

# Using Simulation Based Learning Systems to Train a Large Urban EMS Service in Difficult Airway Management

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## ABSTRACT

**Introduction:** The use of simulation-based learning systems to assess and evaluate paramedics is novel. Using a combination of on-line curriculum, the City of Pittsburgh, Bureau of EMS Difficult Airway Algorithm and simulation-based workshops; we were able to train and evaluate 174 City of Pittsburgh Paramedics in management of a variety of difficult airway scenarios. The goal was to assess the comfort level and working knowledge of the paramedics using the Bureau of EMS Difficult Airway Management Algorithm. This was accomplished by comparing pre-course and post course surveys.

**Methods:** All of the training took place at The Peter M. Winter Institute for Simulation Education and Research (WISER). The training course included three hours of self paced on-line curriculum. An additional four hours of simulation-based training exercises and scenario training was conducted at WISER. The workshop component included review of the Bureau of EMS Difficult Airway Algorithm, a review of difficult airway techniques and rescue airway devices. Each paramedic crew was given a series of six difficult airway scenarios (two pre-course scenarios and four post course scenarios). To maintain a high continuity of instruction, the paramedic instructors were guided by on-line curriculum that allowed for greater uniformity throughout the program. Assessment of the paramedic's performance was traced through a pre-course and post course survey utilizing a web-based program completed by each trainee.

**Results:** The Bureau of EMS Training Division with assistance from the WISER Staff trained 174 paramedics in Difficult Airway Management. Each paramedic crew received six scenarios with a total of 522 scenarios being run. Pre-course and post course surveys were completed on-line. The paramedics reported a 21% improvement in their knowledge of the Difficult Airway Algorithm. Additionally, 11% of the paramedics reported their knowledge of the Difficult Airway Algorithm was such that they could apply it clinically without having to think about it. This education methodology was enhanced by a 99% completion rate of the surveys, with all but one paramedic trainee completing both pre-course and post course surveys.

**Conclusion:** Using a combination of pre-course and post course surveys and simulation-based training exercises, we were able to evaluate performances and attitudes of paramedics based on knowledge and technical skills in the Difficult Airway Management. This model was well received and demonstrated improvement in the paramedic's knowledge of the Difficult Airway Management Algorithm. The analysis of scenario data and clinical experience is also being reviewed.

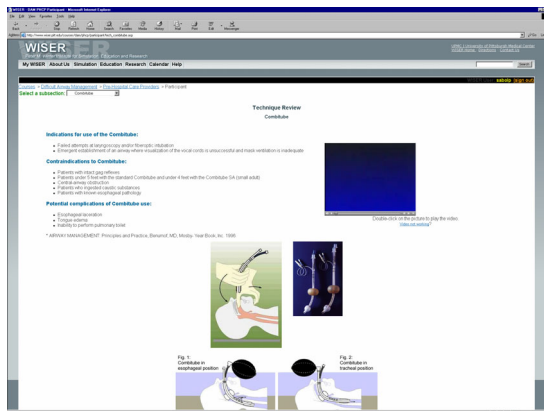
## INTRODUCTION

The use of simulation-based learning systems to assess and evaluate paramedics is novel. Using a combination of on-line curriculum, the City of Pittsburgh, Bureau of EMS Difficult Airway Algorithm and simulation-based workshops; we were able to train and evaluate 174 City of Pittsburgh Paramedics in management of a variety of difficult airway scenarios. The goal was to assess the comfort level and working knowledge of the paramedics using the Bureau of EMS Difficult Airway Management Algorithm. This was accomplished by comparing pre-course and post course surveys.

## METHODS

All of the training took place at The Peter M. Winter Institute for Simulation Education and Research (WISER). The training course included three hours of self paced on-line curriculum. (See Table A). An additional four hours of simulation-based training exercises and scenario training was conducted at WISER. The workshop component included review of the Bureau of EMS Difficult Airway Algorithm (See Table B), a review of difficult airway techniques and rescue airway devices. Each paramedic crew was given a series of six difficult airway scenarios (two pre-course scenarios and four post course scenarios). To maintain a high continuity of instruction, the paramedic instructors were guided by on-line curriculum that allowed for greater uniformity throughout the program (See Table C). Assessment of the paramedic's performance and attitudes was traced through pre-course and post course scenarios and surveys.

Table A: On-line Curriculum



## METHODS

Table B: Difficult Airway Algorithm

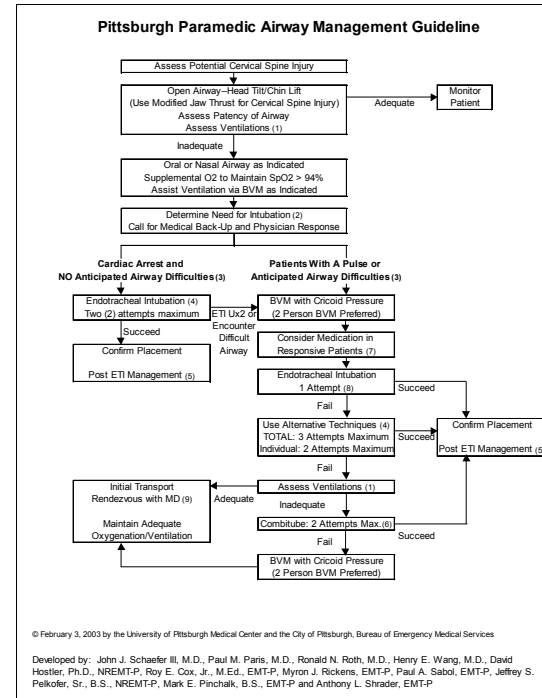


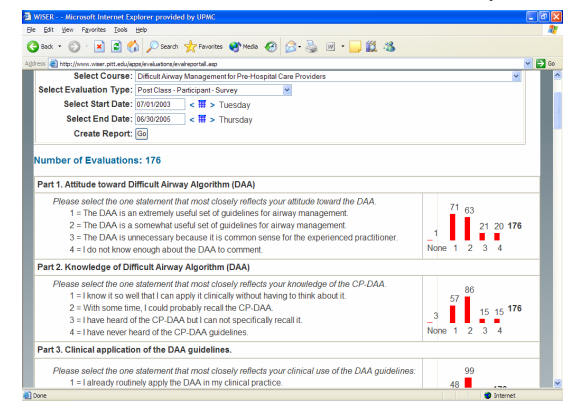
Table C: On-line Feedback of Trainee's Performance



## RESULTS

The Bureau of EMS Training Division with assistance from the WISER Staff trained 174 paramedics in Difficult Airway Management. Each paramedic crew received six scenarios with a total of 522 scenarios being run. Pre-course and post course surveys (See Table D) were completed on-line. The paramedics reported a 21% improvement in their knowledge of the Difficult Airway Algorithm. Additionally, 11% of the paramedics reported their knowledge of the Difficult Airway Algorithm was such that they could apply it clinically without having to think about it. This education methodology was enhanced by a 99% completion rate of the surveys, with all but one paramedic trainee completing both pre-course and post course surveys.

Table D: On-line Survey Results



## CONCLUSION

Using a combination of pre-course and post course surveys and simulation-based training exercises, we were able to evaluate performances and attitudes of paramedics based on knowledge and technical skills in Difficult Airway Management and the application of the City of Pittsburgh, Bureau of EMS Difficult Airway Algorithm during various difficult airway scenarios. This model was well received and demonstrated improvement in the paramedic's attitudes and knowledge of the Difficult Airway Management Algorithm. The analysis of scenario data and clinical experience is also being reviewed.