Preparing to Implement an Electronic Patient Care Records (EPCR) System

Lisa Jones, Phoenix Fire Department

Phoenix, Arizona

CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings or another.

Signed: _____

Abstract

The problem was the Phoenix Fire Department (PFD) utilizes a paper-based system to document medical encounters and patient transports. In order to secure funding for an electronic patient care records (EPCR) management solution, the Department was tasked with exploring the business processes to identify how an EPCR would impact the PFD. The purpose of this applied research project was to prepare a cross sectional review of current business processes in order to identify how an EPCR system would impact the various business functions within the Phoenix Fire Department. To achieve this, three questions were answered: What PFD Divisions have systems and/or procedures linked to the current paper-based system, what are the current state business processes within those Divisions, and how may those processes be made more efficient? Procedurally, data was collected by way of interviews with subject matter experts, focus group meetings and literature review. Literature review addressed how EPCR will impact service delivery through efficiencies and identified those benefits that can be expected. The results of this descriptive research demonstrates our understanding of our business processes and how they are interrelated. It is recommended that the PFD reconnect with City of Phoenix Information Technology Department to present the findings of this research project and move the implementation of EPCR to the next logical step, the selection of a vendor.

Keywords: electronic patient care records, business, analysis, data, fire service, work flow, paper-based, process, efficiency, documentation, electronic interventions, management, transmit, mobile computing, paper-based, process, analysis, pre-hospital, EPCR, PCR, EMS

Table of Contents

Abstract 3
Table of Contents 4
Background and Significance 5
Literature Review 11
Procedures 14
Results 18
Discussion 30
Recommendations 31
References 34
Appendices 36
Appendix A: PFD EMS Report 36
Appendix B: PFD Transport Ticket 37
Appendix C: Definition of Acronyms and Terms 38
Appendix D: Automatic Aid Patient Transfer of Care Detail 39
Appendix E: Photo 1 of storage area 41
Appendix F: Photo 2 of storage area 42
Appendix G: Interview with Todd Harms 43
Appendix H: Interview with Larry Contreras 44
Appendix I: Interview with Dr. John Gallagher 45
List of Figures 46
Figure 1: PFD Patient Care Record Cross Functional Diagram 46
Figure 2: ETS “as is” process flowchart 47
Figure 3: ETS “to be” process flowchart 48
Figure 4: Public Records “as is” process flowchart 49
Figure 5: Public Records “to be” flowchart 50

Preparing to Implement an Electronic Patient Care Records (EPCR) System

Electronic Patient Care Records (EPCR) has become the new norm in the fire service and the expected standard of care as it relates to documentation, tracking, and quality assurance. The problem is the Phoenix Fire Department (PFD) currently utilizes a paper-based system to document medical encounters and patient transports. In order to secure funding for an EPCR management solution, the PFD has been tasked with exploring the current business processes to identify how an EPCR will impact the PFD.

The purpose of this applied research project is to prepare a cross sectional review of current business processes in order to identify how an EPCR system will impact the various business functions within the Phoenix Fire Department. To achieve this, descriptive research was used to answer three questions:

1. What PFD Divisions have systems and/or procedures linked to the current paper-based system?
2. What are the “current state” business processes within those Divisions?
3. How may those processes be made more efficient upon an EPCR implementation?

Background and Significance

The Phoenix Fire Department was established on August 17, 1886 as a volunteer fire company with a charter membership at 25 men. In 1922, the department became a paid full-time organization. Firefighters began to be trained as EMTs in 1971 with the first rescue unit put in service in 1973. Only one year later, the first two Phoenix firefighters were certified as paramedics. ("Phoenix fire history," n.d., p. 1) Prior to 1985, the Phoenix Fire Department relied on private ambulance companies to transport its patients. At that time, seven ambulance

companies participated in our rotational dispatch policy. Average response times were unacceptable; approaching 20 minutes and a standard of a 10 minute response time was met only 50% of the time. The City of Phoenix (COP) chose to change to a single transportation service. The Phoenix Fire Department was permitted to compete in the bidding process for this service and was chosen as the ambulance provider for the COP. In November of 1985, PFD Emergency Transportation Services (ETS) was implemented, which handles all of the billing functions for Rescue (ambulance) transports. Since its inception, Rescue response times to all areas within the boundaries of Phoenix have improved substantially. The service consistently maintains a response time of under 10 minutes 92% of the time with a majority arriving on the scene in less than 5 minutes ("Phoenix fire history," n.d., p. 1). The PFD has 58 fire stations, 65 ALS engine companies, 14 Ladder companies, 37 rescues/ambulances, three squads, five airport units, and eight fire battalions and 10 special operations vehicles. The department responded to almost 180,000 calls into 2014, with 88% representing EMS calls. Phoenix fire department rescues transported over 90,000 people, about 51% of call responded to in 2014 (Phoenix Fire Department [PFD], 2014, p. 1). ETS currently bills for over six million dollars annually (P. Boyd, personal communication, October 15, 2015).

Since the late 1980's, there have been numerous advancements in technology affecting the way the fire service provides EMS and transportation services. One of these improvements was the use of an electronic patient care reporting system. There are documented efforts of members of the PFD engaged in research and discussion related to documenting patient care records electronically since 2000. Lack of funding made acquiring an EPCR system out of reach during previous efforts.

Currently, the Phoenix Fire Department utilizes a paper system to document medical encounters and patient transports. The two most common forms that are completed during an emergency medical service call are an EMS Incident Report (Attachment A) and a Transport Ticket (Attachment B).

The Emergency Medical Services (EMS) Incident Report, also referred to as the Patient Encounter Form, is initiated by a member of the PFD crew, while the remainder of the team evaluates and treats the patient. This document is completed regardless of whether a patient is transported to the hospital. In the event that a patient is not transported, the back of the document includes a "non-treatment and no-transport agreement/release of responsibility" section. The EMS Incident Report does not include a section for identifying supplies expended during the patient encounter. As a result, there is no way of maintaining and accurately tracking all supplies used by field staff. When completing the form, the crew member must manually complete several fields, which are either system generated by the Computer Aided Dispatch (CAD) system or are entered by dispatch staff and sent to the Mobile Computer Terminal (MCT) on the vehicle. As these data elements are written on the paper form, characters may be transposed, may be illegible or may be missed altogether.

The Transport Ticket is completed any time a PFD crew transports a patient to a hospital. Much of the information is copied from the EMS Incident Report and the Mobile Computer Terminal. Fire crews are also required to hand write patient information, such as name, social security number, address, insurance information, etc., even if the patient has been previously transported and accurate information was obtained formerly. Since the document is completed in paper form and is therefore not subject to edits, the documentation may not contain certain

information, such as signatures, required for billing or may not be completed sufficiently to bill an insurance claim at the appropriate level.

The current system has resulted in a number of vulnerabilities, process inefficiencies, and has proven cumbersome to maintain and manage as perceived by the individuals managing those processes. While a significant amount of data is collected, the paper system does not allow for any business analysis in order to identify trends, maintain inventory or improve the overall quality of medical services that has come to be expected by the public. In 2013, we generated over 150,000 patient encounter forms and over 70,000 transport documents (K. Leake, personal communication, January 12, 2015). It was decided in early 2014 to revisit the opportunity to acquire an EPCR system.

In the summer of 2014, the PFD submitted a request to the City of Phoenix (COP) Information Technology Services (ITS) Department to assist our pursuit of an electronic patient care reporting (EPCR) system. It was thought that EPCR "would mature our emergency medical response service, associated patient records, and ambulance billing processes from an antiquated, paper-based architecture, to a modernized electronic medical records architecture" (K. Leake, personal communication, January 12, 2015). The scope of the request was to equip all responding units with mobile devices and related software to enable first responders to electronically enter patient information, share patient information with hospitals while in route, process patient information for future billing and collections, and create an electronic patient care repository for establishing key performance indicators (KPI) and performing quality assurance (QA).

A meeting was convened in the City of Phoenix (City Hall) building in September of 2014 to discuss the EPCR Project and determine next steps. The author was present at the

meeting representing Emergency Medical Services (EMS) with the understanding that a significant weight of directing the project would rest in the EMS Division. Also present at the meeting were executive staff members assistant chief Todd Harms and assistant chief Rick Bartee, the deputy chief of PFD EMS, the deputy chief of PFD technical services division and Debbie Cotton the chief information officer for the city of Phoenix information technology services department. It was during this meeting that we learned of the new governance model recently implemented for projects exceeding a certain figure. We were tasked to identify and document our understanding of the current business processes and to look for areas to improve the current systems via efficiency, cost reduction, and position elimination.

The author attended the Executive Development (ED) course in August 2014 and determined shortly after this meeting that performing this research to identify and document the current business processes and to determine efficiencies would benefit the PFD. This research would allow thorough investigation and an improved understanding of the business practices currently used by our members every day. Additionally, it would allow the City to observe that we have addressed their concerns regarding the business analysis side to managing this "transformational" project.

We anticipate many challenges if we continue to use a paper-based system to document patient encounters. A key challenge is we have learned that the Arizona Department of Health Services (AZDHS) is presently drafting language to require all ground ambulance services to "collect and submit electronic patient care reports" and have a plan for benchmarking and performance improvement processes (Humble, 2014, para. 6). Lack of compliance with establish regulations would seem an unlikely option considering our stature in the community and a trust, which we should try to keep.

The research project supports the City of Phoenix mission to improve the quality of life in Phoenix through efficient delivery of outstanding public services. It also supports the mission of the PFD, which in part, is to provide the highest level of public safety services to our community. This research has opened the door to meeting this priority to an even greater effect and therefore satisfies that the connection has occurred.

The research project supports the first goal of the Executive Development (ED) course, which is to "lead effectively and efficiently within a dynamic and complex organization by enhancing the development of teams and the application of research" as indicated in the *Executive Development Student Manual* (National Fire Academy [NFA], 2013, 4th ed., p. ix).

