

Quality Assurance Of Pre-hospital Endotracheal Intubation Performed By Advanced Care Paramedics (ACPs) In Ottawa, Canada



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Background

- ETI as “gold standard” of airway care in unconscious patients
- Provide secured airway during transport
- Optimize oxygenation and ventilation
- Pulmonary toileting
- Route of drugs administration



Success & outcome

Study	Success Rate	Arrest/ coma	NT/OT	Comp	Pediatrics
Stewart	90.9	Yes	OT	9.5	NA
O'Brian	71.3	No	NT	13.0	NA
Jacobs	96.6	Mainly	OT	NA	NA
Pointer	88.9	Yes	OT	7.4	All
Losek	76.5	No	OT	NA	All
Delec	90.6	NA	OT	5.1	Yes
Pointer	93.5	Yes	OT	31.3	No
Aijan	64.0	Yes	OT	7.0	All
Krisanda	75.0	N	NT/OT	7.0	Yes



Current Controversy

- Modify patient outcome
 - Beneficial vs harmful
- Mode of training
- Skill retention
- Drug-assisted intubation
- Alternative airways



Objectives

- Primary Objective:
 - Ottawa's pre-hospital ETI success rate
- Secondary Objective:
 - To identify potential barriers and complications



Methods

- Retrospective review of Ambulance Call Reports (ACRs) involving invasive airway management by ACPs
- Study period: July 1st 2003 - July 31st 2005



Definitions

- Age:
 - Adults: ≥ 8 yrs old
 - Children: < 8 yrs old
 - AHA ACLS 2000



Definitions

- ETI attempt

- ETT beyond oropharynx

- ETI success

- ETT position confirmed clinically and be able to ventilate through it



Study target

- Advanced Care Paramedics (ACPs)
 - 150 ACPs in Ottawa region
 - Scope of practice
 - ACLS
 - Symptoms relief intervention
 - Perform pre-hospital endotracheal intubation (ETI) as clinically indicated
 - Non DAI

Data source

Ontario Ambulance Call Report
 Ministry of Health and Long-Term Care
Confidential when completed
 Please press hard, you are making carbon copies.

ADMINISTRATION

Surname: _____
 Given Name: _____
 Mailing Address: _____
 City / Town: _____
 Province: _____ Postal Code: _____
 Health Care Unit: _____
 Special Codes: _____
 Pick-up Location: _____
 Facility: _____

CLINICAL INFORMATION

Previously Healthy: 1 Cardiac 3 Stroke/TIA 5 Seizure 7 Psychiatric 9 Cancer
 2 Respiratory 4 Hypertension 6 Diabetes 8 Other

Medications: None Nitrates Digoxin Insulin ASA Ventolin Oral Diabetic Meds Lasix Oral Contraceptive Not Determined

Other: NKA ASA Sulpha Penicillin Codeine Other Not Determined

Service: None Fire Police E.F.R.T. Other Ambulance Rystander Other

PHYSICAL EXAM

General Appearance

Head/Neck: Trachea - Midline - Shifted - R - L JVD - Elevated - Not Elevated

Chest: Air Entry: - Bilaterally - Decreased - R - L Breath Sounds: - Clear - Wheezes - Crackles - Rub - Absent

Abdomen: - Soft - Rigid - Distended - Tender - Mass - Pustule - RU - LU - LL - RL - Center

Back/Pelvis: - Unremarkable

Extremities: - Unremarkable - Peripheral Edema - Absent - Present - Pedal Pulse - Absent - Present

- Ambulance Call Reports
 - Mandatory reports (>95%)



Inclusion criteria

- All patients attended during the study period by Ottawa ACPs



Exclusion criteria

- ETI not performed by ACPs
- Inter-provincial transfer
- Inter-facilities transfer
- Physicians on scene



Method (Data collection)

