Outcomes of Patients Declined or Who Refuse Transport by Orange County (NC) Emergency Medical Services

By

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**Abstract**

**Objective:** In October of 1996, a unique Emergency Medical Services (EMS) system based on separation of paramedic treatment and ambulance transport was implemented in Orange County, NC. The core of the program was having paramedics operate independently and respond to all calls to evaluate the need for transport or further treatment. Paramedics were authorized to decline ambulance transportation to patients for whom other transportation options were more appropriate. This study is an attempt to evaluate the system for quality and safety using several outcome measures.

**Methods:** A retrospective, cross-sectional study of patients who had been declined transportation by Orange County EMS during a one-month interval was conducted to assess self-reported medical outcomes and patient satisfaction via a previously tested survey instrument administered by phone. Outcomes were: 1) subsequent medical attention sought; 2) time lapse between paramedic evaluation and subsequent medical attention; 3) status of patient's condition at the time of survey administration; 4) if patient received instructions from the paramedic about the problem; 5) would status of medical condition be different at time of survey if transported; 6) desire for change in the encounter; and 7) overall satisfaction with care received. Also reviewed prehospital EMS call reports for demographic and system-wide trends. Descriptive statistics were utilized and IRB approval was obtained.

**Results:** From April 15, 2001, to May 15, 2001, there were 658 EMS activations in Orange County, NC. A total of 223 (34%) were recorded as non-transports by the paramedics. Of these, 212 (95%) had designations of paramedic declination (153 or 72%) or patient refusal (59 or 28%). A total of 50.2% (112/223) patients were contacted by phone, and 100 (45% of total) consented to be in the study.
74% (74/100) of included patients were declined. Of these declined patients, 84% remembered receiving instructions, 64% sought further medical care (41% going to an ED) and 9% (4/46) of those were admitted to the hospital. 82% reported resolved or improved health status, and 95% of declined patients were satisfied with their EMS encounter. Compared to a previous unpublished study in 1999, these results showed an increase in satisfaction, but also an increase in admissions (from 0% to 9%).

**Conclusions:** Over five years of implementation, the IRV system has accomplished the goals set out for it. Even with some under-triage noted (9%), the negative *sequelae* from the use of a declination protocol was negligible, especially when viewed in the context of patient satisfaction. The system is performing at an acceptable level and should continuously be evaluated in order to determine need, patient safety and acceptable levels of undertriage, and possible expansion.
Introduction

In October of 1996, a unique Emergency Medical Services (EMS) system based on separation of paramedic treatment and ambulance transport was implemented in Orange County, NC. This action was a result of continuing increased demand of limited EMS resources and a shift of philosophy from treatment to patient outcome. After thorough analysis, an appointed EMS Strategic Planning Committee proposed a new system as a feasible compromise to achieve their stated goals which were to preserve volunteer participation, extend paramedic capabilities, and improve resource utilization.

The new program is founded on the use of Emergency Medical Dispatch (EMD) in triaging all 911 requests for assistance and the discretionary empowering of the separate, initial response vehicle (IRV) paramedic. The core of the program was having paramedics operate independently and respond to all calls to evaluate the need for transport or further treatment.

The scope of the decision-making also includes the newly created treat-and-release, treat-and-refer, treat-and-authorize Basic Life Support (BLS) transport, and treat-and-Advanced Life Support (ALS) transport algorithms, with the goal of the new program being the delivery of appropriate emergency medical intervention to match the need of the patient. Most EMS systems send a BLS truck to the scene for initial
evaluation and to determine if a higher level of care is needed. The IRV system approached this aspect of prehospital care from the opposite perspective, and wanted the most highly trained individuals making the initial assessment and deciding what resources were necessary.

Up to the present, from a system perspective, this program has performed to expectation and accomplished its stated goals. However, there is no firmly established follow-up procedure for those patients who are declined transport, treated-and-released, or treated-and-referred. Since Orange County is the only known EMS system to operate in this manner, there are no published data that address outcomes of patients in such a scenario. Do those patients not transported return to baseline status? Do they follow referral instructions if given and where do they seek further medical care? Are these citizens satisfied with their respective experiences? In order to address these questions, a retrospective cross-sectional study design was utilized to describe statistically how the system is performing in 2001.

Background

History of EMS

To better understand the innovation that Orange County’s EMS system represents, some background on EMS and its history is warranted. Prehospital care, as EMS is known in professional circles, has been practiced for centuries at differing levels. Some of the core principles that
form the foundation of EMS today – recognition of a need for action, evolution of emergency treatment techniques, a system of communication, and a system of transport – can be found as far back as 1500 BC in Egypt. The inspiration for many of the advances in prehospital care can be directly linked to military medicine and battlefield care. The lessons of the Civil War, especially, provided the framework of the system used in the United States (US) today.¹

The personnel that manned the earliest ambulances in the US were hospital interns (physicians), and the ambulance drivers had no formal medical training at all. This was the case throughout the early twentieth century, until World War II (WWII). Anthony Mustalish, in his chapter on the history of EMS in Prehospital Systems and Medical Oversight, cites the increased military demand for physicians as effectively removing them from ambulances in the US for good.¹ For the next twenty years or so, mortuary attendants with no medical training operated half of all ambulances and the prime goal of EMS was getting a patient to a hospital as fast as possible, now known as "scoop and run."²

It was during this post-WWII period that modern EMS began to evolve. The evolution took place along geographical lines, specifically urban and rural. In cities, ambulance services that had been more hospital-based began to form into citywide programs administered by municipalities. Prior to WWII, rural areas were serviced by local funeral home hearses and mortuary attendants who did little in the way of medical
care. This modality was slowly replaced by a variety of units operated by a local fire department or a newly formed rescue squad. Mustalish states that this slower pace of evolution was supplanted by a veritable revolution in the mid-1960's due to multiple factors.

Cardio-pulmonary resuscitation (CPR) was introduced as a viable medical therapy in 1960 by Kouwenhoven, and was quickly adopted as the prehospital medical standard for cardiac arrest. The demonstration that CPR, defibrillation, and pharmaceuticals could save lives created a demand for that level of service in communities. Further research documented the success of bringing the hospital to the patient in the setting of cardiac arrest via mobile coronary care units. It was this newfound knowledge of what the potential for prehospital care was, and the recognition that such systems in the US were "woefully inadequate," that lead to exponential change in 1966.

That year, the National Academy of Sciences-National Research Council (NAS-NRC), a private entity chartered by Congress to advise the federal government on scientific matters, published a scathing report. "Accidental Death and Disability: the Neglected Disease of Modern Society," which chronicled the lack of emphasis that the healthcare system placed on the emergency civilian patient as compared to the care available to military personnel at that time. This was evidenced by soldiers in Vietnam reaching medical care faster than civilians injured on US highways.
Twenty-four recommendations were put forth to close the gap and rectify what was viewed as a failure of the US health care system. The ideas located therein were coupled with a highway safety report from a year earlier, and the Highway Safety Act of 1966 was passed.

This law established the cabinet-level Department of Transportation, and gave it the legislative and financial authority to improve EMS. The mandate was passed on to states, and each was required to develop regional systems that could accommodate prehospital emergency needs.

Creation of Positions

The beginnings of EMS in the US depended on a physician delivering care. After WWII, the prehospital provider was not much more than a chauffeur. With the advent of newer prehospital technologies and procedures in the 1960's, the framers of the Highway Safety Act recognized that a more formal and standardized curriculum for ambulance attendants was necessary. The physician assumed a more supervisory role and dealt with system-wide issues, rather than direct patient care. Thus, a sub-specialty of Emergency Medicine (EM), the EMS physician, was created.

The new position that was created for prehospital care was titled Emergency Medical Technician-Ambulance (EMT-A) and the first 200 people were certified in 1969. Another category, the EMT-Paramedic
(EMT-P), was also formalized during this period and these practitioners had expanded capabilities. EMT-P’s were based on the physician mobile Coronary Care Unit response programs of the 60’s, and were physician-extenders. This two-tier system came to be known as Basic Life Support, or BLS (EMT-A), and Advanced Life Support, or ALS (EMT-P). Between these two categories, several different intermediate certifications came into being over the years, which blurred the distinction between BLS and ALS. These newly created certifications serve to illustrate one of the most important observations about EMS in the US.

Even with federal mandates and oversight, the development of EMS systems had a very local flavor. Each state had its own curriculum and certification requirements, and even though there had been a National Registry for EMT-A’s since 1970, that certification alone was rarely enough to practice in most states. The same was true for paramedic practice. In 1982, EMT-P training ranged from a few hundred to 2000 hours of educational and clinical experience. By the early 1990’s, most if not all paramedic and EMT educational programs had to meet national accreditation, which provided for a higher level of standardization, but still allowed for significant local variations.

Changing Scope of Practice

The scope of practice for BLS and ALS providers has continually expanded as EMS systems have gained a better understanding of what the
needs of the patient are and what can be safely done in the prehospital setting. Noting that each system may have variations on the theme, EMT-A's typically have basic first aid skills including CPR, hemorrhage control, splinting, oxygen therapy, extrication, and transport. Recently, many EMS systems have begun phasing out intermediate level skills and incorporating these into the EMT-A’s scope of practice. This adds airway management, fluid administration via peripheral intravenous catheters, defibrillation, and limited pharmaceuticals to the basic skill set. The paramedic skill set is much more complex and involves more interpretation of the situation at hand and more decision-making.

Typically, this involves more advanced cardiac defibrillation and rhythm recognition, endotracheal intubation, and a more comprehensive formulary of drugs.¹

The earliest days of the modern EMS system required "on-line" medical control for all calls. This means that the pre-hospital provider, especially at the paramedic level, would have to get permission from a physician before initiating therapy in the field. With time and the aforementioned better understanding of prehospital medicine, protocols were developed and incorporated into practice and there was a greater use of standing orders. As one can imagine, this allowed the prehospital provider to use more and more of his or her own judgement in the course of patient care. Across the country, the amount of medical control varies greatly, but most systems have advanced, algorithmic protocols in place
that significantly decrease direct physician involvement. However, those systems also have a threshold within a protocol when medical control must be notified, or stipulate if there is any doubt, then one should contact medical control.

A New Model

One of the major noteworthy trends in prehospital medicine is the idea of bringing the hospital to the patient, rather than the patient to the hospital. The goal is a more efficient, cost-effective, and safe way to bring healthcare resources to patients, especially those who have difficulty with access. The scope of practice for EMS providers is in a state of flux. The fact that other aspects of the healthcare system are undergoing critical evaluation provides an opportunity for EMS systems to do the same.

A group of EMS stakeholders met in 1996 and drafted a document that addresses an agenda for the future. The consensus from the meeting was that EMS should evolve into a community-based health management system that is fully integrated within the larger healthcare network. The new system will have the ability to identify and modify illness and injury risks, provide acute illness and injury care and follow-up, and contribute to treatment of chronic conditions and community health monitoring. After better coordination with public health, public safety, and other health providers, the resultant improved community health should lead to more appropriate use of acute health care resources in the future.
In order to accomplish this change in EMS, the development of new tools and resources to facilitate innovative roles and skills will be necessary. One of these new ideas is the further expansion of paramedic decision-making in the field. In most systems, there are three points along the response continuum where resource-allocation decisions are made: at dispatch, on the scene, and upon transport. In most systems, there is only one option available at each point. 911 calls almost always result in dispatch of EMS resources, and those patients who do not refuse care are treated and transported to an Emergency Department (ED). Neely, et al. suggest a multiple-option decision point (MODP) model based on unique clinical pathways that guide patient movement from point to point.

This new model will require 911 dispatchers to be able to triage calls and determine who requires emergent response, and those who can be served by non-emergent resources. At the scene, paramedics will have the option of directing patients to alternative means of transportation, referring to a personal care provider (PCP), or simply treating the presenting condition and releasing the patient.

There are many important questions concerning the implementation of the MODP-type model, primarily is the model safe for patients? Within that concern, lie many procedural issues, such as the triage ability of dispatchers and paramedics and correlation with ED personnel. Also, what are the implications for ED overcrowding, potential cost-savings and ambulance misuse? It is with this historical
perspective and due to some specific system trends that Orange County conceived the IRV paramedic system, and why it deserves assessment five years after implementation.