The research project supports several United States Fire Administration (USFA) goals. Specifically, one of the goals was to reduce risk at the local level through prevention and mitigation. The implementation of EPCR inspires collaboration across the department, involving internal stakeholders and external partners participating in the professional standards of emergency medical care and all of the phases of interaction. Another goal that this research satisfies was to improve local planning and preparedness. By discovering new information by employing business analysis and process determination, the community benefits as their needs will have been considered and plans made to prevent or mitigate potential concerns even before the community notices them as an issue. This is the definition of improving local planning and preparedness.

A third goal was to improve the fire and emergency services' capability for response to and recovery from all hazards. The research conducted directly related to our ability to respond and recover demonstrated by our concern to have usable data that would allow forecasting to reallocate resources as needed, facilitate innovation opportunities and enhance serviceability to

our customers. A final goal was to lead the Nation's fire and emergency services by establishing and sustaining USFA as a dynamic organization. Collaboration with internal and external stakeholders, streamlining processes to perform at the highest level of effectiveness and efficiency, and using data to improve our capacity to respond to trends and create timely training and educational opportunities achieve this goal.

Literature Review

A literature review was performed to examine what information exists to regarding the implementation of EPCR as it relates to specific Divisions and their business processes, and identifying changing those processes would impact the PFD. The author was concerned about being able to have a respectable amount of information and literature to assist in mapping a plan as the business problem was so specific and targeted. There was not a significant amount of data and previous literary discussion in the fire service on business processes and how performing a business analysis before staring a project would allow all of the relationships and interrelated processes to be uncovered and addressed. In general, my review in this area reveals to me, basic "business" concepts are not yet championed to the extent that there is significant research on the subject. The literary review did reveal information regarding the overall implementation and approach, which will be helpful to getting the entire picture of our project.

There was some information available regarding the interrelatedness of business processes and the importance of creating workflows to really define the work. In an article called Connecting Business Process, IT Infrastructure by Daniel Evenson, he discusses the importance of learning your business processes and how they relate to the other functions and dependencies in the system. This platform allows for a foundation to be built. He suggests to "start with high

level business processes and IT systems and re-adjust the model as you glean greater details through interviews with IT and business units" (Evenson, 2009, p. 49).

As the information related to business processes of the fire service is slim, effort was made to find literary sources from private industries on work flow mapping. Conducting mapping sessions with a group was supported by Gerke & Associates in their document on how to conduct mapping sessions" (Conduct Mapping Sessions, 2010, p. 26). Additional research was located on factors influencing implementation and outcomes of an EPCR system.

Although the article was conducted in the Dental environment, the information was relevant to challenges and benefits noted in other studies on EPCR implementation; a final article located focused on factors that are not traditionally noted. It suggested that "EPR use will always require human input to recontextualize knowledge; that even though secondary work (audit, research, billing) may be made more efficient by the EPR, primary clinical work may be made less efficient; that paper may offer a unique degree of ecological flexibility" (Greenhalgh, Potts, Wong, Bark, & Swinglehurst, 2009, p. 729. pp 4).

John Butler, a fellow Executive Fire Officer student, identified a report from the General Accounting Office indicating that EMS agencies simply do not have the data to quantify needs an answer questions about treatment and performance (Butler, 2009, p. 11). This is a common theme in the research, there is an understanding that data is important, but how to make that data useful, exposes our general lack of knowledge in this area.

Karen Jacobsen in her article, *More is Better*, she discusses the importance of data and the benefits of sharing data nationally through the National EMS Information System (NEMSIS). "NEMSIS is the national repository of all 911 initiated EMS activations in the United States. The

need exists for fire administration to report to city Council is the work that is being performed by stations and personnel in order to justify the department's budget" (Jacobson, 2011, p. 58)

In a phone interview with Todd Harms, Assistant Chief of training, he discussed the cultural shift that would need to occur in order for EPCR to be accepted. He discussed that in situations like this, "significant effort should occur on the front end to include and involve our operations members in every phase of the project. It is important to allow them to sit at the table as we are devising our plan, sit at the table to assist in the selection of the vendor, and they should decide, ultimately, the device and software package chosen." He went on to say "you want to make sure our members will be willing participants in a cultural shift, you allow them in the front seat so they have the same understanding about where we are going, as well as our command officers (T. Harms, personal communication, February 24, 2015).

Deputy Chief Larry Contreras of the PFD had a slightly different take when asked about the significant cost factor of implementing EPCR in a Department as big as ours. He does not see it as an issue as the cost is known. "There has been an estimation for increased collections through billing and considering the ability to mandate field inputs and adjust as needed, this should limit liability and litigation costs. There will be ongoing storage costs dependent on system design, but the large areas needed for storage today would go away. Finally, any training costs will be hugely offset by the ability to customize training secondary to key performance indicator guidance" (L. Contreras, personal communication, March 17, 2015).

Ken Leake, the Deputy Chief of our Fiscal Division, and subject matter expert when it comes to cost savings involved acquiring EPCR would allow for increase cost recovery and improved service delivery through quality assurance programs.

> "The research clearly indicates that electronic data collection methods will increase the efficiency of the organization. According to the diversified ambulance billing, billing and reimbursement is projected to increase by 5 to 10% through electronic data collection. In addition, information concerning individual providers in quality assurance measures can be institutionalized. Personnel now performing these tasks manually can be reassigned to other areas to increase efficiency and those divisions" (K. Leake, personal communication, January 12, 2015).

Paul Newton, in his research on EPCR information collection, he related that one of the biggest advantages of EPCR is the increase in revenue due to readable and complete forms. “Electronic PCR's, can be read more easily and therefore processed more quickly resulting in funding be returned to the providing agency more quickly” (Newton, 2002, p. 9).

In summary, the literary review established that there are a number of studies related to the implementation of EPCR and the efficiencies that have been gained. It appears that the argument for and against has been made on each issue. The positives and negatives revealed by the literary review, will allow a firm starting point for evaluation and discussion

Procedures

To address, research question one; what PFD systems/procedures will be affected by the implementation of an EPCR solution; research question two; what are the current business processes within each of those Divisions, and research question three; how may those processes be made more efficient upon an EPCR implementation, several methods were used to obtain the data necessary for study.

Focus Group Information

The author of this paper held a series of focus groups in October through December 2014 involving 10 members considered to hold the knowledge needed to obtain and document system processes from the following Divisions: Technical Services, EMS, ETS, Public Records/Personnel, and Fiscal. By design, no administrative chief officers were in attendance at any focus group meeting, with the exception of the author of this research paper, to assure an unrestricted communication flow. The focus group did include one member of the Phoenix Firefighter Association, International Association of Firefighters Local 493, to answer questions and provide union perspective, if needed. The team size was selected to be large enough to promote sufficient discussion, but small enough to be productive. "Sessions with too few participants tend to be dominated by a few people and are much less productive. Sessions with too few participants tend to lack the necessary perspectives required to deliver well rounded results" ("Conduct Mapping Sessions," 2010, p. 26, pp. 2).

Discussions consisted of six to ten members, depending on who was available. Meetings were held on October 1, 2014, October 9, 2014, October 15, 2014, and November 21, 2014 for four hours each. There were two goals for this series of meetings; the first was to determine the PFD Divisions impacted by EPCR. The second was to identify the current state or "as is" processes, which are occurring in each Division. A second round of focus group meetings were held on the following dates: November 18, 2014, December 11, 2014, and Dec 18, 2014. The goal for this series of meetings was to identify the future state or "to be" processes.

Participants were directed to focus their efforts on the questions of this research paper and to limit, as much as possible, any distractions of items, while interesting and related to the implementation of EPCR, not in the scope of this paper. Every participant of the group was equipped with a high level Organization Chart of the PFD as well as the organization charts for

all divisions. The discussion was designed to gather information in regard to the following outcomes:

1. To understand the stakeholders, internal and external, involved in this project
2. To understand what Divisions are impacted by the current paper-based system
3. To understand what systems and/or procedures are affected in those Divisions
4. To understand the business processes of systems and/or procedures and demonstrate them visually in a work flow diagram
5. To identify improvements and efficiencies to those systems and/or procedures that would be gained with an EPCR system and demonstrate them visually in a work flow diagram

A total of 32 hours was spent discussing the preceding five focus points and significant data was learned. A system of process mapping was used to identify each step of the identified processes and work flow diagrams were created. Results of the discussion were analyzed and documented immediately following the sessions.

Literary Review

A literary search was started on August 20, 2014, at the Learning Resource Center (LRC) at the National Fire Academy (NFA) to locate any Executive Fire Officers' (EFO) Applied Research Papers (ARP) that may provide information on the topic. Several ARP's were located relevant to the preparation and implementation of EPCR. The key words used for the search were; paper-based, EPCR, PCR, EMS, implementation, electronic patient care record, management, system, business process, paramedic, EMT, interventions, work flow

Other searches were conducted to include magazines: EMS Responder and Fire-Rescue and journals. It became clear, that the best information specific and relatable to our Department

regarding specific process and systems impacted would be from the subject matter experts that are members of the PFD. The same key words were used; paper-based, EPCR, PCR, EMS, implementation, electronic patient care record, management, system, business process, paramedic, EMT, interventions, work flow

Interviews

Interview #1: Todd Harms, Assistant Chief of Training. Chief Harms was interviewed as he is the identified sponsor of the project as he supervising the Deputy Chief of EMS. As the sponsor of the project and a member of executive staff, he has an excellent perspective and is considered a subject matter expert on emergency medical services, Operations, and training on a national scale. The data from the interview was analyzed immediately afterward and documented my findings (Attachment G).

Interview #2: Larry Contreras, Deputy Chief of EMS. Chief Contreras was interviewed as he is the identified sponsor of the project as he supervising the Deputy Chief of EMS. As one of the project Leads who has been a chief officer assigned to EMS for three stints and a total of six years, he directly manages every aspect to our service delivery from the EMS perspective. He is a subject matter expert on emergency medical services. The data from the interview was analyzed immediately afterward and documented my findings (Attachment H).

Interview #3: Dr. John Gallagher, Medical Director, Phoenix Fire Department. Dr. Gallagher has been the medical director for the Department for over 20 years and leads the efforts for all EMT's and paramedics as it relates to initial training, re-certification, and quality assurance. Dr. Gallagher is a subject matter expert as it relates to EMS service delivery (Attachment I).

A Definition of acronyms and terms section can be found in the appendix (Appendix C).