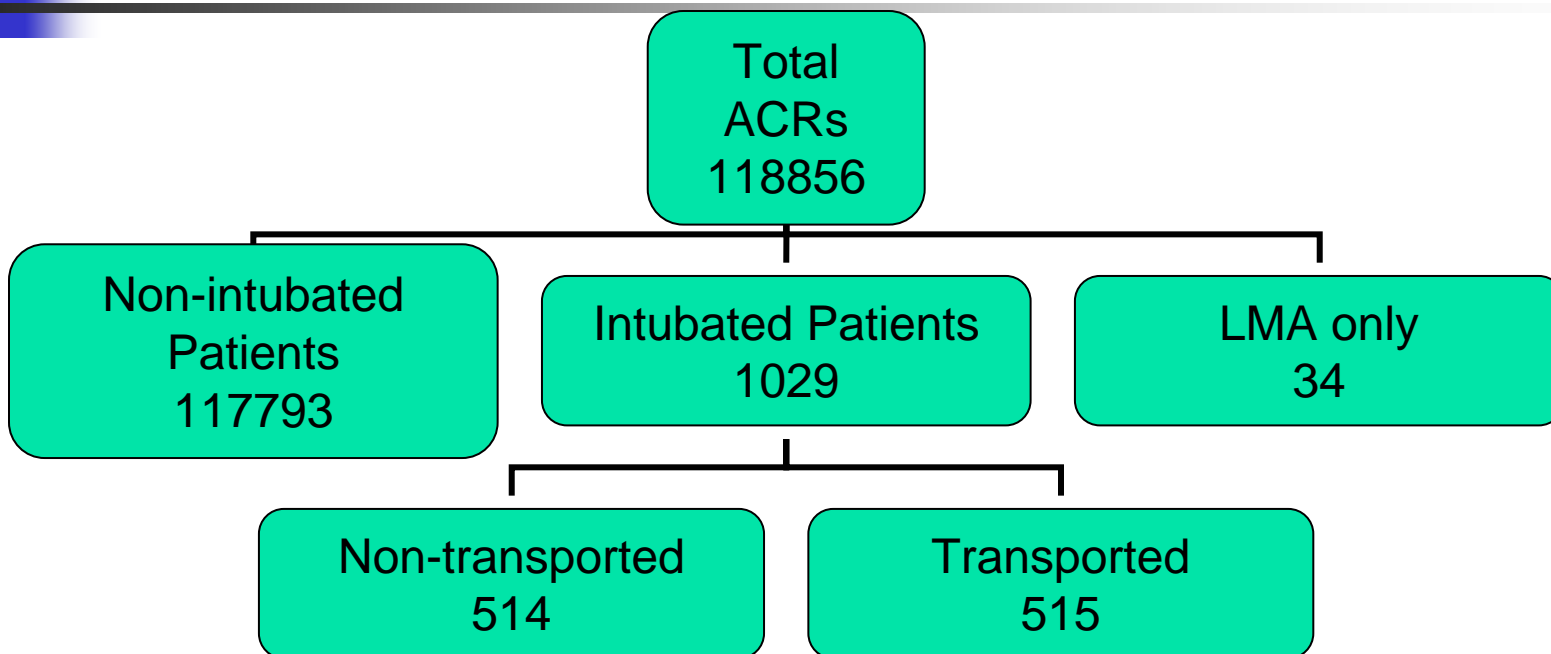
- 3 independent chart extractors
- Reviewed all eligible ACRs, and transcribed onto a predetermined data entry form
- Conflicting of interpretation was resolved by agreement between the two principle investigators



Statistical analysis

- Descriptive statistical analysis
- Univariate analysis on demographics data
- Logistic regression to determine environmental barriers and complications

Study enrollment flowchart





Patient demographics

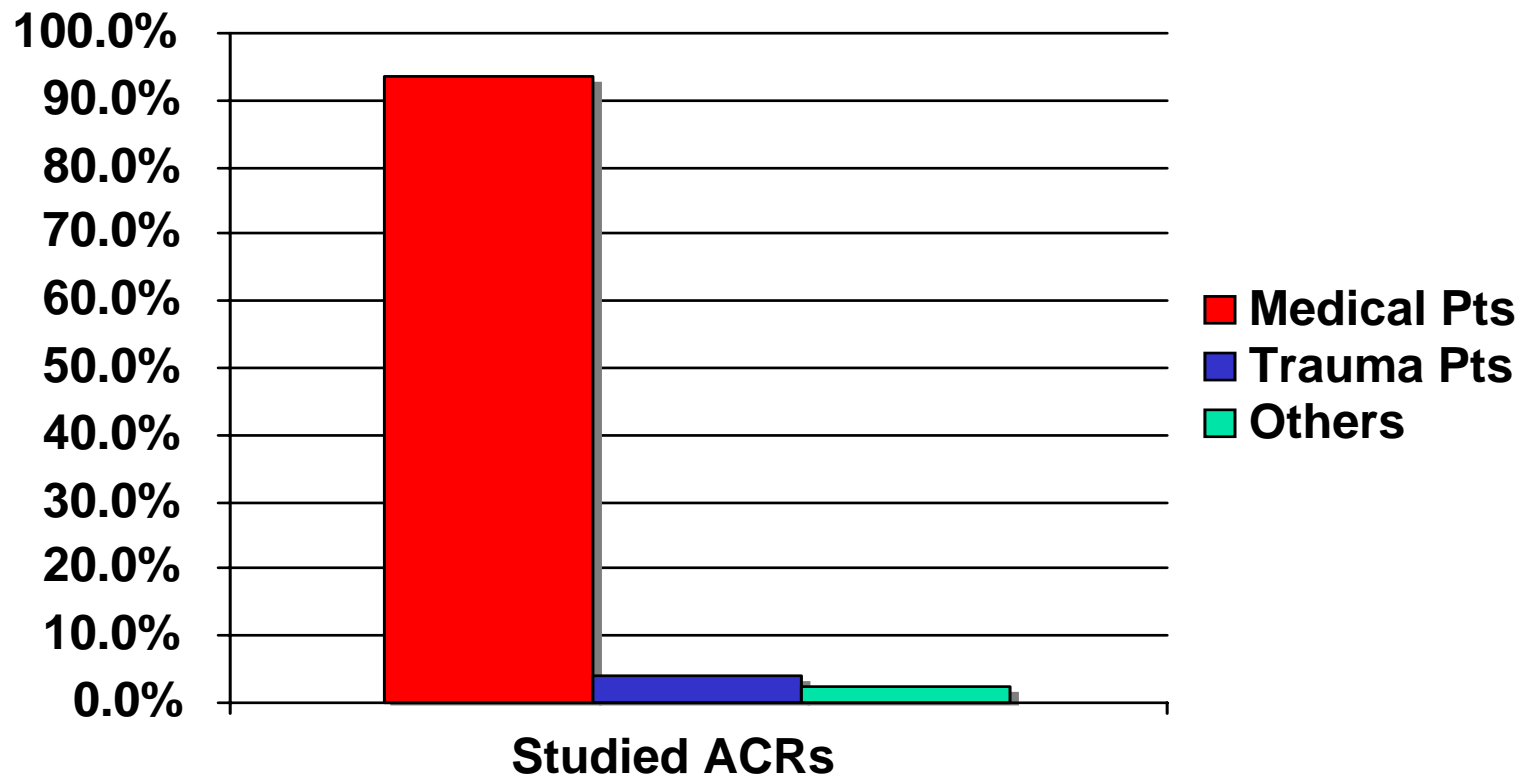
	Total	Non-transported	Transported
Total ACRs	1029	514	515
Sex (M)	640	343	297
Adults	1013	510	503
Pediatrics	9	0	9



