

**Trousdale Medical Center
EMS**

**A Report on the Second Phase of the Quality
Assessment
Of the
Care Given to Patients
Requiring Aero-Medical Transport**



**The report was compiled in conjunction with
Vanderbilt University Medical Center Life Flight Program**

November 2005

Foreword

Trousdale Medical Center EMS (TMC EMS) is continuously looking to improve the quality of care delivered to our patients. In April of 2003, it was decided to conduct a project with Vanderbilt University Medical Center Life Flight Program. Whenever a patient was flown from Trousdale County, a survey was sent to the flight crew and they evaluated our performance. The results of those surveys was compiled and analyzed in October 2004. There were adjustments in procedures, training and equipment completed. A second phase of this project was then started. This “phase two” was conducted along the same guidelines as the study ending in October 2004.

TMC EMS would like to take this opportunity to thank the Life Flight nurses, pilots and administration in this endeavor. The crews took time to complete the surveys and return them to us. This information was used to make changes in policies, procedures, and practices of TMC EMS. These changes will improve the care given to our critical patients.

As you read this report, we feel that it will become evident that the project was a success. It was such a success that we are going to incorporate this process into our Continuous Quality Improvement (CQI) Program.

Dr. Floyd Reed, Jr.
TMC EMS Medical Director

Randall C Kirby BS/EMTP
TMC EMS Director

Trousdale Medical Center EMS
Aero-Medical Survey Project
Phase Two

Goal:

To provide very good care to our critical patients who are flown out by an aero-medical service.

Objectives:

- Maintain the airway of the patient appropriately for their condition.
- Maintain adequate ventilation of the patient appropriately for their condition.
- Maintain adequate oxygenation of the patient.
- Maintain sufficient circulation of the patient.
- If appropriate for their condition adequate spinal immobilization maintained.
- Appropriate medication for their condition is administered (dosage, route etc.).
- The EMS crew will perform an adequate assessment of the patient.
- The EMS crew will accurately communicate their assessment and treatment to the aero-medical crew.
- The landing zone was adequately identified.
- If the transport was at night - the landing zone was adequately lighted.
- The landing site was adequately secured.

Explanation of the Program:

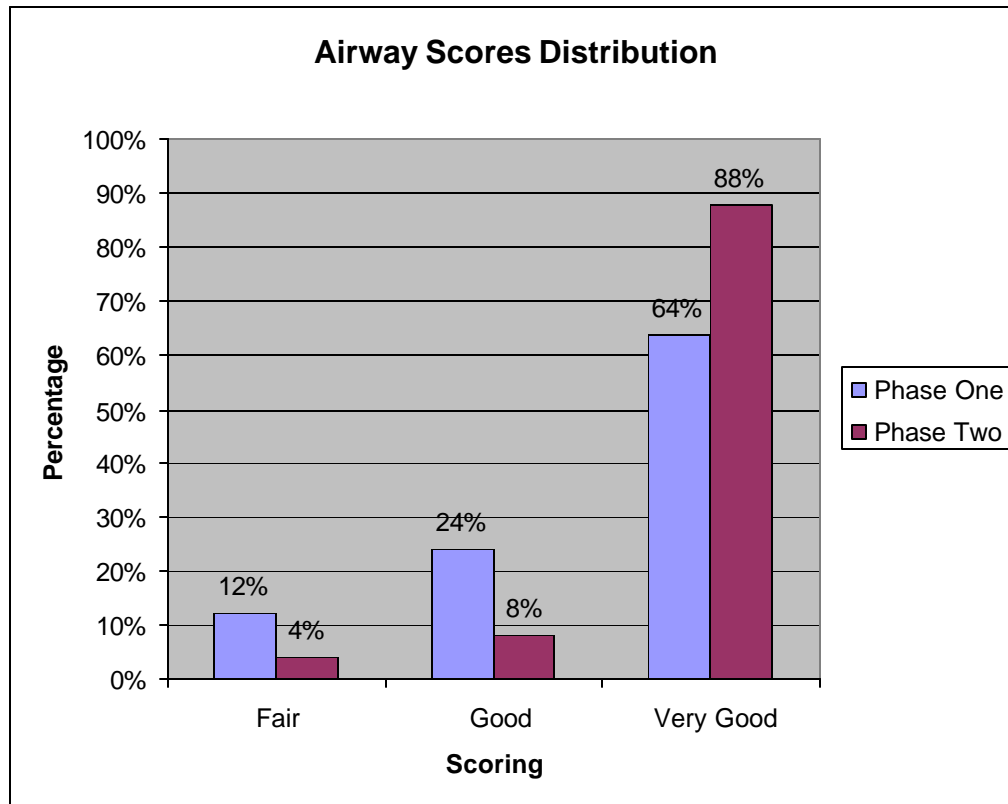
After each flight from TMC EMS a survey form will be sent to the aero medical service with: 1) a letter requesting the aero-medical crew to complete the survey; 2) a self addressed stamped envelope, and 3) a copy of the survey form. Once the form is returned to the office it will be reviewed by the Director, the CQI Coordinator, the crew involved and (if necessary) the Medical Director. A copy of the survey form is included under **Appendix A**. The crews were rated from very poor (1) to very good (5). There was an average score obtained for each flight and a score for each category assessed. It is from this review that it will be determined if any necessary training or procedural changes will be done.

The program ran from January 2005 to September 2005, during this time 25 patients were flown to Vanderbilt University Medical Center (VUMC). The results of the surveys from those patients are contained in **Appendix B**. Overall, the average score was 5.0 out of 5.0 or 100%. In **Appendix B**, the survey results from Phase One is also listed for comparison.