Results

The research questions were answered using the descriptive methodology. These answers came from several different sources and are supported by the data retrieved from personal interviews, focus group discussions, and the analysis of written reports.

The results for the first research question, *what PFD Divisions have systems and/or procedures linked to the current paper-based system*, came from focus group discussions and personal interviews. The focus group discussions revealed a list of internal and external stakeholders that will be prove helpful when creating a Request for Proposal (RFP) in anticipation of selecting an EPCR vendor. Understanding the stakeholders involved in this project is the first step in realizing the Divisions involved and the processes and procedures under their responsibility. The focus group brainstormed all potential stakeholders and identified the following internal stakeholders to a PFD EPCR project: City of Phoenix Information Technology Department (ITD), Alarm Room Headquarters (AHQ)/Computer Aided Dispatch (CAD), COP Law, IAFF Local 493, Technical Services, EMS, ETS, Fiscal, and Operations Divisions. External customers or stakeholders identified included: Hospitals, automatic aid partners, Arizona Department of Health Services (AZDHS), Community partnerships, Regional EMS consortiums, Arizona Prehospital Information & EMS Registry System (AZPIERS), NEMSIS and other health related agencies that would benefit from collaboration with data and information currently not available. External stakeholders will be thoroughly explored in the next phase of the EPCR project and performing a work flow analysis for external partners is not in the scope of this research project.

The Divisions impacted by the current paper-based system and the focus of this research paper are AHQ/Dispatch, Technical Services, EMS, ETS and Operations Divisions. Each of the

Divisions house a significant business process that requires evaluation and documentation of the current state of those systems. Now that the Divisions that are impacted by the current paper-based system have been identified, it is possible to explore what systems and/or procedures are affected in those Divisions.

Dispatch (AHQ)/CAD:

Summary: The Computer Aided Dispatch (CAD) System is the business process identified in the AHQ Division. A successful EPCR implementation will integrate with the PFD AHQ system and CAD generated data elements will merge into a patient care record. Such data elements include incident number, incident location, call times, responding units, etc. There are currently a number of automated aid partners which utilize EPCR systems that integrate with the PFD CAD system. There have been no major issues and the integration has been seamless according the CAD systems administrator, William Hamouz.

Impact: The anticipated impact on AHQ/CAD is minimal as the CAD-EPCR integration is automatic and is therefore transparent to dispatch staff. The only potential and anticipated impact on AHQ staff is that they may be the first point of contact if there are system issues. A contingency plan should be put in place and training to address this potential issue would be relevant in the next phase of this project.

Field Operations

Summary: The completion of the EMS Patient Encounter Form (Appendix A), the Transport ticket (Appendix B) and the transfer of care in an automatic aid situation or to the hospital (Appendix C) is the business process identified in the Field Operations Division. For the purposes of this document “Field Operations” refers to PFD Emergency Medical Technicians (EMT) and Paramedics who provide emergency medical services in the field. Field operations

staff is responsible for providing medical services, often times in less than optimal physical environment and document those encounters as necessary. Documentation produced may include an EMS Incident Report a Transport Ticket and supplemental documentation such as EKG strips, report addenda, etc. In the event that a patient is transported, that documentation is provided to the receiving hospital in order to ensure continuity of care.

Since the Phoenix Fire Department is a participant in the Phoenix Regional Automatic Aid System, there are a number of scenarios where PFD staff may have to exchange documentation with units from other jurisdictions and manage patient transfer scenarios between PFD units and hospitals (Attachment D).

In the current paper environment, emergency medical documentation is returned to the station and the carbon copies are placed into different colored bags for collection by couriers. As fire stations are, at least to some extent, open to the public there is the risk of a patient's medical information or personally identifying information becoming visible to unauthorized parties. The paper documents are also subject to damage, loss or theft.

Another concern is emergency medical encounters are only electronically recorded within *Respond Billing*, the accounts receivable system that is utilized by ETS. While there is a record of chief complaints and observations (HCPCS coding) as well as supplies used, the information entered into Respond Billing is based upon what can be justified for billing purposes given what was documented in the field rather than an actual account of the medical encounter. There are no electronic documentation for the approximately 50% of emergency medical calls which do not result in a patient transport.

Improvements/Efficiencies:

- Properly secured hardware will mitigate PFD exposure to potential HIPAA violations. Many fields which are currently completed manually will be auto populated from Computer Aided Dispatch (CAD.)
- Changes to supplies utilized in the field will be centrally maintained.
- Protocols and standards of care will be centrally maintained and deployed. As a result, field operations staff will have access to up to date standard medical procedures.
- Field operations staff will not have to enter patient and/or insurance information for patients who have been treated previously provided that the information is still accurate.
- For patients who have been treated previously, Field operations staff will be able to view the patient's prior medical history.
- Drug tracking will become transparent to field operations staff.
- Supplies expended will be driven by documented treatment provided/protocols.

Emergency Medical Services (EMS):

The Emergency Medical Services section of the Phoenix Fire Department oversees the emergency medical treatment program within this City of Phoenix and administers a number of related programs, such as EMS training, paramedic certification, and quality assurance.

EMS is the repository for medical documentation generated by field staff during the course of providing emergency medical services. As the documentation only exists in paper form, physical storage, retrieval and maintenance of these records presents EMS staff with a considerable challenge (See Attachment I).

As mentioned previously, emergency medical records do not currently exist in electronic form which impairs the quality assurance process. Currently, there is not a reliable or accurate way to identify calls of a certain type for follow up and review. Likewise, there is no electronic accounting for supplies expended on EMS calls. There are certain grants that the PFD has not able to respond to due to the fact that the applications require quantitative measures related to EMS calls which the Department is not able to provide.

Occasionally, the paper documentation received from the field has been contaminated with blood or other substances. According to a study in the *American Journal of Nursing*, "paper can serve as a vehicle for cross-contamination of bacterial pathogens in medical settings if current recommendations on hand hygiene aren't meticulously followed. According to the study, which considered how long certain bacterial pathogens may survive on paper, "the four tested organisms showed differences in length of survival depending on environmental room conditions, but were stable on paper for up to 72 hours and still cultivable after seven days" (Hubner, Hubner, Kramer, & Assadian, 2011, p. 32). Given the findings of the study, it seems reasonable to believe that paperwork completed at a medical scene could unnecessarily expose office staff to bacterial pathogens as paperwork is collected, processed and organized.

Improvements/Efficiencies:

- Improvements to the Quality Assurance (QA) process.
- Will provide the ability to report on the true nature of an incident rather than a dispatch incident nature code.
- Improvements to inventory control processes. Expended supplies will be tracked for all incidents, regardless of whether or not a patient was transported.

- EPCR will provide the means to identify incidents where PFD staff may have been exposed to infectious disease during the course of their duties.
- Data may be analyzed in order to perform predicative analysis and identify potential outbreaks within a geographic location.
- Expansion of the potential grant pool once PFD staff can quantify EMS call characteristics.

Emergency Transportation Services (ETS):

The Emergency Transportation Services section of the PFD is tasked with recovering ambulance billing revenue owed to the City of Phoenix. Additionally, ETS staff serves as a liaison between the PFD and the Department of Health Services for purposes of maintaining the Department's Certificate of Necessity which grants the authority to operate an emergency ambulance program.

Recently, the Department of Health Services has issued at least one Certificate of Necessity with the requirement that the vendor implement an EPCR solution within six months of issuance. When contacted by ETS staff, a DHS contact stated that it is "our desire is for all providers to be using e-PCRs and submitting data to the Bureau's DQA unit to better serve Arizona with current and accurate data." The email continued as follows: "It is strongly recommended that the City of Phoenix begin using the e-PCR systems and participate within the AZ-PIERS program as it will only enhance the EMS within both Arizona and for the City of Phoenix" (T. Jaramillo, personal communication, January 1, 2015). The PFD's Certificate of Necessity is due for renewal in November, 2016. At this time, renewal is not contingent upon utilization of an EPCR solution; however, the Arizona Department of Health Services is encouraging CON holders to implement a solution and share data with the State.

On a daily basis, ETS couriers visit each PFD fire station in order to retrieve emergency medical encounter documentation and deliver the paperwork to ETS for processing. As demonstrated in Attachment F, ETS staff is responsible for verifying that all expected documentation is received from the field, verifying data elements, copying and separating paperwork for retention in separate physical locations and re-entering call information into Respond Billing.

Throughout the billing process, ETS staff must be able to access the medical records. In the current environment, if a record is not readily available within working files, the original must be pulled, copied, distributed and re-filed (Figure 4)

Improvements/Efficiencies:

- Prebill processes will be streamlined as redundant verification/validation tasks are eliminated.
- If the field user interface is properly configured, fields required to bill any payer will be captured by the EPCR application.
- Timely and comprehensive retrieval of field documentation.
- Data entry processes will be streamlined
- Authorized users would be able to access medical records from their workstations
- Audit logs will track user access to patient/call records.
- There will be no need to physically retrieve paperwork from fire stations.
- Anticipated ETS efficiency improvements are detailed in Attachment G

Technical Services:

The Technical Services section of the Phoenix Fire Department provides technical solutions to meet the needs of the various sections within the Department. This includes

utilization of business intelligence tools to assist in decision making as well as support of commercial and custom applications utilized within the Department. Technical Services staff is responsible for the support and configuration of hardware, software, networking components and storage required for systems to operate and communicate with one another. Additionally, Technical Services staff serve in an advisory capacity in order to ensure that any solutions implemented comply with City and industry standards, are properly secured, adhere to technical best practices and fit within the organization's overall technical environment and vision.

In the current environment, Technical Services staff is often called upon to provide medical incident reporting. Since the PFD operates in a paper environment, reporting of this nature is not always possible. A question as simple as "How many strokes did the PFD respond to during FY 2014?" may not be answerable given the fact that comprehensive medical encounter documentation does not exist in electronic form.

When compiling data for the National Fire Incident Reporting System (NFIRS), medical calls are not included within the PFD's submission. As a result, the overall activity reported for the Phoenix Fire Department suggests that the Department responds to far fewer calls than much smaller departments.