Patient demographics

- Age:
 - Median 69, range (0-97)

Nature of EMS calls





Overall successful attempts

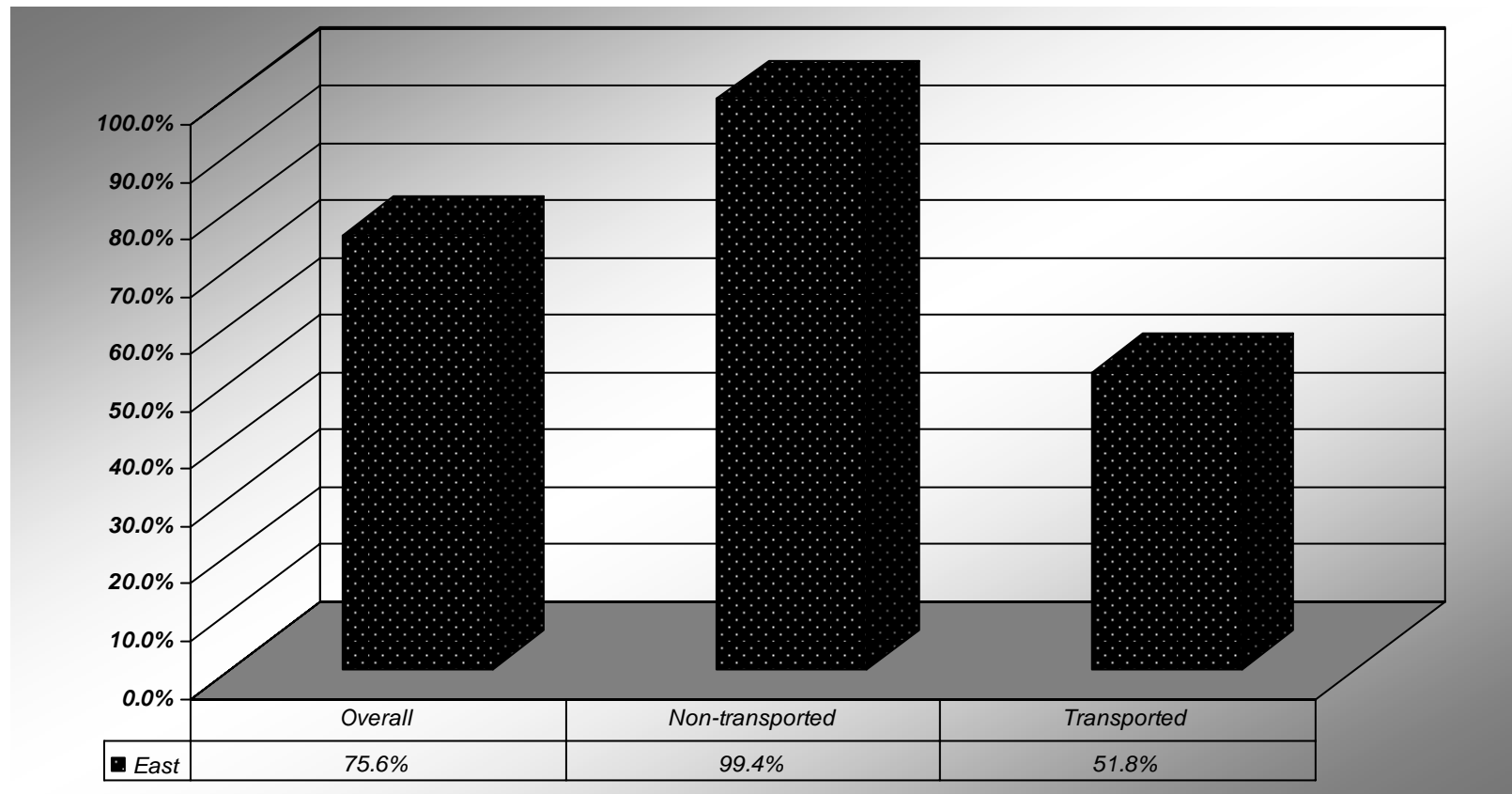
	Overall success rate	Success rate in non-transported	Success rate in Transported
Overall ACRs	82.1%	86.4%	77.6%
VSA	86.3%	86.7%	85.7%
Medical Pts	82.4%	86.7%	78.4%
Trauma Pts	69.8%	75.0%	69.1%
Adults	82.1%	86.3%	77.7%
Children	77.8%	NA	77.8%



