

***The OPALS
Prehospital Research
Group***



ONTARIO PREHOSPITAL ADVANCED LIFE SUPPORT STUDY

Annual Meeting Ottawa 2007

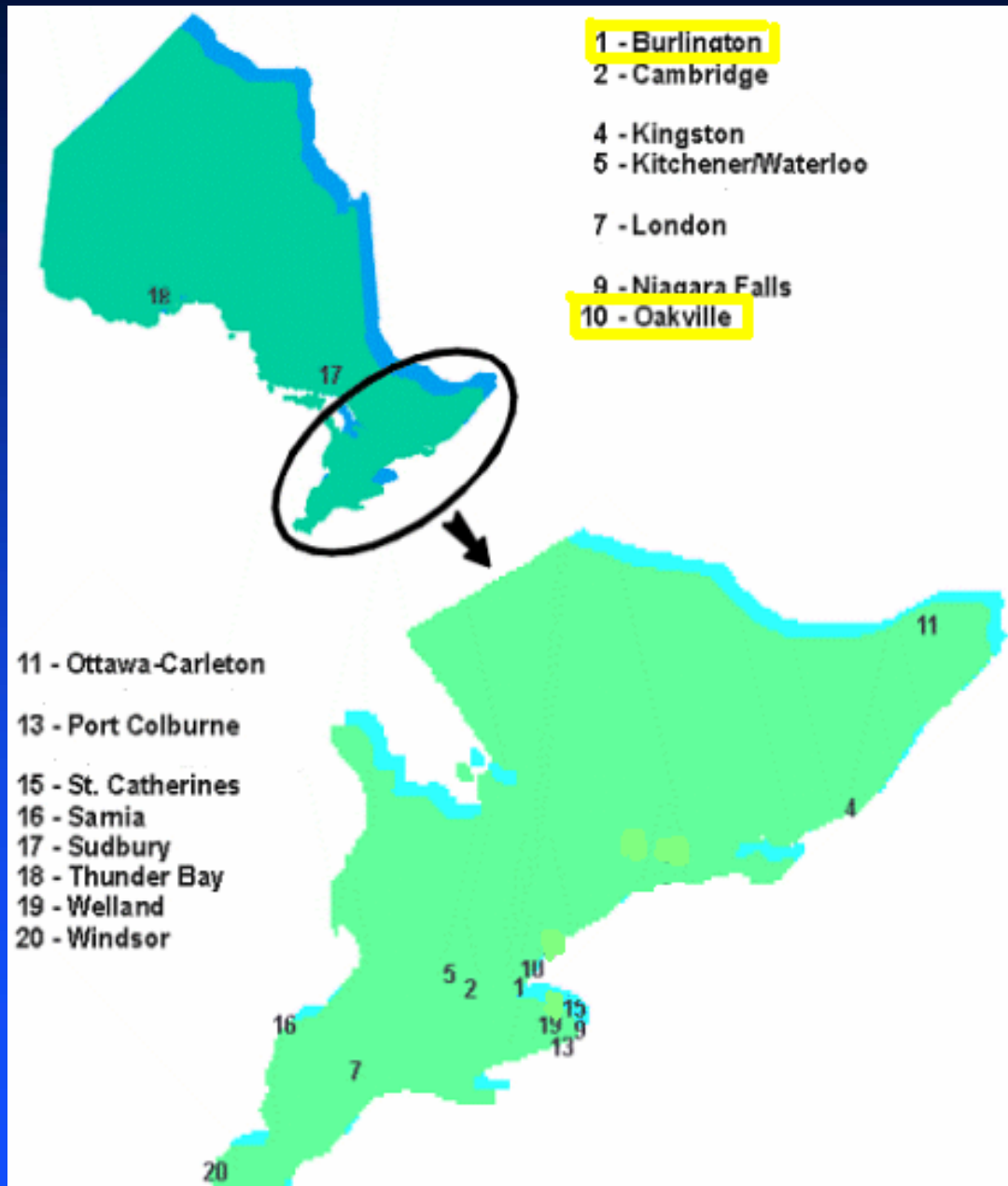
OPALS PRG

Thank you to all our members!

OPALS PRG Members

- **Ottawa Health Research Institute and DCC**
- **MOHLTC and 10 Base Hospital Programs**
- **14 EMS Services**
- **16 Fire Departments**
- **15 cities with population of 2.5 million**
- **Resuscitation Outcomes Consortium**

OPALS Study Cities



OPALS Prehospital Research Group

- **Cambridge**: Dave Waldbillig, Kieran Ballah, Lori Smith, Nilla Dutrisac, Jane Seifried
- **Halton**: Matt Stempien, Ann Wilson, Mediha Kadic
- **Kingston**: Andy Reed, Mark Halladay, Rosie Hawkins Susan Duncan, Sandra Brennan
- **London**: Jon Dreyer, Ken Boyle, Gord Kinney, Joanne Kehoe, Nancy Densmore
- **Niagara**: Doug Munkley, Lorie Luinstra-Toohey, John Wultchyn, Greg Soto, Carol DeGiuli, Lori Ann Parker, Dee Crozier, Jill Banbury

OPALS Prehospital Research Group

- **Ottawa**: Justin Maloney, Richard Dionne, John Trickett, Jeanny Verdon, Cynthia Norris, Sabrina Lawton, Sarah Munroe, Deanna Schofield, Susan Bartlett-Arsenian, Jennifer Guibord, Jason Rouleau, Kristy Smaggus, Susan Vokey, James Marki
- **Sarnia**: Martin Lees, Bob De Raad, Judy Potter, Michelle Smith
- **Sudbury**: Paul Colella, Nicole Sykes, Pam Labelle, Trevor Love

OPALS Prehospital Research Group

- **Thunder Bay**: Andrew Affleck, Elaine Graham, Jessica Dykes, Kristine Perrier, Chrissy Klass, Dana Kolodzidegczak
- **Windsor**: Paul Bradford, Cathie Hedges, Sandra Slogan, Mike Gobet, Chris Fader, Suzanne McKenzie, Linda Purcell