Improvements/Efficiencies:

- Business Intelligence improvements. For example, Technical Services staff will be able to build accurate medical incident reports.
- The PFD would be able to submit accurate and representative call information to NFIRS.

Personnel/Public Records:

Public Records requests are handled by the PFD Personnel section (Attachment H). Requests may be submitted for non-medical records, including 911 tapes and fire reports, but requests for medical records constitute the majority of all requests submitted. This is a significant drain on limited resources and we current charge a very nominal fee for the information.

As the flowchart suggests, the public records process as it relates to medical record requests is inefficient and cumbersome given that medical documentation is saved in different physical locations. Considering that a request for medical records must be routed through two different PFD sections so that records may be pulled and scanned, it may take weeks in order to fulfill a request. In the meantime, it is not uncommon for requesters to submit duplicate requests.

Improvements/Efficiencies:

- Provided that users are able to access records from their workstation, the time required to fulfill a request would decrease drastically.
- Considering that all documentation for a single incident (regardless of the number of patients and whether or not all patients were transported) will be available from a central location, complete and accurate fulfillment of requests becomes more likely.
- It is far less likely that records would be lost or damaged.
- If properly configured, the PFD would be able to comply with the City records retention policy.

External (non-PFD) Stakeholders

Hospitals. A successful EPCR implementation will improve the quality of pre-hospital treatment documentation which is handed off to hospital staff. Not only will a properly

configured EPCR solution capture and accurate and complete treatment record, reports generated by the system will be superior to the current carbon form. Even if an Emergency Department is only capable of accepting paper documentation when receiving a patient, EPCR generated reports are certain to be complete, legible and reproducible. Depending on the level of technology available to Emergency Department staff at each hospital, it is possible that the documentation may be accessed in digital format consisting of data fields which comply with industry data standards.

Arizona Department of Health Services (AZDHS). AZDHS has recently issued certificates of necessity contingent upon EMS providers implementing an EPCR solution and participating in the Arizona Prehospital Information and EMS Registration System (AZ-PIERS). According to the DHS website, AZ-PIERS "will advance best practices derived from evidence-based patient care, QI processes, training, and research opportunities." Implementation of an industry standard EPCR solution will allow the PFD to share data with AZ-PIERS. The terms of recent C of N grants suggest that participation in AZ-PIERS will benefit the PFD when it is time to renew the Department's Certificate of Necessity. Meanwhile the dataset available to DHS staff for best practice analysis and QA efforts will be enhanced by the addition of data related to the approximately 150,000 EMS calls that PFD units respond to annually.

Public Health Entities. As data is collected for all EMS calls, the data can be used to identify concentrations of certain call types within a certain geographic region. Upon identification of an abnormally high concentration of certain call types, Public Health authorities can develop and implement early intervention programs vaccination, treatment, containment, public education, intended to prevent the spread of contagious diseases and illnesses. Note:

While external stakeholders are a critical considering in ensuring a successful implementation of an EPCR system, it is not in the scope of this research to determine the related process therein.

The results for the second research question, *what are the current state business processes for the systems and/or procedures linked to the paper-based system*, came from focus group discussions. As stated in Procedures, the focus group worked to identify those business processes affected by EPCR implementation and to demonstrate them visually in a work flow chart. "Flowcharts allow you to draw a picture of the way a process actually works so that you can understand the existing process and develop ideas about how to improve it ("Flowchart," n.d., p. 1). This effort took several meetings to capture and document all of the steps involved in each individual process. Although time consuming, visually depicting the processes allow them to be understood by all stakeholders. More importantly, it is possible to more accurately streamline those processes to achieve the most optimized system possible.

The following documents were created by the focus group to identify the current state processes for those Divisions significantly impacted by the paper system. The first document was a patient transfer of care document describing how PFD units, non-PFD units and hospitals will work together to establish and maintain patient continuity of care (Appendix D). The second document created was the PFD Patient Care Record Cross Functional Diagram (Figure 1). This document identifies how the divisions are inter-connected and the processes within those divisions. The third document was created to identify current state processes was the ETS current state process flowchart (Figure 2). This document identifies the "as is" process from retrieval of patient encounter forms for billing to encounter form disposition to EMS and duplicated for file retention. The final document to identify current state processes was the

Public Records current state process flowchart (Figure 4). This document identifies the "as is" process from receipt of request to request fulfilled.

Finally, personal observation from the point at which the ems encounter form was picked up from a fire station to the point that the record is file at the offices of EMS was conducted. This observation was conducted over several days and the time was combined to establish the duration of the entire process. It was determined that from the point of pick-up to the point of filing typically takes from seven to 10 days (Appendix J). Compare this with the typical time an EPCR system takes to download or upload, this process would experience an extreme reduction in time and considerable efficiency due to the reduction in time, reduced potential for lost documentation, and reduced or removed staff hours to accommodate the process changes.

The results for the third research question, *how those current state business processes will be made more efficient with EPCR,* came from focus group discussions. Based on the discussion, the following documents were created: Automatic Aid Patient Transfer of Care Details (Appendix D). This document describes the current state process of transferring care between the initial treating unit and the transportation unit. The current state business processes would be made more efficient by having CAD information automatically populated to the device rather that a member of the crew having to manually write it in. The Department has encountered forms that were unreadable, incomplete, and in rare cases, missing altogether. An EPCR system would create a record for every call and mandatory fields would appropriate documentation was completed. The second document created to demonstrate efficiency to the current system was the ETS future state process flowchart (Figure 3). This document identifies the "to be" process from retrieval of patient encounter forms for billing and to encounter form disposition to EMS and duplicated for file retention. Efficiencies are clearly demonstrated in this

process as the steps were reduced from 12 to 4. In addition, removing duplicates from the system reduces unnecessary redundancy, saving staff hours and reducing work load, allowing other work to be accomplished. The final document created for the purpose of documenting efficiencies is the Public Records future state process flowchart (Figure 5). This document identifies the "to be" process from receipt of request to request fulfilled. As in the previous process, a very complicated and time consuming process is reduced to as few as three steps. EPCR would allow a public records request to be pulled and completed in a matter of minutes as opposed to weeks and sometimes months. An EPCR system would drastically improve the efficiency of conducting public records requests.

In summary, all three questions were answered by this research project. The processes of those Divisions impacted by EPCR were identified and the processes for the current state as well as the future state of business processes were identified and documented. Because of the specific nature of breaking down current of the PFD to learn of potential efficiencies, subject matter experts and the group discussions were heavily relied upon to achieve these results.

Discussion

The members of the PFD present in the meeting when it was learned we were not able to move forward as expected were very surprised as various projects of extreme significance have been completed without any issues and to great success. We were instructed that while our project was worthwhile, and even, necessary, the project would move forward when we were able to demonstrate a thoughtful and specific breakdown of the work that is completed every day. We were charged to uncover the different Divisions that are connected and thus impacted by other divisions and systems and how those processes, and related ones, would reveal exactly where the efficiency would be. We learned that "business as usual: changed for us in an hour

long meeting and the expectation is that there is a new standard of how projects are presented, articulated and supported. Ultimately, information and the demonstration of a clearly thought out plan, with supporting documentation, is the new norm, at least, in the Phoenix Fire Department.

The literature review did not reveal anything earth shattering to my research. The information learned was helpful to remind us that others are challenged by the same thing, it is a matter of the strengths, weaknesses and also the funding that is available to determine whether something is supported. My applied research project was very specific and atypical to the fire service. It is not the norm to be asked to complete a business analysis to demonstrate you understand what you are asking for before August of 2014. The good news is, the leadership have embraced that we will do whatever we need to do to make sure we have the tools necessary to serve the community and our partners to the best of our ability.

Recommendations

The City of Phoenix and the Phoenix Fire Department recognizes what a transformational project moving from a paper-based system to an Electronic Patient Care Record system would be and have been in full support of it since it was first discussed. The issue in the past has been funding. The funding was not available to support 58 fire stations and multiple units in the way that would have been needed. Previous plans have included supplying only the Rescues (ambulances) and/or Engine companies with the units for the documentation of patient care records. This scope was far too limited and those projects did not forecast to consider all of the future possibilities of data capture, especially if every single responding unit had a device.

That has changed. The scope today includes one device for every responding unit to include our 24/7 managers operating in Car 957, Car 958 and Car 959 positions, our Crisis

Response staff on units: CR12, CR16 and CR25. A truly transformational project would have to include everyone in the system so that nothing is lost, the data would be utilized at the full capacity, and everyone is contributing to it.

Much of the research completed in the literary review were things we had already considered. At issue for us, was to demonstrate a thorough understanding of the systems that would be impacted by EPCR and to consider those gaps that we would need to close before the City would allow us to move forward. As mentioned, this new method is not business as usual for us. Our opinion last September 2014 was one of impatience as we felt comfortable taking on this project without the delays and waiting, much like we have done before. However, opinions have changed to positive as we have learned so much about the systems and how they relate and impact each other. We understand, very clearly, the gaps to our knowledge and understand all of the stakeholder that are impacted by a Department as large as ours embarking on this effort of bringing EPCR to the Phoenix Fire Department.

The recommendations for the short term are to work on closing those gaps identified by this applied research project. In almost every Division, there is work to be done to give everyone confidence that we are ready to move to the next step. The second short term recommendation is to connect with every stakeholder, especially those outside of the Department. We have identified some risks to the project by opening up the dialogue to our external partners. One thing we have been made aware of concerns our surrounding cities that are already using EPCR. The hospitals “love” the old paper-based system, because when we walked away, they had the patient treatment and record in hand. They could count on it. Now, it seems that many fire departments and ems agencies have elected to finish their paperwork at the station, and often right before going home for the shift. Because of this, we have already stipulated that we will

not allow the EPCR convenience feature supporting the idea that the record can be created at a later time. Documentation has an important role in patient care and ensuring that the continuity of care is maintained is critical to the success of EPCR.

Long term recommendations would include building technology, innovation, and research as pillars to support moving our ability to serve our customers to our highest ability. Institutionalizing efficiency, is the great step to future proofing our legacy.