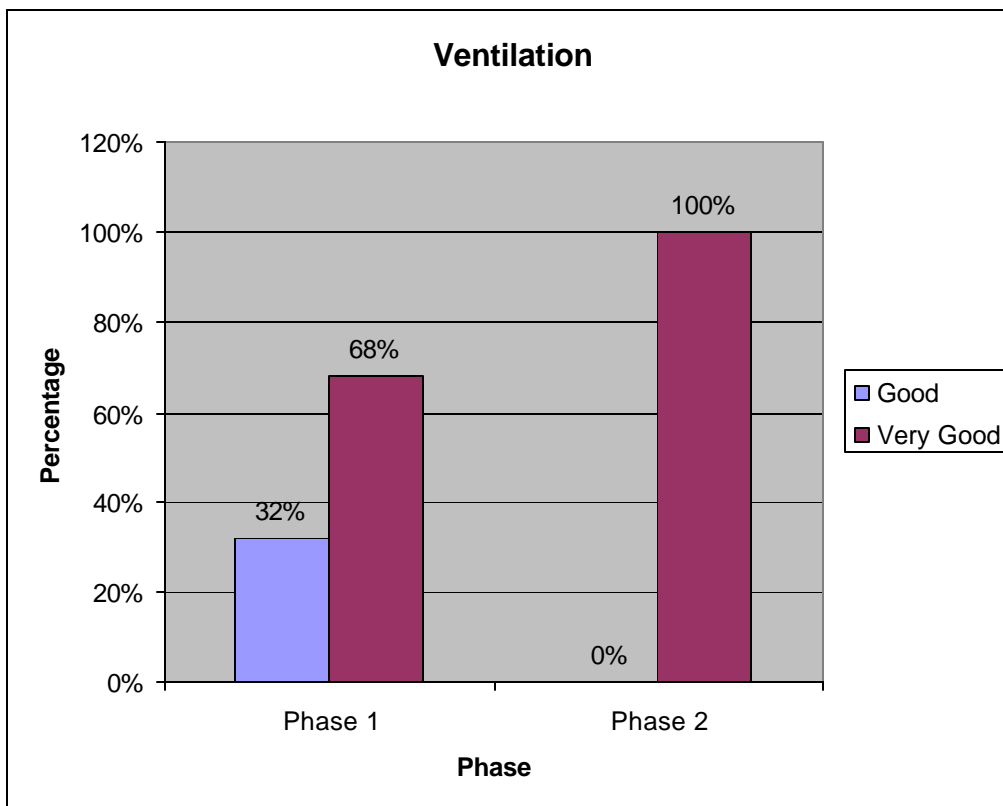
Discussion:

In the first report, we discussed the results in each of the categories. In the interest of brevity we will only discuss the changes in each category as to the distribution of scores. The complete text of the Phase One report is contained in **Appendix C**.

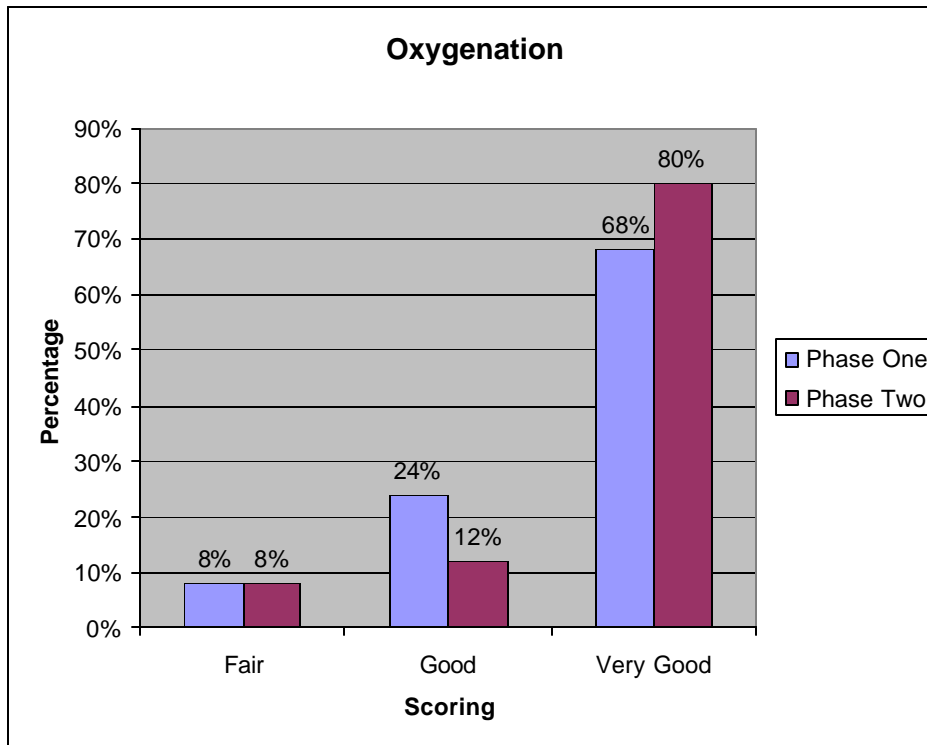
In the areas of landing zone identification, security, and lighting, both phases had the exact same scores of 5.0 throughout. The responsibility of these functions falls on the capable shoulders of our local rescue squad (Trousdale County Rescue Squad). This is a testament to their dedication and professionalism.



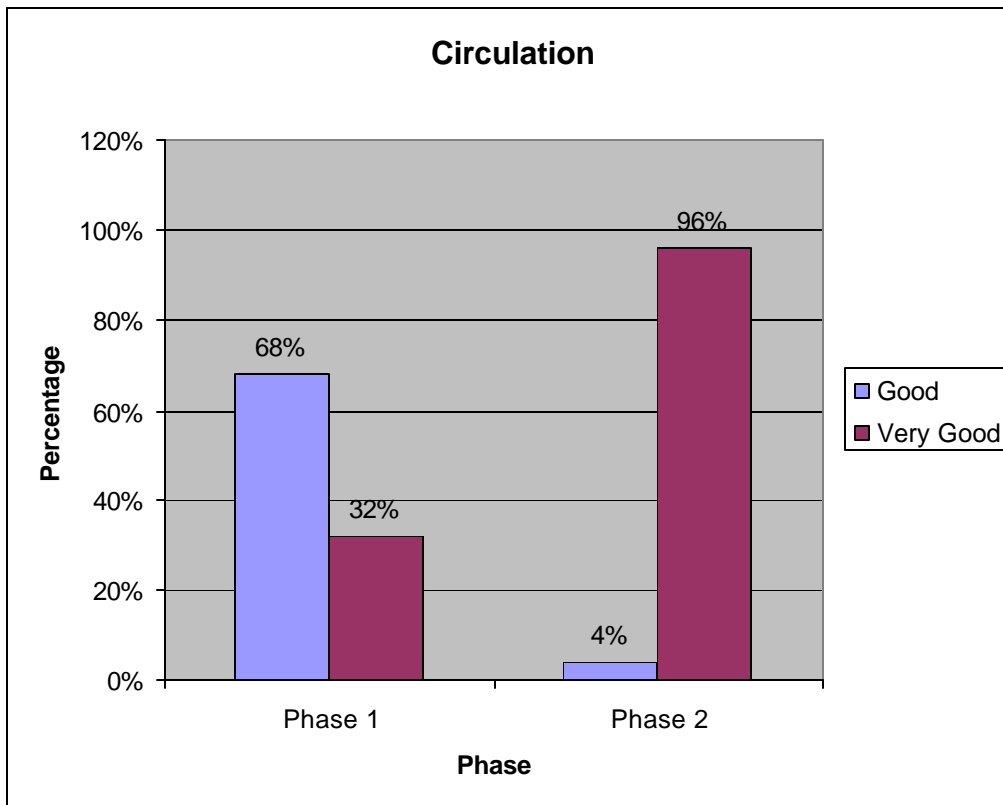
These scores reflect a shift in the scores from “Fair” and “Good” to “Very Good” by 24%. The only score of “Fair” was the result of an endotracheal tube being placed in a burn patient was smaller than what VMC Burn Center’s Protocol required. It was established what the correct size for burn patient’s required and a change in procedures was instituted.



