	4	28.6%
No - A report is sent to the facility after time of patient transfer (after 24 hours)	2	14.3%
No - A report is sent to the facility after time of patient transfer (within 24 hours)	2	14.3%
Yes - Immediate: Printed (whether printed on site or sent to fax and printed)	1	7.1%
Yes - Immediate: Transmitted Electronically (not printed/faxed, etc. - No paper - Actual full data merger)	1	7.1%

Q45-Submit Data to AZ-PIERS	N	%
Yes	10	66.7%
No	5	33.3%

Q46-Relationship with Receiving Hospital	N	%
More Positive than Negative	3	42.9%
Always Positive	2	28.6%
Neutral	2	28.6%
Always Negative	0	0.0%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
KRMC	2	28.6%
yuma regional medical center	1	14.3%
Dixie Regional Medical Center St. George, Utah	1	14.3%
YRMC in Yuma AZ.	1	14.3%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
Yuma Regional Medical Center	1	14.3%
Kingman Regional Medical Center (avg. transport 49 miles one way)	1	14.3%

Q48-Hospital Critical/High Acuity Medical Patients	N	%
KRMC	1	14.3%
yuma regional medical center	1	14.3%
Dixie Regional Medical Center St. George, Utah	1	14.3%
KRMC / UMC	1	14.3%
YRMC in Yuma Az.	1	14.3%
Yuma Regional Medical Center	1	14.3%
Kingman Regional Medical Center (avg. transport 49 miles one way) or Flight them to Las Vegas, Sunrise Medical Center	1	14.3%

Q49-Hospital Critical/High Acuity Trauma Patients	N	%
KRMC	1	14.3%
west valley abrazo	1	14.3%
Dixie Regional Medical Center St. George, Utah	1	14.3%
UMC	1	14.3%
YRMC in Yuma Az.	1	14.3%
Yuma Regional Medical Center	1	14.3%
Kingman Regional Medical Center (avg. transport 49 miles one way) or Flight them to Las Vegas, Sunrise Medical Center	1	14.3%

Q50-Critical/High Acuity Medical Patients Mode of Transport	N	%
More Likely via Ground	5	71.4%
More Likely via Air	2	28.6%

Q51-Critical/High Acuity Trauma Patients Mode of Transport	N	%
More Likely via Air	4	57.1%
More Likely via Ground	3	42.9%

Q52-Contact Receiving ED Directly when transporting	N	%
Yes - Via cell phone	7	100.0%
No - Personnel contact third-party (i.e. call center) who then contacts hospital	0	0.0%
Yes - Via radio	0	0.0%
No - No pre-notification is made to a receiving facility	0	0.0%
Yes - Via computer-based text	0	0.0%

Q53-Interfacility Transport	N	%
No - We only transport from scene to hospital	5	71.4%
Yes - Both emergency and non-emergency interfacility	2	28.6%
Yes - Emergency interfacility only	0	0.0%

Q54-Primary Method of Dispatch	N	%
Computer-Assisted Dispatch (CAD) without GPS Location	4	23.5%
Full Computer-Assisted Dispatch with GPS Location	4	23.5%
VHF/UHF Radio Only	4	23.5%
Combination of Pager, Telephone, Radio but no CAD	3	17.6%
Pager/Beeper Only	1	5.9%
Telephone Only	1	5.9%
Other:	0	0.0%

Q55 - Communication Devices in Service	N	Percent
Cellular Telephones	12	70.6%
Simple VHF Radios	10	58.8%
Pagers/Beepers	9	52.9%
Trunked Radio System	9	52.9%
Simple UHF Radios	6	35.3%
Computer-Based Text Communication (i.e. Instant Messaging)	2	11.8%
Satellite Telephones	1	5.9%

Q56-Communication Dead-Spots in your Service Area	N	%
Yes	13	76.5%
No	4	23.5%

Q57-Priority Dispatch System	N	%
Yes	9	52.9%
No	8	47.1%

Q58-Dispatchers EMD Certified	N	%
Yes - Some	6	35.3%
Yes - All	6	35.3%
No	5	29.4%

Q59-Dispatch:Tele-printers or Telecommunication Device for the Deaf	N	%
Yes	10	58.8%
No	7	41.2%

Q60-Dispatch:Bilingual Dispatchers	N	%
Yes - staffed less than 24/7	8	47.1%
No	5	29.4%
Yes - staffed 24/7	4	23.5%

Q61-Dispatch: Language Line for Translation Services	N	%
Yes - available 24/7	7	41.2%
No	6	35.3%
Yes - available less than 24/7	4	23.5%

Q62-Regular Maintenance/Repair for EMS Vehicles	N	%
Yes	15	88.2%
No	2	11.8%

Q63-Vehicles Equipped with GPS/Location Tracking	N	%
No	14	82.4%
Yes -All	3	17.6%
Yes - Some	0	0.0%

Q64-EMS Vehicle by Category	BLS		ALS		Total
	N	%	N	%	
Utility Vehicle - Non Ambulance	20	67%	10	33%	30
Fire Apparatus - Non Ambulance	31	45%	38	55%	69
Licensed Ground Ambulance	3	14%	19	86%	22
Licensed Air Ambulance	0	0%	0	0%	0

Q65-EMS Ground Ambulances Need Replaced	N	%
N/A - Agency does not have any EMS Ground Ambulances	9	52.9%
Yes	8	47.1%
No	0	0.0%

Q66-EMS Air Ambulances Need Replaced	N	%
N/A - Agency does not have any EMS Air Ambulances	17	100.0%
No	0	0.0%
Yes	0	0.0%

Q67-EMS Fire Apparatus - Non Ambulance Need Replaced	N	%
Yes	13	76.5%
No	3	17.6%
N/A - Agency does not have any EMS Fire Apparatus - Non Ambulance	1	5.9%

Q68-EMS Utility Vehicle - Non Ambulance Need Replaced	N	%
Yes	11	64.7%
No	5	29.4%
N/A - Agency does not have any EMS Utility Vehicle - Non Ambulance	1	5.9%

Q69 - Additional EMS Vehicles Needed	N	Percent
Yes - EMS Ground Ambulance	11	64.7%
Yes - EMS Fire Apparatus (Non Ambulance)	8	47.1%
Yes - EMS Utility Vehicle (Non Ambulance)	8	47.1%
No	3	17.6%

Q70-Regular Maintenance/Repair Plan for EMS Equipment	N	%
Yes	12	70.6%
No	5	29.4%

Q73 - Brand/Type of ALS Cardiac Monitors Front-line	N	Percent
Phillips - HeartStart MRx	7	43.8%
Physio Control - LifePak 12	4	25.0%
Zoll - M Series	3	18.8%
Physio Control - LifePak 15	2	12.5%
Zoll - E Series	2	12.5%
Physio Control - LifePak 10	1	6.3%
Zoll - X Series	1	6.3%

Q74 - Capabilities of ALS Cardiac Monitors	N	Percent
12-lead ECG	16	100.0%
Defibrillation	16	100.0%
External Pacing	16	100.0%
Pulse Oximetry (SpO2)	16	100.0%
Synchronized Cardioversion	16	100.0%
Blood-Pressure (NiBP)	15	93.8%
End-Tidal Carbon Dioxide (ETCO2)	15	93.8%
3-lead ECG	14	87.5%
Data Transmission to Receiving Facility (Vitals/ECG/etc.)	7	43.8%
CPR Quality Feedback	5	31.3%
Other:	1	6.3%

Q89 - Type of General Splints Used	N	Percent
Air splints	4	23.5%
Cardboard splints	15	88.2%
Other:	3	17.6%
Vacuum splints	2	11.8%

Q71-94: EMS Equipment/Protocols Used	Yes	No
BLS-AEDs	100.0%	0.0%
Portable ALS Cardiac Monitors	94.1%	5.9%
Stand-alone SpO2 Monitors	52.9%	47.1%
Stand-alone ETCO2 Monitors	17.6%	82.4%
CPAP Devices	64.7%	35.3%
Supraglottic Airway Devices	94.1%	5.9%
Protocols Include RSI/PAI Endotracheal Intubation	23.5%	76.5%
Protocols Authorize Surgical Airways	94.1%	5.9%
Transport Ventilators/Portable Ventilators	5.9%	94.1%
Chest-seals for Open Pneumothorax	94.1%	5.9%
Chest-needle Decompression for Tension Pneumothorax	94.1%	5.9%
Automated Chest Compression Device for CPR	17.6%	82.4%
Commercial Tourniquets and/or Junctional Compression for Hemorrhage Control	76.5%	23.5%
Hemostatic Agents for Hemorrhage Control	17.6%	82.4%
Intraosseous Devices	94.1%	5.9%
Pelvic Binders	70.6%	29.4%
Traction Splints	94.1%	5.9%
Cervical Collars	100.0%	0.0%
Backboards	100.0%	0.0%
Protocols allow for Field Clearance of Spinal Immobilization/Selective Immobilization	82.4%	17.6%
Devices to Maintain Body Temperature	94.1%	5.9%

Q95-CBRNE Event Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	15	88.2%
Specialized Education/Training	2	11.8%
None - Our agency is fully prepared to respond to CBRNE events	0	0.0%