References

Business process mapping. (2010). Retrieved from http://www.gerke.com/wp-content/uploads/2010/05/Business-Process-Mapping-Document.pdf

Butler, J. S. (2009). *A plan for implementing an electronic patient care reporting system in Howard County Fire & Rescue*. Emmitsburg, MD: National Fire Academy.

Evenson, D. (2009). Connecting business process, IT infrastructure. *Disaster Recovery Journal*, *22*, 48-50. Retrieved from www.DRJ.com

Flowchart. (n.d.). Retrieved from nnphi.org/CMSuploads/Flowchart guide.pdf

Greenhalgh, T., Potts, H. W., Wong, G., Bark, P., & Swinglehurst, D. (2009, December 14). Tensions and paradoxes in electronic patient record research: A systemic literature review using the meta-narrative method. *The Milbank Quarterly: A multidisciplinary journal of population health and health policy*, *87*, 729-788. http://dx.doi.org/10.1111/j.1468-0009.2009.00578.x

Hubner, N., Hubner, C., Kramer, A., & Assadian, O. (2011, December). Survival of bacterial pathogens on paper and bacterial retrieval from paper to hand: Preliminary results. *AJN, American Journal of Nursing*, *111*, 30-34. Retrieved from http://journals.lww.com/ajnonline

Humble, W. (2014, December 17). What is a con anyway [Blog post]. Retrieved from http://directorsblog.health.azdhs.gov/whats-a-con-anyway-2/

Jacobson, K. (2011, January). More is better. *Fire Chief*, 54-59. Retrieved from http://www.nemsis.org

Managing Partners Incorporated. (2012). [City of Phoenix Innovation and Efficiency Study]. Unpublished raw data.

Newton, P. L. (2002). *EPCR information collection in Chesterfield Fire and EMS*. Executive Fire Officer Research Paper, Emmitsburg, MD: National Fire Academy.

Phoenix fire department. (2014). *2014 summary*. Retrieved from City of Phoenix Fire Department website: https://www.phoenix.gov/fire

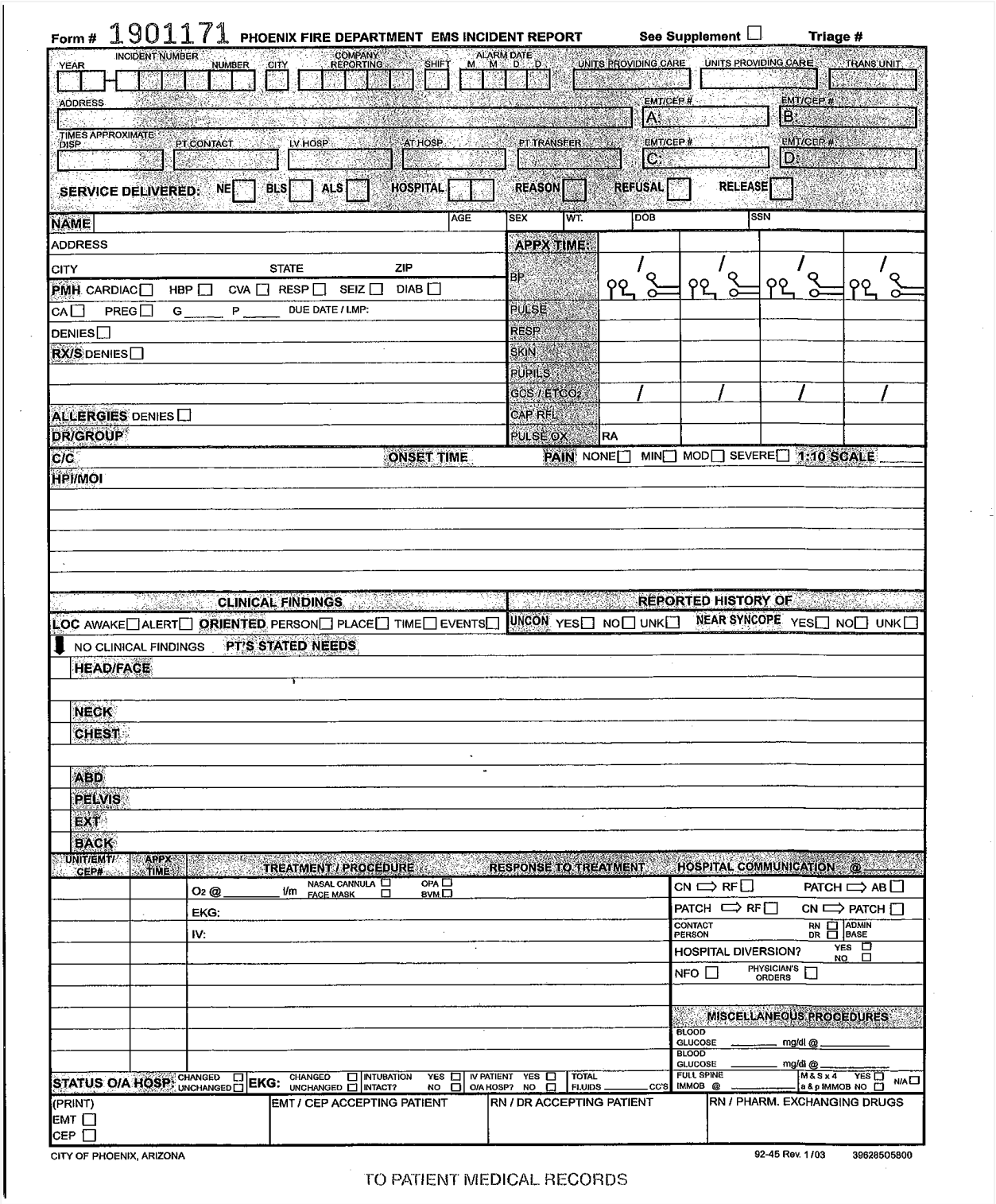
Phoenix fire department history. (n.d.). Retrieved from https://www.phoenix.gov/fire/about-us/history

Smith, R. F. (2007). *Business process management and the balanced scorecard: Using processes as strategic drivers*. Hoboken, NJ: John Wiley & Sons.

United States Fire Administration. (2013). Executive Development Student Manual. (4th ed 4th printing, pp. ix). Emmitsburg, MD: FEMA.

Appendices

Appendix A: PFD EMS Report



Form # 1901171 PHOENIX FIRE DEPARTMENT EMS INCIDENT REPORT See Supplement ☐ Triage #

YEAR | INCIDENT NUMBER | NUMBER | CITY | COMPANY REPORTING | SHIFT | ALARM DATE M M D D | UNITS PROVIDING CARE | UNITS PROVIDING CARE | TRANS UNIT

ADDRESS | EMT/CEP # A: | EMT/CEP # B:

TIMES APPROXIMATE DISP | PT CONTACT | LV HOSP | AT HOSP | PT TRANSFER | EMT/CEP # C: | EMT/CEP # D:

SERVICE DELIVERED: NE ☐ BLS ☐ ALS ☐ HOSPITAL ☐☐ REASON ☐ REFUSAL ☐ RELEASE ☐

NAME | AGE | SEX | WT. | DOB | SSN

ADDRESS

CITY STATE ZIP

PMH CARDIAC ☐ HBP ☐ CVA ☐ RESP ☐ SEIZ ☐ DIAB ☐

CA ☐ PREG ☐ G _____ P _____ DUE DATE / LMP:

DENIES ☐

RX/S DENIES ☐

ALLERGIES DENIES ☐

DR/GROUP

APPX TIME:				
BP	/	/	/	/
PULSE				
RESP				
SKIN				
PUPILS				
GCS / ETCO2	/	/	/	/
CAP RFL				
PULSE OX	RA			

C/C ONSET TIME PAIN NONE ☐ MIN ☐ MOD ☐ SEVERE ☐ 1-10 SCALE _____

HPI/MOI

CLINICAL FINDINGS

LOC AWAKE ☐ ALERT ☐ ORIENTED PERSON ☐ PLACE ☐ TIME ☐ EVENTS ☐

NO CLINICAL FINDINGS PT'S STATED NEEDS

HEAD/FACE

NECK

CHEST

ABD

PELVIS

EXT

BACK

REPORTED HISTORY OF

UNCON YES ☐ NO ☐ UNK ☐ NEAR SYNCOPE YES ☐ NO ☐ UNK ☐

UNIT/EMT/CEP#	APPX TIME	TREATMENT / PROCEDURE	RESPONSE TO TREATMENT
		O_2 @ _____ l/m NASAL CANNULA ☐ FACE MASK ☐ OPA ☐ BVM ☐	
		EKG:	
		IV:	

HOSPITAL COMMUNICATION @

CN ⇨ RF ☐ PATCH ⇨ AB ☐

PATCH ⇨ RF ☐ CN ⇨ PATCH ☐

CONTACT PERSON RN ☐ DR ☐ ADMIN ☐ BASE ☐

HOSPITAL DIVERSION? YES ☐ NO ☐

NFO ☐ PHYSICIAN'S ORDERS ☐

MISCELLANEOUS PROCEDURES

BLOOD GLUCOSE _____ mg/dl @ _____

BLOOD GLUCOSE _____ mg/dl @ _____

FULL SPINE IMMOB @ _____ M & S x 4 YES ☐ a & p IMMOB NO ☐ N/A ☐

STATUS O/A HOSP: CHANGED ☐ UNCHANGED ☐ EKG: CHANGED ☐ UNCHANGED ☐ INTUBATION YES ☐ INTACT? NO ☐ IV PATIENT YES ☐ O/A HOSP? NO ☐ TOTAL FLUIDS _____ CC'S

(PRINT) EMT ☐ CEP ☐	EMT / CEP ACCEPTING PATIENT	RN / DR ACCEPTING PATIENT	RN / PHARM. EXCHANGING DRUGS

CITY OF PHOENIX, ARIZONA 92-45 Rev. 1/03 39628505800

TO PATIENT MEDICAL RECORDS

Appendix B: PFD Transport Ticket

EMERGENCY TRANSPORTATION SERVICES

INCIDENT # _____ **RESCUE #** _____ **REPORTING EMS CO.:** _____ **DATE:** _____

PATIENT INFO

LAST NAME | (JR,SR,II,III) | FIRST NAME | MID INITIAL | D.O.B.