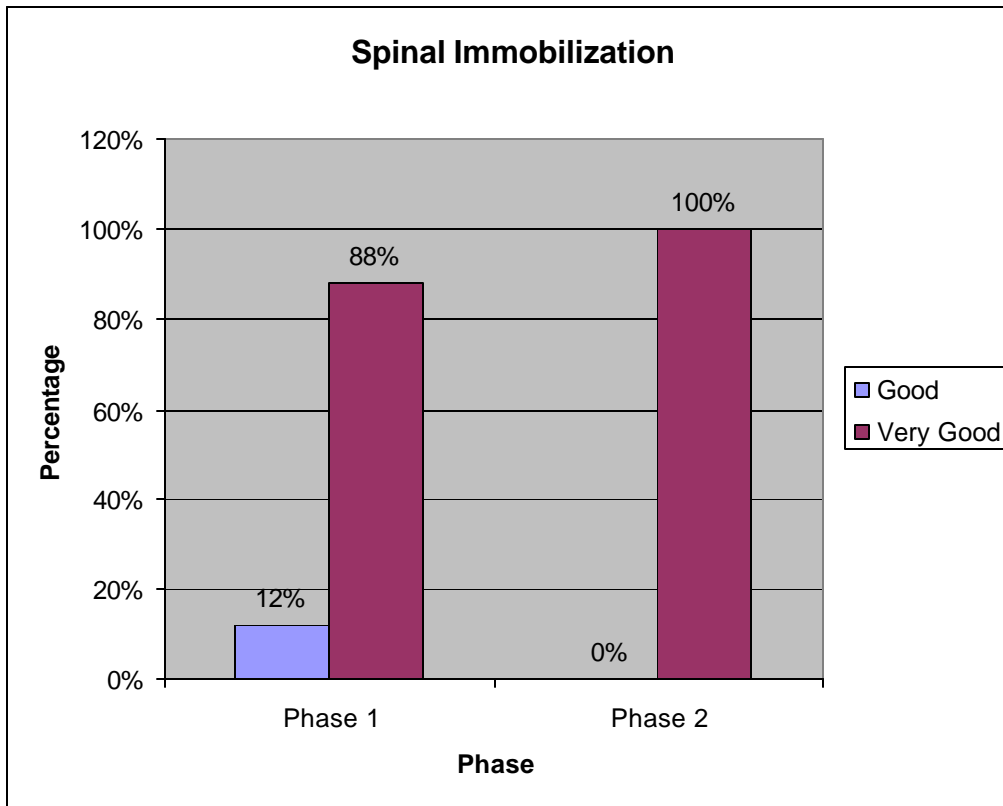
This category reflects a change that is possibly the most dramatic. In Phase One we had only Good and Very Good scores. The shift was to 100% Very Good scores.



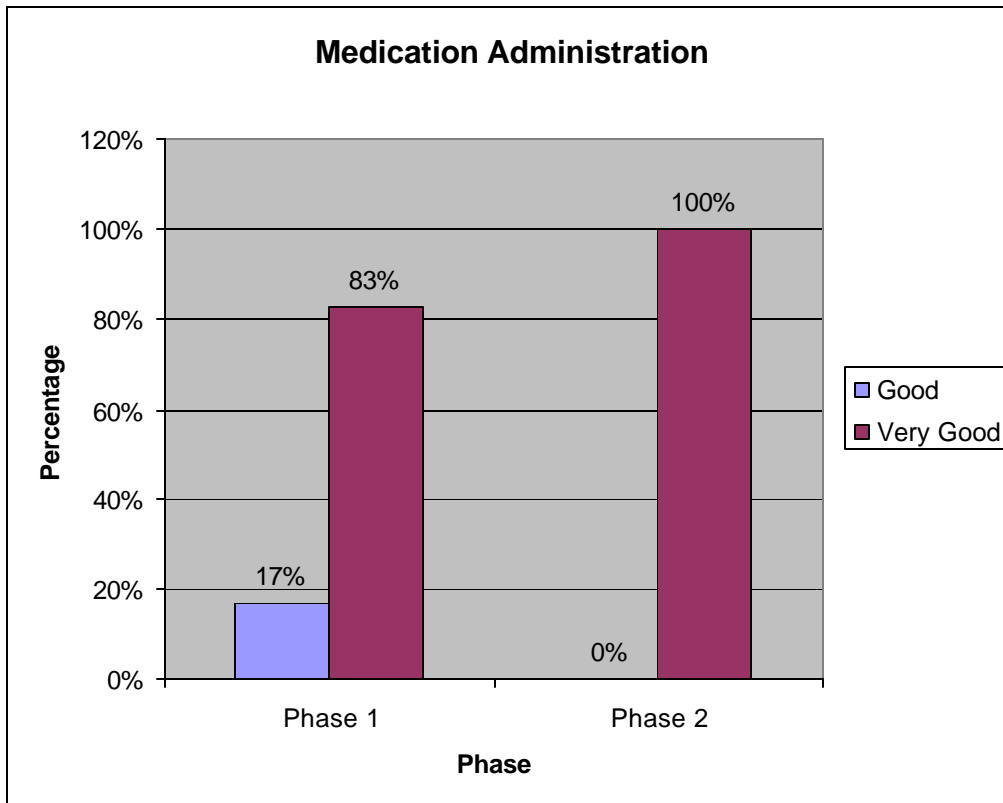
This graph represents the improvement in our oxygenation of the patients. This was a shift from Good to Very Good by 12%. The only issue is that the Fair score remained the same. A review was done of these patients and a new protocol was placed at Trousdale Medical Center; whereby, aero-medical patients were placed on 100% oxygen.