The Orange County, NC Experience

Demographics

Orange County is located in the central piedmont of North Carolina. The population, based on the 2000 census, is 118,227 not including the 25,000 students who attend the University of North Carolina-Chapel Hill. It is 420 square miles of land dissected by Interstates 85 and 40. The southern half is suburban, whereas the northern half is completely rural. The three major townships are Chapel Hill, Carrboro, and Hillsborough. The percentage of whites is 78.0%, of blacks, or African-Americans, is 13.8%, and of others is 8.2%. The percentage of persons 65 and older is 8.4%, and reflects the increasing popularity of the area as a retirement destination. The percentage of females in the county is 52.6%.13

System Issues and Pressures

In 1991, officials at Orange County Emergency Management's (OCEM) Division of EMS identified four developing trends that were leading to a decrease in the productivity of services.14 These trends were analyzed in a systematic way by an EMS Strategic Planning Committee
(EMSSPC) over the course of three and a half years. The 48-member EMSSPC was made up of a cross-section of community persons who had an interest in EMS, specifically EMS professionals, doctors, nurses, citizens, firefighters, law enforcement, and representatives of city and county government.¹⁵

The first trend identified was the EMS system’s reliance on volunteers.¹⁶ As many other EMS systems in the nation, Orange County’s was started in 1968 by a group of volunteers. These people were dissatisfied with the quality and time the old infrastructure took to respond, so they formed a rescue squad. Over time, the county government took over some aspects of the system, but the manpower component was still heavily dependent on volunteers.

With advances in prehospital medicine and an emphasis on quality control, training requirements at both the state and local levels increased. Coupled with increasing call volumes, these added burdens made volunteering in EMS almost a second occupation and the numbers of certified members in the squads fluctuated greatly. In addition, the squads recruited many personnel from the university community as numbers were decreasing. This lead to an even higher attrition rate as many of these members would graduate and move away, taking their experience with them.

The second trend was related to the high attrition rate mentioned above. The system would invest in the ALS education (~18 months) of
many of the rescue squad members, only to have them leave after training for other careers or other systems. The knowledge and experience-level of the members was always decreasing, as the higher skilled members would invariably leave soon after completing training. Thirdly, staff workloads (especially overtime) were ever-increasing for both paid and volunteer personnel. The increases in workload directly lead to the fourth trend, an increase in response times for calls.\textsuperscript{16}

\textit{A New Way of Thinking}

The EMSSPC's first goal was to change the conventional way of thinking in EMS. Typically, the response rationale for EMS was "scoop and run." That idea stemmed from the time when EMS was simply a transport modality, and response times were the primary quality measurement variable. The newer vision of EMS as a treatment modality dictated that patient outcomes be the most important measure. A paucity of outcomes-based research in the field has been cited in the EMS literature;\textsuperscript{17} Delbridge, \textit{et al.} in the EMS Agenda for the Future mention this as a prime area for improvement.\textsuperscript{6} Recognizing this, the EMSSPC sought to emphasize patient outcome rather than response time when developing their recommendations. The committee also defined short-term outcomes (result of care provided from time of contact to disposition) and long-term outcomes (death, survival, satisfaction) for the purposes of future study.\textsuperscript{16}
After redefining the goals of EMS for Orange County, the committee received training in planning process and split into four sub-committees: cardiac, pediatric, major trauma, and mass casualty. Each one deliberated and made recommendations regarding their subject area, and a consensus was reached about how best the system could accomplish and implement change.

The major issue that was the foundation for most of the other concerns was the volunteer role and the pressures that declining numbers meant for the system. It was clear that the county could not afford to replace the volunteers with a fully paid service. So the concept of separating treatment and transport was developed to preserve volunteer participation, utilize better resource management, and most importantly, to raise the level of care received by patients who activated the 911 system. That lowering EMS net costs was not an explicit goal of the new IRV system should be noted; modest cost increases were actually expected initially. In light of this, the committee recommended charging for EMS services for the first time in a fee-for-service manner.

The critical components of the new IRV system are the reliance of EMD to triage the 911 calls and on the paramedic to evaluate and triage the patient at the scene. The dispatch component is not evaluated critically in this study, other than to note dispatch priority and dispatch complaints. The transport component is maintained by a combination of contract employees and volunteers and consists of at least two BLS providers on
each of the four ambulances maintained by the county daily. Routine (non-
911) transports are conducted by a private ambulance service contracted
by the county for that express purpose.

The paramedic is dispatched to every call for medical assistance
and makes a decision about disposition based on patient assessment. In
order to prepare for this, Orange County conducted several pilot studies
and introduced a new training curriculum that all IRV paramedics had to
complete before beginning work. This culminated in a rigorous evaluation
using simulated patients and scenarios. The medical director also
revamped all the protocols and introduced the new treatment and transport
algorithms into each. Since continuing education is such an important part
of prehospital training, the system also enhanced the level and breadth of
these requirements to match the new responsibilities of the paramedics.

During the first year of implementation (1996), every time a
paramedic determined that the treat and release/declination option was
warranted, he or she had to phone the medical director, Greg Mears, MD,
to justify it. With careful assessment of the practice, this is no longer
required. The continuing education is now structured so that the
paramedics are taught to form a symptom-driven differential diagnosis.
They then explore that differential with physical exam and history taking
which has been expanded beyond what a "normal" paramedic would do.
The protocol manual contains written categories and instructions that may
be referred to as needed, and a copy of which is on every vehicle, IRV and
transport. When a patient is declined, they are given a copy of a discharge sheet that has pre-printed instructions. The medical director also periodically reviews the declinations for quality assurance purposes.

Outcomes of Patients Who Refuse or are Declined Transport in Orange County, NC

Introduction

The evolution of prehospital care in the US is reaching new heights. With newer technologies and more outcomes-based research, the breadth and depth of what can be accomplished for patients is being redefined. One area where change is already occurring is the expansion of paramedic decision-making in the out-of-hospital setting. Also known as paramedic triage, out-of-hospital decision-making includes rapidly identifying a patient's presentation, resource allocation, implementing the correct therapeutic protocol, and determining what transport modalities may be needed.

One aspect of paramedic triage that has not received much academic attention is the role of paramedic-initiated refusal to transport patients to emergency facilities, based on paramedic assessment of non-emergency conditions. Also termed paramedic declination, an example of such a situation would be a patient calling 911 for a sprained ankle. Upon evaluation by the paramedic, it may be determined that the complaint is not an emergency and the patient can have a friend drive the patient to an
ED for further work-up and not use an ambulance. This decision should not be made indiscriminately, but with firm protocols in place.

In Orange County, NC, the county-based EMS system has had an active declination protocol in effect for almost five years. With periodic system evaluations and random follow-up, the medical director noted in 1998 that the Initial Response Vehicle (IRV) program was achieving its stated goals. It is time for another assessment of this expanded-scope prehospital system, and evaluation of the outcomes of patients who are declined transport by ambulance.

Paramedic-initiated non-transport of prehospital patients is a fairly recent phenomenon. The traditional approach in EMS dictated that when a patient called 911, he would get transported to the ED for further medical evaluation. However, recent trends in prehospital care show that a greater percentage of 911 activations are resulting in non-transport, as much as 25-70% of the time. A majority of these involve patient-initiated refusal, and this entity has been studied frequently.

The literature is quite consistent in showing that patients who refuse care suffer more adverse outcomes and subsequent hospital admission rates range from 6-25%. There are very little data that evaluate paramedic triage and patient outcome, though Zacariah, et al. do include paramedic declinations in their analysis. In that study, approximately one third of all patient contacts resulted in non-transport (both paramedic declination and patient-initiated refusals), but these were
determined solely on the discretion of on-scene providers with no written
guidelines for paramedic declination or on-line medical control.

A major reason for the lack of data is the lack of established
paramedic declination programs in place around the country. In 1996, only
17% of the EMS systems in the 200 largest cities had protocols allowing
for paramedic declination. Of the 34 systems in that study, 62% had off-
line protocols (standing protocols that do not require medical control
contact) and 21% had alternative transport plans available for declined
patients.22

In the current prehospital care environment, there are various
pressures on EMS systems that point to paramedic-initiated non-transport
as a viable option. These factors range from medically unnecessary
ambulance usage, ED overcrowding, managed care influences, and
resource management.8-11 In the case of Orange County, the impetus for
the IRV system was a lack of resources in the setting of increasing call
volumes and increasing response times.16

The prehospital care community has acknowledged the need for
innovative system redesign to address the above concerns, but change
must be conducted in an evidence-based manner. Zachariah postulates that
it may be possible to design EMS systems that more closely approximate
patient needs by including priority dispatch systems, non-911 access
points, alternatives to ambulance transport, or initiating medically
appropriate treatment-and-release protocols.11 In order to accomplish this,
Krohmer states that EMS should "strive to identify criteria that will allow us to make decisions about the proper use of EMS resources (including the use of ambulances) without jeopardizing the system and its resources, without risk of medical legal consequences and without risk to the patient."¹⁰

The wide-ranging effects that the above-mentioned pressures may have on EMS systems also prompted the National Association of EMS Physicians (NAEMSP) to publish two position papers on the subject in 2001. In conjunction with the American College of Emergency Physicians (ACEP), NAEMSP stated that patient non-transport can only be implemented in the presence of online medical direction or detailed offline protocols. In addition, educational programs must be in place for both paramedics and the community.²³ The second position paper stated that alternative transportation for patients might be appropriate if ALS or ED evaluation is deemed not necessary. This includes patients driving themselves to the ED or to the office of another healthcare provider, or the use of public transportation.²⁴

The EMS system in Orange County is administered by the county commissioners through Orange County Emergency Management (OCEM). The paramedics operate under the medical direction of UNC Hospitals Department of Emergency Medicine, and subscribe to state requirements through the North Carolina Office of EMS. The patients are
charged for services rendered by paramedics only if medications are used or if they are transported to an ED.

Initial Response Vehicles (IRV) are dispatched to all calls by Emergency Medical Dispatch trained 911 operators located in central Orange County. After initial triage at the access point, resources are sent to the call based on pre-set dispatch protocols. The variations include a paramedic alone (Code 2, no lights or siren, or 3, with lights and sirens), paramedic with a non-emergency ambulance (Code 2), and paramedic with emergency ambulance (Code 3).

The county also benefits from a well-established first responder system. In the municipalities of Chapel Hill, Carrboro, and Hillsborough, fire departments equipped with Automatic External Defibrillators (AED) are dispatched for all Code 3 calls and are available for assistance at other times. The rural areas have volunteer-based systems and also have AED's available.

The ambulances are staffed with at least EMT-B trained personnel 24 hours a day. They consist of a mix of volunteers and paid staff, all working through Orange EMS and Rescue Squad which contracts with the county for 911 transports. Routine nonemergent transports are contracted to two private ambulance companies, and keep county ambulances free for response to 911 calls. The IRV paramedics are assigned to zones rather than stations, and work 12-hour shifts where sleep is not allowed.
Since the implementation of the IRV system in 1996, paramedics have been empowered to decline patients transport via ambulance. This is not a judgement on the necessity of further medical evaluation or care, but rather an assessment that the patient does not require ambulance transport. The criteria used to develop the declination protocol were chosen after through review of Orange County's 911 database, EMS trip sheet database, hospital database, and other literature collected regarding patient care and outcome.16

The policy statements on transport and declination are included (Appendix 2 and 3), as well as some sample protocols for specific complaints (Appendices 4-9). Those patients that are declined care are then instructed to either seek medical care at an ED or primary care provider within some time frame, to self-treat or call EMS back if a problem worsens or doesn't resolve. Some sample discharge instructions are provided in Appendix 10.

For those patients that the paramedic refers to the ED, he is required to call ahead and provide a report to the triage nurse about the potential patient. Depending on the time of the day, paramedics may or may not contact a patient's primary care provider (PCP) and advise him or her about the situation. Even though they are not required to do so, paramedics contact PCP's approximately 50% of the time according to the Director of Emergency Management, Nick Waters.
Paramedic Declination in the Literature

A search of the Medline, PubMed, and MD Consult databases was conducted using the keywords: paramedic, triage, decision-making, declination and refusal. Only five germane articles were identified, so relevant prehospital and emergency medicine journals were searched by hand and cross-referencing also identified additional articles.