ADDRESS | APT # | AREA CODE PHONE # ( )

CITY | STATE | ZIP CODE | GENDER | SS #

RSPNSBL PARTY

LAST NAME | FIRST NAME | AREA CODE PHONE # ( ) | EMPLOYER

ADDRESS | APT # | AREA CODE PHONE # ( )

CITY | STATE | ZIP CODE | (ETS USE)

INSURER

AHCCCS PLAN | AHCCCS ID # | RATE CODE | OTHER INS | ID #

MEDICARE # | OTHER MED INS | ☐ RISK ☐ COMM | ID # | GROUP #

INCID INFO

DISP TIME | ON SC TIME | LV TIME | HOSP TIME | DRIVER | ATTENDANT | ETS USE

ON SCENE ADDRESS | HOSPITAL CODE | MILES | ETS USE

☐ ALS 1 ☐ ALS 2 ☐ BLS *TX:* ☐ O2 ☐ EKG ☐ IV(successful) ☐ IV ATTEMPT(unsuccessful) ☐ INTUBATION

SPINAL IMMOBILIZATION ☐ full mech ☐ vacuum ☐ manual

C/C or REASON FOR ENCOUNTER: _____

HPI / MOI: _____

PERTINENT PMH: _____

ETS USE

TRANSPORT VITALS	TIME	TIME
BP	/	/
PULSE		
RESP		
SKIN		
PUPILS		

VALUABLES TRANSFERRED: _____ **TO:** _____

RESCUE
- 461 Sheets (set)
- 442 Gloves (pair)

ECG / DEFIB / PACE
- 427 Electrodes (set)
- 429 Multi pads (set)

C-SPINE / SPLINT
- 301 Headblock
- 302 C-collar, adult
- 303 C-collar, other
- 305 Extremity splint
- 310 Straps (10pt)

SYRINGES
- 435 10 cc
- 438 20 cc
- 439 60 cc

O2 / AIRWAY / SUCTION
- 101 Oxygen
- 201 Cannula, adult
- 202 Cannula, ped
- 203 O2 mask, adult
- 204 O2 mask, other
- 206 OPA
- 213 NPA
- 218 BVM, adult
- 219 BVM, pediatric
- 233 ET kit (7.0 - 8.5)
- 237 Endotrol ET
- 223 ET (2.5-6.5, 9.0)
- 240 ET holder, adult
- 241 ET holder, ped
- 277 Combitube
- 251 Cricothyro kit
- 253 Intubat detect
- 254 BAAM
- 449 SVN
- 278 Filterline set
- 279 Capnoline
- 257 Yankauer tip
- 265 Suction cath
- 259 Suction canister
- 264 Mecon aspirator
- 270 NG tube

IV / IO SUPPLIES
- 501 IV Start kit
- 502 Catheter, 12g
- 503 Catheter,14-24g
- 512 IV tubing, micro
- 513 IV tubing, macro
- 518 Saline, 250 ml
- 519 Saline, 1000 ml
- 520 LR, 1000 ml
- 517 Saline, 50 ml
- 521 Dex5%, 250 ml
- 509 Central line set
- 510 IO needle, 15g
- 511 IO holder
- 527 Sternal IO device
- 526 Pressure infuser

BLOOD GLUCOSE
- 431 Test kit
- 433 Test strip

OTHER
- 416 Blanket
- 424 Pulse ox probe
- 422 OB kit
- 406 Trauma dressing
- 408 Petroleum gauze
- 409 Chest seal
- 419 Cold pack

BURN
- 410 4"x4" dressing
- 411 8"x8" dressing
- 414 Burn sheet

MEDICATIONS
- 603 Adenosine 6mg
- 604 Albuterol 2.5mg
- 606 Aspirin 81mg
- 607 Atropine 1mg
- 608 Atropine 8mg vial
- 632 Atrovent .5mg
- 610 Calcium Chlor 1g
- 602 Charcoal 50g
- 611 Dextrose 25g
- 612 Diphenhyd 50mg
- 613 Dopamine 400mg
- 615 Epi 1:10k 1mg/10ml
- 614 Epi 1:1k 1mg/1ml
- 616 Epi 1:1k 30ml vial
- 617 Furosemide 40mg
- 618 Glucagon 1mg
- 601 Glucose, oral 15g
- 619 Lidocaine 100mg
- 620 Lido premix bag
- 621 Mag sulfate 1g
- 622 Mthyl pred 125mg
- 623 Naloxone 2mg
- 626 Nitro .4mg
- 628 Phenyleph 15ml
- 625 Saline (inhal) 3ml
- 629 Sdm Bicarb 50ml
- 630 Thiamine 100mg
- 631 Verapamil 5mg

HOSPITAL LABEL

OR

M.R. / ACCT #: _____

MED #	ROUTE	DOSE	MED #	ROUTE	DOSE

(ROUTES): IV- intravenous R-rectal SL- sublingual I- inhalation (SVN) SQ- subcutaneous ET- endotracheal (tube) PO- oral N- nasal IM- intramuscular IO- intraosseous

I request that payment of authorized Medicare, Medicaid, or any other insurance benefits be made on my behalf to City of Phoenix/Emergency Transportation Services ("COP/ETS") for any services provided to me by COP/ETS now or in the future. I understand that I am financially responsible for the services provided to me by COP/ETS, regardless of my insurance coverage, and in some cases, may be responsible for an amount in addition to that which was paid by my insurance. I agree to immediately remit to COP/ETS any payments that I receive directly from insurance or any source whatsoever for the services provided to me and I assign all rights to such payments to COP/ETS. I authorize COP/ETS to appeal payment denials or other adverse decisions on my behalf without further authorization. I authorize and direct any holder of medical information or documentation about me to release such information to COP/ETS and its billing agents, and/or the Centers for Medicare and Medicaid Services and its carriers and agents, and/or any other payers or insurers as may be necessary to determine these or other benefits payable for any services provided to me by COP/ETS, now or in the future. A copy of this form is as valid as an original. I acknowledge that I have been provided a copy of COP/ETS' Notice of Privacy Practices.

If PUTS and rep unable to sign, crewmember must sign at bottom-right and give reason here:

_____ @ _____
Dr. / R.N. accepting patient **(time)**

Signature of patient (or representative* - see below)
*relationship to pt: _____

Signature of Crewmember (patient unable to sign)

Dist.: Original- ETS Pink- Patient Gold- Hospital

92-14D Revised 01/08 61582505287-CP

Appendix C: Definition of Acronyms and Terms

PFD – Phoenix Fire Department

COP – City of Phoenix

ITD – Information Technology Department

EPCR - Electronic Patient Care Record

CAD – Computer Aided Dispatch

AHQ – Alarm Room Headquarters

QA – Quality Assurance

Focus Group - A small group of people whose response to something is studied to determine the response that can be expected from a larger population (Merriam-Webster)

ALS – Advanced Life Support

BLS – Basic Life Support

City's – Referring to the City of Phoenix

Division(s) – Referring to the Phoenix Fire Department

AZDHS – Arizona Department of Health Services

KPI – Key Performance Indicators

Department – Phoenix Fire Department

Appendix D: Automatic Aid Patient Transfer of Care Detail

Initial Treatment:

All incident information must be transferred in handwritten manner from MCT to patient encounter form and transportation billing ticket. This is completed in route to the incident scene. Transfer of care and documentation occurs when:

- First responding company is BLS and requires ALS company evaluation and treatment
- Anytime a patient is transported to the hospital by rescue
- On scene Company performs evaluation and initiates treatment
    - Special calls rescue unit if transport is needed
- All patient documentation is handwritten on encounter form
- Stable patient
    - Encounter form is fully completed prior to transfer of care to transporting rescue company
- Unstable patient
    - The first responding company rides in with rescue company to hospital
    - Encounter form is completed at hospital after transfer of care to hospital staff
    - Transportation ticket is completed at hospital. Carbon copy of patient information given to registration staff, patient information label given to rescue personnel

Transfer of care occurs is based on patient condition:

- Stable patients typically receive evaluation and treatment on scene. The patient encounter form is fully completed on scene. The rescue personnel sign and are given the top copy of form. Patient care information is transferred from patient encounter form to transportation ticket by rescue personnel in handwritten manner.
- Unstable patients typically receive ongoing evaluation and treatment from incident scene to emergency department. This requires on scene personnel to accompany rescue personnel and patient to hospital. The documentation is often completed after patient care is transferred to hospital staff. Patient care information is transferred from patient encounter form to transportation ticket by rescue personnel in handwritten manner.
- Patient care information is transferred to receiving hospital registration staff by giving them the back “gold” carbon copy of the transportation ticket. Rescue personnel wait for patient information to be entered into system and receive a label with patient information barcode. Label is attached to front copy of transportation ticket.

Transfer of care and documentation to outside agencies:

- Transfer of patient care and documentation **from** a Phoenix Fire Department unit to outside agency is facilitated in the same manner as transfer within our organization:
- First copy of patient encounter is completed and given to transporting agency

Transfer of patient care and documentation **to** Phoenix Fire Department unit from an outside agency:

- Currently requires transferring agency to produce written patient care report
- Most automatic aid partners are currently using electronic documentation systems
    - Must have access to printer to satisfy an efficient, legal transfer of care
    -

Multiple patient scenario:

- One patient encounter form per patient treated is required
- Each patient involved in the incident and receiving evaluation and /or treatment is assigned a sequential number on the encounter form
    - 1 of 4, 2 of 4. 3 of 4 etc...
- All companies carry minimum 2 clipboards for documentation purposes
- Patients are often evaluated and released without transport
    - requires additional resources/personnel for documentation purposes

Appendix E: Photo 1 of storage area

Appendix F: Photo 2 of storage area

Appendix G: Interview with Todd Harms

1. What Divisions have systems and/or procedures linked to the current paper-based system? The first system is "billing" and that would in the Emergency Transportation Division (ETS). I think of that one first because we are able to recover over six million dollars annually because of the work that they do in ETS. The second one that comes to mind is EMS because of the training and QA that goes along with treating illness and injuries appropriately according to standards procedures. The systems of completing the EMS paper work and the transportation tickets are important systems to field operations. Another important systems is public records requests. This process is handled by our Personnel Division. Other important system are the purchasing and inventory control processes. I see billing, public records requests, field operations and ems would be the most critical. I should also mention Technical Services as they are charged with managing the data and requests for information. They would be integral to system identification as well.