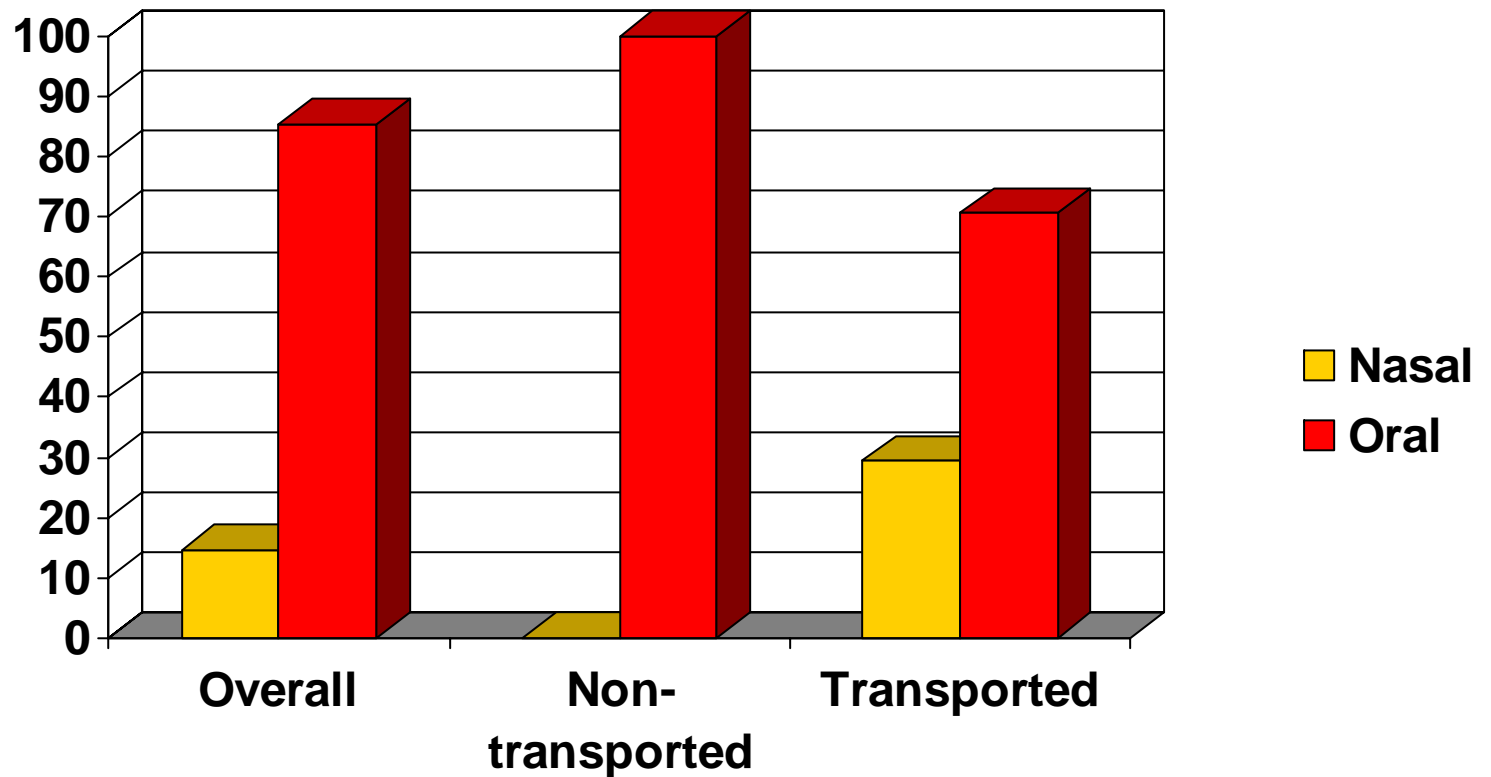
Success in first attempts

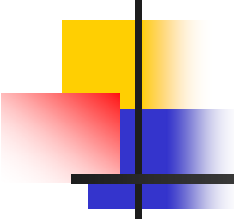
	Overall ACRs success Rate	Non-transported success rate	Transported success rate
Overall	63.6%	66.5%	62.7%
VSA	67.0%	66.5%	67.8%
Medical Pts	65.3%	67.3%	63.4%
Trauma Pts	53.5%	0%	54.8%
Adults	65.0%	66.3%	63.6%
Children	22.2%	NA	22.2%