Patient-initiated refusal of care was also included because it makes up a significant proportion of non-transports in the country as a whole and provides some interesting comparisons. An unpublished research study by Clifton Lavenhouse, MD (written communication, 2002) describing the Orange County IRV system and paramedic declination was also used for a more direct comparison.
Methods

Study Design

A retrospective, cross-sectional study of patients who had been declined transportation by EMS assessing self-reported medical outcomes and patient satisfaction was conducted via a previously tested survey instrument administered by phone (Appendix 1). This study was approved by the Institutional Review Board of the University of North Carolina at Chapel Hill.

Study Setting

The study was conducted in Orange County, NC, the response area for Orange County EMS. Orange County EMS had an annual call volume of 9,231 in 2001, with 3,143 ALS transports and 1,647 BLS transports (52% of all dispatches result in EMS transport). In addition, there were 354 dispatches where paramedics provided ALS treatment on the scene, but there was no transport.

Study Population and Protocol

EMS call reports were reviewed from 4/15/01 to 5/15/01 for designation of refusal or declination, dispatch complaint, chief complaint, age, sex, dispatch priority, and phone number. All patients who were declined or refused transport were identified with a unique number to preserve confidentiality. The primary investigator reviewed all reports and
was the primary data collector. For all patients who were declined or who refused transport, seven attempts were made to contact them by phone. The first attempt was made one week after activation of EMS. This was arbitrarily chosen as sufficient time for the patient to have sought further care or to self-treat the presenting complaint. If no contact was made, then six more attempts were conducted on different days at different times of the day in order to take into account different work schedules and timings.

Once contact was established with the patient or guardian, verbal consent for a survey was obtained. If a patient refused, he was excluded from the study. The survey instrument (Appendix 1) was adopted from a previous study by Lavenhouse, who validated it with a pilot study in 1999. Some of the questions were modified for the purposes of this investigation. Responses were recorded on a data sheet and identified only by the unique identifier, and all identifying information was destroyed.

The chief complaints were recorded for a majority of patients and should represent what the patient states is the reason for calling 911. It was important to record chief complaints because it is the best measure we have of identifying trends in the reasons a person activates the 911 system. In addition, EMD codes were recorded for all calls. The EMD code is the card that the dispatcher uses to triage the phone call. Orange County uses AMPDS v10.2 (Medical Priority, Salt Lake City, UT) EMD cards that have been modified to reflect the IRV system's goals. These codes were extracted from the 911 database, which has a run history for every call to
the 911 center. The code was then referenced to the actual EMD card and dispatch priority was then recorded.

Inclusion criteria were defined as activation of Orange County EMS from 4/15/01 to 5/15/01, refusal or declination noted on EMS call report, contact number available. Patients less than 18 years of age were included if their guardian would agree to serve as a proxy and was present at the time of the paramedic encounter. Exclusion criteria were patient refusal to participate, persons in police custody, non-English speakers, no phone, disconnected phones, and incompetent patients. Patients who gave a long-distance number were also excluded because the phones at OCEM are prevented from dialing long-distance.

Outcome Measures

Patient outcome data collected: 1) subsequent medical attention sought; 2) time lapse between paramedic evaluation and subsequent medical attention; 3) status of patient's condition at the time of survey administration; 4) if patient received instructions from the paramedic about the problem; 5) would status of medical condition be different at time of survey if transported; 6) desire for change in the encounter; and 7) overall satisfaction with care received.
Statistical Analysis

Using the Intercooled STATA 6.0 (College Station, TX) statistical package, descriptive statistics were obtained. No inferential applications were used for the purposes of this study.

Results

Demographics

From April 15, 2001, to May 15, 2001, there were 658 EMS activations in Orange County, NC. A total of 223 (34%) were recorded on EMS call reports as non-transports by the paramedics. Of these, 212 (95%) had designations of paramedic declination (153/212 or 72%) or patient refusal (59/212 or 28%) (Table 1 and Figure 1). This corresponds to the average number of non-transports in the previous study by Lavenhouse, which found approximately 200 refusals and declinations per month in a 3-month study. In the 1999 study, the percentage of declinations was 36% (214/598). The demographic data approximates the prevailing census data from the year 2000, with a mean age of 38 (range from 6 months to 92 years), 47% male, and 67% white (Table 2).

55% (123/223) of the patients were excluded from the study, with almost 50% (61/123) of those because they either did not have a phone or the contact number extracted from the EMS record was disconnected. Another 18% had long-distance numbers and were not called due to restrictions at OCEM. Only 17 (14%) of patients were unable to be reached within seven phone calls (Table 3 and Figure 1). For the 11
patients that had no designation on the call report, if a phone number was available an attempt was made to contact them to see if they could provide that information. None of this group was contacted successfully.

A total of 50.2% (112/223) patients were contacted by phone, and 9% (11/112) refused to participate in the study (Table 4 and 5), and one patient contacted was excluded because she was a non-English speaker. So 100 patients were included in the study and this constituted 45% (100/223) of the total non-transported patients and 89% (100/112) of the included group. Of the contacted persons, 18% (20/112) were parents or guardians of minors and served as proxies.

System Data

All 223 patients had dispatch complaints or EMD codes recorded. It is important to note that paramedics often make errors when entering this data into their call reports, but there is still value in evaluating the difference between the dispatch complaint and what is recorded as the main complaint at the actual scene, also known as the chief complaint.

The dispatch complaints and EMD codes were matched to the EMD cards that dispatchers use and assigned a number. Of the 32 possible EMD cards used by Orange County, only 23 were referenced during the study period (72%). This indicates that there may be some types of complaints that just were not seen in Orange County, NC in the study period (e.g. burns or inhalational injuries), or that these types of complaints resulted in transport based on the relevant protocol.
Based on the data in the EMS records, 15% (33/223) were for sick calls (non-specific complaints that do not have a separate EMD card), 14% (31) for motor vehicle crashes (MVC), 10% (22) were dispatched as respiratory calls, 8% (18) were falls, and 7% (15) were for general trauma. The percentages for the other dispatch complaint groups are located in Table 6.

The chief complaint is supposed to be a subjective description of why a patient activated the EMS system. Once again, due to the vagaries of the prehospital setting, it is possible that what is recorded in the call report is not completely accurate. Paramedics may be influenced by the dispatch complaint, or if a patient has multiple complaints, then only one may get recorded. However, just as with the dispatch complaints, it is useful to note and compare the two types of complaints.

When extracting the chief complaints, the investigator found that different patients used different words to describe similar complaints (e.g. "chest pain", "chest pressure", and "chest discomfort"). For analysis purposes, such responses were grouped by physiological system whenever possible. For example, the previous chest complaints were recorded as "Cardiovascular" on the data sheet (Table 7).

Musculoskeletal complaints made up 15% of the total (33/223), and consisted of sprains, strains, fractures or other symptoms localized to an area, such as the knee or ankle. The next most frequent were lacerations (10%), then respiratory complaints (8.5%), and "other medical" (e.g.
general weakness, rectal pain, hemorrhoids) at 8%. For 6% (14/223) of the total, paramedics did not record a chief complaint in the space provided.

One of the goals of the IRV system was to create an EMS environment that maximized safety for both patient and practitioner. Many EMS related accidents occur when vehicles are using their lights and sirens (Code 3). With the use of cars, rather than ambulances, paramedics can arrive on scene much faster, even while traveling without lights and sirens (Code 2).

Dispatch priority is determined by the dispatcher based on the modified EMD protocols for the IRV system. Our study revealed that 41% (91/223) of dispatches were for a IRV paramedic Code 2 only, 30% (67) called for a IRV medic Code 3 and ambulance Code 2, 12% (27) were for both Code 3, and 13% (28) of calls did not have a dispatch priority recorded on the call report (Table 8). When viewed by declination, 50% of the time a paramedic goes Code 2 and 35% he or she progresses at Code 3. In cases where the patient refuses, paramedics travel Code 2 34% of the time, and Code 3 59% of the time (Table 8A).

Outcome Data

As noted earlier, 72% (153/212) of patients were declined transport by IRV medics. Of the 112 patients contacted in the study, 11 refused participation and one patient was a non-English speaker. This left 100 patients (45% of total population and 89% of contacted patients) available
for analysis. Declinations made up 74% (74/100) of the respondents, while refusals accounted for 26%.

An important part of the IRV system is the paramedic delivering instructions for the patient regarding what actions to take in the future if a patient is declined or refuses care. The investigators were concerned that patients may not remember such crucial information, especially if in a stressful situation. 81% of patients remembered receiving instructions from the paramedic on the scene about their medical condition at least seven days after EMS contact (Table 9). Respondents were not asked exactly what they remembered for this study, but many offered such information without prompting. 84% (62/74) of declined patients remember receiving some instructions, compared to 73% (19/26) of refusal patients.

When asked what action was taken after EMS contact, 36% stated they went to a local ED (this could include UNC Hospitals, Durham Regional, Duke, or Alamance Regional). 20% did not seek further medical care, 19% visited their primary care provider or another health care resource, 15% opted for self-treatment of their problem, 5% called their primary care provider for advice, and 5% called EMS back and were subsequently transported to an ED (Table 10).

When broken down by refusal or declination, 41% (30/74) of declined patients sought care at an ED, whereas only 23% (6/26) of refusal patients did the same. 24% (18/74) of the declined patients did nothing,
and only 8% (2/26) of refusals chose to not seek further care. This actually brings up a point of potential confusion with the survey. Some patients may have construed "doing nothing" as just not actively seeking medical care from a professional, and not mentioned any self-treatment done at home. In order to minimize this, if a patient stated they did nothing, they were specifically asked if they did anything at home for their problem. 18% (13/74) of declined patients went to their PCP, and 23% of refusal patients did the same. Of note, 15% of refusal patients called EMS back to their location for re-evaluation and only 1% declined patients chose to do that.

The majority of patients sought care within 24 hours of being evaluated by an IRV paramedic (87.5% or 56/64). The range of time was immediately (27%) to 192 hours, or 8 days (1.6%). For declined patients, 89% (42/47) sought care within 24 hours, and 28% of those went immediately and 57% within 2 hours. In the refusal patient pool, 82% (14/17) were seen within 24 hours, and 24% went immediately and 53% within 2 hours (Table 11). One patient in the declination group initially chose self-treatment, and was not included in this table. However, he did seek further care in the ED because there was no improvement in his complaint and he is included in that data.

Upon evaluation by whatever medical care was sought, 88% (57/65) were discharged or managed on an outpatient basis and 12% (8) were admitted to a hospital (see Table 12 and 13). No patients were
admitted to an intensive care unit (ICU) as reported to the investigators. Death records were not checked in this study, but for the patients contacted by phone this was not an issue. 91% (42/46) of declined patients were discharged with only 4 being admitted. 79% of refusal patients were discharged, and another 4 were admitted.

This study also was concerned with the status of patients' health concerns at the time of follow-up (Table 14). 82% (61/74) of declined patients stated that their health problem was either resolved or improved, as compared to 73% (19/26) of refusal patients. Three declined patients (4%) actually called their status at the time of the survey worse than at the initial EMS contact. No patient who refused EMS care reported worse status.

One interesting measure for how well the IRV system is doing is patients' perceptions on whether or not transportation to the hospital might have affected their health concern, particularly when that perception is viewed in the context of the current status of their initial problem. 85% (85/100) of all patients felt that transport would not have made a difference, with the same proportion holding when declinations and refusals are viewed separately (Table 15).

10% (7/74) of declined patients and 8% (2/26) of refusal patients perceived that their current status would have been different had they been transported. Mostly because they felt they would have been evaluated in the ED faster if taken by ambulance, rather than park, check in, be triaged,
and then possibly wait. Upon further examination, when compared to current status, 7 of the 9 reported improved status (Table 15A). The 2 patients reporting worse status and a perceived difference if transported were both from the declined group.