Q96-Mass Casualty Incident Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	16	94.1%
Specialized Education/Training	1	5.9%
Specialized Equipment	0	0.0%
None - Our agency is fully prepared to respond to CBRNE events	0	0.0%

Q97-Employ Specially-trained Tactical EMS Personnel	N	%
No	15	88.2%
Yes	2	11.8%

Q98-Specific Active Shooter Response Plan/Inter-agancy Coordination	N	%
No	14	82.4%
Yes	3	17.6%

Q99-Community Routinely Train/Rehearse Active Shooter Response Plan	N	%
Yes - Once a year	2	66.7%
Yes - Twice a Year	1	33.3%
No	0	0.0%

Q100 - Public Awareness and Educational Programs in Community	N	Percent
CPR	16	94.1%
Advanced Directives / DNRs	7	41.2%
Car Safety Seat Education	7	41.2%
Disease Management	5	29.4%
Domestic Violence Awareness and/or Prevention	5	29.4%
EMS Bystander Education (i.e. First There/First Care)	5	29.4%
Helmet Safety	5	29.4%
Substance Abuse Awareness	5	29.4%
Suicide Prevention	5	29.4%
Water Safety	5	29.4%
Seat Belt Awareness	4	23.5%
Child Safety (i.e. Risk Watch/Safe Kids)	3	17.6%
Mental Health Awareness	3	17.6%
Injury Prevention (General)	2	11.8%
None	1	5.9%
Poison Prevention	1	5.9%

Q101-Currenlty have Community Paramedicine/Mobile Integrated Health Program	N	%
No	12	75.0%
Yes	4	25.0%

Q102-Interested in Developing a Community Paramedicine/Mobile Integrated Health Program	N	%
Yes	8	66.7%
No	4	33.3%

Q103 - Specific Need by priority	Priority Score
Equipment/Supplies	69.0
Vehicles	37.0
Funding	33.0
Education/Training	30.0
Personnel	18.0
Communications/Dispatch Technology	11.0
Community Paramedicine	9.0
Information Technology	7.0
Public Outreach	6.0
Other	5.0
Facilities	4.0

CRITICAL ACCESS EMS Provider/Agency Type	N	%
Total	11	100.0%
Fire District	4	36.4%
Municipal Fire Department	3	27.3%
Private EMS (Independent Corporation)	2	18.2%
Hospital-Based EMS (i.e. Owned/Operated by a hospital)	1	9.1%
Tribal Fire/EMS Agency	1	9.1%
Other:	0	0.0%

Q4-EMS Provider/Agency Highest Level of Service	N	%
Advanced Life Support Ground Ambulance (transport)	6	54.5%
Advanced Life Support First Responder (no transport)	2	18.2%
Other:	2	18.2%
Basic Life Support First Responder (no transport)	1	9.1%
Air Ambulance (transport)	0	0.0%

Q5-Regional EMS Coordinating System	N	%
Southeastern Arizona EMS Council (SAEMS)	5	45.5%
Northern Arizona Emergency Medical Services (NAEMS)	4	36.4%
Western Arizona Council of EMS (WACEMS)	1	9.1%
Arizona Emergency Medical Systems (AEMS)	1	9.1%
None - N/A	0	0.0%
I don't know / I'm not sure	0	0.0%

Q7-Approximate Size of Service Area	N	%
1-49 sq mi	3	27.3%

Q7-Approximate Size of Service Area	N	%
50-99 sq mi	2	18.2%
100-249 sq mi	1	9.1%
250-499 sq mi	1	9.1%
500-999 sq mi	1	9.1%
1000+ sq mi	3	27.3%

Q8-Population Estimate of Service Area	N	%
Varies due to tourism	0	0.0%
1-999 people	1	9.1%
1,000-9,999 people	3	27.3%
10,000-49,999 people	6	54.5%
50,000-99,999 people	1	9.1%
100,000-499,999 people	0	0.0%
500,000-999,999 people	0	0.0%
1,000,000+ people	0	0.0%

Q9-Average Age of EMS Agency/Provider Service Area	N	%
Unknown	1	11.1%
0-14	0	0.0%
15-29	0	0.0%
30-49	5	55.6%
50-64	2	22.2%
65+	1	11.1%

Q13-Does your agency bill patients for services?	N	%
Yes	7	63.6%
No	4	36.4%

Q14-Who provides billing services?	N	%
Contract Out to Third Party	4	57.1%
Self-Bill	3	42.9%

Q15-Q17: Proportion of Services Billed	Mean	Median
Annual Collections for Billing	35.0%	25.0%
Expenses Subsidized	66.4%	65.0%
Medicare Patients	26.0%	29.0%
AHCCCS Patients	38.1%	35.0%
Dual Eligible Patients	10.0%	10.0%
Private/Commercial insurance Patients	14.7%	10.0%
Uninsured/Self-Pay Patients	13.3%	10.0%

Q18-Name of Base Hospital	N	%
Banner-University Medical Center â€“ Tucson Campus	2	18.2%
Summit Healthcare	2	18.2%
Other:	1	9.1%

Q18-Name of Base Hospital	N	%
Carondelet St. Josephâ€™s Hospital	1	9.1%
Canyon Vista Medical Center	1	9.1%
Flagstaff Medical Center	1	9.1%
None - N/A	1	9.1%
Whiteriver IHS	1	9.1%
Banner Casa Grande Medical Center	1	9.1%

Q19 - Specialty area of Medical Director	N	Percent
Emergency Medicine (EM)	9	81.8%
Emergency Medical Services (EMS)	5	45.5%
Cardiology	1	9.1%
Family Medicine	1	9.1%
General Practice	1	9.1%
Obstetrics and Gynecology	1	9.1%
Other:	1	9.1%
Physical Medicine and Rehabilitation	1	9.1%
Preventative Medicine	1	9.1%
Surgery (General)	1	9.1%
Surgery (Ortho)	1	9.1%

Q20-How often do you meet with medical direction	N	%
Monthly	7	63.6%
Quarterly	3	27.3%
Never	1	9.1%
Weekly	0	0.0%

Q20-How often do you meet with medical direction	N	%
Twice a Year	0	0.0%
Once a Year	0	0.0%
Daily	0	0.0%

Q21-EMS Personnel by compensation	Full-Time Paid		Part-Time Paid		Volunteer		Total
	N	%	N	%	N	%	
Paramedic	89	77.4%	23	20.0%	3	2.6%	115
AEMT/EMS-I	0	0.0%	0	0.0%	0	0.0%	0
EMT/EMT-B	102	58.6%	48	27.6%	24	13.8%	174
First Responder	0	0.0%	0	0.0%	0	0.0%	0
Nurse	5	100.0%	0	0.0%	0	0.0%	5
Other	3	100.0%	0	0.0%	0	0.0%	3
Total							297

Q22-EMS Personnel by years with agency	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	1	2.3%	7	15.9%	15	34.1%	19	43.2%	2	4.5%	44
AEMT/EMS-I	0	0.0%	6	54.5%	4	36.4%	0	0.0%	1	9.1%	11
EMT/EMT-B	3	3.4%	37	42.0%	36	40.9%	11	12.5%	1	1.1%	88
First Responder	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Nurse	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Other	0	0.0%	0	0.0%	0	0.0%	3	100.0%	0	0.0%	3
Total											146

Q23-EMS Personnel by years in EMS	<1 yr		1-5 yrs		5-10 yrs		10-20 yrs		20+ yrs		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	1	3.7%	5	18.5%	4	14.8%	15	55.6%	2	7.4%	27
AEMT/EMS-I	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
EMT/EMT-B	2	4.9%	15	36.6%	15	36.6%	8	19.5%	1	2.4%	41
First Responder	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Nurse	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Total											68

Q24-EMS Personnel by Highest Level of Education obtained	Graduate Degree		Bachelor Degree		Associate Degree		Some College		High School / GED		Total
	N	%	N	%	N	%	N	%	N	%	
Paramedic	0	0.0%	1	5.6%	3	16.7%	3	16.7%	11	61.1%	18
AEMT/EMS-I	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
EMT/EMT-B	0	0.0%	0	0.0%	36	52.2%	11	15.9%	22	31.9%	69
First Responder	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Nurse	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Total											87

Q25 - Barriers to Recruitment and Retention	N	Percent
Pay	8	80.0%
Time Commitment	7	70.0%
Geography/Location	6	60.0%
No Interest	3	30.0%
Training Requirements	2	20.0%

Q25 - Barriers to Recruitment and Retention	N	Percent
Other:	1	10.0%

Q26-Critical Incident Stress Management	N	%
Yes	10	100.0%
No	0	0.0%

Q27-Designated EMS Training Officer	N	%
Yes	9	81.8%
No	2	18.2%

Q28-33:Certifications required for employment	Yes	Other Similar	No
NREMT	9.1%	--	90.9%
BLS-HCP	63.6%	27.3%	9.1%
ACLS	63.6%	18.2%	18.2%
PALS	45.5%	27.3%	27.3%
NRP	9.1%	0.0%	90.9%
PHTLS	27.3%	9.1%	63.6%