2. Would an EPCR system allow the department to be more efficient? Why or why not? Definitely! We have requests for data that we cannot provide. We would like information to predict and forecast personnel needs and resources that are not possible or would take many people a lot of time to complete. The paper system has worked for us because it gets the job done, but our goals are much higher than that. The ability to identify trends, direct training to deficient areas, and qualify for grant opportunities because problems are quantifying are just a few ways we would become more efficient.

3. What are the challenges to implementing an EPCR system? The first challenge is the cost. Many departments that surround us have been using EPCR for years. Securing funding for equipment and software for six stations and 12 units has proven to be much easier than 58 stations with more than 100 responding units. So, cost is our biggest challenge. A close second would be choosing a device and package that our field personnel feel comfortable with so their learning curve can be overcome more easily. We have identified from surrounding departments that this has been a large issue for them. The cultural shift from 40 years of completing a paper patient encounter form will be another challenge the project.

4. What are the benefits to implementing an EPCR system? I mentioned one earlier, having real time data to improve decision making and drive priorities. There are many legislative changes occurring on the storage of patient records such as the HITECH Act that we must be prepared for. Having EPCR allows us to meet this standard and others. Having an EPCR system would allow us to quantify quality and good patient care in ways that we are incapable of today.

Appendix H: Interview with Larry Contreras

1. What Divisions have systems and/or procedures linked to the current paper-based system? Divisions not impacted; payroll, personnel, arson, maybe fire prevention, health center.

2. Would an EPCR system allow the department to be more efficient? Why or why not? In most ways yes, in others no. For instance, initial generation is not faster and in some ways longer and more difficult. There is a learning curve to contend with. All other factors seem to be more efficient. No brainer.

3. What are the challenges to implementing an EPCR system? Negatives and biggest hurdle is going to be training the membership initially, correcting outliers, and keeping them calm during the transition. Deciding to what degree if any we keep paper format around for multi pt. Scenes, legacy members near retirement, or just in case. Housekeeping decisions really. I think another struggle will likely be tech support of the ongoing variety. I believe that we are well positioned for this based on our current plan and resources. Many cities don't have our degree of dedicated personnel and they seem to get by. They do suggest this is a weak link.

4. What are the benefits to implementing an EPCR system? The positives are clearly evident. Biggest is using data trends for planning and training and reporting. Our traditionally conservative membership are primed and ready for the change. They expect to be provided the tools of the trade. EPCR is the industry standard both locally and nationwide. A robust program will be facilitated by staff as opportunities arise. Current smaller systems don't express opportunities as staff has not been dedicated for this purpose

Appendix I: Interview with Dr. John Gallagher

1. What do we currently measure? Out of hospital cardiac arrest.
2. How do we measure it? Well, once a month, the Technical Services Division sends me a list of all "codes." Staff from the office of EMS takes that list and goes to the file room and physically locates those files. A copy is made of the file for review and the original is placed by in its place. The copy is given to me and I look at the encounter form and make sure the treatment was appropriate and established standing orders were followed. It is extremely labor intensive to physically pull all of the files, but without electronic records, it is the best we can do.
3. What else do we measure? That is the only area we formally measure at this time and that information is sent in to the Arizona Department of Health Services for their review.
4. So, currently, we do not formally measure:
    a. STEMI? No
    b. Trauma? No
    c. Pain Management? No
    d. Respiratory distress? No
    e. Chest pain management? No
    f. Patient satisfaction? No
    g. Complaints? No
5. If you could measure these areas, would you? Absolutely! We don't measure those areas because we have no way to measure those areas. A paper system and over 175 thousand calls, equals over 200 hundred thousand patient encounter forms annually. We do have the resources to do manually what EPCR would do almost instantaneously, in terms of having access to that data.