Patient satisfaction with the EMS encounter in the IRV system is a marker for how well paramedics are communicating the methodology, and also for gauging patients’ understanding. In addition, it can serve as a qualitative assessment of triage accuracy. Overall satisfaction was 91% (91/100), which is slightly less than the 95% calculated by Lavenhouse in 1999. However, among declined patients the satisfaction rate was almost 95% (70/74), up from 90% previously. In the refusal group, 81% (21/26) reported to be satisfied, down from 97% in the previous study.

Lastly, respondents were asked some subjective questions about their respective experiences, namely, what are some things they would like to change or comment on about their EMS activation? A majority of patients stated they would not change anything about the encounter; several were unsure and said they did not know what, if anything, they would change. Many others had both positive and negative comments to share.

A strong theme in the negative comments was difficulty understanding the discharge instructions. A patient stated that she did not feel listened to and that the paramedic was “too hasty.” Several patients expected an ambulance and when one did not arrive, they were quite
surprised. They felt more public education would be helpful. One patient expressed frustration at not having any choice in the matter. Of those who gave responses, a few thought their problem (usually pain) would have resolved faster if transported.

The positive things patients had to say essentially praised the kindness and knowledge of the paramedics. One thought the system was well designed but wanted to see a more formal follow-up procedure after a couple of days. Others recognized that their condition probably was not an emergency, but they appreciated the assessment. One patient even asked if the paramedics would consider doing suturing so he wouldn't have to go to the ED and wait. These responses were completely subjective, and not submitted to any type of analysis.

Discussion

Expanded paramedic decision-making forms the core of Orange County's EMS system today. For that reason, on-going assessment and evaluation of the practice is necessary and this study is a part of that process. The IRV system has made an impact on how EMS is delivered in Orange County. Since it is such a novel approach to EMS, there are very few accepted methodologies to test the quality of such a system. This study was an attempt to assess quality through self-reported patient outcomes and perceptions, and to evaluate system-specific trends and components.
Spaite, et al. recognized the potential for expanded-scope EMS and developed some potential guidelines that one could use in an evaluation. Their first approach is most appropriate for our purposes and involves system-wide incorporation of expanded-scope. The main outcome considered is out-of-hospital cardiac arrest because the authors note that this complaint is the only entity on which EMS has proven positive effect. The supposition is that if expanded-scope decreases the survival for cardiac arrest, then it may be more harmful than beneficial.

In 1998, Orange County actually conducted a productivity analysis that has been cited previously. They concluded that average Code 3 response times decreased by 1 minute and 33 seconds after the IRV system, and the average cardiac save ratio increased from 9% to 22% with the IRV system (a cardiac save is defined as a patient surviving to discharge from the hospital).

Spaite actually is very wary of enhancing the power of paramedics with regards to triage, and focuses his study on expansion of public health initiatives. However, based on Spaite's own criteria, one can say that the improvement in cardiac save ratios, coupled with the decrease in overall response time for the most serious of dispatches, supports the value of the IRV system. One aspect of the new system that probably plays an important role in these findings is first responder defibrillation, but that has yet to be quantified and remains anecdotal.
In addition, the system cut overall transports from 80% of all dispatches to 60% in the first year of implementation. In 2001, 52% of dispatches resulted in transport according to Kent McKenzie, Director of EMS for Orange County. During our study period this number was 66%, but this time period may also represent a seasonal phenomenon with respect to EMS use.

Yet, the annual data represents sustained gains in ambulances available for other more serious calls in the county. One trend that is of note concerns the percentage of ALS transports. McKenzie stated that over the last four years ALS transports have been increasing, and he attributed that to either over-triage by some of the newer medics, or increasing acuity secondary to an increasing elderly population. This is a trend that bears close scrutiny, because as acuity increases so does the need for more transport resources, and could fundamentally alter the role of paramedic declination or expanded scope services.

Several studies have investigated the feasibility of paramedic triage, and evaluated potential protocols.26-28 One should note that none of these studies evaluated an existing program. Our study did not examine the accuracy of the declination protocols used in Orange County, and thus makes it difficult to compare them to this previous work. However, a similar concept of triaging non-emergency patients from an ED to an outpatient clinic has been implemented successfully, and deserves mention.
The ED has become a primary care delivery center, with as many as 50% of visits for non-emergency conditions.\textsuperscript{29} It can be extrapolated that increases in ED usage for such complaints also are found in EMS systems, and studies show as many as 11-61% of ambulance transports are unnecessary.\textsuperscript{30} Derlet and colleagues introduced a program of referring non-emergency patients from the ED to other health care providers.\textsuperscript{31} They found that patients could be successfully triaged out using their criteria and not suffer adverse outcomes. The majority of the non-emergency chief complaints were found to be musculoskeletal in nature, with at least 18.2% having that presentation.

In our study, dispatch and chief complaints were assessed to identify what trends were present in Orange County. It is reassuring to see that the largest fraction (15%) of our chief complaints were also for musculoskeletal injuries, and this approximates well with what Derlet found. When one compares some of the other non-emergency complaints described by Derlet, one also sees much agreement with the rest of our chief complaint profile for non-transport

This trend of agreement between a tested ED referral program and our IRV system provides a foundation for future comparisons, and reaffirms the supposition that similar trends are present in the prehospital and hospital settings. The findings from such comparisons are useful and can help this EMS system tailor training curricula and future protocols to best meet the system's needs.
The dispatch priority assigned to each call can provide some interesting information about appropriateness of the dispatch. In declined patients, 51% of the time a paramedic was sent Code 2, or non-emergency. This shows that the dispatch protocols appropriately evaluated a non-emergency condition, sent the medic Code 2, and it resulted in a declination a majority of the time. 36% of the declinations had a paramedic attached Code 3, and this speaks to the conservative nature of the EMD protocols currently in place.

In the refusal group, paramedics were dispatched Code 3 59% of the time. These patients refuse medical care and transport against medical advice. The fact that a majority of dispatches were Code 3 indicates that the protocol identified a potentially serious medical condition. It is little surprise then that studies have shown increased adverse outcomes in patients who refuse transport, with admission rates on follow-up ranging from 6-25%. Without any quantitative data, it would be difficult to say that the dispatch component of the IRV system is accurate; yet, the numbers for dispatch priority are favorable and show a trend that potential declinations are dispatched appropriately.

There is no data assessing how much patients who are declined transport remember about the instructions given by a paramedic. One study by Schmidt, et al. did look at patients who refused transport, and found that only 49% of patients contacted between 7 and 30 days after EMS evaluation remembered the instructions they were given (both
In our study, 84% of declined patients remembered receiving some instructions, and 73% of refusal patients did as well. As a measure of how well the paramedics are communicating, this seems to bode well. In addition to verbal instructions, patients are given fairly detailed written instructions modeled after discharge instructions given in the ED setting (Appendix 10) which can be referred to at the patient's convenience.

This variable is important to the overall success of a paramedic triage program because patient involvement and understanding of instructions positively correlate with those instructions being followed. The patient is made to be a part of the health care team in a declination program, because they are asked to make some assessment of his or her condition after some time and decide whether to call EMS back, go to their PCP or an ED, self-treat, or do nothing. So it is imperative that paramedics communicate effectively, especially in what may be a stressful situation for the patient. The fact that some patients expressed that they had difficulty understanding the discharge instructions is an area of concern, and may be a skill where IRV medics should receive more training.

The actions taken by patients after EMS contact represent a major marker for success of this type of prehospital declination. The main idea put forward by the framers of the IRV system was not evaluating medical necessity, but rather ambulance necessity. If the IRV system declined
patients who then did not seek the further care recommended, adverse outcomes might increase and be attributed to declination being a new barrier to care. Only 65% of the contacted and consenting patients sought subsequent care, and the rest, 35%, either did nothing or self-treated their problem. The number who did nothing or self-treated is a fairly large percentage considering that they activated 911.

This shows that in Orange County, many people may use 911 services for perceived emergencies, and may not need to after all. Of course, it would be more complete to ask patients why they chose to do nothing or self-treat to exclude other barriers to seeking further care, such as financial ones or lack of transportation.

Of declined patients, 41% sought care in an ED, compared to 23% of refusal patients. Lavenhouse found that 38% of declined patients went to an ED in 1999, and 27% of refusal patients chose to do that. The difference is slight over the three years, but could possibly be due to paramedics being better at conveying referral information to the declined patient pool. The refusal patients are difficult to assess because they are refusing further medical care from the paramedic, but still seem to go to the ED 20% of the time.

When viewing the other options for subsequent medical care, another 20% of both groups go to their PCP, and an additional 20% of the declined patients did nothing about their problem as compared with only
10% of the refusals. One finding particularly interesting found refusal patients calling EMS back 4 times more frequently than declined patients.

This could be a pseudo-marker for satisfaction since only 1% of declined patients chose to call EMS back for transport. If more people were uncomfortable or upset with their care upon declination, one would expect more repeat calls to EMS, especially since this is always given as an option to all patients, declined and refusal. However, one must also consider that patients may feel more reluctant to call EMS again if they were declined transport for the same complaint; the patient may be thinking that he may just get declined again, when what he really wants is transport to an ED or PCP for further evaluation.

Patient disposition after evaluation by subsequent medical care is the best marker we have for assessing accuracy of paramedic triage in this investigation. Though a more formal correlation between paramedics and hospital staff was not conducted in this study, contacted patients were asked about their disposition if they sought further care. 91% of declined patients stated that they were discharged from the ED or had outpatient contact with their PCP (either via phone or clinic visit). 9% (4/46) were admitted to the hospital, but none were admitted to an ICU setting and no deaths occurred. In 1999, 5% of declined patients were admitted to the hospital. Of refusals, 21% were admitted and this compares to 4% in 1999.

This rate of admission is important because it represents the under-triage rate for the IRV system. Triage is a very subjective entity at its
worst, but it is also a very efficient tool for delineating what resources a patient may need both in-hospital and out-of-hospital. Triage is particularly useful in disaster situations when resources are particularly scarce. However, there is much debate on what are acceptable rates of under and over-triage.

Under-triage is defined as appropriating fewer resources to the patient than they actually need (e.g. declining a patient who subsequently needs admission). Over-triage is defined as appropriating more resources than a patient may need, or transporting a patient that could have been safely declined. One study suggests that 5% is an acceptable under-triage rate, and 50% for over-triage. Other studies that investigated the accuracy of paramedic triage found under-triage rates of around 10%. Our rate of 9% under-triage for declinations is similar to these earlier findings, but higher than the 5% for declined patients in 1999. The rates found for refusal patients also seem to fall within what previous studies have determined, and deserve more careful assessment in light of the dramatic increase from 1999. It is very difficult to discuss this population without better understanding why they refused care, but they definitely deserve more study in this system.

Upon closer examination of the declined patients who were admitted (Table 13), one can see that the chief complaints were for general medical issues and one instance of localized trauma. Also, the reason for admission is not exactly clear in these cases, though the woman with
inflammation was given IV antibiotics for cellulitis. In that case, one could argue that she did not need an ambulance, especially since she had a personal vehicle and went immediately to the ED for further evaluation. The other patients also seem to have had conditions that, in hindsight, did not require EMS transport. Most importantly, all patients who were admitted after declination expressed satisfaction with their EMS encounter. One would assume that if they experienced adverse outcomes as a result of pre-hospital triage, then they would be more likely to be dissatisfied, and this was clearly not the case.

This brings up the point that maybe hospital admission is a poor indicator of ambulance necessity, and Derlet mentions the same thing with regard to referral out of the ED: "the use of hospital admission as a measure of poor outcome is not necessarily valid. For example, not every patient with pneumonia needs to be admitted." Further evaluation of hospital records for admitted patients would also be helpful in determining why patients were admitted. If a diabetic with poor control was admitted for social work reasons, that would also not be due to under-triage by paramedics.

Lastly, it may be worthwhile to document which triage protocol IRV medics use in each case to better assess whether they are following the guidelines correctly. Schmidt et al. found that misuse of guidelines was a prevalent issue in their study. She also states that each EMS system needs to determine what are acceptable rates of under-triage and
over-triage in paramedic declination, because each EMS system will have unique needs and trends. This is something that Orange County needs to address in the future, after more thorough analysis of their protocols.