Q34 - Sources of funding for EMS continuing education/training	N	Percent
Agency/Internal	8	72.7%
Base Hospital	4	36.4%

Q34 - Sources of funding for EMS continuing education/training	N	Percent
Grants	2	18.2%
None (EMS personnel must independently pay)	2	18.2%
Other:	2	18.2%
EMS Council	1	9.1%

Q35-Receiving Hospitals Routine Patient Follow-up/Discharge Information	N	%
Yes - Only individual patients when requested by EMS agency	6	54.5%
No - No feedback/follow-up is provided by receiving hospitals	4	36.4%
Yes - All Trauma Patients	1	9.1%
Yes - Combination of Trauma / STEMI / Stroke Patients	0	0.0%
Yes - All Patients	0	0.0%
Yes - All STEMI Patients	0	0.0%
Yes - All Stroke Patients	0	0.0%

Q36-Participation in electronic HIE	N	%
No - But we are interested	6	54.5%
Yes	3	27.3%
No - And we are not interested	2	18.2%

Q37-Maintain Active Quality Program	N	%
Yes	9	81.8%
No	2	18.2%

Q38 - Provider of Continuous Quality Monitoring and Feedback	N	Percent
Internal (Self)	8	88.9%
Base Station Hospital	6	66.7%
Other:	1	11.1%

Q39-Quality Program: Chart/Case Review	N	%
Yes - Randomized Review of greater than or equal to 50% of EMS calls	3	33.3%
Yes - Randomized Review of less than 50% of EMS calls	3	33.3%
Yes - 100% review of all EMS calls	2	22.2%
Yes - Only specific calls when issue(s) arise	1	11.1%

Q40-Quality Program: Other Metrics	N	%
Yes - Combination of System Performance and Clinical Metrics	7	77.8%
No	2	22.2%
Yes - System Performance Metrics (for example, average response times to scene)	0	0.0%
Yes - Clinical Metrics (for example, application of oxygen to SOB patients)	0	0.0%

Q41-Type of PCR	N	%
All Electronic Records (full ePCR)	7	63.6%
Paper Field Reports later converted into Electronic Files/Databases (partial ePCR)	2	18.2%
All Paper Records	2	18.2%

Q42-ePCR Platform/Vendor	N	%
Xerox (i.e. FIREHOUSE)	0	0.0%
Zoll (i.e. RescueNet)	1	11.1%
ImageTrend (i.e. EMS Bridge)	3	33.3%
Starwest Tech (i.e. Zoi)	0	0.0%
Other:	5	55.6%

Q43-ePCR: Receiving Hospital Access	N	%
Yes - Some receiving hospitals have access	4	44.4%
No - Receiving hospitals do not have access	3	33.3%
Yes - All receiving hospitals have access	2	22.2%

Q44-PCR Left at Receiving Hospital when Patient Transferred	N	%
Yes - Immediate: Printed (whether printed on site or sent to fax and printed)	5	62.5%
No - A report is sent to the facility after time of patient transfer (within 24 hours)	2	25.0%
Yes - Immediate: Hand-written	1	12.5%
Yes - Immediate: Transmitted Electronically (not printed/faxed, etc. - No paper - Actual full data merger)	0	0.0%
No - A report is sent to the facility after time of patient transfer (after 24 hours)	0	0.0%
No - A report is never sent/delivered to the receiving facility	0	0.0%

Q45-Submit Data to AZ-PIERS	N	%
Yes	5	55.6%
No	4	44.4%

Q46-Relationship with Receiving Hospital	N	%
More Positive than Negative	6	75.0%
Always Negative	1	12.5%
Neutral	1	12.5%
Always Positive	0	0.0%

Q47-Nearest Hospital when Transporting Routine Patients	N	%
White Mountain Regional Medical Center	2	28.6%
varies	1	14.3%
Holy Cross Hospital, Nogales Az.	1	14.3%
Banner Page	1	14.3%
CARONDELET HOLY CROSS HOSPITAL	1	14.3%
Chandler Regional	1	14.3%

Q48-Hospital Critical/High Acuity Medical Patients	N	%
UMC Tucson	1	14.3%
Banner UMC-Tucson	1	14.3%
Summit Healthcare Regional Medical Center	1	14.3%
Banner Page or Air transport to Flagstaff Medical Center	1	14.3%
BANNER UNIVERSITY MEDICAL CENTER	1	14.3%
Summit Healthcare	1	14.3%
Mercy Gilbert	1	14.3%

Q49-Hospital Critical/High Acuity Trauma Patients	N	%
UMC Tucson	1	14.3%
Banner UMC-Tucson	1	14.3%
Good Sam	1	14.3%
Banner Page or air transport to Flagstaff Medical Center	1	14.3%
BANNER UNIVERSITY MEDICAL CENTER	1	14.3%
Level I Trauma Center / Flown from scene	1	14.3%
Chandler Regional	1	14.3%

Q50-Critical/High Acuity Medical Patients Mode of Transport	N	%
More Likely via Air	4	57.1%
More Likely via Ground	3	42.9%

Q51-Critical/High Acuity Trauma Patients Mode of Transport	N	%
More Likely via Air	7	87.5%
More Likely via Ground	1	12.5%

Q52-Contact Receiving ED Directly when transporting	N	%
Yes - Via cell phone	7	87.5%
No - No pre-notification is made to a receiving facility	1	12.5%
No - Personnel contact third-party (i.e. call center) who then contacts hospital	0	0.0%
Yes - Via radio	0	0.0%
Yes - Via computer-based text	0	0.0%

Q53-Interfacility Transport	N	%
Yes - Both emergency and non-emergency interfacility	4	50.0%
No - We only transport from scene to hospital	3	37.5%
Yes - Emergency interfacility only	1	12.5%

Q54-Primary Method of Dispatch	N	%
Computer-Assisted Dispatch (CAD) without GPS Location	6	54.5%
Combination of Pager, Telephone, Radio but no CAD	2	18.2%
Full Computer-Assisted Dispatch with GPS Location	1	9.1%
VHF/UHF Radio Only	1	9.1%
Other:	1	9.1%
Pager/Beeper Only	0	0.0%
Telephone Only	0	0.0%

Q55 - Communication Devices in Service	N	Percent
Simple VHF Radios	8	72.7%
Cellular Telephones	6	54.5%
Trunked Radio System	5	45.5%
Pagers/Beepers	4	36.4%
Simple UHF Radios	3	27.3%
Computer-Based Text Communication (i.e. Instant Messaging)	2	18.2%
Self-Contained Deployable Communications System (i.e. stand-alone system for disaster)	2	18.2%
Other:	1	9.1%

Q56-Communication Dead-Spots in your Service Area	N	%
Yes	8	72.7%
No	3	27.3%

Q57-Priority Dispatch System	N	%
No	6	54.5%
Yes	5	45.5%

Q58-Dispatchers EMD Certified	N	%
No	6	54.5%
Yes - All	3	27.3%
Yes - Some	2	18.2%

Q59-Dispatch:Tele-printers or Telecommunication Device for the Deaf	N	%
Yes	6	54.5%
No	5	45.5%

Q60-Dispatch:Bilingual Dispatchers	N	%
No	5	45.5%
Yes - staffed less than 24/7	4	36.4%

Q60-Dispatch:Bilingual Dispatchers	N	%
Yes - staffed 24/7	2	18.2%

Q61-Dispatch: Language Line for Translation Services	N	%
No	6	54.5%
Yes - available 24/7	4	36.4%
Yes - available less than 24/7	1	9.1%

Q62-Regular Maintenance/Repair for EMS Vehicles	N	%
Yes	8	72.7%
No	3	27.3%

Q63-Vehicles Equipped with GPS/Location Tracking	N	%
No	6	54.5%
Yes - Some	3	27.3%
Yes -All	2	18.2%

Q64-EMS Vehicle by Category	BLS		ALS		Total
	N	%	N	%	
Utility Vehicle - Non Ambulance	7	46.7%	8	53.3%	15

Fire Apparatus - Non Ambulance	37	94.9%	2	5.1%	39
Licensed Ground Ambulance	27	47.4%	30	52.6%	57
Licensed Air Ambulance	0	0.0%	0	0.0%	0

Q65-EMS Ground Ambulances Need Replaced	N	%
Yes	5	45.5%
N/A - Agency does not have any EMS Ground Ambulances	4	36.4%
No	2	18.2%

Q66-EMS Air Ambulances Need Replaced	N	%
N/A - Agency does not have any EMS Air Ambulances	10	90.9%
Yes	1	9.1%
No	0	0.0%

Q67-EMS Fire Apparatus - Non Ambulance Need Replaced	N	%
Yes	5	45.5%
N/A - Agency does not have any EMS Fire Apparatus - Non Ambulance	5	45.5%
No	1	9.1%

Q68-EMS Utility Vehicle - Non Ambulance Need Replaced	N	%
Yes	7	63.6%
No	2	18.2%
N/A - Agency does not have any EMS Utility Vehicle - Non Ambulance	2	18.2%

Q69 - Additional EMS Vehicles Needed	N	Percent
Yes - EMS Ground Ambulance	4	36.4%
No	3	27.3%
Yes - EMS Fire Apparatus (Non Ambulance)	3	27.3%
Other:	1	9.1%
Yes - EMS Utility Vehicle (Non Ambulance)	1	9.1%