Thank You EMS Service Staff

- **Region of Waterloo:** Roger Mayo
- **Prescott-Russell:** Louis Rathier, Gilles Lacroix, Yves Lariviere, Roxanne Bourdeau, Patrice Brennan, Mario Periard, Marc-Andre Periard, Natalie Nadeau
- **Halton Region:** Greg Sage
- **Frontenac Paramedic Service:** Paul Charbonneau, Susan Brown
- **Thames EMS:** Bob Hopper, Dave Goddard

Thank You EMS Service Staff

- **Niagara Region EMS:** Hal Klassen
- **Ottawa Paramedic Services:**
Anthony Di Monte, Pierre Poirier, Peter Kelly,
Stephanie Mills, Andrew Orchard, Mike Dupuis,
Clayton Foster, Saleh Hashem
- **Lambton EMS:** Jeff Brook, Sandra Kearns
- **Greater Sudbury EMS:** Jennifer Amyotte, Tim
Beadman, Tom Isaia
- **Superior North Emergency and Rescue:** Norm
Gale, Wayne Gates

Thank You EMS Service Staff

- Sun Parlour EMS: John Rutgers
- Amherstburg Anderdon & Maiden: Chris Grant, Brian Birdfell
- Harrow Ambulance: Michael Smith
- Essex County EMS: Dean Wilkinson

Thank You Fire Service Staff

- **Burlington:** Mark Alderman
- **Cambridge:** David Greenhough
- **Kingston:** Neville Murphy, Clint Long, Harold Tulk
- **London:** Brian Arnold, Gwen Frances
- **Niagara:** Jim Boutilier
- **Oakville:** Al Kentie
- **Ottawa:** Phil Muggleton, Don Thompson, Bruce Montone

Thank You Fire Service Staff

- **Sarnia:** Dave Hanley, Pat Cayen, John Kingyens, Rick MacGregor, Doug McKenzie, Dana Pitts
- **Sudbury:** Gordon Stauffer
- **Thunder Bay:** John Hay, John Mill, Rod Hurdon
- **Waterloo:** Ryan Schubert
- **Windsor:** Mike Mio, John Quennell, Curtis Fedoruk

OPALS PRG Steering Committee

Dr. Ian Stiell	Chair and Scientific Director
Dr. George Wells	Scientific Advisor
Ms. Cathy Clement	Research Manager
Dr. Justin Maloney	OPALS Med Director Rep
Mr. John Trickett	OPALS Prog Director Rep
Dr. Jon Dreyer	OBHG Med Director Rep
Mr. Tony Campeau	MOHLTC Rep
Mr. Ken Boyle	OBHG Prog Director Rep

OPALS PRG Steering Committee

Dr. Jim Christenson	At Large Member
Mr. Anthony Di Monte	At Large Member
Ms. Lorie Luinstra-Toohey	At Large Member
Dr. Doug Munkley	At Large Member
Dr. Martin Osmond	At Large Member
Dr. Christian Vaillancourt	At Large Member

Thank You Ottawa D.C.C. Staff

- ◆ **Cathy Clement**
- ◆ **Jane Banek**
- ◆ **Tammy Beaudoin**
- ◆ **Julie Cummins**
- ◆ **Irene Harris**
- ◆ **Heather Bobier**
- ◆ **Linda McDonald**
- ◆ **Angela Marcantonio**
- ◆ **Marc-Andre Da Ponti**
- ◆ **My-Linh Tran**
- ◆ **Vanessa Baillie**
- ◆ **Sheryl Domingo**
- ◆ **Wayne Lowe**
- ◆ **Christine Tym**
- ◆ **Julie Foxall**
- ◆ **Mary-Jo Lewis**
- ◆ **Tracy McArdle**
- ◆ **Irene Watpool**
- ◆ **Elizabeth Anderson**

Thank You to Our Invited Guests

Berit Bardarson

Seattle DCC

Dr. Dan Davis

San Diego

Dr. Clif Callaway

Pittsburgh

Dr. Sheldon Cheskes

Peel Region

Dr. Jim Christenson

Vancouver

Sarah Pennington

Vancouver

Barb Boychuk

Vancouver

Helen Connolly

Vancouver

Dug Andrusiek

Vancouver

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***What Has the OPALS Study Taught us
About the
Prehospital Care of Critically Ill and
Injured Patients?***



OPALS Annual Meeting Ottawa 2007

***The Ontario Prehospital Advanced Life
Support Study***



The OPALS Study

- **The largest prospective pre-hospital study yet conducted**
- **Evaluates the impact of rapid defibrillation and ALS programs on survival and morbidity**
- **Over 9 years (1994-2003) involved 36,000 patients:**
 - ▶ **Cardiac arrest (10,000)**
 - ▶ **Major trauma (3,000)**
 - ▶ **Respiratory distress (8,000)**
 - ▶ **Chest pain (13,000)**
 - ▶ **Pediatrics (2,000)**

Primary Objectives

- 1. Cardiac Arrest:** The incremental benefit for survival of adding rapid defibrillation program
Phase II - JAMA 1999
- 2. Cardiac Arrest:** The incremental benefit of adding ALS program
Phase III – New Engl J Med 2004
- 3. Respiratory:** The incremental benefit of ALS
Phase III – New Engl J Med 2007
- 4. Trauma, Chest Pain, Pediatrics:** The incremental benefit for survival/morbidity of adding ALS
Phase III – Not yet published

Secondary Objectives: Cardiac Arrest

1. Modifiable factors affecting survival
Ann Emerg Med 1999
2. EMS-witnessed cases
Ann Emerg Med 2000
3. Survival with only CPR?
Ann Emerg Med 2001
4. Quality of life of survivors
Circulation 2003
5. Optimal Defib Response Interval
Ann Emerg Med 2003
6. Locations of arrest and PAD
Can J Card 2004
7. Coroner's Diagnosis Pediatric CA
Resusc 2007

OPALS: Setting and Design

- Multicenter before-after controlled clinical trial
- 21 Canadian cities
- Multiphase design:
 - *Phase I Baseline (36 mo.)*
 - *Phase II Rapid Defibrillation (12 mo.)*
 - *Phase III Full ALS (36 mo.)*
- Interventions:
 - Rapid defibrillation (II)
 - Endotracheal intubation
 - IV lines
 - IV fluids & drugs