The outcome of current status of the health concern at time of survey administration provides qualitative assessment of the triage protocol as well. If a patient had a condition that did not resolve or improve, then this could indicate that EMS should have transported the patient for further medical evaluation. The main problem with such measures is the inherent subjectivity in them.

Noting this, 82% of declined patients stated their problem was resolved or improved; 73% of refusal patients said the same. When compared to 1999, this yields a difference of -4% in declinations and -11% in refusals. 14% of declined patients stated their condition was unchanged, and 27% of refusals also had no change in status. The most troubling finding was that 4% (3/74) of declined patients reported a worse status, and this compares to 0% in the 1999 study. A tabulation of current status by disposition showed that no patient with a worse status was admitted.

Of the three declined patients reporting worse outcomes, one was a 27-year-old male involved in a MVC, another was a 64-year-old male with an unknown chief complaint, and the third was a 50-year-old male with a seizure. The first patient had neck and back pain that was determined to be musculoskeletal. He self-treated, but wasn't any better, so he went to his
PCP. His condition is reflective of the chronicity of certain musculoskeletal injuries that take upwards of a month to heal properly. This patient stated he thought the system worked well, and was satisfied with his care, but he also suggested a more formal follow-up structure to "see how patients are doing."

The patient with an unknown chief complaint went to the ED for evaluation and was discharged. He did this five days after EMS contact. It is difficult to further analyze this case due to lack of more complete information, but this patient also expressed satisfaction with his EMS experience. The final patient stated that he had another seizure after EMS left the scene, but he did nothing about this event. He did not call EMS back to the scene or see another health care provider. He did feel that if transported he may not have had another seizure, but he also expressed satisfaction with his EMS encounter and treatment.

Subjective measures of quality control must be viewed very carefully and not taken simply at face value. In the case of current status, if one were just to view 3 patients with worse conditions after declination, one might conclude that declination leads to those worse outcomes. However, one must take into account the natural history of a disease process. The patient with musculoskeletal pain, for example, may not feel better until a month after his injury. The other two patients are examples of where more information is required in this type of investigation to decide why they felt worse. This could be accomplished through asking...
patients more specifically about their history, and searching ED, hospital, and PCP records for those patients referred by the paramedics. The fact that all three patients were also satisfied with their EMS encounter despite having worse status is reassuring.

Perception on the patients' part that transport would have made a difference in current status also succumbs to some of the limitations of subjective measurements mentioned above. In our study, we used this as a way to gauge whether patients understand in lay terms the philosophy of the IRV declination system. If patients overwhelmingly felt that transport would have made a difference, then it might indicate that the paramedics are not communicating effectively or that patients need more information than they are currently given.

From our results, it would appear that the vast majority of patients (85%) did not feel that non-transport affected their health status. In the declined group, the perception was that EMS transport would have decreased the amount of time it took to be evaluated in the ED or their PCP. This seems to be an issue with ED overcrowding rather than a problem with ambulance necessity. The fact that 7 of the 9 total patients (declined and refusal) who felt that transport would have made a difference also expressed improved status after EMS contact makes this an almost contradictory finding. It would appear that the reasons patients have for this perception should be fleshed out in future investigations;
particularly what specifically about transport would have changed their status.

One of the main outcomes of this study was patient satisfaction. Coupled with disposition, this is viewed by the investigator to be an adequate marker of quality for the IRV system, and specifically the use of paramedic triage. Satisfaction also contributes with several of the other qualitative outcomes in gauging paramedic communication and patient understanding. The overall satisfaction rate for the declined and refusal patients was 91%, a decrease of 4% from the previous study. Yet, when evaluated by declination, one finds a rate of 95%, which is an increase of 5% from 1999. This is a very positive finding and may indicate several things. Namely, that patients are more familiar and accepting of the declination protocol. It could also be a reflection of improved communication skills on the part of the paramedics.

The refusal group once again provides an area of concern. As with admission rates, there was a fairly big difference between the 1999 satisfaction rate and this study. Lavenhouse found a satisfaction rate of 97% in the refusals, and we determined a rate of 81%. Explanations for this difference are difficult, because the very nature of the refused population is contradictory. This study has shown that over 40% of the time, refusal patients still seek further medical care after refusing EMS. One reason could be personality or racial differences. If a patient decides he or she does not like a paramedic, or if they feel slighted because of his
or her race, then they may choose to refuse EMS care and seek other care on their own. Regardless, the refusal population in Orange County deserves more research in order to better understand the phenomenon.

Limitations and Future Questions

The major limitation of this study stems from the design. As a retrospective survey, there was potential for recall bias in the respondents. In addition, the fact that phone calls were made from OCEM may have influenced people to alter their answers to be more favorable, rather than if a third party with no affiliation asked similar questions.

The study also suffered from a poor contact rate. Over 55% of the total population was unable to be contacted, and a majority of those were without phones or had disconnected lines. This is important because the lack of phones could be a marker for poorer outcome, and indicate a lack of basic resources for the patient, including transportation to further medical care.

No hospital or death records were searched for non-contacted patients, and this may have identified some additional outcome data. As stated earlier, the study would also have benefited from analyzing the ED records of patients referred to the ED in order to compose a more complete picture of the disposition. The reliance on the EMS record for some data points can lead to incorrect or biased information.
The system would benefit from a critical assessment of paramedic triage accuracy as compared to triage nurses or ED physicians. Also, future analysis should focus questions on why patients act the way they do. With sufficient sample size, accurate trends can be identified and perhaps lead to programs and solutions to combat ambulance and ED misuse. Also, Orange County is a very rural setting. The studies that are less supportive of paramedic triage typically have been conducted in urban settings. It may be fruitful to compare the use of these protocols in a more urban area, in order to determine if geography or call volume plays a role in the success of paramedic triage.

Conclusions

Over five years of implementation, the IRV system has accomplished the goals set out for it. Even with some under-triage noted, the negative sequelae from the use of a declination protocol was negligible, especially when viewed in the context of patient satisfaction. The system is performing at an acceptable level and should continuously be evaluated in order to determine need, patient safety, and possible expansion.
Table 1: Declinations and Refusals in Orange County, NC from 4/15-5/15/02

<table>
<thead>
<tr>
<th>RefvsDec</th>
<th>Freq.</th>
<th>%</th>
<th>Cumulative %</th>
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<tbody>
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<td>59</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Declined</td>
<td>153</td>
<td>69</td>
<td>95</td>
</tr>
<tr>
<td>Unknown</td>
<td>11</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>223</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Demographic Characteristics for Study Population

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean/</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>219</td>
<td>38.3</td>
<td>0.5-92.0</td>
</tr>
<tr>
<td>Sex (%male)</td>
<td>220</td>
<td>47.3</td>
<td>-</td>
</tr>
<tr>
<td>Race (%white)</td>
<td>194</td>
<td>67.5</td>
<td>-</td>
</tr>
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</table>

Table 3: Exclusion Criteria for Study Population

<table>
<thead>
<tr>
<th>Exclusion</th>
<th>Freq.</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No phone</td>
<td>61</td>
<td>49.59</td>
<td>49.59</td>
</tr>
<tr>
<td>Non-English</td>
<td>1</td>
<td>0.81</td>
<td>50.41</td>
</tr>
<tr>
<td>Incarcerated</td>
<td>4</td>
<td>3.25</td>
<td>53.66</td>
</tr>
<tr>
<td>Incompetent</td>
<td>7</td>
<td>5.69</td>
<td>59.35</td>
</tr>
<tr>
<td>Refused</td>
<td>11</td>
<td>8.94</td>
<td>68.29</td>
</tr>
<tr>
<td>Long-distance</td>
<td>22</td>
<td>17.89</td>
<td>86.18</td>
</tr>
<tr>
<td>No contact</td>
<td>17</td>
<td>13.82</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>123</strong></td>
<td><strong>100</strong></td>
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</tr>
</tbody>
</table>

Table 4: Study Subjects Able to be Contacted by Phone

<table>
<thead>
<tr>
<th>Contact</th>
<th>Freq.</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>111</td>
<td>49.78</td>
<td>49.78</td>
</tr>
<tr>
<td>Yes</td>
<td>112</td>
<td>50.22</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>223</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Table 5: Total Number of Phone Attempts required to make Contact

<table>
<thead>
<tr>
<th>Attempt#</th>
<th>Freq.</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>First attempt</td>
<td>98</td>
<td>43.95</td>
<td>43.95</td>
</tr>
<tr>
<td>Second attempt</td>
<td>16</td>
<td>7.17</td>
<td>51.12</td>
</tr>
<tr>
<td>Third attempt</td>
<td>11</td>
<td>4.93</td>
<td>56.05</td>
</tr>
<tr>
<td>Fourth attempt</td>
<td>8</td>
<td>3.59</td>
<td>59.64</td>
</tr>
<tr>
<td>Fifth attempt</td>
<td>4</td>
<td>1.79</td>
<td>61.43</td>
</tr>
<tr>
<td>Sixth attempt</td>
<td>1</td>
<td>0.45</td>
<td>61.88</td>
</tr>
<tr>
<td>Final attempt</td>
<td>15</td>
<td>6.73</td>
<td>68.61</td>
</tr>
<tr>
<td>No contact</td>
<td>70</td>
<td>31.39</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>223</strong></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

### Table 6: Emergency Medical Dispatch Complaints for All Patients

<table>
<thead>
<tr>
<th>EMD</th>
<th>Frequency</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sick call</td>
<td>33</td>
<td>14.8</td>
<td>14.80</td>
</tr>
<tr>
<td>MVC</td>
<td>31</td>
<td>13.9</td>
<td>28.70</td>
</tr>
<tr>
<td>Respiratory</td>
<td>22</td>
<td>9.87</td>
<td>38.57</td>
</tr>
<tr>
<td>Falls</td>
<td>18</td>
<td>8.07</td>
<td>46.64</td>
</tr>
<tr>
<td>Gen trauma</td>
<td>15</td>
<td>6.73</td>
<td>53.37</td>
</tr>
<tr>
<td>Unknown</td>
<td>14</td>
<td>6.28</td>
<td>59.65</td>
</tr>
<tr>
<td>Laceration</td>
<td>14</td>
<td>6.28</td>
<td>65.93</td>
</tr>
<tr>
<td>Chest pain</td>
<td>13</td>
<td>5.83</td>
<td>71.76</td>
</tr>
<tr>
<td>Seizures</td>
<td>12</td>
<td>5.38</td>
<td>77.14</td>
</tr>
<tr>
<td>Unconscious</td>
<td>9</td>
<td>4.04</td>
<td>81.18</td>
</tr>
<tr>
<td>Abd pain</td>
<td>7</td>
<td>3.14</td>
<td>84.32</td>
</tr>
<tr>
<td>Overdose</td>
<td>7</td>
<td>3.14</td>
<td>87.46</td>
</tr>
<tr>
<td>Assault</td>
<td>6</td>
<td>2.69</td>
<td>90.15</td>
</tr>
<tr>
<td>Diabetic</td>
<td>6</td>
<td>2.69</td>
<td>92.84</td>
</tr>
<tr>
<td>Arrest</td>
<td>4</td>
<td>1.79</td>
<td>94.63</td>
</tr>
<tr>
<td>Stroke</td>
<td>3</td>
<td>1.35</td>
<td>95.98</td>
</tr>
<tr>
<td>Heart problems</td>
<td>2</td>
<td>0.9</td>
<td>96.88</td>
</tr>
<tr>
<td>Psych</td>
<td>2</td>
<td>0.9</td>
<td>97.78</td>
</tr>
<tr>
<td>Allergies</td>
<td>1</td>
<td>0.45</td>
<td>98.23</td>
</tr>
<tr>
<td>Animal</td>
<td>1</td>
<td>0.45</td>
<td>98.68</td>
</tr>
<tr>
<td>Back pain</td>
<td>1</td>
<td>0.45</td>
<td>99.13</td>
</tr>
<tr>
<td>Headache</td>
<td>1</td>
<td>0.45</td>
<td>99.58</td>
</tr>
<tr>
<td>Environmental</td>
<td>1</td>
<td>0.45</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>223</strong></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
### Table 7: Chief Complaints for All Patients