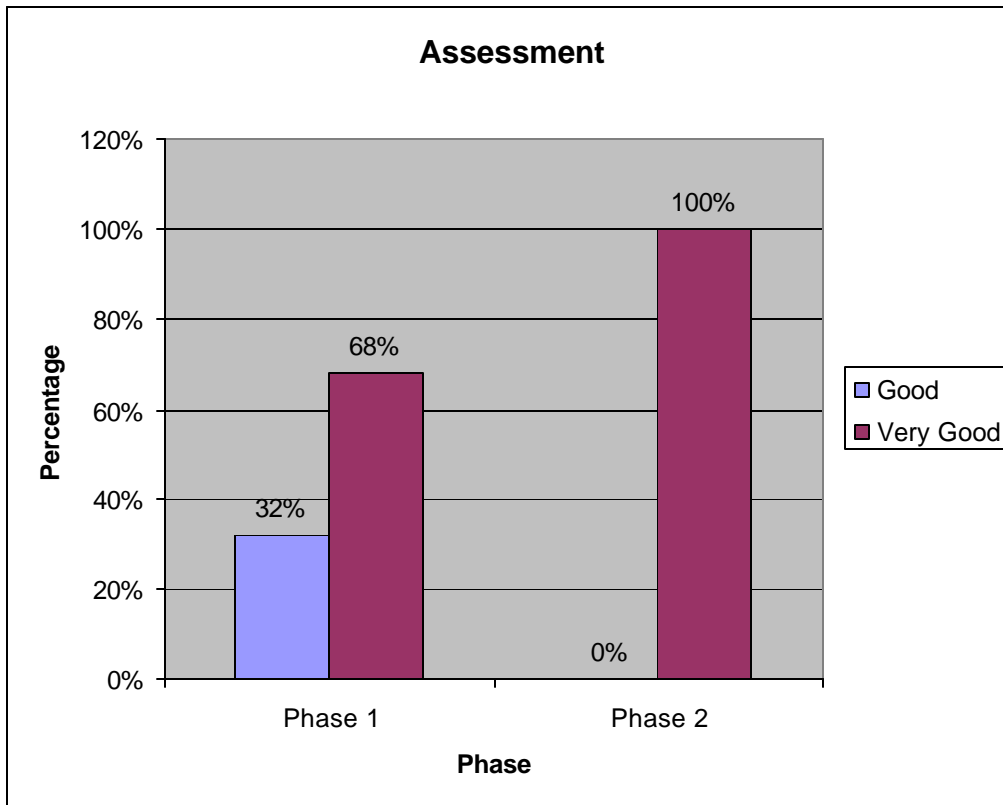
A 28% increase in the Very Good scores was seen in the area of circulation. This was the second highest shift seen in Phase Two.



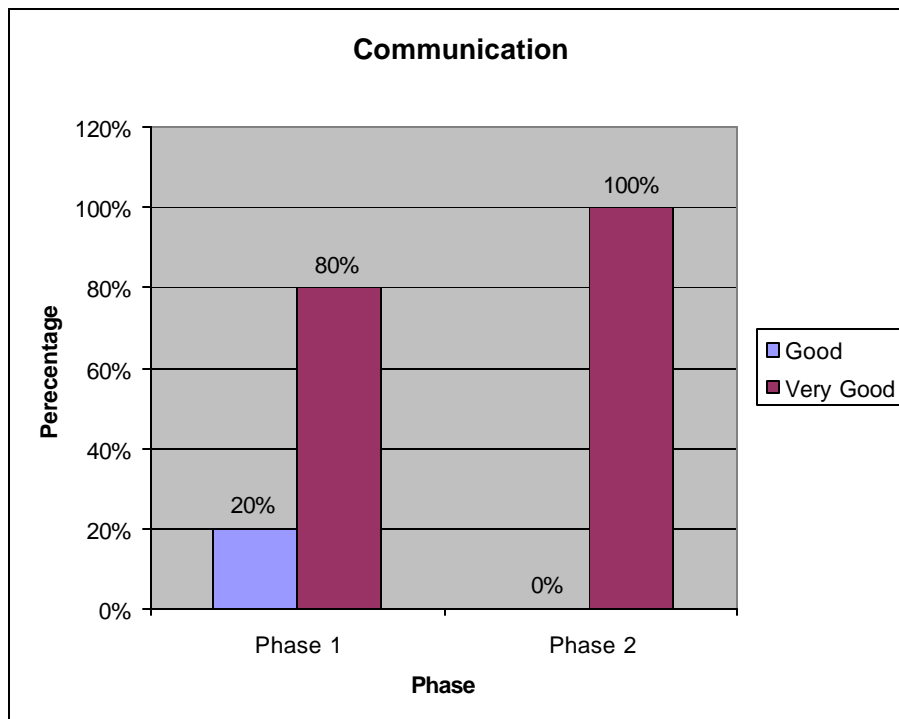
The reason for this shift was that an emphasis was placed with maintaining immobilization of patients even if they had been evaluated locally and the spinal column had been cleared of any injury.



The 17% distribution of scores in the Good category was moved to the Very Good one. This was mainly due to a new Rapid Sequence Induction and Intubation (RSII) tool that facilitates the procedure and communication of the process to the flight crew.



This illustrates the improvement in assessment of our crews of the patient and how that assessment correlates to the flight crew's findings.



The final area is in communications with the flight crew. This is both via two-way radio, verbal and in written form.

Total Distribution of Scores

Item	n	Very Good	Good	Fair
Phase One	234	82%	16%	2%
Phase Two	242	97%	2%	1%
Change	+8	+15%	-14%	-1%

The table above illustrates how this program has improved our operation. We increased the overall performance by 15%.

The assessment of an EMS operation performance by an outside entity (especially one that is considered a specialist in their field) is paramount to improving the delivery of care to your patient population. However, that assessment must be accompanied by training focused to improving an area (as it was with the airway section), or improving existing equipment/tools (as it was with the medication section).

For such a program to be a success both entities must be honest and have a good working relationship. They must not lose sight of the end process of improvement of patient care.

Appendix A

Trousdale Medical Center EMS Aero-Medical Transport Survey

Instructions: *Recently, you responded to a request for aero-medical transport of a patient from Trousdale Medical Center EMS. It is our goal to provide very good service to our patients. To accomplish this goal and to better serve you as our aero-medical transport service please complete this survey and return it in digital format to tmcems@bellsouth.net. We wish to thank you for cooperating in this endeavor to improve our service.*

Scale

1 – Very Poor	2 – Poor	3 – Fair	4 – Good	5 – Very Good
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Patient Information

Name:	Transport Record No.
Date of Service:	Lithocode No.:

Survey Questions:

1. The airway was maintained appropriately for the condition.
Score:

2. Adequate ventilations were maintained for the patient’s condition.
Score:

3. Adequate oxygenation was maintained for the patient’s condition.
Score:

4. Sufficient circulation was maintained for the patient’s condition.
Score:

5. Proper spinal immobilization was maintained if their condition warranted.
Score:

6. Appropriate medications were administered for their condition (dosage, rate, etc.).
Score:

7. The EMS crew’s assessment of the patient was:
Score:

8. The EMS crew’s communication accurately relayed their assessment and treatment of the patient.
Score:

9. The landing zone was adequately identified.
Score:

10. The landing zone was adequately secured.
Score:

11. If the transport is at night – the landing zone was adequately lighted.

Score:

If you have to score us a “3” or below in a category, it would be greatly appreciated if you would outline below what we could have done better.