List of Figures

Figure 1: PFD Patient Care Record Cross Functional Diagram

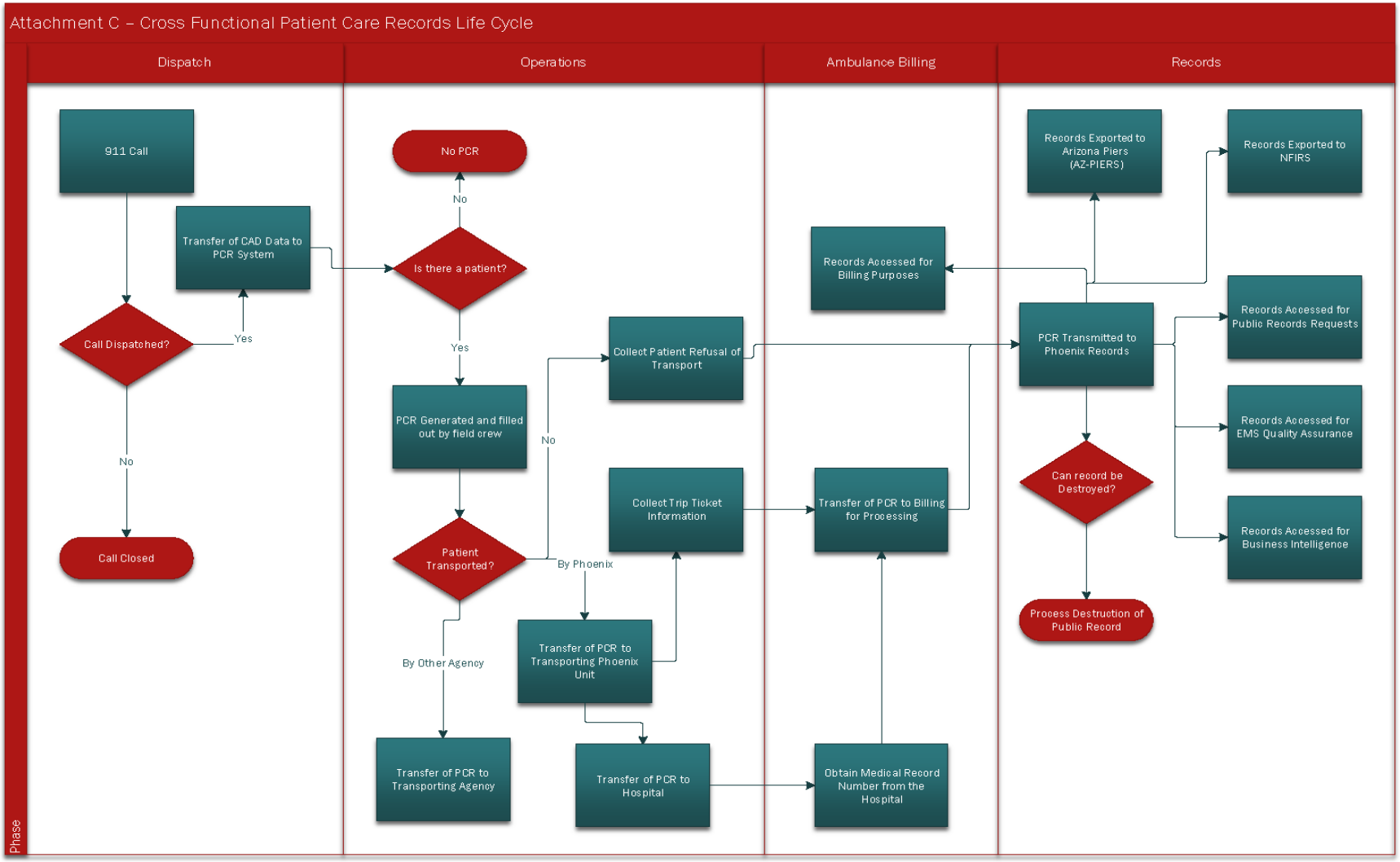


Figure 2: ETS “as is” process flowchart

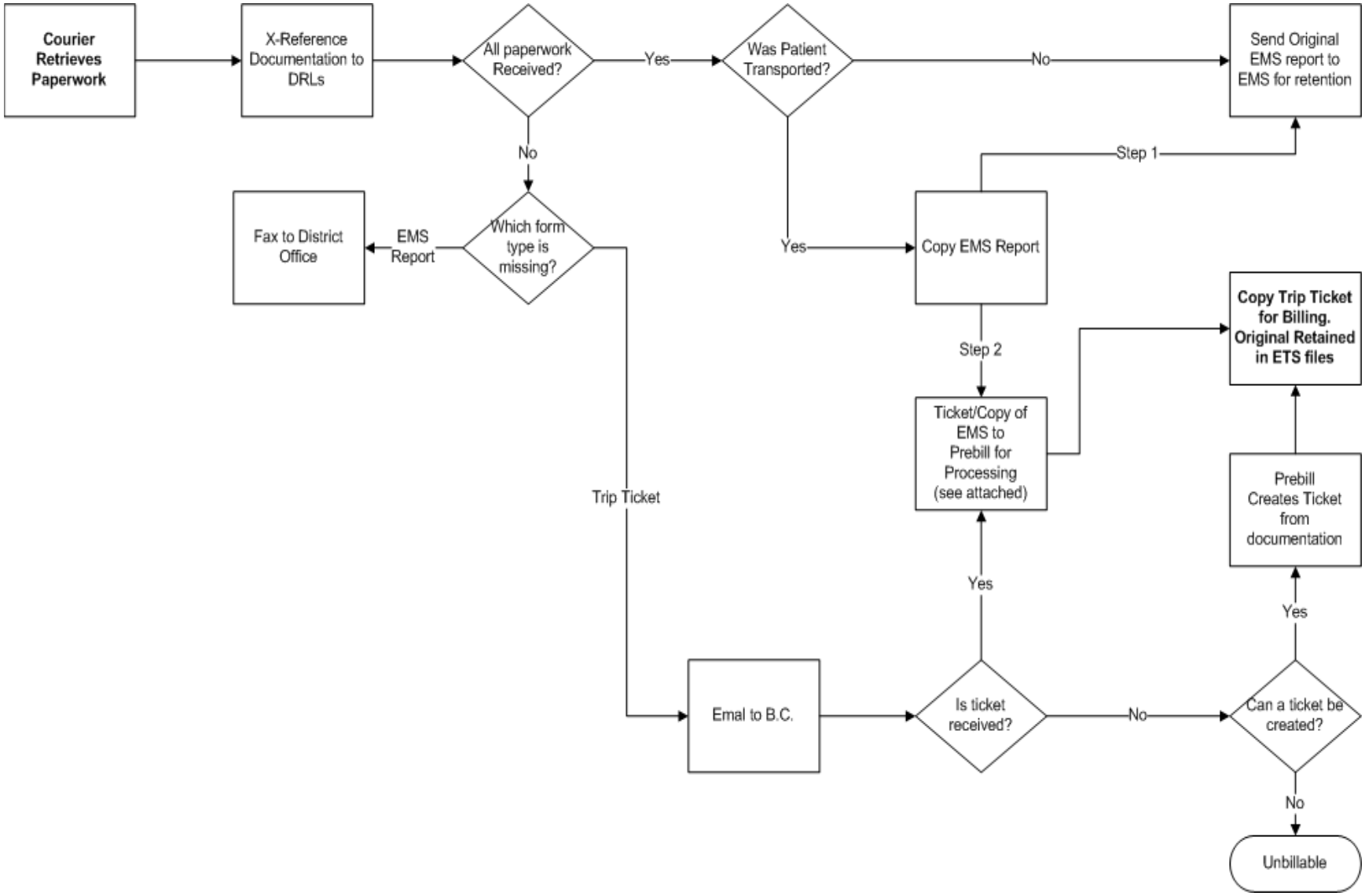


Figure 3: ETS “to be” process flowchart

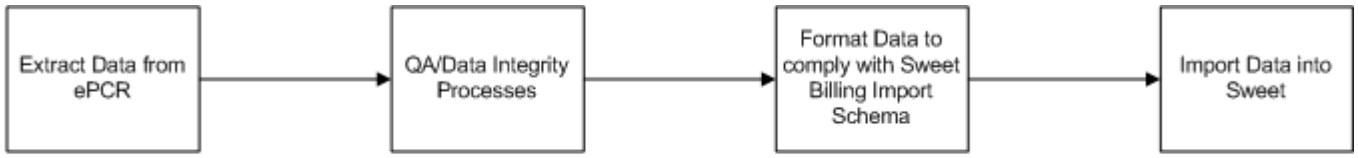


Figure 4: Public Records "as is" process flowchart

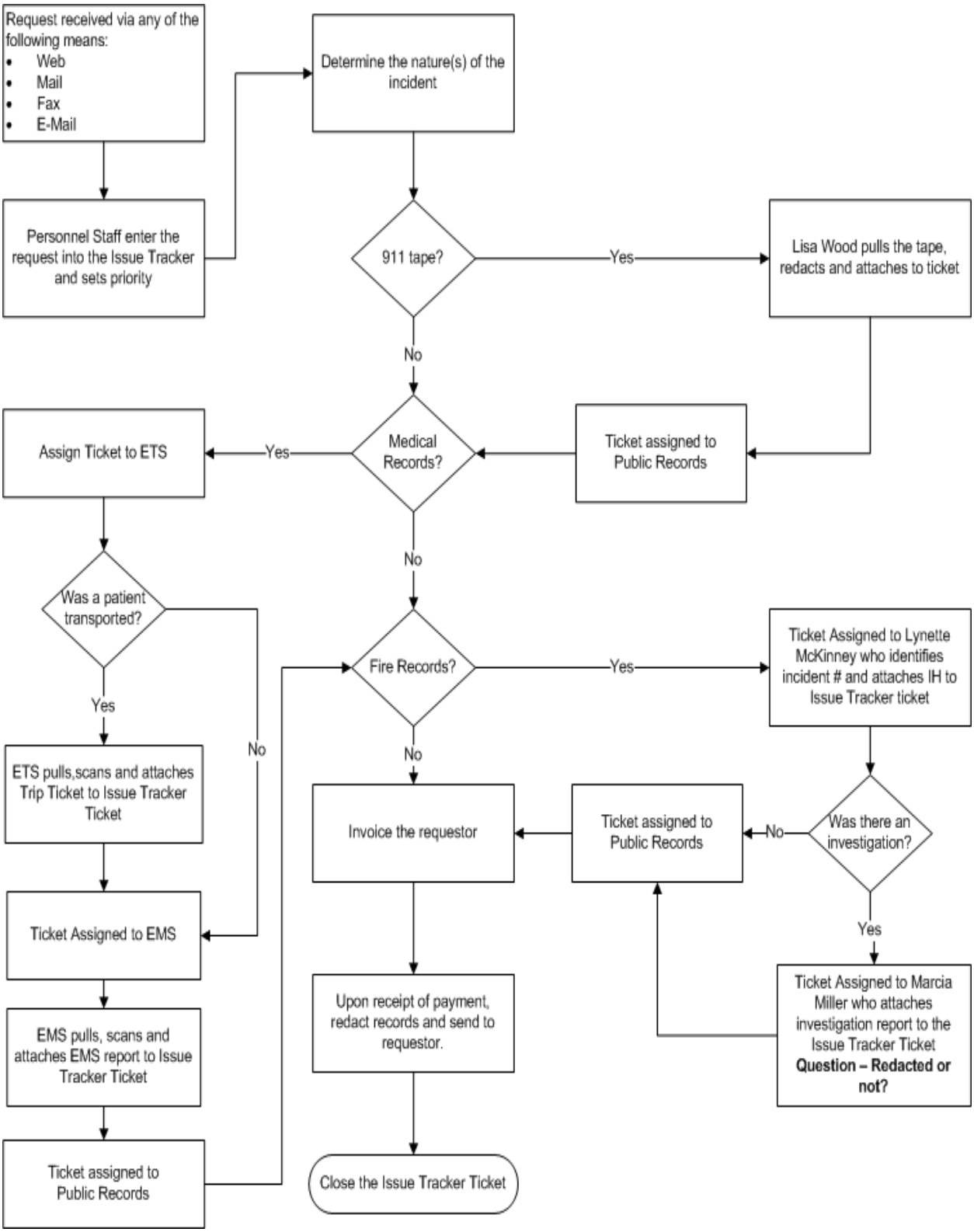
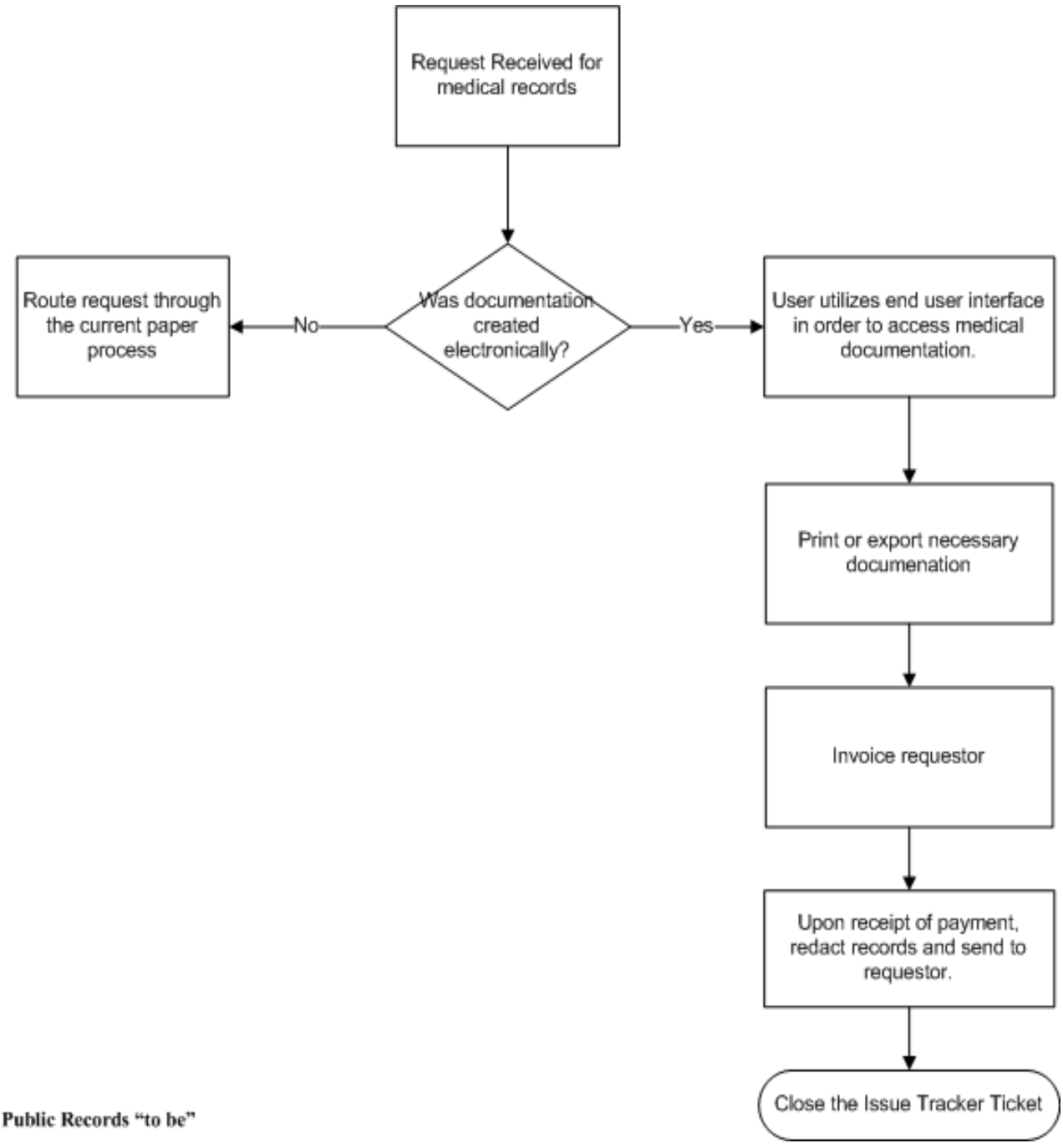


Figure 5: Public Records “to be” flowchart



Public Records “to be”