Cardiac Arrest ALS Response Targets

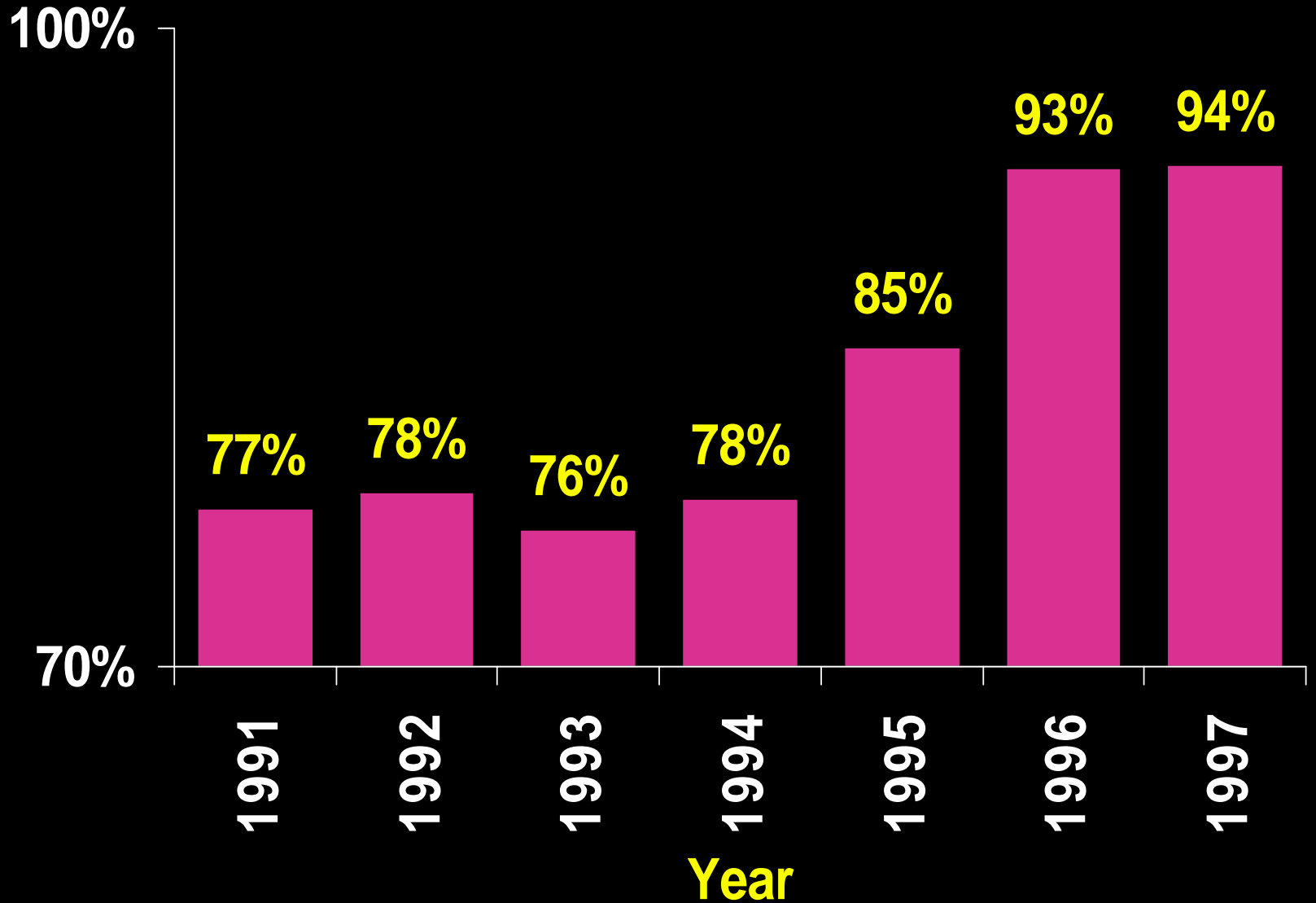
Defib at scene \leq 8 min	94%
ALS paramedic at scene	93%
ALS paramedic 11 min	87%
Successful intubation	94%
Successful IV insertion	85%

***Improved Out-of-hospital Cardiac
Arrest Survival Through the
Inexpensive Optimization of an
Existing Defibrillation Program***

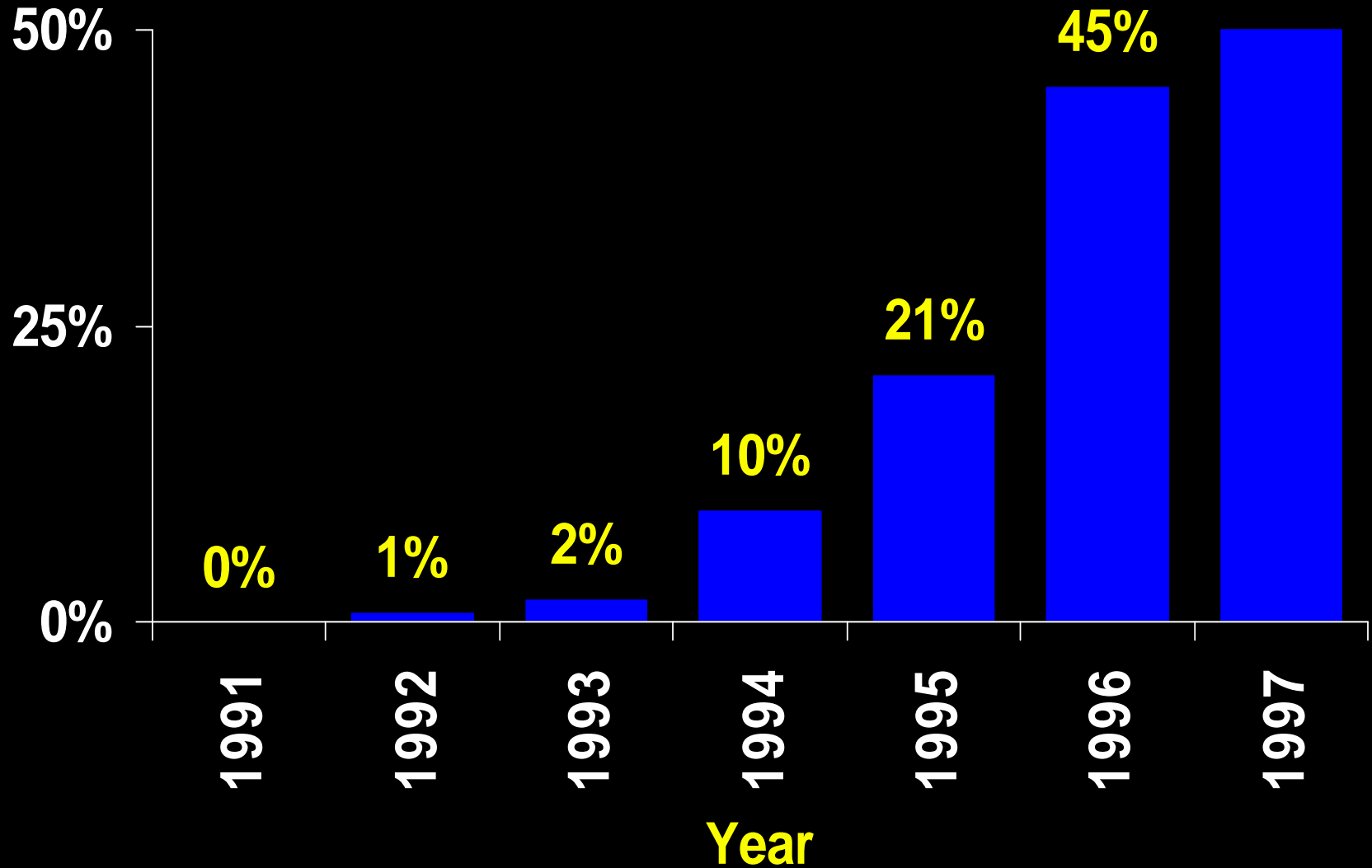
***Stiell, Wells, Field, et al
for the OPALS Study Group***