Appendix B

**Trousdale Medical Center EMS
Aero-Medical Transport Surveys Phase 2**

Transport	Airway	Ventilations	Oxygenation	Circulation	Immobilization	Medication	Assessment	Communication	LZ ID	LZ Secure	LZ Lighted	Total	n	Average
1	5	5	5	5	n/a	5	n/a	n/a	5	5	5	40	8	5.0
2	4	5	5	5	n/a	5	5	5	5	5	n/a	44	9	4.9
3	5	5	5	5	5	5	5	5	5	5	5	55	11	5.0
4	5	5		5	5	5	5	5	5	5	5	52	11	4.7
5	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
6	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
7	5	5	5	5	5	5	5	5	5	5	n/a	50	10	5.0
8	5	5	5	5	5	5	5	5	5	5	5	55	11	5.0
9	5	5	5	5	5	5	5	5	5	5	5	55	11	5.0
10		5	5	5	5	5	5	5	5	5	n/a	48	10	4.8
11	5	5	5	5	5	5	5	5	5	5	n/a	50	10	5.0
12	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
13	5	5	5	5	5	5	5	5	5	n/a	n/a	45	9	5.0
14	5	5	5	5	5	5	5	5	5	5	5	55	11	5.0
15	5	5	4	5	5	5	5	5	5	5	n/a	49	10	4.9
16	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
17	5	5	5	5	5	5	5	5	5	5	n/a	50	10	5.0
18	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
19	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
20	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
21	5	5	5	5	n/a	5	5	5	5	5	5	50	10	5.0
22	4	5		5	n/a	5	5	5	5	5	n/a	42	9	4.7
23	5	5	4	4	n/a	5	5	5	5	5	n/a	43	9	4.8
24	5	5	5	5	5	5	5	5	5	5	n/a	50	10	5.0
25	5	5	4	5	n/a	5	5	5	5	5	5	49	10	4.9
Total	121	125	118	124	60	125	120	120	125	120	40	1197	242	5.0
n	25	25	25	25	12	25	24	24	25	24	8	x	x	x
Score	4.8	5.0	4.7	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	54.5	11	5.0

**Trousdale Medical Center EMS
Aero-Medical Transport Surveys Phase 1**

Transport	Airway	Ventilations	Oxygenation	Circulation	Immobilization	Medication	Assessment	Communication	LZ ID	LZ Secure	LZ Lighted	Total	n	Average
1	4	5	5	5	5	n/a	5	5	5	5	n/a	44	9	4.8
2	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
3	5	5	5	5	5	5	5	5	5	5	5	55	11	5.0
4	5	5	5	5	5	n/a	5	5	5	5	n/a	45	9	5.0
5	5	5	5	5	5	n/a	5	5	5	5	n/a	45	9	5.0
6	5	5	5	5	5	n/a	5	5	5	5	n/a	45	9	5.0
7	5	5	5	5	5	n/a	4	5	5	4	n/a	43	9	4.8
8	5	5	5	5	5	5	5	5	5	5	n/a	50	10	5.0
9	4	4	4	4	5	5	5	5	5	5	n/a	46	10	4.6
10	5	5	4	5	5	n/a	5	5	5	5	5	49	10	4.9
11	5	5	5	5	5	n/a	5	5	5	5	5	50	10	5.0
12	4	4	4	4	4	5	5	5	5	5	5	50	11	4.5
13	5	5	5	5	5	n/a	5	5	5	5	n/a	45	9	5.0
14	5	5	5	5	5	n/a	5	5	5	5	n/a	45	9	5.0
15	4	4	3	4	4	4	4	4	5	5	n/a	41	10	4.1
16	4	4	4	4	n/a	n/a	4	4	5	5	n/a	34	8	4.3
17	5	5	5	5	n/a	n/a	4	5	5	5	n/a	39	8	4.9
18	4	4	3	4	5	5	4	4	5	5	n/a	43	10	4.3
19	5	4	5	5	5	n/a	5	5	5	5	5	49	10	4.9
20	3	4	4	5	5	5	5	5	5	5	n/a	46	10	4.6
21	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
22	5	5	5	5	n/a	5	5	5	5	5	n/a	45	9	5.0
23	5	5	5	5	n/a	n/a	5	4	5	5	5	44	9	4.9
24	3	4	n/a	4	n/a	4	4	4	5	5	n/a	33	8	4.1
2.5	5	5	4	5	n/a	5	5	5	5	5	n/a	44	9	4.9
Total	115	117	110	119	83	58	119	120	125	124	30	1120	234	4.8
n	25	25	24	25	17	12	25	25	25	25	6	n/a	n/a	n/a
Score	4.6	4.7	4.6	4.8	4.9	4.8	4.8	4.8	5.0	5.0	5.0	53.0	n/a	4.8

Appendix C

Trousdale Medical Center EMS

Aero-Medical Survey Project

Goal:

To provide very good care to our critical patients who are flown out by an aero-medical service.

Objectives:

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- The EMS crew will perform an adequate assessment of the patient.
- The EMS crew will accurately communicate their assessment and treatment to the aero-medical crew.
- The landing zone was adequately identified.
- If the transport was at night - the landing zone was adequately lighted.
- The landing site was adequately secured.