<table>
<thead>
<tr>
<th>CC</th>
<th>Frequency</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSK</td>
<td>33</td>
<td>14.8</td>
<td>14.80</td>
</tr>
<tr>
<td>Laceration</td>
<td>23</td>
<td>10.31</td>
<td>25.11</td>
</tr>
<tr>
<td>Respiratory</td>
<td>19</td>
<td>8.52</td>
<td>33.63</td>
</tr>
<tr>
<td>Other medical</td>
<td>18</td>
<td>8.07</td>
<td>41.70</td>
</tr>
<tr>
<td>Unknown</td>
<td>14</td>
<td>6.28</td>
<td>47.98</td>
</tr>
<tr>
<td>CV</td>
<td>12</td>
<td>5.38</td>
<td>53.36</td>
</tr>
<tr>
<td>Syncope/dizzy</td>
<td>11</td>
<td>4.93</td>
<td>58.29</td>
</tr>
<tr>
<td>Contusion</td>
<td>11</td>
<td>4.93</td>
<td>63.22</td>
</tr>
<tr>
<td>Seizure</td>
<td>11</td>
<td>4.93</td>
<td>68.15</td>
</tr>
<tr>
<td>Back/neck pain</td>
<td>11</td>
<td>4.93</td>
<td>73.08</td>
</tr>
<tr>
<td>EtOH/OD</td>
<td>10</td>
<td>4.48</td>
<td>77.56</td>
</tr>
<tr>
<td>Abd pain</td>
<td>10</td>
<td>4.48</td>
<td>82.04</td>
</tr>
<tr>
<td>Psych</td>
<td>8</td>
<td>3.59</td>
<td>85.63</td>
</tr>
<tr>
<td>Headache</td>
<td>8</td>
<td>3.59</td>
<td>89.22</td>
</tr>
<tr>
<td>Trauma</td>
<td>6</td>
<td>2.69</td>
<td>91.91</td>
</tr>
<tr>
<td>Diabetic</td>
<td>4</td>
<td>1.79</td>
<td>93.70</td>
</tr>
<tr>
<td>AMS</td>
<td>4</td>
<td>1.79</td>
<td>95.49</td>
</tr>
<tr>
<td>F/N/V</td>
<td>4</td>
<td>1.79</td>
<td>97.28</td>
</tr>
<tr>
<td>Inflammatory</td>
<td>2</td>
<td>0.9</td>
<td>98.18</td>
</tr>
<tr>
<td>Ob/Gyn</td>
<td>2</td>
<td>0.9</td>
<td>99.08</td>
</tr>
<tr>
<td>Metabolic</td>
<td>1</td>
<td>0.45</td>
<td>99.53</td>
</tr>
<tr>
<td>Unresponsive</td>
<td>1</td>
<td>0.45</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>223</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Table 8: Dispatch Priority for All Patients

<table>
<thead>
<tr>
<th>DisPri</th>
<th>Freq.</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2</td>
<td>91</td>
<td>40.81</td>
<td>40.81</td>
</tr>
<tr>
<td>P3</td>
<td>2</td>
<td>0.9</td>
<td>41.7</td>
</tr>
<tr>
<td>P2A2</td>
<td>8</td>
<td>3.59</td>
<td>45.29</td>
</tr>
<tr>
<td>P3A2</td>
<td>67</td>
<td>30.04</td>
<td>75.34</td>
</tr>
<tr>
<td>P3A3</td>
<td>27</td>
<td>12.11</td>
<td>87.44</td>
</tr>
<tr>
<td>Unknown</td>
<td>28</td>
<td>12.56</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>223</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Table 8A: Dispatch Priority by Declination or Refusal

<table>
<thead>
<tr>
<th>RefvsDec</th>
<th>P2</th>
<th>P3</th>
<th>P2A2</th>
<th>P3A2</th>
<th>P3A3</th>
<th>unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refused</td>
<td>18</td>
<td>1</td>
<td>2</td>
<td>22</td>
<td>12</td>
<td>4</td>
<td>59</td>
</tr>
<tr>
<td>Declined</td>
<td>72</td>
<td>1</td>
<td>5</td>
<td>44</td>
<td>10</td>
<td>21</td>
<td>153</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>2</td>
<td>7</td>
<td>66</td>
<td>22</td>
<td>25</td>
<td>212</td>
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</tbody>
</table>

### Table 9: Did the Patient Receive Instructions from the IRV Paramedic?

<table>
<thead>
<tr>
<th>Instructions</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refused (%)</td>
<td>7 (27)</td>
<td>19 (73)</td>
<td>26</td>
</tr>
<tr>
<td>Declined (%)</td>
<td>12 (16)</td>
<td>62 (84)</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>81</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 10: Action after EMS Contact for Declinations and Refusals

<table>
<thead>
<tr>
<th>Action</th>
<th>Nothing</th>
<th>MD called</th>
<th>MD visit</th>
<th>ED</th>
<th>Self-treat</th>
<th>EMS re-called</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refused (%)</td>
<td>2 (8)</td>
<td>2 (8)</td>
<td>6 (23)</td>
<td>6 (23)</td>
<td>6 (23)</td>
<td>4 (15)</td>
<td>26</td>
</tr>
<tr>
<td>Declined (%)</td>
<td>18 (24)</td>
<td>3 (4)</td>
<td>13 (18)</td>
<td>30 (12)</td>
<td>9 (12)</td>
<td>1 (1)</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>5</td>
<td>19</td>
<td>36</td>
<td>15</td>
<td>5</td>
<td>100</td>
</tr>
</tbody>
</table>
### Table 11: Time in Hours Before Seeking further Medical Care

<table>
<thead>
<tr>
<th>Time</th>
<th>Freq.</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (Immediately)</td>
<td>17</td>
<td>26.56</td>
<td>26.56</td>
</tr>
<tr>
<td>0.3</td>
<td>2</td>
<td>3.12</td>
<td>29.69</td>
</tr>
<tr>
<td>0.5</td>
<td>2</td>
<td>3.12</td>
<td>32.61</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>12.5</td>
<td>45.31</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>10.94</td>
<td>56.25</td>
</tr>
<tr>
<td>2.5</td>
<td>1</td>
<td>1.56</td>
<td>57.81</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1.56</td>
<td>59.38</td>
</tr>
<tr>
<td>3.5</td>
<td>1</td>
<td>1.56</td>
<td>60.94</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1.56</td>
<td>62.5</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1.56</td>
<td>64.06</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>1.56</td>
<td>65.62</td>
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<tr>
<td>12</td>
<td>4</td>
<td>6.25</td>
<td>71.88</td>
</tr>
<tr>
<td>24</td>
<td>10</td>
<td>15.62</td>
<td>87.5</td>
</tr>
<tr>
<td>36</td>
<td>1</td>
<td>1.56</td>
<td>89.06</td>
</tr>
<tr>
<td>48</td>
<td>3</td>
<td>4.69</td>
<td>93.75</td>
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<td>72</td>
<td>1</td>
<td>1.56</td>
<td>95.31</td>
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<td>96</td>
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<td>1.56</td>
<td>96.88</td>
</tr>
<tr>
<td>120</td>
<td>1</td>
<td>1.56</td>
<td>98.44</td>
</tr>
<tr>
<td>192</td>
<td>1</td>
<td>1.56</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

### Table 12: Patient Disposition after Seeking Further Medical Care

<table>
<thead>
<tr>
<th>Disposition</th>
<th>Discharged</th>
<th>Admitted</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refused (%)</td>
<td>15 (79)</td>
<td>4 (21)</td>
<td>19</td>
</tr>
<tr>
<td>Declined (%)</td>
<td>42 (91)</td>
<td>4 (9)</td>
<td>46</td>
</tr>
<tr>
<td>Total (%)</td>
<td>57 (88)</td>
<td>8 (12)</td>
<td>65</td>
</tr>
</tbody>
</table>
### Table 13: Patients Who Were Admitted after seeking further Medical Care

<table>
<thead>
<tr>
<th>Refused</th>
<th>Age/Sex</th>
<th>Chief Complaint</th>
<th>Mode of Transport</th>
<th>Time</th>
<th>Status</th>
<th>Difference</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refused</td>
<td>52/M</td>
<td>Metabolic</td>
<td>Personal vehicle</td>
<td>Immediate</td>
<td>Resolved</td>
<td>None</td>
<td>No</td>
</tr>
<tr>
<td>Refused</td>
<td>65/M</td>
<td>Syncope</td>
<td>EMS re-called</td>
<td>2 hours</td>
<td>Improved</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Refused</td>
<td>54/F</td>
<td>Unknown</td>
<td>Personal vehicle</td>
<td>48 hours</td>
<td>Improved</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Refused</td>
<td>44/M</td>
<td>Altered Mental Status</td>
<td>Personal vehicle</td>
<td>Immediate</td>
<td>Improved</td>
<td>None</td>
<td>Yes</td>
</tr>
</tbody>
</table>

| Declined | 58/F | Inflammatory | Personal vehicle | Immediate | Improved | Yes | Yes |
| Declined | 68/M | Weakness     | Personal vehicle | 1/2 hour  | Improved | Unknown | Yes |
| Declined | 33/M | Contusion    | Unknown          | 1 hour    | Unchanged | None | Yes |
| Declined | 37/M | Dislocation  | Personal vehicle | Immediate | Resolved | None | Yes |

### Table 14: Current Status of Health Concern at time of Survey Administration

<table>
<thead>
<tr>
<th>Status</th>
<th>Refused (%)</th>
<th>4 (15)</th>
<th>15 (58)</th>
<th>7 (27)</th>
<th>0 (0)</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Declined (%)</td>
<td>17 (23)</td>
<td>44 (59)</td>
<td>10 (14)</td>
<td>3 (4)</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>21</td>
<td>59</td>
<td>17</td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 15: Difference in Current Status if Transported by EMS

<table>
<thead>
<tr>
<th>Status</th>
<th>None</th>
<th>Yes</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refused (%)</td>
<td>22 (84)</td>
<td>2 (8)</td>
<td>2 (8)</td>
<td>26</td>
</tr>
<tr>
<td>Declined (%)</td>
<td>63 (85)</td>
<td>7 (10)</td>
<td>4 (5)</td>
<td>74</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>85</td>
<td>9</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 15A: Difference if Transported by Current Health Status

<table>
<thead>
<tr>
<th>Status</th>
<th>None</th>
<th>Yes</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolved (%)</td>
<td>21 (100)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>21</td>
</tr>
<tr>
<td>Improved (%)</td>
<td>46 (78)</td>
<td>7 (12)</td>
<td>6 (10)</td>
<td>59</td>
</tr>
<tr>
<td>Unchanged (%)</td>
<td>17 (100)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>17</td>
</tr>
<tr>
<td>Worse (%)</td>
<td>1 (33)</td>
<td>2 (66)</td>
<td>0 (0)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>85</td>
<td>9</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 16: Patient Satisfaction with EMS Encounter

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refused (%)</td>
<td>5 (19)</td>
<td>21 (81)</td>
<td>26</td>
</tr>
<tr>
<td>Declined (%)</td>
<td>4 (5)</td>
<td>70 (95)</td>
<td>74</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9</td>
<td>91</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 16A: Satisfaction vs Perceived Difference in Status if Transported

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>None (%)</th>
<th>Yes (%)</th>
<th>Unknown (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>5 (6)</td>
<td>3 (33)</td>
<td>1 (17)</td>
<td>9</td>
</tr>
<tr>
<td>Yes</td>
<td>80 (94)</td>
<td>6 (67)</td>
<td>5 (83)</td>
<td>91</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>85</td>
<td>9</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>
Figure 1: Study Population and Exclusion Criteria

223 Non-transports

112 Contacted

100 Consent and Included

11 Refused

1 Non-English

111 No Contact

61 No phone
22 Long-distance
17 No contact x7 attempts
7 Incompetent
4 Incarcerated

123 Excluded
Appendix I

Revised script for IRB 01-EMERG/MED-110: Decision-Making in the Pre-Hospital Setting and Prospective Medical Outcomes in Orange County, NC

ID#        CFS#        Declination_  Refusal_  
Age_  Sex_  Race_  Chief Complaint_  

May I speak with _______. Hi, my name is __________, and I'm a medical student at UNC-Chapel Hill. I'm calling in regards to your recent use of Orange County EMS. I am conducting a research study that involves seeing how patients who call 911 are doing, and was wondering if you would mind answering a few questions. If you feel uncomfortable or just don't wish to take part, just let me know at any time and I will end the call. In addition, all your answers are confidential and will be recorded without use of your name, but with a unique identifying number that will be destroyed at the end of the study. Would you like to participate in the study survey? It will only take about 3-5 minutes.