JAMA 1999

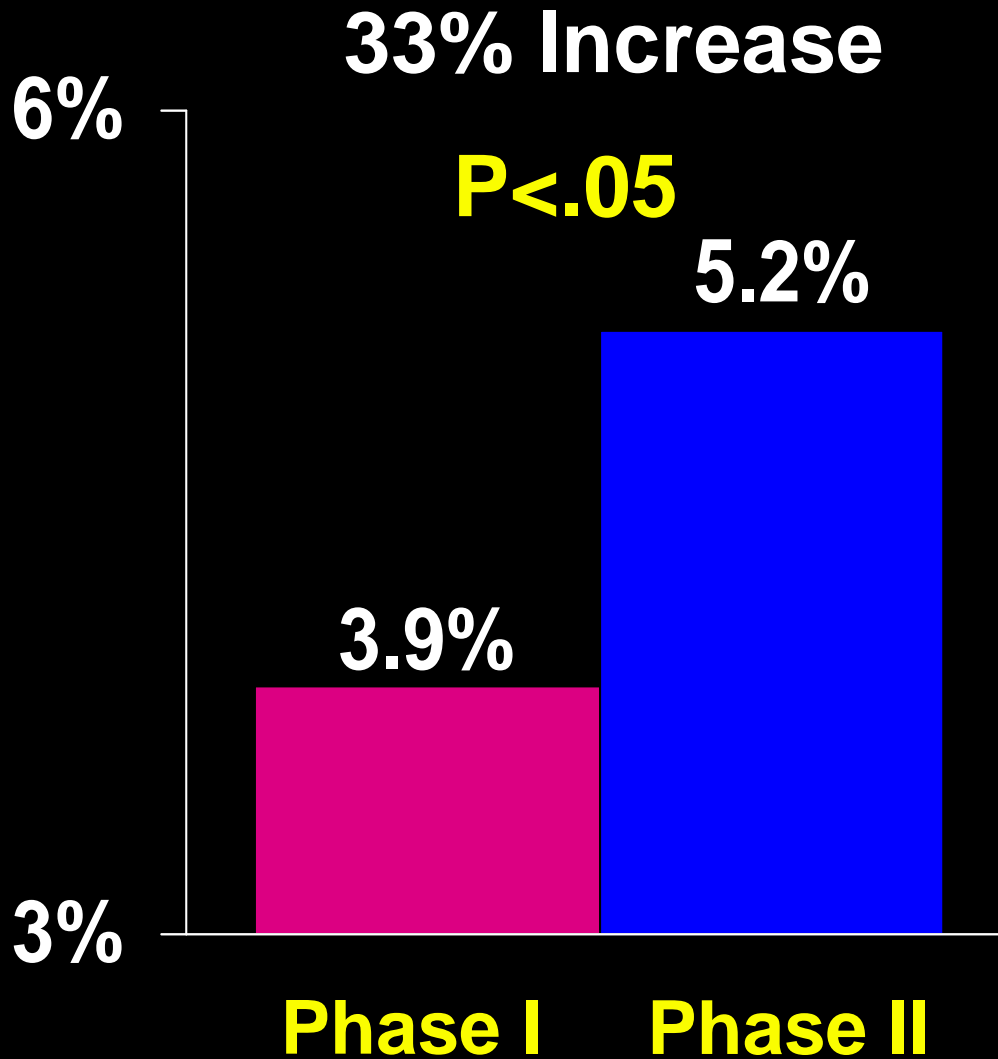
% of Cases Reached with Defibrillator in 8 Minutes or Less



Firefighters Arrived First with Defibrillator



Patient Survival



ORIGINAL ARTICLE

Advanced Cardiac Life Support in Out-of-Hospital Cardiac Arrest

Ian G. Stiell, M.D., George A. Wells, Ph.D., Brian Field, A.C.P., M.B.A.,
Daniel W. Spaite, M.D., Lisa P. Nesbitt, M.H.A., Valerie J. De Maio, M.D.,
Graham Nichol, M.D., M.P.H., Donna Cousineau, B.Sc.N., Josée Blackburn, B.Sc.,
Doug Munkley, M.D., Lorraine Luinstra-Toohey, B.Sc.N., M.H.A.,
Tony Campeau, M.Ed., Eugene Dagnone, M.D., and Marion Lyver, M.D.,
for the Ontario Prehospital Advanced Life Support Study Group