Q70-Regular Maintenance/Repair Plan for EMS Equipment	N	%
Yes	8	72.7%
No	3	27.3%

Q73 - Brand/Type of ALS Cardiac Monitors Front-line	N	Percent
Phillips - HeartStart MRx	4	50.0%
Zoll - E Series	4	50.0%
Zoll - M Series	2	25.0%
Zoll - X Series	1	12.5%

Q74 - Capabilities of ALS Cardiac Monitors	N	Percent
12-lead ECG	8	100.0%
Blood-Pressure (NiBP)	8	100.0%
Defibrillation	8	100.0%

Q74 - Capabilities of ALS Cardiac Monitors	N	Percent
External Pacing	8	100.0%
Pulse Oximetry (SpO2)	8	100.0%
3-lead ECG	7	87.5%
End-Tidal Carbon Dioxide (ETCO2)	7	87.5%
Synchronized Cardioversion	7	87.5%
CPR Quality Feedback	5	62.5%
Data Transmission to Receiving Facility (Vitals/ECG/etc.)	5	62.5%

Q89 - Type of General Splints Used	N	Percent
Air splints	4	36.4%
Cardboard splints	8	72.7%
Other:	4	36.4%
Vacuum splints	1	9.1%
Wooden splints	1	9.1%

Q71-94: EMS Equipment/Protocols Used	Yes	No
BLS-AEDs	81.8%	18.2%
Portable ALS Cardiac Monitors	72.7%	27.3%
Stand-alone SpO2 Monitors	72.7%	27.3%
Stand-alone ETCO2 Monitors	0.0%	100.0%
CPAP Devices	54.5%	45.5%
Supraglottic Airway Devices	81.8%	18.2%
Protocols Include RSI/PAI Endotracheal Intubation	9.1%	90.9%
Protocols Authorize Surgical Airways	72.7%	27.3%
Transport Ventilators/Portable Ventilators	27.3%	72.7%
Chest-seals for Open Pneumothorax	72.7%	27.3%
Chest-needle Decompression for Tension Pneumothorax	72.7%	27.3%

Automated Chest Compression Device for CPR	18.2%	81.8%
Commercial Tourniquets and/or Junctional Compression for Hemorrhage Control	81.8%	18.2%
Hemostatic Agents for Hemorrhage Control	18.2%	81.8%
Intraosseous Devices	81.8%	18.2%
Pelvic Binders	54.5%	45.5%
Traction Splints	90.9%	9.1%
Cervical Collars	90.9%	9.1%
Backboards	90.9%	9.1%
Protocols allow for Field Clearance of Spinal Immobilization/Selective Immobilization	63.6%	36.4%
Devices to Maintain Body Temperature	90.9%	9.1%

Q95-CBRNE Event Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	8	72.7%
None - Our agency is fully prepared to respond to CBRNE events	2	18.2%
Specialized Education/Training	1	9.1%

Q96-Mass Casualty Incident Assistance	N	%
Combination of Specialized Equipment and Specialized Education/Training	7	63.6%
None - Our agency is fully prepared to respond to CBRNE events	3	27.3%
Specialized Education/Training	1	9.1%
Specialized Equipment	0	0.0%

Q97-Employ Specially-trained Tactical EMS Personnel	N	%
No	10	90.9%
Yes	1	9.1%

Q98-Specific Active Shooter Response Plan/Inter-agancy Coordination	N	%
No	7	63.6%
Yes	4	36.4%

Q99-Community Routinely Train/Rehearse Active Shooter Response Plan	N	%
No	3	75.0%
Yes - Once a year	1	25.0%
Yes - Twice a Year	0	0.0%

Q100 - Public Awareness and Educational Programs in Community	N	Percent
CPR	9	81.8%
Car Safety Seat Education	6	54.5%
Domestic Violence Awareness and/or Prevention	6	54.5%
Suicide Prevention	6	54.5%
Substance Abuse Awareness	5	45.5%
Advanced Directives / DNRs	4	36.4%
Mental Health Awareness	4	36.4%
Injury Prevention (General)	3	27.3%
Seat Belt Awareness	3	27.3%
Child Safety (i.e. Risk Watch/Safe Kids)	2	18.2%
Disease Management	2	18.2%

Q100 - Public Awareness and Educational Programs in Community	N	Percent
EMS Bystander Education (i.e. First There/First Care)	2	18.2%
Other:	2	18.2%
Water Safety	2	18.2%
Helmet Safety	1	9.1%
None	1	9.1%

Q101-Currenlty have Community Paramedicine/Mobile Integrated Health Program	N	%
No	8	72.7%
Yes	3	27.3%

Q102-Interested in Developing a Community Paramedicine/Mobile Integrated Health Program	N	%
Yes	6	75.0%
No	2	25.0%

Q103 - Specific Need by priority	Priority Score
Education/Training	29
Equipment/Supplies	23
Personnel	18
Vehicles	17
Funding	10

Other	7
Facilities	2

Arizona MIH/CIP Data Crosswalk Project

Manuscript by Taylor A. George MHS, NR-P*

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Matthew Eckhoff MPH, Les Caid MSL, Melanie Mitros PhD,**
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Executive Summary

Arizona is on the front line of the national Mobile Integrated Healthcare (MIH) movement with approximately 30 Community Integrated Paramedicine (CIP) programs statewide (including those in development), a number that seems to be growing almost every day. Early results of Arizona's community paramedicine programs show promise in achieving the 'Triple Aim' of healthcare reform: costs are going down, patient satisfaction is going up, and the overall health of the communities' populations is improving.

The Crosswalk Project (this publication) is intended to identify currently-collected data elements and assess common themes and core metrics among Arizona's CIP programs while also identifying gaps in data collection; with the goal being an actionable document that can be used as an advocacy tool to promote uniform core data collection among Arizona's CIP programs.

To initiate the Crosswalk Project, an electronic survey was distributed to Arizona Fire/EMS agencies with some type of involvement in CIP. Agencies were asked to provide information regarding (a) CIP Program Type, (b) Data Collection Methods, (c) Data Metrics Collected, and (d) Outcomes Measured. Of those contacted, 27 agencies participated, with 16 of those 27 indicating current/ongoing CIP programs. Results of this survey can be seen in the attached Tables, with detailed analysis and discussion found throughout this document. A review of this information will show the lack of standardization in Arizona CIP data - with a wide variety of metrics collected and fluctuation in collection practices between Arizona CIP programs.

We posit that in order to achieve functional sustainability and self-sufficiency in the new world of Value-Based Purchasing, all of the state's CIP programs should move towards the collection of standardized data sets and standardized outcomes measurements. These data sets and outcomes measurements should be a combination of state/region-specific metrics combined with consensus-based metrics that include the national MIH/CP Outcome Measures Project, as well as Centers for Medicare and Medicaid Services (CMS) Quality Measures, Institute of Medicine (IOM) Quality Domains, Institute for Healthcare Improvement (IHI) Triple Aim Measures, and other relevant validated patient-centered health outcomes evaluative tools. All data sets and outcomes measurements should be targeted evaluation metrics used to show alignment with and achievement of the IHI Triple Aim.

Background and Introduction

In the modern healthcare landscape, innovation and integration are key to achieving the Triple Aim[1] of (1) improving the health of populations, (2) improving the patient experience of care, and (3) reducing and/or controlling per capita cost. In no other corner of healthcare are these efforts more apparent as in Emergency Medical Services (EMS) systems. The Fire/EMS industry is transforming itself in a revolutionary manner, transitioning from a pure "you call, we haul" emergency response model into a comprehensive system of Mobile Integrated Healthcare[2] (MIH) - taking a patient-centered approach to delivering a wide range of health services in the out-of-hospital environment with full coordination of a vast array of health and social services entities.

On the national stage, customized MIH programs have been developed to serve community-specific needs across the country and have proven to be "successful" when looking at projected financial metrics (primarily *cost avoidance*) and operational outcomes (such as decrease in ambulance utilization). For example, a modelled high-frequency user program in Fort Worth, TX resulted in a significant decline in ambulance and emergency department use over a one year period, resulting in a charge decrease of $1.9 million and a freeing-up of ~14,000 bed hours;[3] a modelled mental health and substance abuse alternative destination program in Wake County, NC resulted in freeing 2,400 emergency department bed hours within the first six months of program implementation by transporting 167 patients to more appropriate facilities;[4] and a modelled full-spectrum comprehensive system in Reno targeted frequent users, alternative destinations, and a nurse triage line, with 18 months of preliminary data suggesting that the program has reduced the number of unnecessary emergency department visits by 1,795, reduced unnecessary ambulance transports by 354, and prevented 28 hospital readmissions - altogether totaling approximately $7.9 million in charge avoidance and saving a projected $2.8 million in Medicare payments.[5]

But the question remains: What is the long-term impact of these programs and how does the Fire/EMS industry create MIH sustainability and self-sufficiency? Up to this point, many - if not most - major MIH programs have been grant-funded or self-funded with limited timelines and/or pilot phases. At some point these financial streams will end, but the transformative MIH programs should not. In order to move forward, the MIH movement must become a standardized practice that is outcomes-oriented in-line with the evolving healthcare industry. It will no longer be enough to simply monitor financial and operational implications, we *must* show our impact on patient-specific health outcomes that influence the population health status while subsequently proving that our delivery mechanism(s) enhance the patient experience and reduce total cost.