Verbal consent given?  YES  NO

1. Have you used Orange County EMS prior to this event?  YES  NO
   If yes, when?

2. Did you receive any instructions on how to care for your problem and when to re-contact EMS?  YES  NO

3. What did you do about your problem?

4. Did you seek further medical attention?
   _____ MD visit  _____ Admitted
   _____ call MD & talk  _____ what hospital?
   _____ clinic  _____ self-tx
   _____ hosp  _____ nothing
   what hosp?_______  _____ other

5. How long after being seen by EMS did you seek further medical attention?

6. Is your problem resolved, improved, unchanged, or worse?

7. Do you think your condition would be different now if EMS transported you?  YES  NO
   If yes, how so?

8. What would you change about this encounter if you could?

9. Were you satisfied with your EMS care?  YES  NO
   How could Orange County EMS serve you better?
Policy:

All individuals served by Orange County EMS will be evaluated and furnished transportation (if indicated) in the most timely and appropriate manner for each individual situation.

Purpose:

To provide:

- Rapid emergency EMS transport when needed.
- Appropriate medical stabilization and treatment at the scene when necessary.
- Appropriate non-EMS transport in non-emergent situations, based on availability.
- Protection of patients, Orange County EMS personnel, and citizens from undue risk when possible.

Procedure:

1. All trauma patients with mechanisms or history for multiple system trauma will be transported as soon as possible. The scene time should be 10 minutes or less.

2. Medical patients will be transported in the most efficient manner possible considering the medical condition. Advanced life support therapy should be provided at the scene if it will positively impact patient care. Justification for scene times greater than 20 minutes should be documented.

3. Patients who do not require EMS transport, but will need further medical evaluation and/or care will be provided a disposition form and will be referred to an alternative transport provider. Alternative transport providers include public or private mass transit services, private vehicles, and franchised non-emergency providers. Depending on the situation, law enforcement may also be considered a transport provider.

4. No patients will be transported in initial response vehicles (IRVs).

5. In unusual circumstances, transport in other vehicles may be appropriate.
Policy:

All patient encounters responded to by Orange County EMS will result in the accurate and timely completion of the appropriate patient care report and/or patient discharge instruction (disposition) form (appendices A and B).

Purpose:

To provide for the documentation of:
- The evaluation and care of the patient
- The patient’s refusal of the evaluation, treatment, and/or transportation
- The patient’s discharge (disposition) instructions
- The patient’s encounter to protect Orange County EMS and its personnel from undue risk and liability.

Procedure:

1. All patient encounters, which result in some component of an evaluation, must have a patient care report completed.

2. All patients who refuse any component of the evaluation or treatment, based on the complaint, must have a disposition (patient discharge instruction form) completed.

3. All patients who are not transported by Orange County EMS must have a disposition (patient discharge instruction form) completed including the patient instruction section.
**Pearls:**
- Any patient contact which does not result in an EMS transport must have a completed disposition form.
- Exam: Minimal exam if not noted on the specific protocol is vital signs, mental status, and location of injury or complaint.
- Required vital signs on every patient include blood pressure, pulse, respirations, pain/severity.
- Pulse oximetry and temperature documentation is dependent on the specific complaint.
- Timing of transport should be based on patient's clinical condition and the transport policy.
- Orthostatic vital sign procedure should be performed in situations where volume status is in question.
Respiratory Distress

History:
- Asthma; COPD -- chronic bronchitis, emphysema, congestive heart failure
- Home treatment (oxygen, nebulizer)
- Medications (theophylline, steroids, inhalers)
- Toxic exposure, smoke inhalation

Signs and Symptoms:
- Shortness of breath
- Pursed lip breathing
- Decreased ability to speak
- Increased respiratory rate and effort
- Wheezing, rhonchi
- Use of accessory muscles
- Fever, cough
- Tachycardia

Differential:
- Asthma
- Anaphylaxis
- Aspiration
- COPD (Emphysema, Bronchitis)
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pneumothorax
- Cardiac (MI or CHF)
- Pericardial tamponade
- Hyperventilation
- Inhaled toxin (Carbon monoxide, etc.)

Universal Patient Care Protocol (11)

IV Protocol (8)

- Rales / Signs of CHF
- Wheezes

Pulmonary Edema Protocol (25)

Albuterol

If no improvement after 3 nebs
Methylprednisolone

Contact Medical Control

Epinephrine
1:1000 SQ

Pearls:
- **Exam:** Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro
- **Pulse oximetry** should be monitored continuously if initial saturation is < or = 96%, or there is a decline in patients status despite normal pulse oximetry readings.
- When possible, peak flow **measurements** should be obtained before and after each nebulized treatment.
- Status asthmaticus -- severe prolonged asthma attack unresponsive to therapy -- life threatening!
- In patients who are >50 years of age, have a history of cardiac disease, or if the patient's heart rate is >150, Contact Medical Control prior to administering epinephrine. Epinephrine may precipitate cardiac ischemia.
- A 12-lead ECG should be performed on these patients.
- A silent chest in respiratory distress is a pre-respiratory arrest sign.

Disposition:
- **EMS Transport:**
  - ALS: All patients other than below
  - BLS: Pulse oximetry > 96%, speaking comfortably post Albuterol, and no retractions
  - MD Within 4 Hours: Asymptomatic post Albuterol, history of respiratory disease

Protocol 27
### Behavioral

**History:**
- Situational crisis
- Psychiatric illness/medications
- Injury to self or threats to others
- Medic alert tag
- Substance abuse / overdose
- Diabetes

**Signs/Symptoms:**
- Anxiety, agitation, confusion
- Affect change, hallucinations
- Delusional thoughts, bizarre behavior
- Combative, violent
- Expression of suicidal / homicidal thoughts

**Differential:**
- see Altered Mental Status differential
- Alcohol intoxication
- Toxin / Substance abuse
- Medication effect / overdose
- Withdrawal syndromes
- Depression
- Bipolar (manic-depressive)
- Schizophrenia
- Anxiety disorders

---

**Scene Safety**

**Universal Patient Care Protocol (11)**

- Treat suspected medical or trauma problems per appropriate protocol
  - Altered Mental Status (14)
  - Overdose (23)
  - Head Trauma (51)

---

**Legend**

- EMT
- EMT-D
- EMT-P
- IRV Medic
- MC Order

---

**Pearls:**
- Exam: Mental Status, Skin, Heart, Lungs, Neuro
- The decision to restrain a patient is the responsibility of the paramedic.
- Your safety first!!
- Be sure to consider all possible medical/trauma causes for behavior (hypoglycemia, overdose, substance abuse, hypoxia, head injury, etc.)
- Do not irritate the patient with a prolonged exam.

---

**Disposition:**
- EMS Transport:
  - ALS: All restrained patients or patients who receive ALS care
  - BLS: All other patients
### History
- Onset and location
- Insect sting or bite
- Food allergy / exposure
- Medication allergy / exposure
- New clothing, soap, detergent
- Past history of reactions
- Past medical history
- Medication history

### Signs and Symptoms:
- Itching or hives
- Coughing / wheezing or respiratory distress
- Chest or throat constriction
- Difficulty swallowing
- Hypotension or shock
- Edema

### Differential:
- Urticaria (rash only)
- Anaphylaxis (systemic effect)
- Shock (vascular effect)
- Angioedema (drug induced)
- Aspiration / Airway obstruction
- Vasovagal event
- Asthma or COPD
- CHF

### Universal Patient Care Protocol (11)

- Hives / Rash only
  - No respiratory component
  - Diphenhydramine
  - Reassess patient

- Evidence of impending respiratory distress or shock
  - Epinephrine 1:1000 SQ
  - IV (8) / Cardiac monitor
    - IV (8) / Cardiac monitor
    - Diphenhydramine
    - Methylprednisolone
    - Contact Medical Control
    - If evidence of Anaphylaxis
      - Epinephrine 1:10,000 IV

- Hypotension
  - Hypotension protocol (22)

- Dysrhythmia
  - Appropriate protocol

- Respiratory distress
  - Respiratory distress protocol (27)

### Pearls:
- Exam: Mental Status, Skin, Heart, Lungs
- Prior to administering epinephrine, Contact Medical Control in patients who are >50 years of age, have a history of cardiac disease, or if the patient's heart rate is >150. Epinephrine may precipitate cardiac ischemia. These patients should receive a 12-lead ECG.
- Any patient with respiratory symptoms or extensive reaction should receive IV or IM diphenhydramine.
- The shorter the onset from symptoms to contact, the more severe the reaction.

### Disposition:
**EMS Transport:**
- ALS: Anaphylaxis
- Respiratory distress
- Chest pain

**MD Within 4 Hours:**
- Increased rash, not improved with Benadryl (diphenhydramine)

**MD Within 24 Hours:**
- Persistent (or recurrent) rash
### Seizure Protocol

#### History:
- Reported / witnessed seizure activity
- Previous seizure history
- Medical alert tag information
- Seizure medications
- History of trauma
- History of diabetes
- History of pregnancy

#### Signs and Symptoms:
- Decreased mental status
- Sleepiness
- Incontinence
- Observed seizure activity
- Evidence of trauma

#### Differential:
- CNS (Head) trauma
- Tumor
- Metabolic, Hepatic, or Renal failure
- Hypoxia
- Electrolyte abnormality (Na, Ca, Mg)
- Drugs, Medications, Non-compliance
- Infection / Fever
- Alcohol withdrawal
- Eclampsia
- Stroke
- Hyperthermia

### Patient Care Protocols

- Universal Patient Care Protocol (11)
- Spinal Immobilization Protocol (10)
- Status epilepticus
- Post-ictal
- Airway Protocol (1)
- IV Protocol (8)
- Diazepam (Midazolam if no IV)
- Focused history / Physical exam
- IV Protocol (8)
- Blood Glucose
  - Glucose < 60
    - Thiamine
    - 50% Dextrose
    - Glucagon if no IV
  - Glucose > 60
- Status / Seizure recurs?
  - Diazepam (Midazolam if no IV)

### Pearls:
- Exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro
- Status epilepticus is defined as two or more successive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid airway control, treatment, and transport.
- Grand mal seizures (generalized) are associated with loss of consciousness, incontinence, and tongue trauma.
- Focal seizures (petit mal) effect only a part of the body and are not usually associated with a loss of consciousness.
- Jacksonian seizures are seizures which start as a focal seizure and become generalized.
- Be prepared for airway problems and continued seizures.
- Assess possibility of occult trauma and substance abuse.
- Be prepared to assist ventilations especially if Diazepam is used.
- For any seizure in a pregnant patient, follow the OB Emergencies Protocol.

### Disposition:
- EMS Transport: ALS: All patients who receive drug therapy unless cleared by medical control
- MD Within 4 Hours: Seizure history with limited seizure after paramedic consultation with personal MD

---

**Protocol 28**

**3 / 2002**
## Extremity Trauma

### History:
- Type of injury
- Mechanism: crush / penetrating / amputation
- Time of injury
- Open vs. closed wound / fracture
- Wound contamination
- Medical history
- Medications

### Signs and Symptoms:
- Pain, swelling
- Deformity
- Altered sensation / motor function
- Diminished pulse / capillary refill
- Decreased extremity temperature

### Differential:
- Abrasion
- Contusion
- Laceration
- Sprain
- Dislocation
- Fracture
- Amputation

---

**Universal Patient Care Protocol (11)**

1. Hemorrhage control
2. Wound care / splinting
3. Life or limb threatening event? Pain medication needed? IV Protocol (8)
4. Pain Control Protocol (9)
5. Amputation?
   - Clean amputated part
   - Wrap part in sterile dressing soaked in Normal Saline
   - Place in air tight container
   - Place container on ice if available

### Pearls:
- **Exam: Mental Status, Extremity, Neuro**
- In amputations, time is critical. Transport and notify medical control immediately, so that the appropriate destination can be determined.
- Hip dislocations and knee and elbow fracture / dislocations have a high incidence of vascular compromise.
- Urgently transport any injury with vascular compromise.
- Blood loss may be concealed or not apparent with extremity injuries.
- Lacerations must be evaluated for repair within 6 hours from the time of injury.