Table 2. Survival and Functional Outcomes of Patients from the Two Study Phases.*

Outcome	Rapid-Defibrillation Phase (N=1391)	Advanced-Life-Support Phase (N=4247)	Absolute Increase (95% CI)	P Value
	<i>no. (%)</i>		<i>percentage points</i>	
Return of spontaneous circulation	180 (12.9)	766 (18.0)	5.1 (3.0 to 7.2)	<0.001
Admission to hospital	152 (10.9)	621 (14.6)	3.7 (1.7 to 5.7)	<0.001
Survival to hospital discharge	69 (5.0)	217 (5.1)	0.1 (-1.2 to 1.5)	0.83
Survivors' cerebral performance category, level 1†	54 (78.3)	145 (66.8)	—	0.73
	<i>score</i>			
Survivors' Health Utility Index, Mark III, at one year			—	0.67
Median	0.84	0.79		
Interquartile range	0.49–0.97	0.43–0.91		

* CI denotes confidence interval, and dashes denote not applicable.

† There were 69 survivors in the rapid-defibrillation phase, and 217 in the advanced-life-support phase.

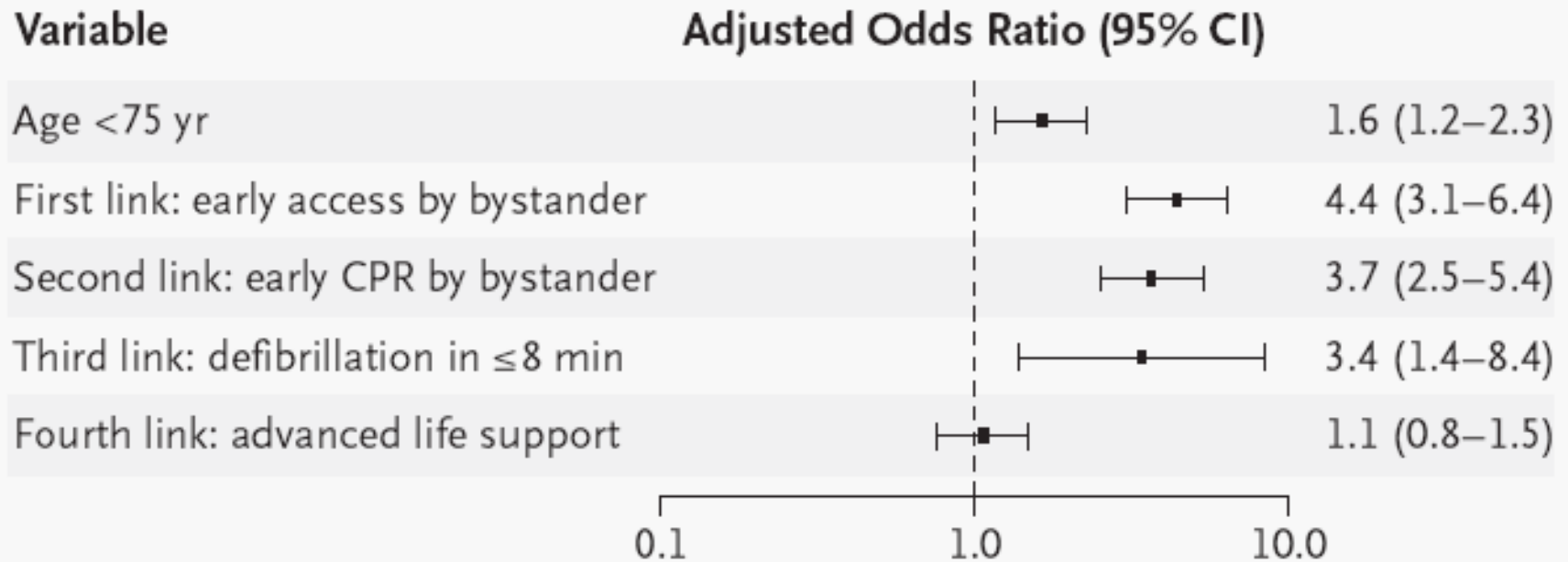


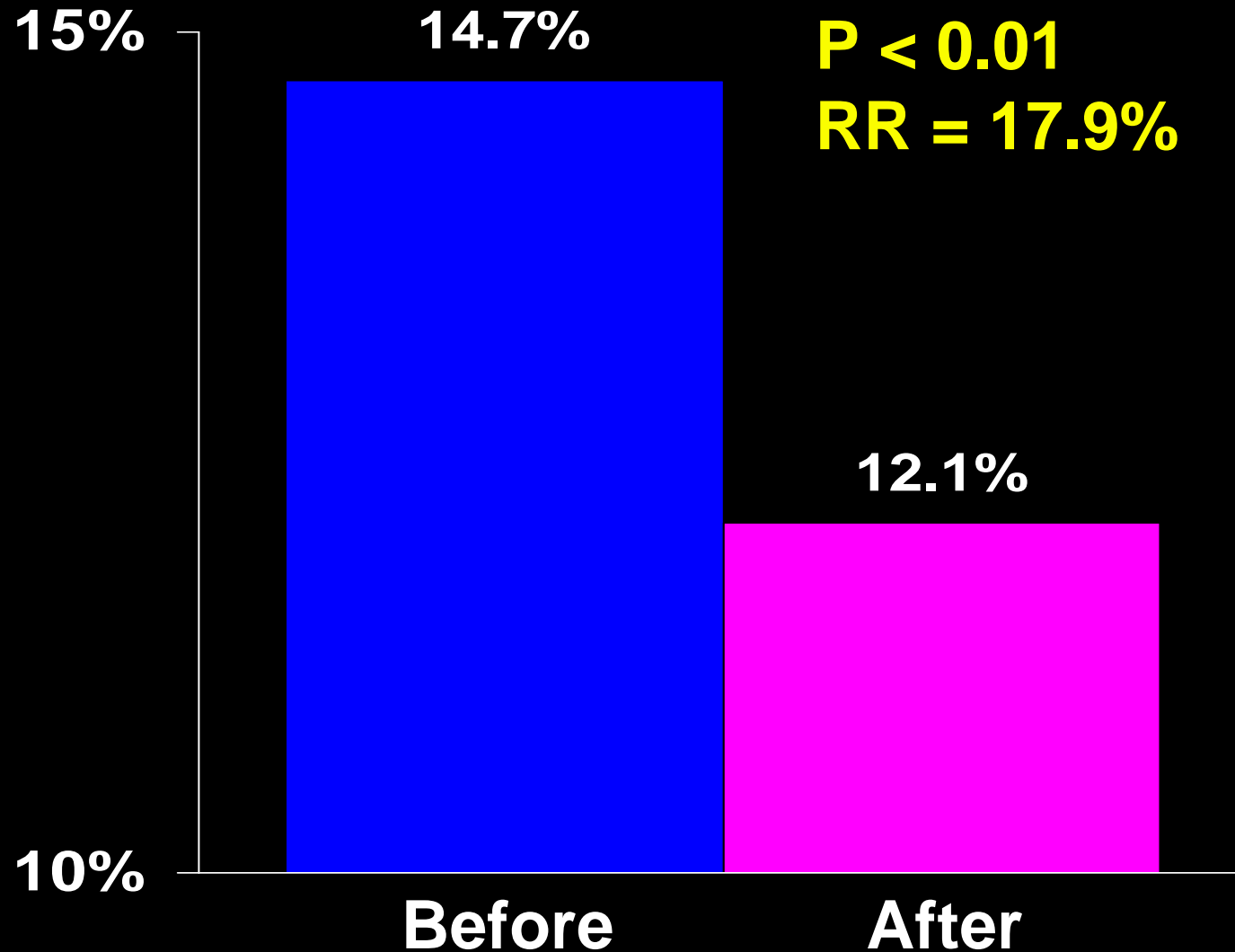
Figure 1. Odds Ratios for Survival to Hospital Discharge Associated with Selected Factors.