VSA patients on 1st ETI attempts



Route of ETI on 1st attempts

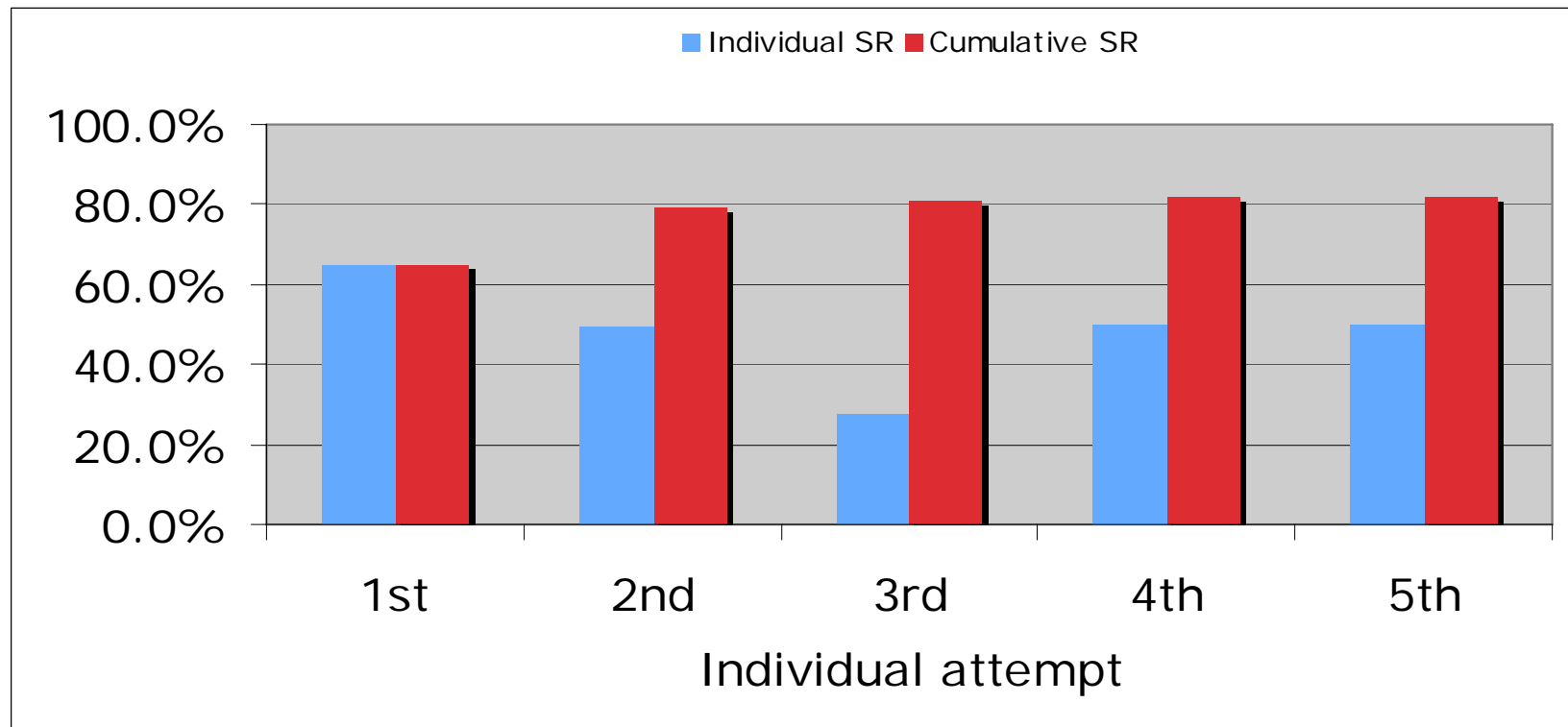


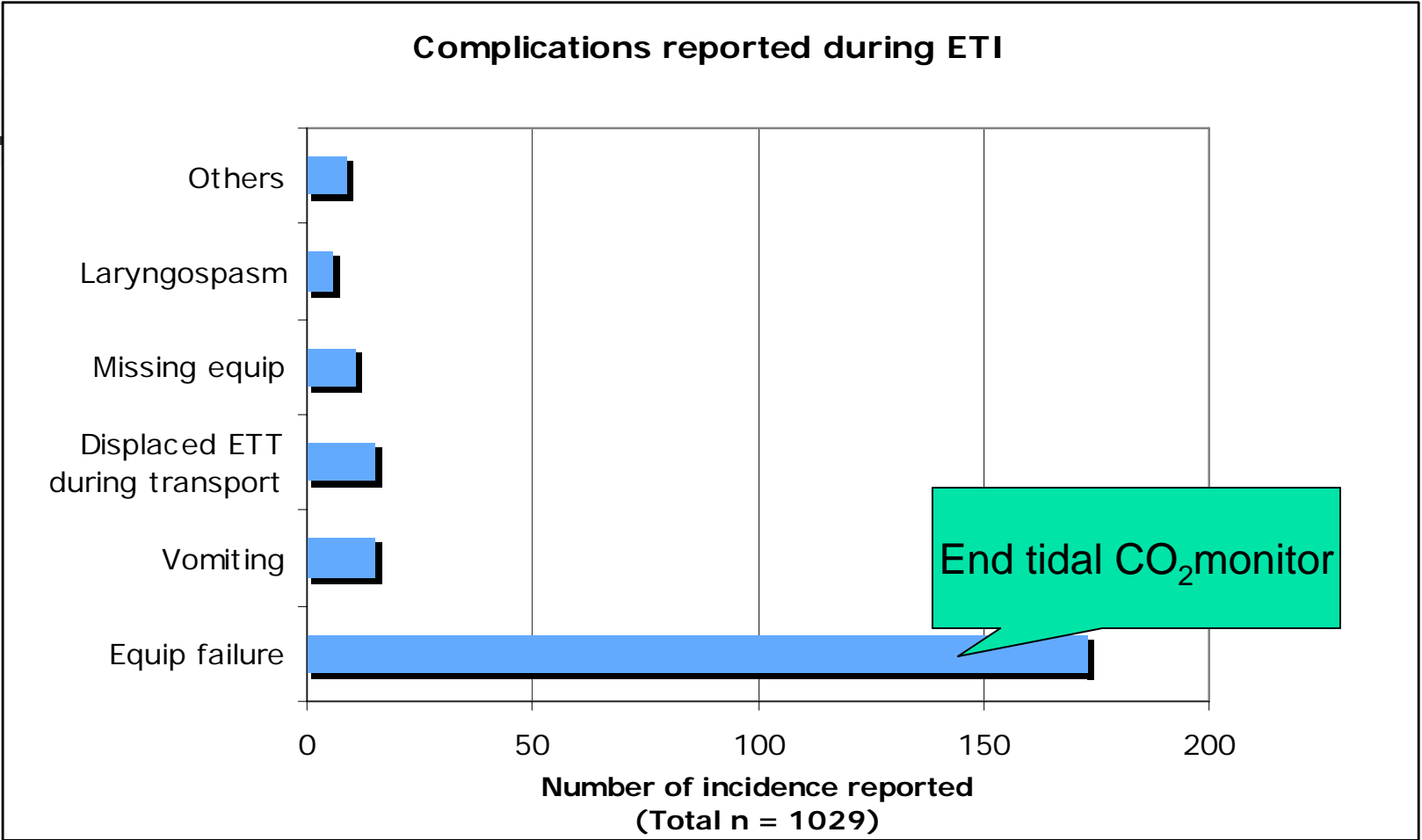
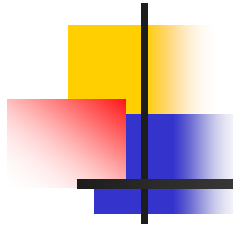