Arizona MIH/CIP Programs

Arizona is on the front line of the national MIH movement with approximately 30 Community Integrated Paramedicine (CIP) programs[6] statewide (including those in development), a number that seems to be growing almost every day. In February 2016, St. Luke's Health Initiatives (now Vitalyst Health Foundation) published a Policy Primer[6] that reviewed the backgrounds and operational priorities of our state's 6 largest programs (Buckeye, Chandler, Mesa, Rio Rico, Scottsdale, and Tempe). The conclusionary statement of the primer summed-up our state's efforts well: *"Early results of Arizona's community paramedicine programs show promise in achieving the 'Triple Aim' of healthcare reform. Costs are going down, patient satisfaction is going up, and the overall health of the communities' populations is improving"*.

Arizona MIH/CIP Data Crosswalk

The Arizona MIH/CIP Data Crosswalk Project (this publication) is not simply a re-hashing of the generalized program attributes discussed in the aforementioned policy primer; instead, we will be diving deep into the primer's conclusionary statement - examining what it means when we say "*results*", and discussing the implications for sustainability and self-sufficiency. The Crosswalk Project is intended to identify currently-collected data elements and assess common themes and core metrics among Arizona's CIP programs while also identifying gaps in data collection.[7] The goal of this publication is to be an actionable document that can be used as an advocacy tool to promote uniform core data collection among Arizona's CIP programs.[7]

To initiate the Crosswalk Project, an electronic survey was distributed to Arizona Fire/EMS agencies via a private MIH/CIP contact list maintained by Vitalyst Health Foundation and Rio Rico Medical & Fire District. Agencies were asked to provide information regarding (a) CIP Program Type, (b) Data Collection Methods, (c) Data Metrics Collected, and (d) Outcomes Measured. While an attempt was made to include all Arizona agencies involved in CIP in any capacity, not all agencies responded to the survey questionnaire. Of those contacted, 27 agencies participated, with 16 of those 27 indicating current/ongoing CIP programs. Results of this survey can be seen in the attached Table 1 - Survey Data General Overview.

For those respondents that indicated current/ongoing CIP programs, a request was sent to the agency point of contact to provide detailed information (to include forms, specific metrics, etc.) relating to data collection practices. This information was requested in order to compile a listing of line-item metrics being collected by programs across the state. Of those 16 agencies, 7 responded with the

requested information prior to the established deadline. Research staff performed an analysis of all documentation received and aggregated it into the attached Table 2 - Detailed Data Collection Metrics.

For validity's sake, it is important to note that not all agencies contacted actually participated; and that not all agencies who participated were able/willing to share/disclose all requested information. As such, the associated analysis and following comprehensive report could only include the information that was received; thus, we acknowledge the fact that there may be programs and/or specifics that we are not aware of and/or were not able to take in to account.

Arizona CIP Data Collection Methods and HIE Implications

As can be seen in Table 1 - Survey Data General Overview, 7 different data collection platforms are employed by the participating agencies who indicated current/ongoing CIP programs. Of the 14 agencies who indicated current/ongoing CIP programs and who provided information for this category: 9 agencies utilize one of five commercial EMS-based Electronic Patient Care Report (ePCR) platforms [64.29%]; 2 agencies utilize commercial clinical practice Electronic Health Records (EHR) [14.29%]; and 3 agencies utilize paper reports that are later entered into a proprietary in-house database [21.43%].

Of those agencies utilizing an ePCR suite, Zoi has the highest frequency with 4 agencies using; followed by ImageTrend and Zoll, each with 2 agencies using; and ESO Solutions with 1 agency using. Zoi, ImageTrend, and Zoll all offer CIP -specific applications for enhanced data collection;[8-10] while ESO is currently in transition from a traditional ePCR platform to a full EHR.[11] The key distinction between traditional EMS ePCR platforms and an EHR or ePCR with CIP widget is the user interface and record-keeping design being patient-centric with the latter two, versus incident-centric with the former.[10] In the landscape of CIP, the ability to maintain patient-centric electronic data is key to integrated service delivery; with *integration* being used to describe the programmatic ability to interface with other health services databases - such as hospitals, primary care offices, mental/behavioral health facilities, etc. All of the reviewed EHRs and ePCRs with an CIP widget claim the ability to be fully integrated into the care spectrum;[8-13] however, based on our interpretation, those platforms that are EMS/ CIP -specific appear to maintain the greatest spectrum of interoperability and boast the widest array of Health Information Exchange (HIE) applications for our industry.

HIE allows for secure real-time electronic transmission of health-related data across multiple organizations and charting platforms, providing more effective continuity of care and data sharing.[14] To achieve this level of interoperability, it is important that CIP programs verify that their electronic data collection platforms are "HL7 Compliant"[15], meaning that the platform is able to *translate* its electronic

data into the latest version of electronic health language for distribution to outside platforms. All of the reviewed EHRs and ePCRs with an CIP widget claim this capability. As the CIP movement continues to advance, HIE capability will play a vital role in our industry's ability to achieve the Triple Aim[1], as well as our industry's ability to fully integrate into the Arizona HIE Strategic Plan.

While states across the country are in various stages of HIE development and EMS data integration, in 2011 the Arizona Governor's Office of Health Information Exchange (GOHIE) established a strategic plan[16] with a vision to "*implement a sustainable statewide Health Information Exchange (HIE) that enables the sharing of health care data across organizational boundaries to improve patient safety, security, quality, and cost*". As of this writing, the Arizona HIE captures ~90% of hospital discharge data and continues to build its infrastructure for the integration of community providers, with 3 Fire-based EMS agencies already linked and many others interested.[17] Per Arizona HIE staff, there are a variety of benefits for EMS/ CIP providers, including: (a) improved utilization of the 911 system by way of communication with a patient's primary care provider or linkage to appropriate navigation resources; (b) supporting coordination of post-acute care; (c) ability to use patient health information to support patient management during out-of-hospital encounters, including primary care information, discharge instructions, and pharmacy information; (d) ability to communicate in a secure manner with a patient's health care providers; and (e) bidirectional linkage of EMS/ CIP and hospital outcome data (see Figure 1 - EMS & Arizona HIE).[17,18] In addition, the power of HIE can also be harnessed to identify likely candidates for CIP enrollment via monitoring of patient and population health data; such as is successfully being accomplished in Maricopa County by the Health Services Advisory Group (HSAG) in partnership with local Fire/EMS agencies.[19]

Arizona CIP Data Metrics Collected and Outcomes Measured - Overview

As can be seen in Table 1 - Survey Data General Overview, agencies were asked to indicate which general categories of data metrics that they currently collect and monitor. Of the 14 agencies who indicated current/ongoing CIP programs and who provided information for this category: 10 indicated collection of patient referral information [71.43%]; 14 indicated collection of patient demographic information [100%]; 11 indicated collection of patient satisfaction information [78.57%]; 11 indicated collection of medication adherence information [78.57%]; 5 indicated collection of pre-enrollment healthcare utilization information [35.71%]; 11 indicated collection of enrollment period healthcare utilization information [78.57%]; and 4 indicated collection of post-enrollment healthcare utilization information [28.57%].

As can be seen in Table 1 - Survey Data General Overview, agencies were then asked to indicate which general categories of outcomes measures they currently collect and monitor. Of the 16 agencies who indicated current/ongoing CIP programs and who provided information for this category: 13 indicated collection of EMS system utilization rates [81.25%]; 9 indicated collection of hospital readmission rates [56.25%]; 11 indicated collection of customer satisfaction information [68.75%]; 9 indicated collection of cost of care information [56.25%]; and 11 indicated collection of patient outcomes information [68.75%].

For those 16 agencies that indicated current/ongoing CIP programs in the general survey, a direct request was sent to the agency point of contact to provide detailed information (to include forms, specific metrics, etc.) relating to data collection practices. 7 agencies responded with detailed information prior to the established deadline and these results can be seen in Table 2 - Detailed Data Collection Metrics. A review of this table will show the wide variety of metrics collected and the fluctuation in collection practices between agencies.

Arizona CIP Data Metrics Collected and Outcomes Measured - Discussion

The goal of the Crosswalk Project is the compilation and analysis of Arizona CIP programs' data collection metrics and outcomes measures. We posit that in order to achieve functional sustainability and self-sufficiency in the new world of Value-Based Purchasing,[20] all of the state's CIP programs should move towards the collection of standardized data sets and standardized outcomes measurements. These data sets and outcomes measurements should be a combination of state/region-specific metrics combined with consensus-based metrics that include the national MIH/CP Outcome Measures Project,[21] as well as Centers for Medicare and Medicaid Services (CMS) Quality Measures,[22] Institute of Medicine (IOM) Quality Domains,[23] Institute for Healthcare Improvement (IHI) Triple Aim Measures,[24] and other relevant validated patient-centered health outcomes evaluative tools. All data sets and outcomes measurements should be targeted evaluation metrics used to show alignment with and achievement of the previously-discussed Triple Aim[1].