ORIGINAL ARTICLE

Advanced Life Support for Out-of-Hospital Respiratory Distress

Ian G. Stiell, M.D., M.Sc., F.R.C.P.C., Daniel W. Spaite, M.D.,
Brian Field, M.B.A., E.M.C.A., Lisa P. Nesbitt, M.H.A., Doug Munkley, M.D.,
Justin Maloney, M.D., F.R.C.P.C., Jon Dreyer, M.D., F.R.C.P.C.,
Lorraine Luinstra Toohey, B.Sc.N., M.H.A., Tony Campeau, M.A.Ed.,
Eugene Dagnone, M.D., F.R.C.P.C., Marion Lyver, M.D.,
and George A. Wells, Ph.D., for the OPALS Study Group*

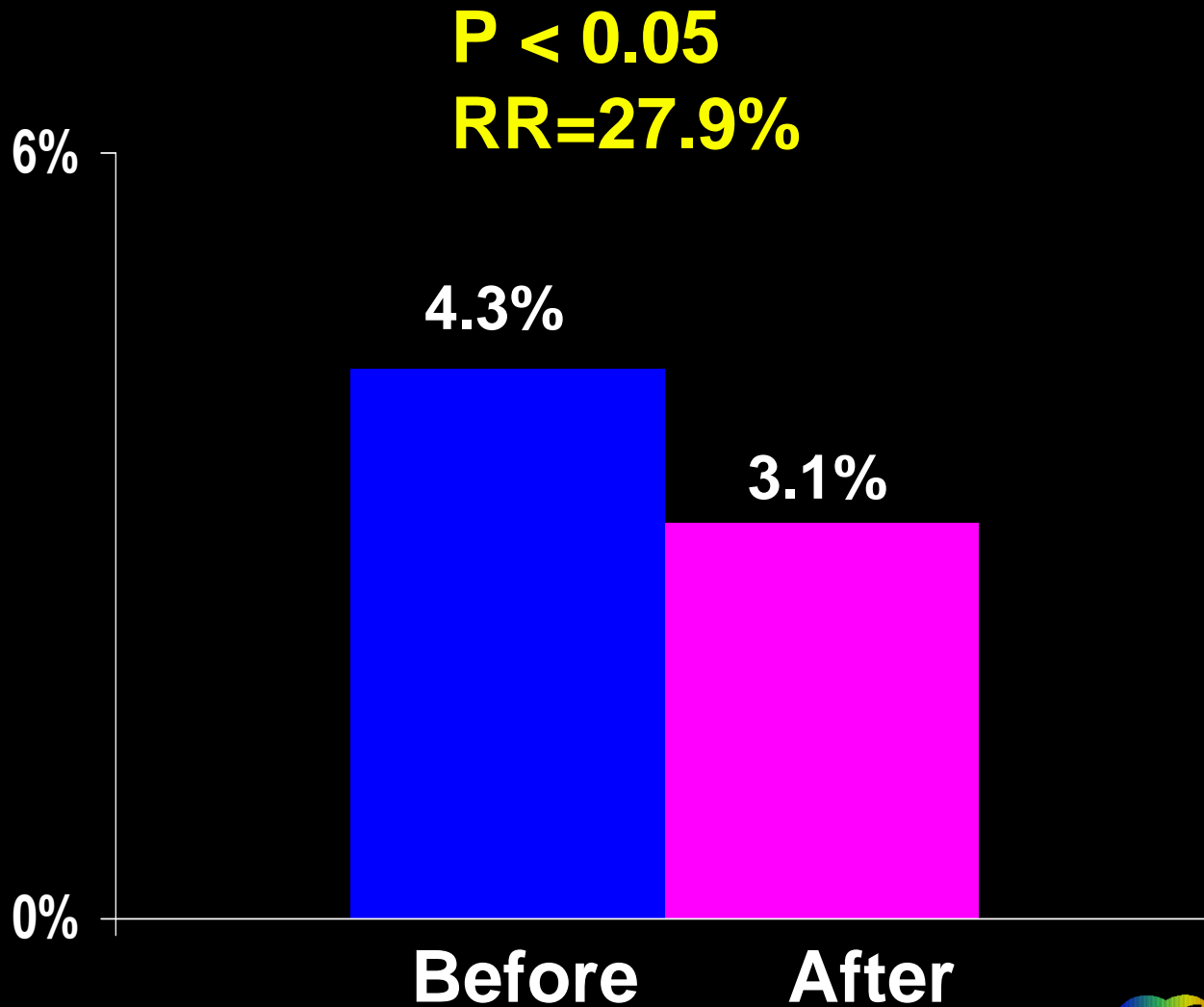
Primary Outcome: Overall Mortality



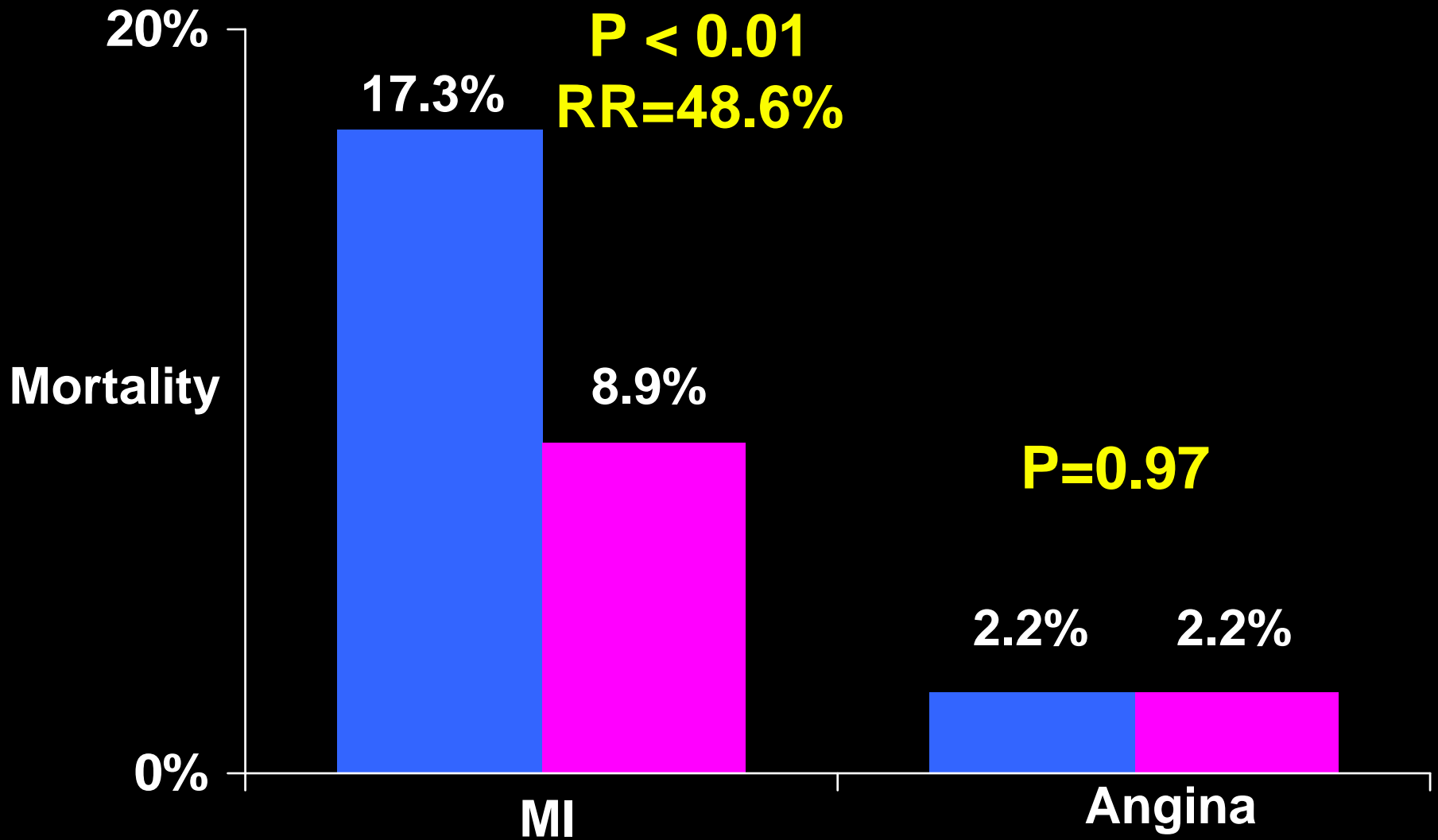
Overall Impact of ALS in Study Communities (N = 2 Million)