Success: oral vs nasal route on 1st attempts

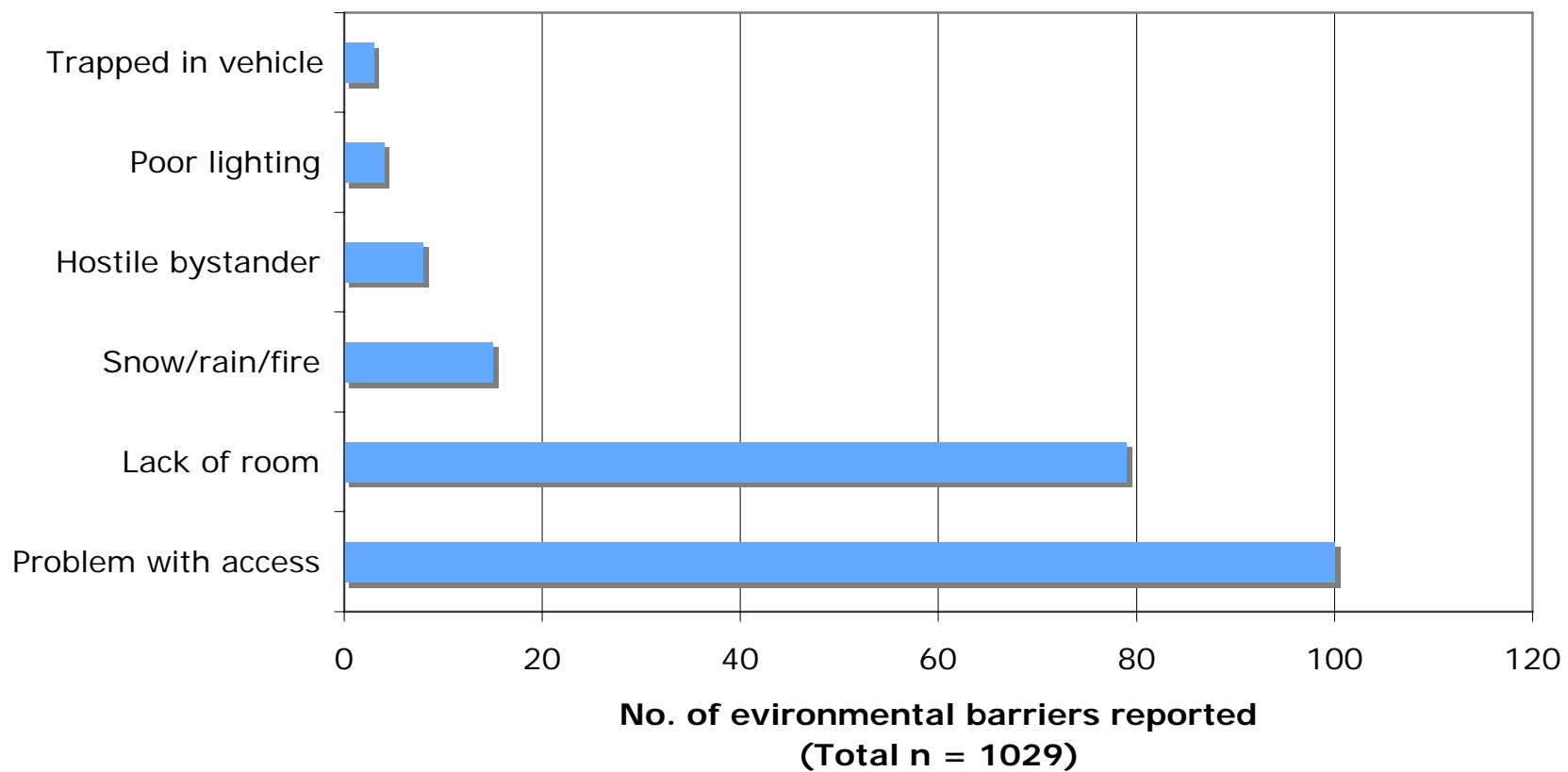
	<i>Overall</i>	<i>Non-transported</i>	<i>Transported</i>
<i>Nasal route</i>	54.7%	NA	54.97%
<i>Oral route</i>	66.1%	66.54%	65.84%