Explanation of the Program:

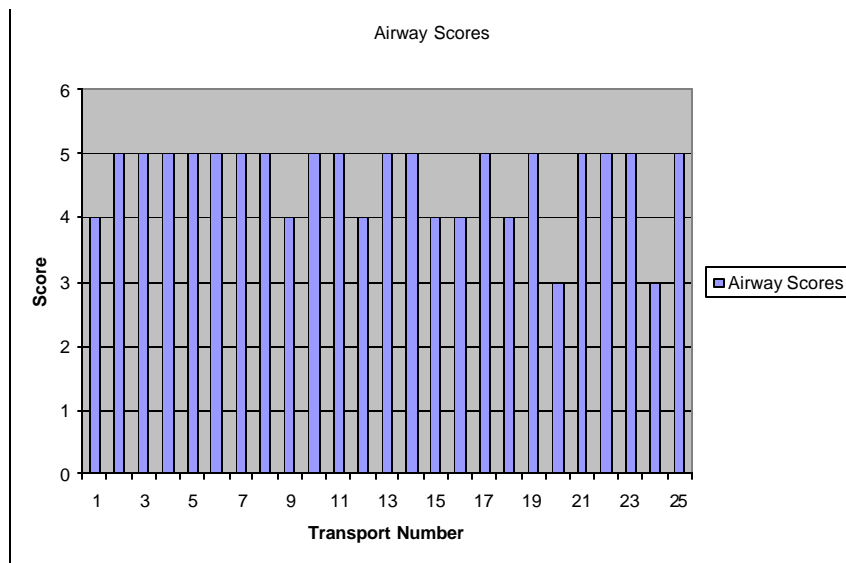
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The program ran from April 2003 to May 2004, during this time 25 patients were flown to Vanderbilt University Medical Center (VUMC). The results of the surveys from those patients are contained in **Appendix B**. Overall, the average score was 4.8 out of 5.0 or 96%.

Discussion of the Findings:

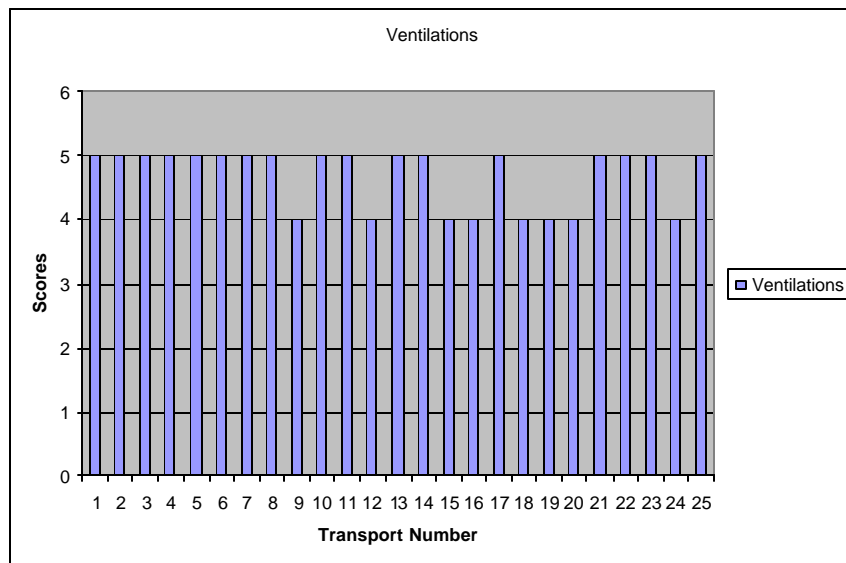
The first area I would like to discuss is the responsibilities of our local rescue squad. They are the ones who identify, secure and light the landing zone. The EMS crews are usually very busy with patient care. The rescue squad average score in these areas was 5.0 across the board. TMC and TMC EMS wishes to pass along to the Trousdale County Rescue Squad their thanks and commendation on a job well done.

The next area for discussion is the one of airway maintenance. This skill is one of the most paramount skills that an EMS crew can master. It is well recognized that without a patent airway the prognosis for a complete recovery is very poor. A large amount of time is spent in training of pre-hospital providers in the establishment and maintenance of the patient's airway.

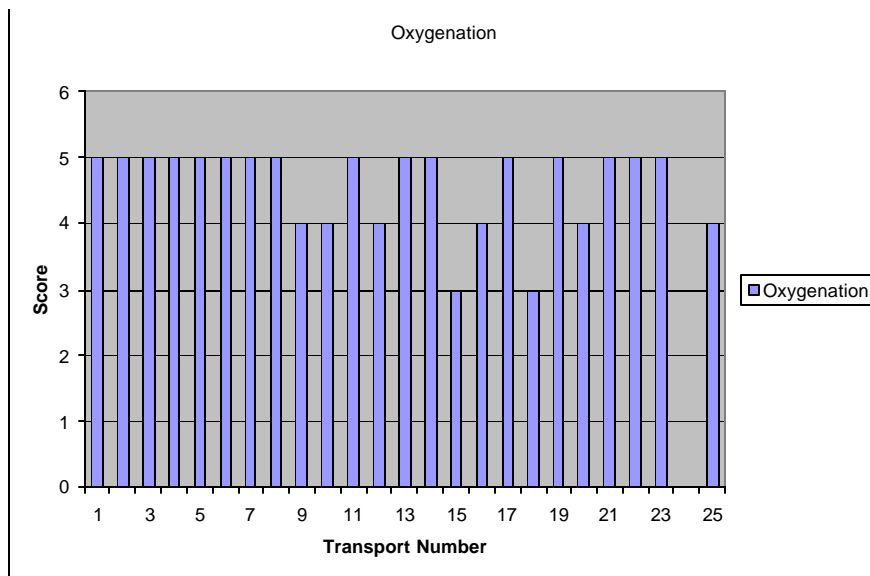


On Transports Number 20 and 24, it is noted that the scores dropped to a “3”. We did a review of those transports and what happened. In both cases the patients were intubated by EMS at Trousdale Medical Center and the endotracheal tube slipped down into the right main stem bronchus. The endotracheal tube holder that the hospital was using was evaluated and considered to be inadequate for the task. A new holder has since been tested and has replaced the holder evaluated in this study. It is important to note that at no time did the tube become dislodged.

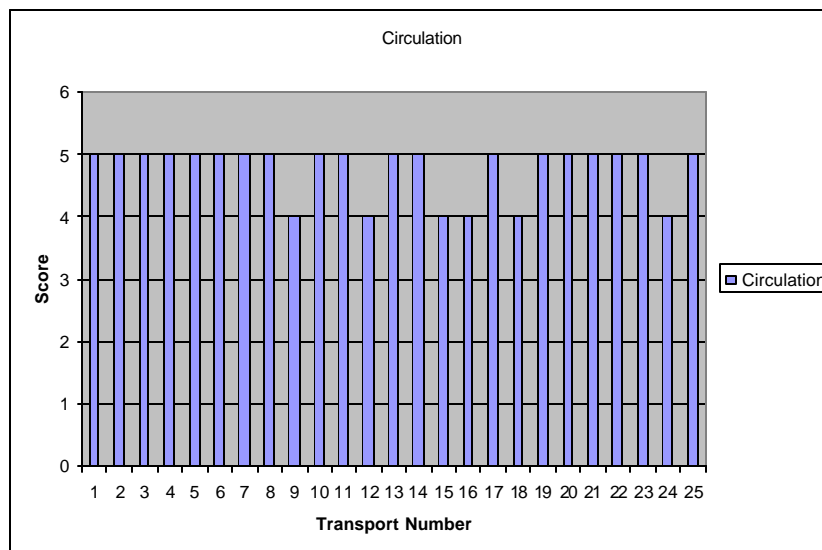
The graph below reflects the evaluation of maintaining adequate ventilation in our patients. As you can see the ventilation maintenance our staff was rated very high. The average score was 4.7. Some of these patients were being manually ventilated by the EMS staff; therefore, the patient’s ventilations effort – both depth and quality were in the hands of the EMS staff.