In order to mold Arizona's CIP programs into a fully-functioning Triple Aim Enterprise[25] (see Figure 2 - Design of a Triple Aim Enterprise), we must begin by defining what "*quality*" means to our industry and our patients. We think it is fair to say that our industry's meaning of quality should be equivalent to that of the rest of healthcare - in that outside of system performance metrics and measurements of projected cost avoidance (historical MIH/CIP data capture), we must truly begin to focus on the health outcomes of individual patients and community populations combined with their

experience of care. At our core, Arizona's CIP programs combine health care, public health, and social services while impacting individuals/families, primary care, integration, cost reduction, and prevention / health promotion - all of the key tenants of a successful Triple Aim Enterprise.[25] We just need to hone our system-level quality metrics in order to *prove* it. We believe that Arizona's CIP programs are on the right path and we look to continue towards achieving 100% core data capture in all data collection categories and outcomes measurements discussed throughout this publication (and as seen in the attached tables).

Patient Referral Information and Patient Demographics are necessary for identifying our patients and for understanding where they are coming from and why - in this sense, we can better identify some of the root-causes of our patient care interactions while maintaining a point of contact for future follow-up, with both the individual patient and the source(s) that referred them. This helps provide loop closure for our care cycle.

Collection of Medication Adherence information should be performed for all patients enrolled in CIP programs, as this information directly ties to the Aims[1] of Population Health and Per Capita Cost. Medication Adherence is defined as "*the patient's conformance with the provider's recommendation with respect to timing, dosage, and frequency of medication-taking…*".[26] In essence, CIP programs should be verifying that patients are following the pharmacological plan of care as prescribed by their physician(s). The Centers for Disease Control and Prevention (CDC) estimate that 20%-30% of prescriptions are never filled; and that of those filled, ~50% of patients do not adhere to full continuity.[26] This can be inferred to have a possible direct causal relationship with decompensating health status and/or exacerbation of health conditions leading to EMS/ CIP patient contact;[27] thus medication adherence is equivalent to preventative measures for our industry. In addition, verifying medication adherence can also impact projected cost reductions as non-adherence is estimated to cost ~$2,000 per patient[26] in annual physician visits. It is important to note that Medication Adherence *is not* Medication Reconciliation. Medication Reconciliation refers to the process of avoiding inconstancies in pharmacological therapy across multiple providers and transitions in care, thus acting to prevent adverse drug events.[28] Medication Reconciliation includes an in-depth review and comparative analysis of medications; and as such, should only be performed by a physician or pharmacist. For further information regarding Medication Adherence and Medication Reconciliation, Arizona CIP programs can contact Dr. Kelly Boesen with the Arizona Poison and Drug Information Center (AzPDIC).[29] AzPIC provides services to all 14 Arizona counties outside of Maricopa, and is currently providing ongoing medication management support to patients enrolled in Santa Cruz County CIP programs.[30]

While a majority of Arizona CIP programs indicated collection of CIP Enrollment Period Healthcare Utilization Information, less than half of the agencies collect Pre-Enrollment and/or Post-Enrollment Healthcare Utilization Information. It is important for all agencies to collect all 3 phases of utilization data in order to longitudinally track/compare usage rates before, during, and after enrollment - thus possibly verifying the impact of CIP programs on access/usage of care. Agencies can look to simply track: (a) number of EMS calls; (b) number of ED visits; (c) number of inpatient admissions; and (d) number of PCP visits - looking at 6 months pre-enrollment, during the course of enrollment, and 6 months post-enrollment. In addition to simple rates of utilization, these metrics factor heavily into cost of care projections - be it cost avoidance or cost effectiveness (avoiding unnecessary ambulance transport and ED visits, avoiding hospital readmission penalties, administering medications in-home rather than in-hospital, etc.). As such, Healthcare Utilization Information directly ties to the Aims[1] of Population Health and Per Capita Cost.

Patient Satisfaction / Customer Satisfaction information is also necessary for all CIP programs to capture because these data metrics directly impact the Aim[1] of Experience of Care. The only true way to collect this metric is to directly ask patients (or their caretaker/family) about their experience(s) with CIP programs. This can be achieved on an episodic basis or at the conclusion of the full enrollment period. In the brick and mortar healthcare environment, patient satisfaction is not only tied to 25% of reimbursement under Value-Based Purchasing for FY2016,[31] it has also been shown to correlate with patient outcomes.[32] According to IHI, Experience of Care should be measured via (a) standard questions from patient surveys; and/or (b) set of measures based on key IOM dimensions.[23,24] Of the 7 agencies that provided detailed information to the Crosswalk Project, 4 indicated the use of follow-up patient surveys. Upon review, these surveys appear to meet the minimums established by IHI; however, we would like to note that Mesa Fire & Medical Department appears to be the only participating agency using an EMS/ CIP -based version of the standardized HCAHPS survey (Hospital Consumer Assessment of Healthcare Providers and Systems)[33] promulgated by CMS. HCAHPS is a validated patient experience surveillance tool that is currently tied to hospital reimbursement; and as such, we believe this to be an invaluable tool for CIP programs to measure Experience of Care because findings can be interpreted synonymously with hospitals, further integrating our care methodology into the greater healthcare landscape.

Last, but definitely not least, and arguably more important than all - Patient Outcomes. This is what we are here for… This is what our industry was founded on… *Improving and Saving Lives*. While almost 70% of participating agencies with current/ongoing CIP programs indicated collection of Patient

Outcomes information, with only 7 agencies providing limited detailed information upon request, it is difficult to fully determine the level and specificity of patient outcomes tracked. Patient Outcomes should ideally refer to changes in patient health/functional status as a result of enrollment in an Arizona CIP program - which directly corresponds with the Aim[1] of Population Health. Per IHI,[24] Population Health should be measured via: (a) validated health evaluation tools, such as SF-12,[34] HRQOL-14,[35] DQOL-B,[36] Minnesota Living with Heart Failure Questionnaire,[37] etc.; (b) composite health risk appraisal score; (c) disease burden, incidence, and prevalence; and (d) mortality. For our purposes, this can be condensed-down to the need to collect pre- and post- enrollment disease-specific biometric/vitals data and disease-specific quality of life data along with the previously discussed healthcare utilization information metrics. In brick and mortar institutions, direct/specific patient outcomes measures constitute 40% of reimbursement under the Value-Based Purchasing model for FY2016.[31] At this time, based on the limited information received, it appears that Rio Rico is the only agency monitoring disease-specific patient outcomes utilizing validated measurement tools. *We posit that the primary driver in MIH/CIP sustainability and self-sufficiency will be showing that we can directly impact disease-specific patient/population-level health outcomes at a reduced per capita cost.*

National MIH/CP Outcome Measures Project

The National MIH/CP Performance Measures Project is a national consortium of administrative and clinical experts involved in MIH programs across the country who have come together to "*describe performance measures which encourage achieving the optimum sustainability and utilization of patient centered, mobile resources in the out-of hospital environment and achiev[ing] the Institute for Healthcare Improvement's Triple Aim*".[21] Active project participants from Arizona include: Arizona Department of Health Services; Chandler Fire, Health, & Medical Department; Mesa Fire & Medical Department; The University of Arizona; and Vitalyst Health Foundation (formerly St. Luke's Health Initiatives) - with Dr. Gary Smith of Mesa Fire & Medical being a member of the *Core Measures Mastermind Group*.[38] The prime driver of the project is the development of uniform measurement tools in order to build an evidence base for sustainability.[39] Arizona CIP programs should strive to model their minimum core data metrics off of those provided by this consortium.

The National MIH/CP Performance Measures Project has created a publically-accessible MIH Measurement Strategy Overview[40] that clearly defines 44 MIH program measures. 18 of the measures are considered "Core Measures" and are defined as "*essential for program integrity, patient safety, and outcome demonstration*"; 4 of the measures have been identified by the Center for Medicare and

Medicaid Improvement as "*the four primary outcome measures for healthcare utilization*"; 4 of the measures are considered "*mandatory to be reported in order to classify the program as… bona-fide MIH…*"; and the remaining 18 measures have been identified by active MIH programs as being of "*highest priority to their healthcare partners*".[40]

Based on the limited detailed data received from Arizona CIP programs as part of the Crosswalk Project, it is difficult to evaluate our state's adherence to these consensus measures. As such, a truly valid exhaustive detailed review and comparison with the National MIH/CP Performance Measures Project is unable to be completed at this time. That being said, a general high-level analysis revealed the following discussion points.