### Disposition:

<table>
<thead>
<tr>
<th>EMS Transport:</th>
<th>ALS: Patient with multisystem trauma, abnormal vital signs, uncontrolled bleeding, abnormal vascular or neurologic exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BLS: Patient with normal exam who has isolated extremity injury, extensive wound with controlled bleeding or deformed fracture or dislocation.</td>
</tr>
<tr>
<td>MD Within 4 Hours:</td>
<td>Patient with lacerations requiring repair or isolated extremity injury (no deformity) who has a normal exam and is mobile for private transportation.</td>
</tr>
<tr>
<td>MD Within 24 Hours:</td>
<td>Patient with isolated extremity injury with normal exam, no lacerations.</td>
</tr>
</tbody>
</table>
Orange County Emergency Medical Services
Patient Discharge Information Form - Instructions

The OCEMS Patient Discharge Information (PDI) form is designed for use by EMS personnel to legally document a variety of situations. This duplicate form consists of a single page. The front of the page is used to describe the situation and the back lists a variety of specific patient instructions by complaint.

The form should be used to document any refusal of care by a patient (complete refusal or refusal of specific aspects of care), to document any patient encounter where there is not EMS transport (other than dead-on-scene), and to document the patient/guardian's understanding of medical instructions.

To understand the intent of this form, it is probably simplest to walk through several common patient encounter situations.

1. Complete refusal of EMS care or transport: The first box "Patient Refusal" should be marked. In the first section, the appropriate blocks for "Paramedic recommendation" should also be marked. This section should be explained to the patient or guardian, who should understand that their refusal may result in complications up to and including death. The patient or guardian should be asked to sign the form, indicating that he/she understands the seriousness of the situation and the information provided. If the situation warrants, the paramedic should explain the risks of the refusal using the patient instructions section and the back of the form for assistance. If the instructions section is used, the appropriate blocks should also checked.

2. Refusal of a specific procedure (IV therapy, for example): The first box "Patient Refusal" should be marked. In the first section, the specific refused procedure should be marked. The first section should be explained to the patient or guardian, who should understand the potential consequences of their refusal. The patient or guardian should be asked to sign the form, indicating that he/she understands the seriousness of the situation.

3. Referral (including both declination of transport and mutual agreement situations): The second box "EMS Referral" should be marked and explained to the patient. The third box "Patient Instructions" and the appropriate blocks in that section should be marked. The third section and the specific instructions (on the back) should all be carefully explained to the patient and/or guardian, who must understand them. The patient or guardian should be asked to sign the form, indicating that he/she understands the instructions and the seriousness of the situation.

In all situations, the top part of the form should be completed, and as much of the signature portion as necessary. It is preferable to have witnesses, particularly if the patient or guardian refuses to sign. The original form is to be kept on file at OCEM, while the duplicate copy is for the patient or guardian.
Orange County Emergency Medical Services
Patient Discharge Information

Patient's Name
Date of Birth
Date
Patient's Address
Phone
Paramedic Name

This section only applies if this box is marked

The Paramedic has recommended:
- Measuring the patient's blood pressure
- A backboard and neck collar for the patient
- Ambulance transportation for the patient

A complete physical exam of the patient
Starting an IV for the patient
Giving the patient medicine
Other

I refuse the care that the Paramedic has recommended. I understand that my refusal may result in serious injury or death to the patient. I accept full responsibility for this decision. I assume all risks and consequences resulting from my refusal of care. I will not hold Orange County EMS or its officers, agents, or employees responsible for any bad things that happen to the patient because of my refusal.

My signature below attests that I understand what has been recommended, what the consequences may be if that is not done, and I still refuse to have the recommended care provided by Orange County EMS.

This section only applies if this box is marked

The Paramedic has performed a limited physical exam and referred the patient as indicated below.

I will follow the Paramedic's instructions. If I disregard the Paramedic's instructions, I accept full responsibility for my actions. I understand that the failure to follow these instructions may result in complication of the patient's condition, up to and including death. If I do not follow these instructions, I will not hold Orange County EMS or its officers, agents, or employees responsible for any bad things that happen to the patient.

My signature below attests that I understand the referral information below, what the consequences may be if that information is not followed, and that I will do my best to follow the instructions.

This section only applies if this box is marked

You have not been evaluated by a doctor. If you don't have a doctor, you can call UNC Healthlink at (919) 966-7890.

You should see a doctor as indicated:
- Immediately
- Within 24 hours
- Within ___ days

You should see a doctor as indicated:
- Within 4 hours
- Within ___ days

The patient is being released to:
- Family member
- Guardian
- Law Enforcement Officer
- Other:

Follow the instructions (printed on the back of this form) indicated:
- Abdominal Pain
- Back Pain
- Head Injury
- Insect Bite/Sting
- Extremity Injury
- Vomiting / Diarrhea
- Respiratory Distress
- Wound Care
- Universal
- Fever

Other instructions:

Guardian's name (printed)

Guardian's address
- Same as Patient

Guardian's signature

Patient / Guardian Signature

Date of Signature

Paramedic Signature

Consult with Paramedic
Discharge Instructions

UNIVERSAL INSTRUCTIONS:
• YOU HAVE NOT RECEIVED A COMPLETE MEDICAL EVALUATION. SEE A PHYSICIAN AS SOON AS POSSIBLE.

• IF AT ANY TIME AFTER YOU HAVE TAKEN ANY MEDICATION, YOU HAVE TROUBLE BREATHING, START WHEEZING, GET HIVES OR A RASH, OR HAVE ANY UNEXPECTED REACTION, CALL 911 IMMEDIATELY.

• IF YOUR SYMPTOMS WORSEN AT ANY TIME, YOU SHOULD SEE YOUR DOCTOR, GO TO THE EMERGENCY DEPARTMENT OR CALL 911.

ABDOMINAL PAIN:
• Abdominal pain is also called belly pain. Many illnesses can cause abdominal pain and it is very difficult for EMS to identify the cause.
• Take your temperature every 4 hours.

Call or see a physician, go to the emergency department, or call 911 immediately if:
• Your pain gets worse or is new only in 1 area
• You vomit (throw up) blood or find blood in your bowel movement
• You become dizzy or faint
• Your abdomen becomes distended or swollen
• You have a temperature over 100° F
• You have trouble passing urine
• You have trouble breathing

BACK PAIN:
• Apply heat to the painful area to help relieve pain.
• You may use a warming pad, whirlpool bath, or warm, moist towels for 10 to 20 minutes every hour.
• Stay in bed as much as possible the first 24 hours.
• Begin normal activities when you can do them without causing pain.
• When picking things up, bend at the hips and knees. Never bend from the waist only.

Call or see a physician, go to the emergency department, or call 911 immediately if:
• You have shooting pains into your buttocks, groin legs, or arms or the pain increases.
• You have trouble urinating or lose control of your stools or urine.
• You have numbness or weakness in your legs, feet, arms, or hands.

FEVER:
• Always take medications as directed. Tylenol and Ibuprofen can be taken at the same time.
• If you are taking antibiotics, take them until they are gone, not until you are feeling better.
• Drink extra liquids (1 glass of water, soft drink or gatorade per hour for fever for an adult)
• If the temperature is above 103° F, it can be brought down by a sponge bath with room temperature water. Do not use cold water, a fan, or an alcohol bath.
• Temperature should be taken every 4 hours .

Call or see a physician, go to the emergency department, or call 911 immediately if:
• Temperature is greater than 101° F for 24 hours
• A child becomes less active or alert.
• The Temperature does not come down with Acetaminophen (Tylenol) or Ibuprofen with the appropriate dose.

HEAD INJURY:
• Immediately after a blow to the head, nausea, and vomiting may occur.
• Individuals who have sustained a head injury must be checked, and if necessary awakened, every 2 hours for the first 24 hours.
• Ice may be placed on the injured area to decrease pain and swelling.
• Only drink clear liquids such as juices, soft drinks, or water the first 12 hours after injury.
• Acetaminophen (Tylenol) or Ibuprofen only may be used.

Call or see a physician, go to the emergency department, or call 911 immediately if:
• The injured person has persistent vomiting, is not able to awaken, has trouble walking or using an arm or leg, has a seizure, develops unequal pupils, has a clear or bloody fluid coming from the ears or nose, or has strange behavior.

INSECT BITE/STING:
• A bite or sting typically is a red lump which may have a hole in the center. You may have pain, swelling and a rash. Severe stings may cause a headache and an upset stomach (vomiting).

Call or see a physician, go to the emergency department, or call 911 immediately if:
• You develop any chest pain or difficulty breathing.
• You have an allergic reaction to one of the stings.

RESPIRATORY DISTRESS:
• Respiratory Distress is also known as shortness of breath or difficulty breathing.
• Causes of Respiratory Distress include reactions to pollen, dust, animals, molds, foods, drugs, infections, smoke, and respiratory conditions such as Asthma and COPD. If possible avoid any causes which produce respiratory distress.
• If you have seen a physician for this problem, take all medication's as directed.

Call or see a physician, go to the emergency department, or call 911 immediately if:
• Temperature is greater than 101° F.
• The cough, wheezing, or breathing difficulty becomes worse or does not improve even when taking medications.
• You have Chest Pain
• Sputum (spit) changes from clear to yellow, green, grey, or becomes bloody.
• You are not able to perform normal activities.

EXTREMITIES:
• Extremity Injuries may consist of cuts, scrapes, bruises, sprains, or broken bones (fractures).
• Apply ice on the injury for 15 to 30 minutes for the first 24 hours.
• Elevate the extremity above the heart as possible.
• Use the extremity as pain allows.

Call or see a physician, go to the emergency department, or call 911 immediately if:
• Temperature is greater than 101° F.
• The bruising, swelling, or pain gets worse despite the treatment listed above.
• Any problems listed on the Wound Care Instructions are noted.
• You are unable to move the extremity if numbness or tingling is noted.
• You are not improved in 24 to 48 hours or you are not normal in 7 to 10 days.

VOMITING/DIARRHEA:
• Vomiting (throwing up) can be caused by many things. It is common in children, but should be watched closely.
• Dehydration is the most serious problem associated with vomiting or diarrhea.
• Drink clear liquids such as water, apple juice, soft drinks, or gatorade for the first 12 hours or until things improve. Adults should drink 8 to 12 glasses of fluids per day with diarrhea. Children should drink 1 cup of fluid for each loose bowel movement.

Call or see a physician, go to the emergency department, or call 911 immediately if:
• Temperature is greater than 101° F.
• Vomiting or Diarrhea lasts longer than 24 hours, gets worse, or blood is noted.
• You cannot keep fluids down or no urination is noted in 8 hours.

WOUND CARE:
• Wounds include cuts, scrapes, bites, abrasions, or puncture wounds.
• If the wound begins to bleed, apply pressure over the wound with a clean bandage and elevate the wound above the heart for 5 to 10 minutes.
• Unless instructed otherwise, clean the wound twice daily with soapy water, and keep the wound dry. It is safe to take a shower but do not place the wound in bath or dish water.
• See a physician for a tetanus shot if it has been 10 years or more since your last one.
• Call or see a physician, go to the emergency department, or call 911 immediately if:

See the Extremity Injury Instructions.
• Temperature is greater than 101° F.
• Bruising, swelling, or pain gets worse or bleeding is not controlled as directed above.
• Any signs of infection, such as redness, drainage of yellow fluid or pus, red streaks extending from the wound, or a bad smell is noted.
References

5. Committee on Trauma and Committee on Shock. Accidental death and disability: the neglected disease of modern society. Sep 1966. 5th printing by Commission on Emergency Medical Services, Jan 1970, AMA.