The issue of oxygenation is next. The average score for this area was 4.6 and on face value that is very good. However, as one digs deeper into it, it is obvious that providing adequate oxygen to the tissues is an absolute in preventing hypoxia and acidosis.

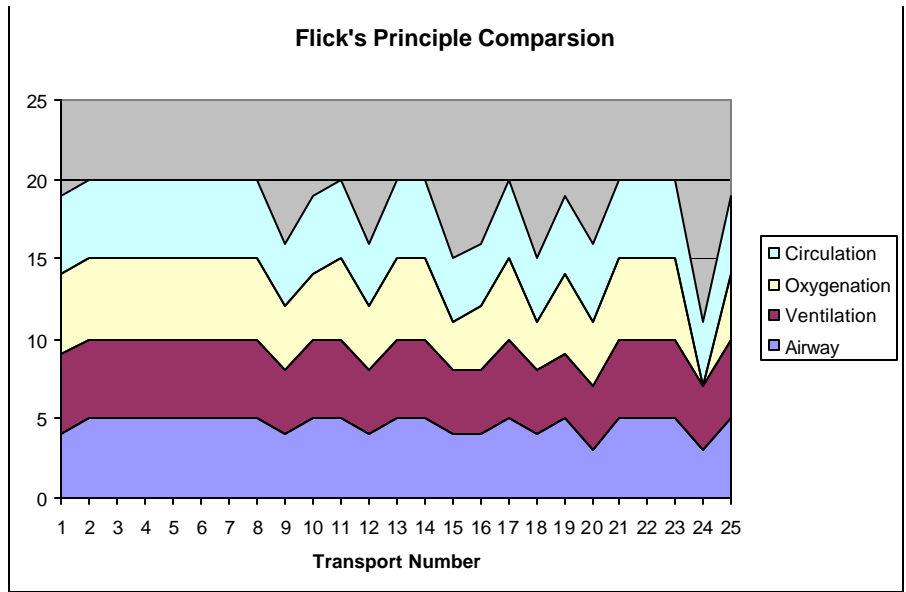


Transport Number 24 had a condition that did not require the evaluation of his oxygenation status. The two transports that cause us the most concern are numbers 15 and 18. They were individuals out of the same accident and were not receiving high flow oxygen that is considered the standard for condition of these patients. The crews were coached on the standard of care that they delivered and there has not been a recurrence. It needs to be noted that these individuals were flown to the trauma center due to the mechanism of injury.

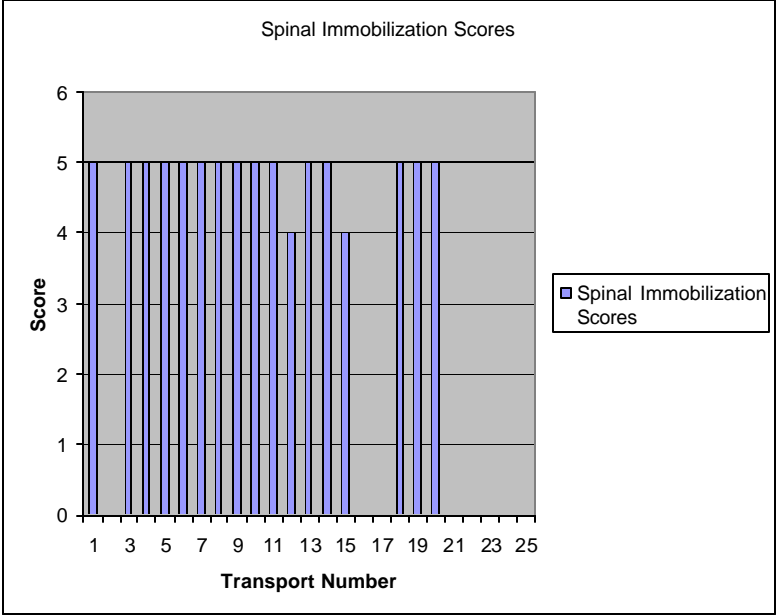


The next area for consideration is the one of adequate circulation. This component completes the all the components of Flick’s principle of adequate airway, adequate ventilation, adequate oxygenation and adequate circulation (perfusion) necessary to maintain homeostasis. The graph below illustrates an average score of 4.8. There were no areas of concern identified here.

As we combine all of the components of the Flick’s Principle into one graph we find that we have a consistent performance of 4.7 over maintaining these four components in our critical patients. The staff was taught the Flick Principle during paramedic school. By taking all of the components of the principle and placing on a graph we can see if there is any one area that brings the total score down.

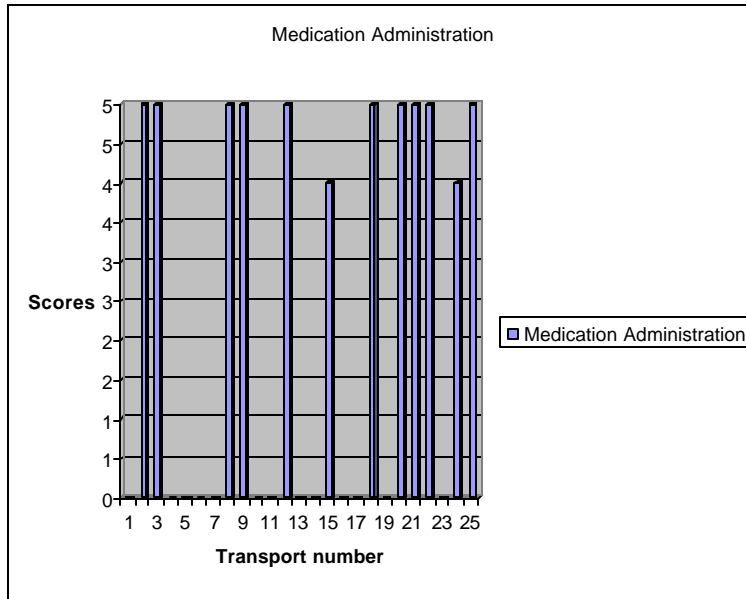


The area of spinal immobilization is the next item to be considered. This item is very important due to individuals who were transported due to trauma (17 out of the 25) are required to be spinally immobilized. The incident of spinal column and/or spinal cord injury in patients who have a mechanism of injury great enough to warrant transport to a trauma center is very high. We have included the criteria for referral to a trauma center in **Appendix C**.