9 of the 18 *Core Measures* fall under the domains of *Utilization* and *Cost of Care* - focusing on (a) ambulance transports, (b) ED visits, (c) hospital admissions/readmissions, and (d) the projected cost savings associated with all of the above.[40] An additional 5 of the 18 Core Measures fall under the domain of *Quality of Care & Patient Safety* - focusing on (a) primary care utilization, (b) care plan development, and (c) adverse outcomes.[40] As discussed in the previous section, while ~80% of Arizona CIP programs monitor EMS utilization, only ~55% monitor hospital admission/readmission and/or cost of care (see Table 1); and it appears that only 2 agencies specifically monitor primary care utilization (see Table 2). However, it is possible that agencies are monitoring these metrics as part of Healthcare Utilization Information (see Table 1), although only 4 agencies [25%] indicated monitoring all three phases of pre-, during-, and post- enrollment Healthcare Utilization Information - for which primary care, EMS, and hospital utilization fluctuations would also be associated. On a more positive note, out of the 7 agencies that provided detailed information to the Crosswalk Project, 5 appear to monitor care plan development and goals [71.43%] (see Table 2); but of concern is the fact that none of the 16 Arizona CIP programs appear to *specifically* track adverse outcomes as a result of CIP program intervention - although this could simply be a matter of adverse outcome monitoring being combined with Healthcare Utilization Information.

Conclusion

In the modern healthcare landscape, innovation and integration are key to achieving the Triple Aim[1] of (1) improving the health of populations, (2) improving the patient experience of care, and (3) reducing and/or controlling per capita cost. Arizona CIP programs are well on their way to successfully demonstrating their impact in those domains; however, work still remains to be done regarding data collection and outcomes measurements. We posit that in order to achieve functional sustainability and

self-sufficiency in the new world of Value-Based Purchasing,[20] all of the state's CIP programs should move towards the collection of standardized data sets and standardized outcomes measurements. These data sets and outcomes measurements should be a combination of state/region-specific metrics combined with consensus-based metrics that include the national MIH/CP Outcome Measures Project,[21] as well as Centers for Medicare and Medicaid Services (CMS) Quality Measures,[22] Institute of Medicine (IOM) Quality Domains,[23] and Institute for Healthcare Improvement (IHI) Triple Aim Measures[24]. Moving forward, we must show our positive impact on patient-specific health outcomes that influence the population health status while subsequently proving that our delivery mechanism(s) enhance the patient experience and reduce total cost. Then, and only then, will Arizona CIP programs have achieved sustainability and self-sufficiency.

TABLE 1 - SURVEY DATA GENERAL OVERVIEW

		Crosswalk Project Agencies with CIP/MIH Programs (including those in development)																										
		Avra Valley Fire	Buckeye Fire	Bullhead Fire	Central Arizona Fire	Chandler Fire	Colorado City Fire	Copper Canyon Fire	El Mirage Fire	Florence Fire	Golder Ranch Fire	Goodyear Fire	Green Valley Fire	Guardian Med Transport	Mesa Fire	North County Fire	Peoria Fire	Prescott Fire	Rio Rico Fire	Somerton - Cocopah Fire	Sun City Fire	Suprise Fire	Timber Mesa Fire	Tucson Fire	Verde Valley Ambulance	Verde Valley Fire	Yarnell Fire	Yuma Fire
Program Type(s)	None - N/A - Not Provided - In Development			X	X		X	X		X						X	X	X			X						X	X
	High Frequency 911 Utilizer Management	X				X			X			X			X				X	X				X	X			
	Readmission Avoidance Model	X	X								X	X		X	X				X	X			X		X	X		
	911 Triage / Alternate Response Model					X			X						X									X				
	Other MIH Model (i.e. NP/PA, Psych, etc.)												X		X					X		X						
Data Collection Method(s)	None - N/A - Not Provided - In Development															X		X		X			X				X	X
	ESO Solutions ePCR									X												X						
	High Plains ePCR						X																					
	ImageTrend ePCR			X	X			X																	X	X		
	MediTouch EHR														X													
	Practice Fusion EHR												X															
	Zoi ePCR		X			X						X		X			X				X							
	Zoll ePCR	X									X																	
	Paper (later entered into proprietary database)								X										X					X				
Data Collected	None - N/A - Not Provided - In Development			X	X				X	X						X		X			X		X				X	X
	Healthcare Utilization Info (Pre-Enrollment)													X			X		X	X				X	X			
	Healthcare Utilization Info (During Enrollment)	X	X								X		X	X			X		X	X		X		X	X	X		
	Healthcare Utilization Info (Post-Enrollment)													X			X		X					X	X			
	Medication Adherence	X	X			X					X	X		X	X		X		X	X					X	X		
	Patient Demographics	X	X			X	X				X	X	X	X	X		X		X	X		X		X	X	X		
	Patient Referral Info		X			X	X	X			X		X	X			X		X	X				X	X	X		
	Patient Satisfaction Info	X	X			X					X	X	X	X	X		X		X					X	X			
Outcome(s) Measured	None - N/A - Not Provided - In Development			X	X					X						X		X			X							X
	Cost of Care (Specific)	X				X					X		X	X	X		X		X	X		X						
	Customer Satisfaction	X	X			X		X			X	X	X	X	X		X		X					X	X			
	EMS System Utilization	X				X	X		X		X	X	X	X	X		X		X	X		X		X	X		X	
	Hospital Readmission Rates	X	X					X			X	X		X	X		X		X	X						X		
	Patient Outcomes (Specific)	X	X			X		X			X			X	X		X		X	X			X	X	X			

TABLE 2 - DETAILED DATA COLLECTION METRICS

		Crosswalk Project Agencies with CIP/MIH Programs (including those in development)																												
		Avra Valley Fire	Buckeye Fire	Bullhead Fire	Central Arizona Fire	Chandler Fire	Colorado City Fire	Copper Canyon Fire	El Mirage Fire	Florence Fire	Golder Ranch Fire	Goodyear Fire	Green Valley Fire	Guardian Med Transport	Mesa Fire	North County Fire	Peoria Fire	Prescott Fire	Rio Rico Fire	Somerton - Cocopah Fire	Sun City Fire	Suprise Fire	Timber Mesa Fire	Tucson Fire	Verde Valley Ambulance	Verde Valley Fire	Yarnell Fire	Yuma Fire
	None - N/A - Not Provided - In Development	X	X	X	X		X	X	X	X	X	X	X			X	X	X			X		X	X		X	X	X
Incident Data	Referral Source / Referral Date					X									X				X	X					X			
	Method of CIP Contact (In-Person, Phone, etc.)					X									X				X	X								
	Date of Service / Incident Date					X								X					X	X		X						
	Service Times																		X	X								
	Service Mileage																		X	X		X						
	Run Number / Incident Number					X								X								X						
	Patient Disposition / Incident Disposition					X								X	X				X	X		X			X			
	Patient Care Plan / Goals / Referrals					X								X	X				X	X								
	Narrative of Patient Encounter					X								X	X				X	X								
	Home Services / Billing Codes																			X								
	Follow-Up Patient Surveys					X									X				X						X			
Demographic Data	Patient ID Number / Medical Record Number					X																			X			
	Patient Social Security Number														X													
	Patient Name					X								X	X				X	X					X			
	Patient DOB					X													X	X					X			
	Patient Age					X									X				X			X						
	Patient Gender					X									X				X	X		X						
	Patient Race / Ethnicity														X				X	X								
	Patient Primary Language																		X	X								
	Patient Address														X				X	X					X			
	Patient Phone Number					X									X				X	X					X			
	Patient Email														X				X	X								
	Patient's Emergency Contact / Secondary Contact																		X	X								
	Patient Insurance Status / Insurance Information														X				X	X								
	Patient Primary Care Provider																		X	X					X			
	Patient Medical Home																			X								
	Patient Pharmacy Information																		X	X								
	Patient Education Level (School)																		X									
	Advanced Directive / Do Not Resuscitate																								X			
	Number of EMS Calls within 6 Months					X													X						X			
	Number of ED Visists within 6 Months					X													X									
	Number of Inpatient Admissions within 6 Months																		X									
	Number of PCP Visits within 6 Months					X																			X			
Vital Signs Data	Level of Consciousness / Neurologic Status													X					X						X			
	Heart Rate / Pulse Rate					X								X					X	X					X			
	Electrocardiogram (ECG)													X					X	X								
	Respiratory Rate					X								X					X	X					X			
	Lung Sounds					X													X	X								
	Supplemental Oxygen Status																								X			
	Pulse Oximetry (SpO2)													X					X	X					X			
	End-Tidal Carbon Dioxide (ETCO2)													X					X	X								
	FEV1 / FVC (Tiffeneau-Pinelli)													X					X	X								
	Blood Pressure					X								X					X	X					X			
	Blood Glucose Level / A1C					X								X					X	X					X			
	Temperature													X					X						X			
	Pain													X														
	Skin Assessment																		X	X								
	Height																		X									
	Weight					X								X					X	X					X			
Assessment / Evaluation Data	Disease Type(s) / Condition Type(s) / Diagnoses					X								X	X				X	X		X			X			
	Evaluation of Self/Family Care					X								X	X				X	X								
	Detailed Health History													X	X				X	X								
	Detailed Physical Exam													X					X	X								
	Allergies																		X	X					X			
	Current Medications / Medication Reconcile					X								X	X				X	X					X			
	Current Vaccinations / Vaccination Reconcile														X													
	Laboratory Specimines (Blood, Stool, etc.)																			X					X			
	Activities of Daily Living					X								X	X				X									
	Alcohol Use																		X									
	Tobacco Use																		X									
	Asthma Evaluation													X					X	X								
	Diabetes Evaluation													X	X				X	X					X			
	CHF Evaluation													X	X				X						X			
	COPD Evaluation													X	X				X						X			
	CPAP Evaluation														X				X	X								
	CVA Evaluation													X					X	X								
	Hypertension Evaluation																		X									
	Intravenous Access Evaluation																		X	X								
	MI Evaluation														X				X	X								
	Nutritional Evaluation					X													X	X								
	Physical Fitness / Exercise Evaluation					X																						
	Psychosocial Evaluation					X								X	X				X	X								
	Renal Failure Evaluation																								X			
	Sepsis / Infection / Wound Evaluation													X	X				X	X					X			
	In-Home Fall Risk Assessment / Home Safety													X	X				X	X					X			
	In-Home Environmental Assessment / Air Quality																		X	X								

FIGURE 1 - EMS & Arizona HIE[18]

Fire Service/Emergency Medical Services (EMS) & the Health Information Exchange (HIE)

Through connection to the HIE, fire-service based and other EMS providers may strengthen health system partnerships to transform the way patient care is delivered. HIE tools support fostering increased communication among providers and patients, improving the ability to access and analyze information, and reducing healthcare costs.