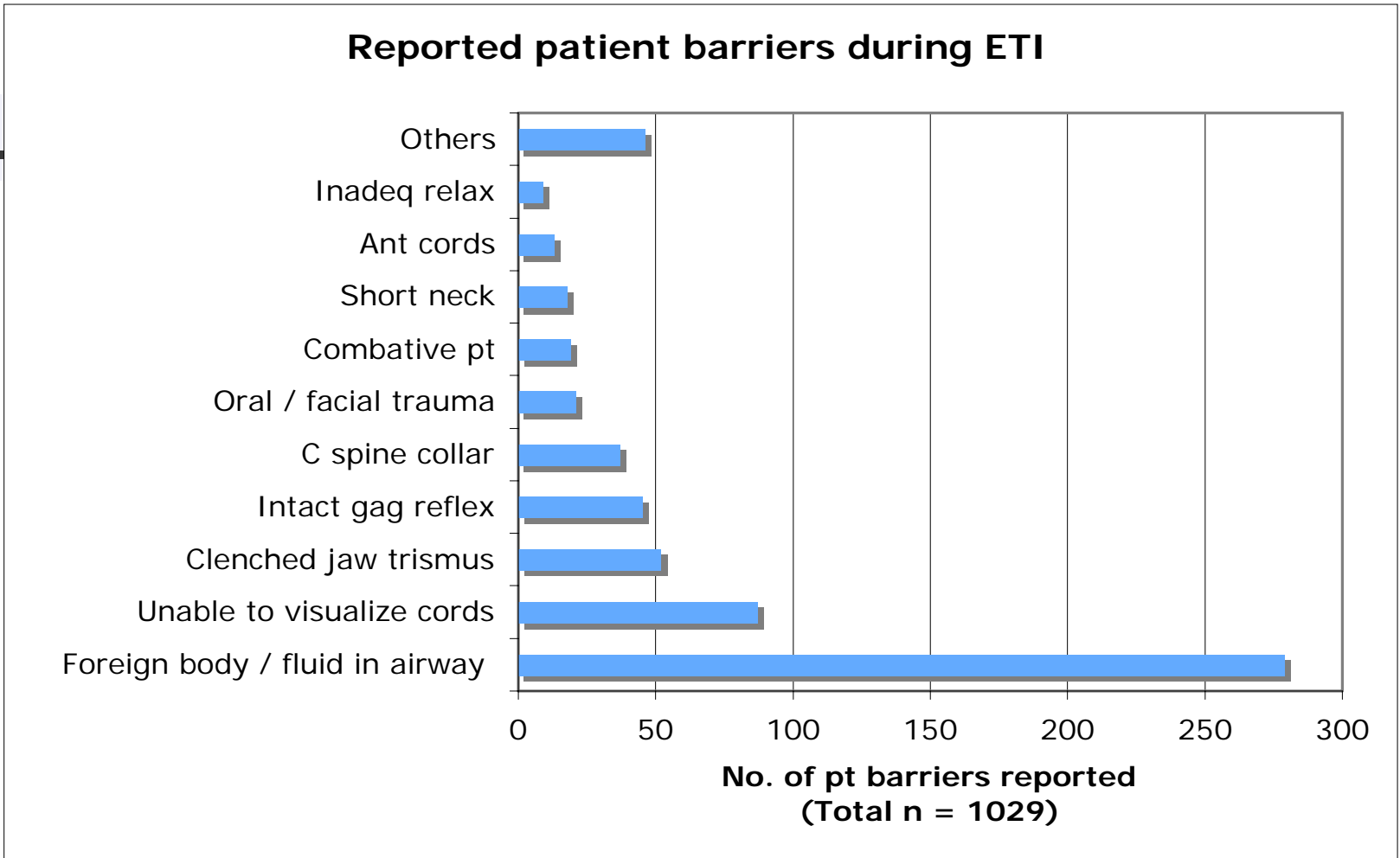
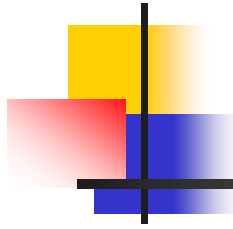
Success rates in sequential attempts and cumulative attempts