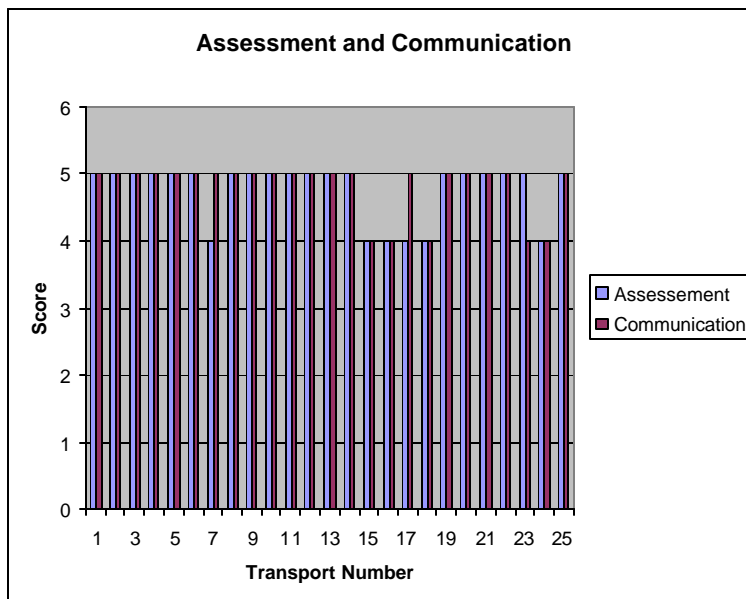


The graph above represents an average score of 4.9 and this score did not require any further evaluation.

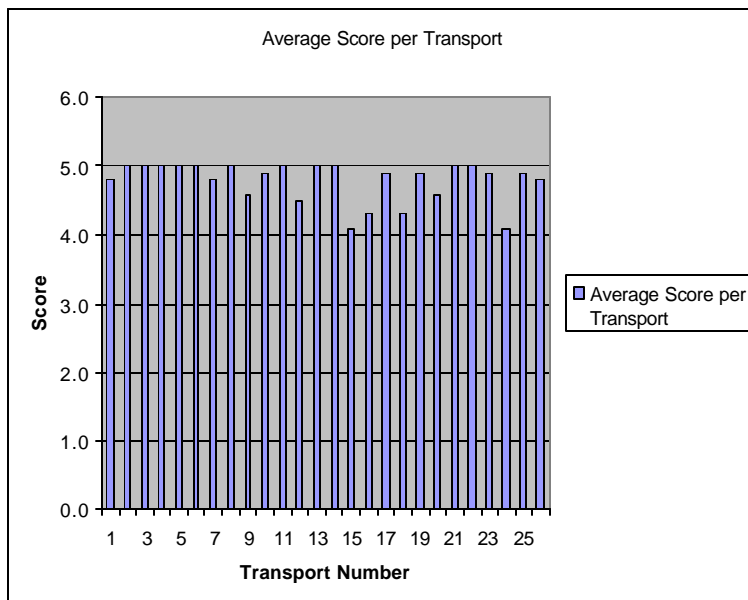
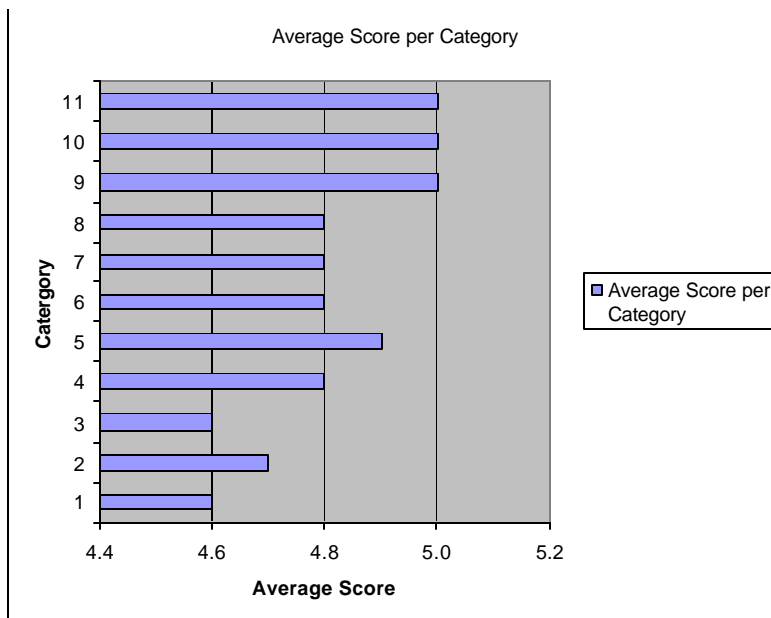
One of the National Patient Safety Goals is the reduction of medication errors and to this end we had VUMC Life Flight assess the appropriateness and correctness of the dosage and route of any medications we administered. Fourteen of the twenty-five patients did not require any medications. However, the remaining ones most received rapid sequence induction and intubation (RSII). This procedure requires the administration of at least five different medications. In all of these cases we scored a five and the overall score was 4.8. We felt that we need to continue our training in RSII and pharmacology to maintain this high score. It needs to be noted that we had no medication errors in this study.



The next two areas we will consider together. These are the ones of assessment and communication. The area of assessment is obvious – “How well did we assess the patient and was our assessment appropriate for the injuries or conditions found?” The section of communication is basically “How well did we communicate the patient’s conditions and injuries to you?” The average score on assessment was 4.8 and communication was a 4.8 also. Therefore, it was felt no intervention was needed at this time.



The average score on each category of evaluation was 4.8. This was the average score on each patient also.



Conclusions

At the risk of sounding boastful, this evaluation is validation from an outside agency with the expertise needed to evaluate our patient care. The result of this project validates our protocols, operational procedures, skill mastery, training and quality improvement program.

It is our intent to continue the project for another twenty-five transports. During this time frame we will continue to monitor the results and make adjustments as needed during the project. At the end of the project we will evaluate the results for any area that will need improvement.