Select HIE Tools to Help Meet the IHI Triple Aim:

PORTAL ACCESS

Review Patient Health Information

- Recent Medical Events
- Medications/Rx Fill Data
- Reports: Radiology/Laboratory
- Discharge Information (ED/IP)
- Advanced Directives

ALERTS & NOTIFICATIONS

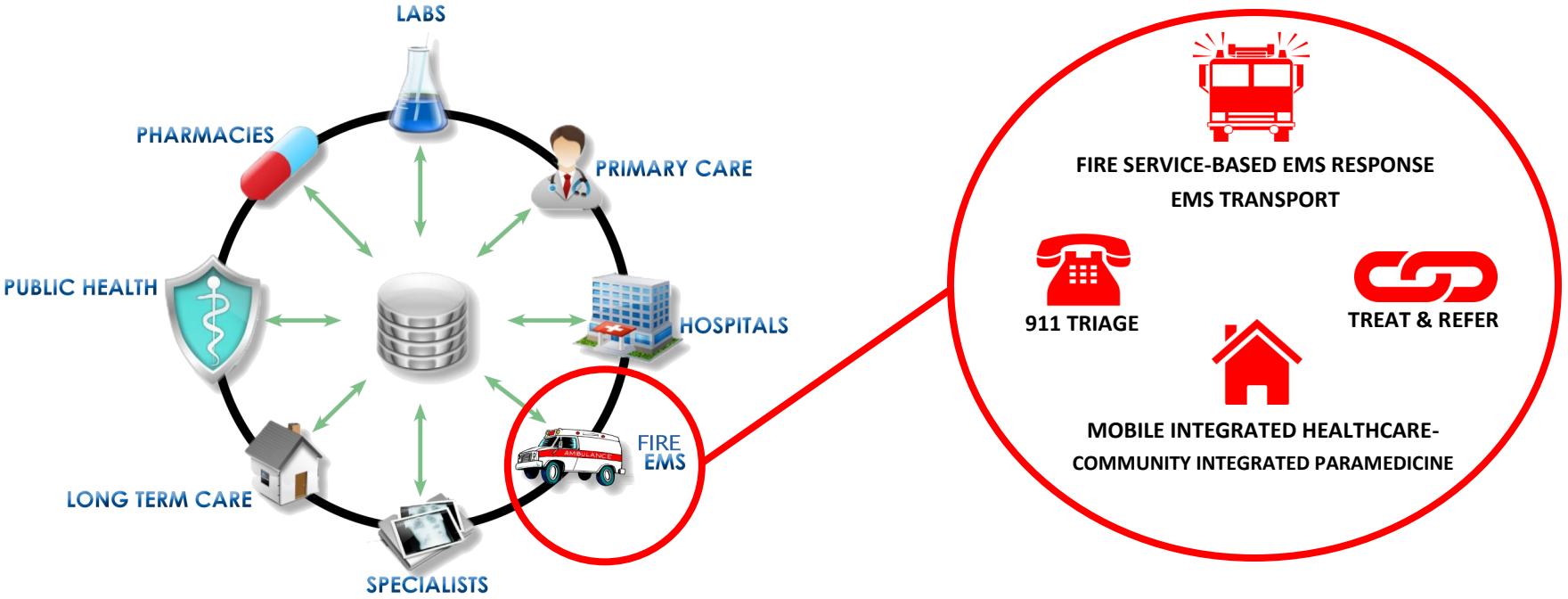
Stay Up to Date

- High Utilizer Tracking
- MIH-CP/High-Risk Tracking
- Health System Utilization
- Discharge/Transfer Updates

DIRECT SECURE EMAIL

Securely Communicate

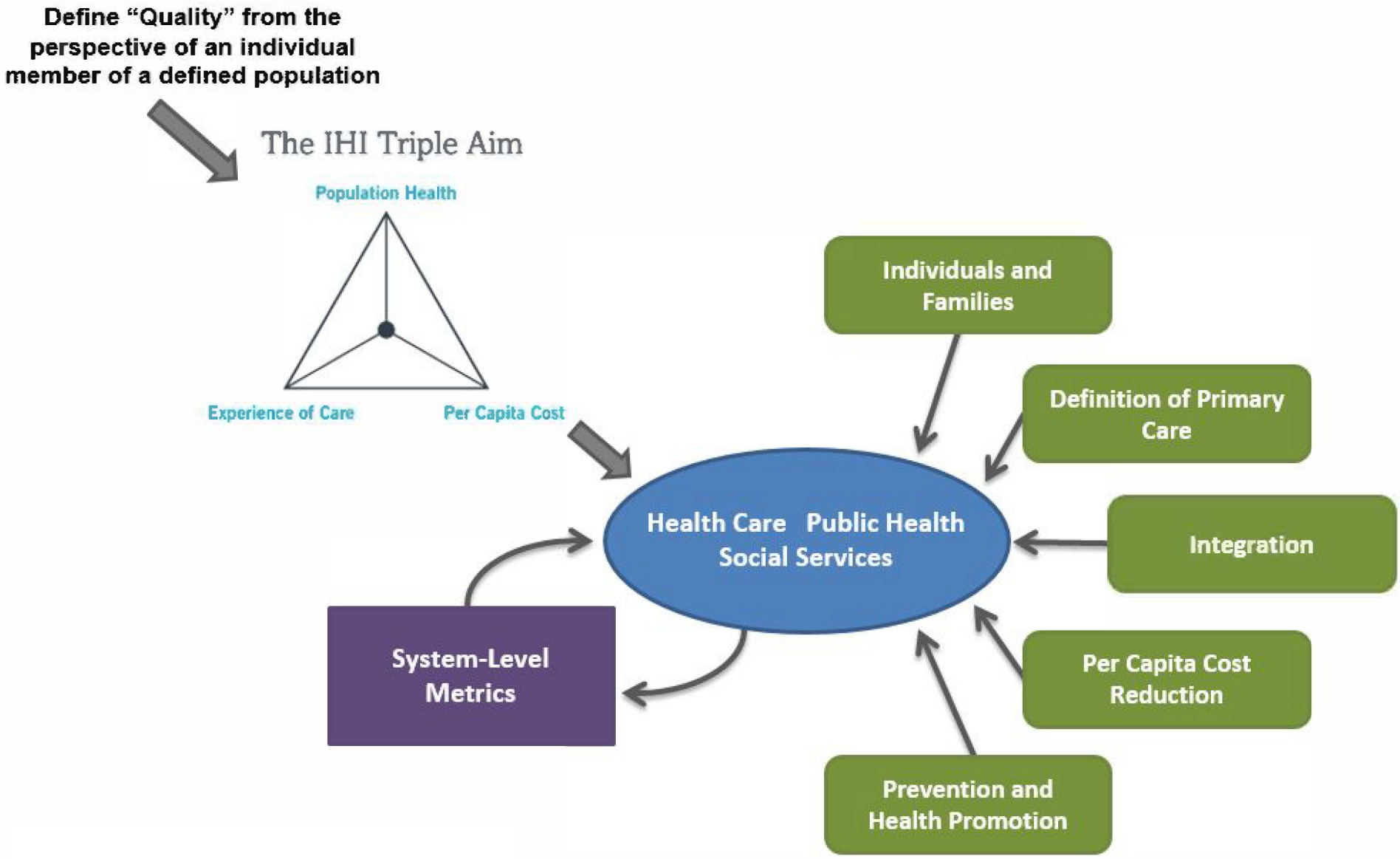
- Send/Receive Messages
- Send/Receive Referrals
- HIPAA-compliant



Arizona Health-e Connection is a public-private partnership that improves health and wellness by advancing secure and private sharing of electronic health information. A statewide non-profit, AzHeC drives the adoption and optimization of health information technology (HIT) and health information exchange (HIE).

Contact the Arizona Health-e Connection: 602.688.7200 | info@azhec.org | azhec.org

FIGURE 2 - DESIGN OF A TRIPLE AIM ENTERPRISE[23]



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