Environmental barriers reported during ETI







Success in 1st attempts

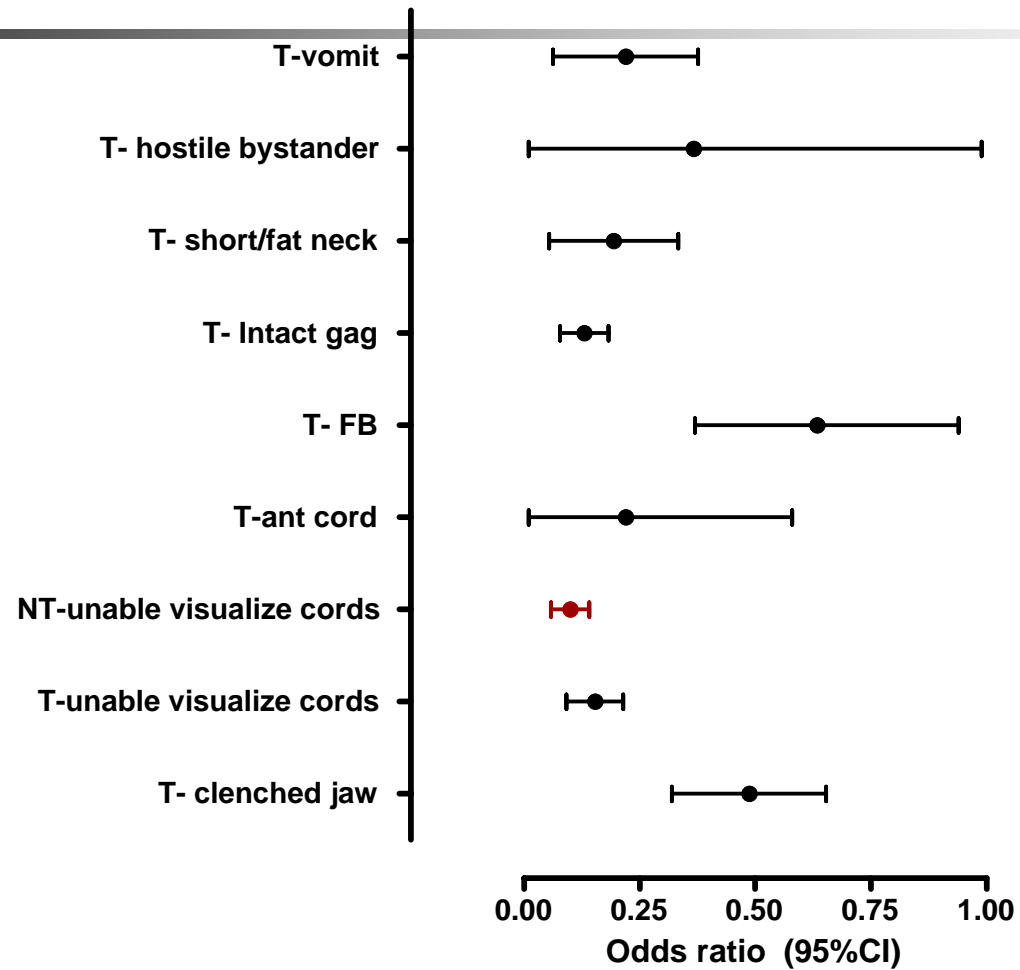
Descriptive data	p values
Age	0.055
Gender	0.0280
Nature EMS calls	0.182
Pre-intubated GCS (3 vs >3)	0.080

Factors influencing overall success

Descriptive data	p values
Pre-intubation GCS (3 vs >3)	0.003
VSA	<0.001



Regression analysis of barriers and complications on ETI success





Discussion

- Our ETI success rate of 82.1% is consistent with rates reported in the literature
- There is no significant improvement in success rates after the 2nd attempt



Discussion

- Positive predicting variables of success
 - VSA
 - Pre-intubation GSC=3



Discussion

- Negative predicting variables of success
 - Combative, alert patients
 - Unable to visualize vocal cords



Discussion

- Complication rate was 3.2%, excluding equipment issues
- Equipment failure and vomiting were common complications



Conclusion

- Ongoing QA of pre-hospital ETI is critical to ensure successful airway management
- Patient and environmental barriers to ETI success can be identified
- Protocols and training for pre-hospital ETI must consider a risk stratification approach



Limitations

- Retrospective chart review on ACRs; quality of the chart documentation varied
- Lack of independent field validation on ETI confirmation
- No hospital data on transported patients
- Outcome measurement limited to documented intubation success



Future

- National standardized ETI data collection
- Multi-centers collaboration on children



References

- ¹Krisanda TJ, Eitel DR, et al: An analysis of invasive airway management in a suburban emergency medical services system. *Prehosp Disaster Med.* 1992; 7(2): 121-6.
- ²Wang HE, Kupas DF, et al: Preliminary experience with a prospective, multi-centered evaluation of out-of-hospital endotracheal intubation. *Resuscitation.* 2003; 58(1):49-58.



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Study partners

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