Additional lives saved / year	173
Number needed to treat to save a life	38

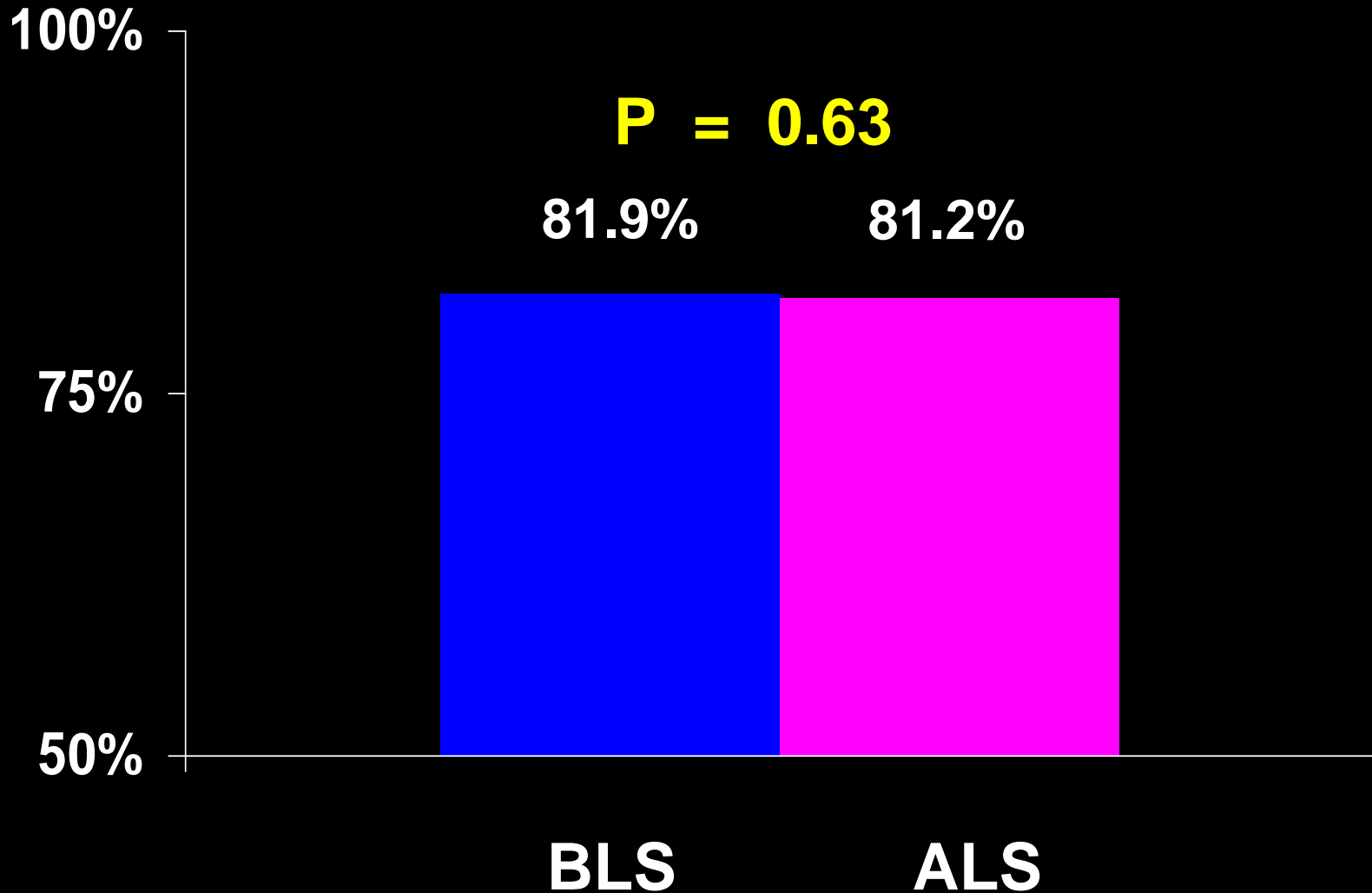
Chest Pain: Overall Mortality (N=10,371)



Mortality by Diagnosis Subgroups



Major Trauma: Overall Survival (N=2,884)



Adjusted Odds Ratios for Mortality

H-L G of Fit P = 0.44

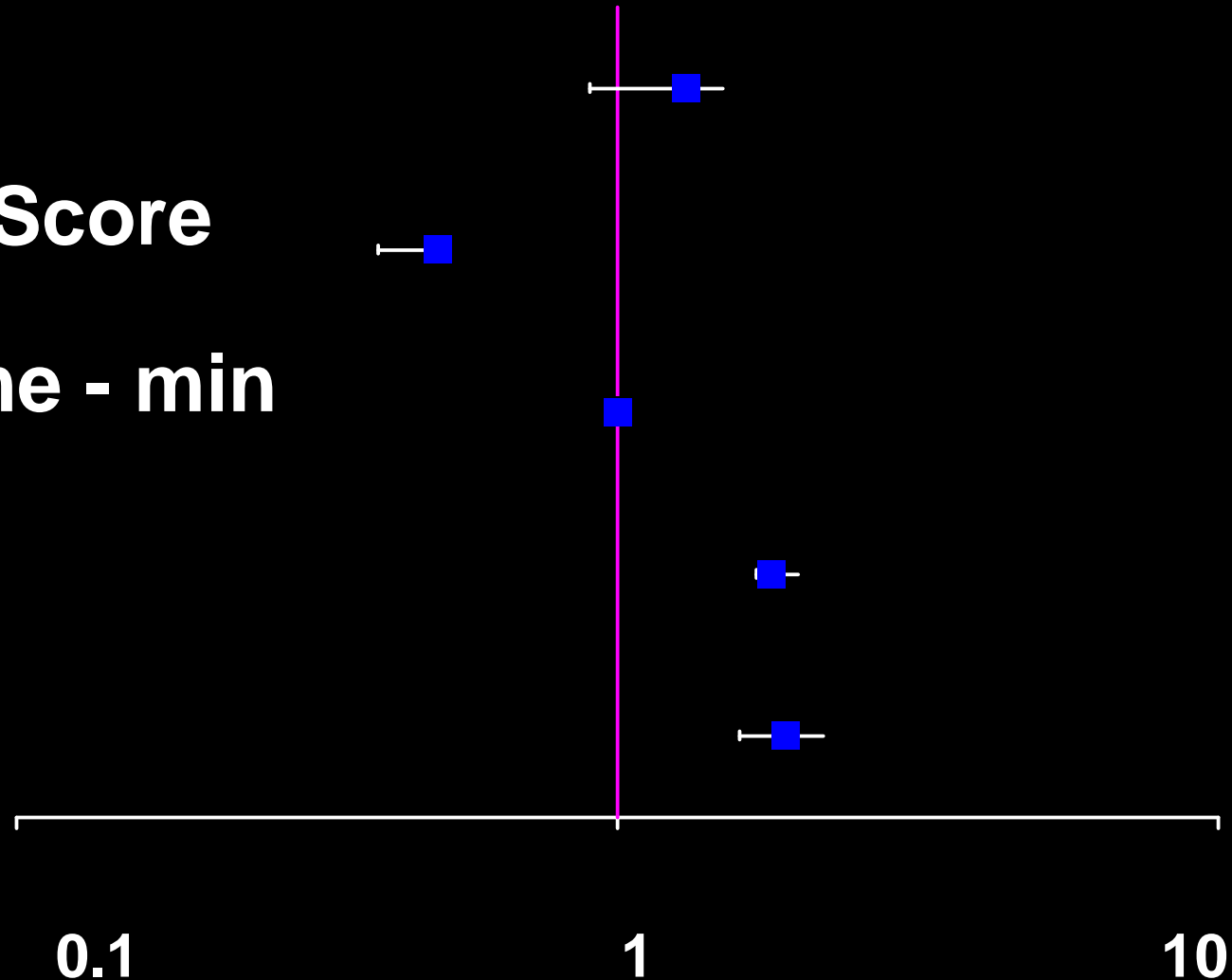
ALS Phase

Rev Trauma Score

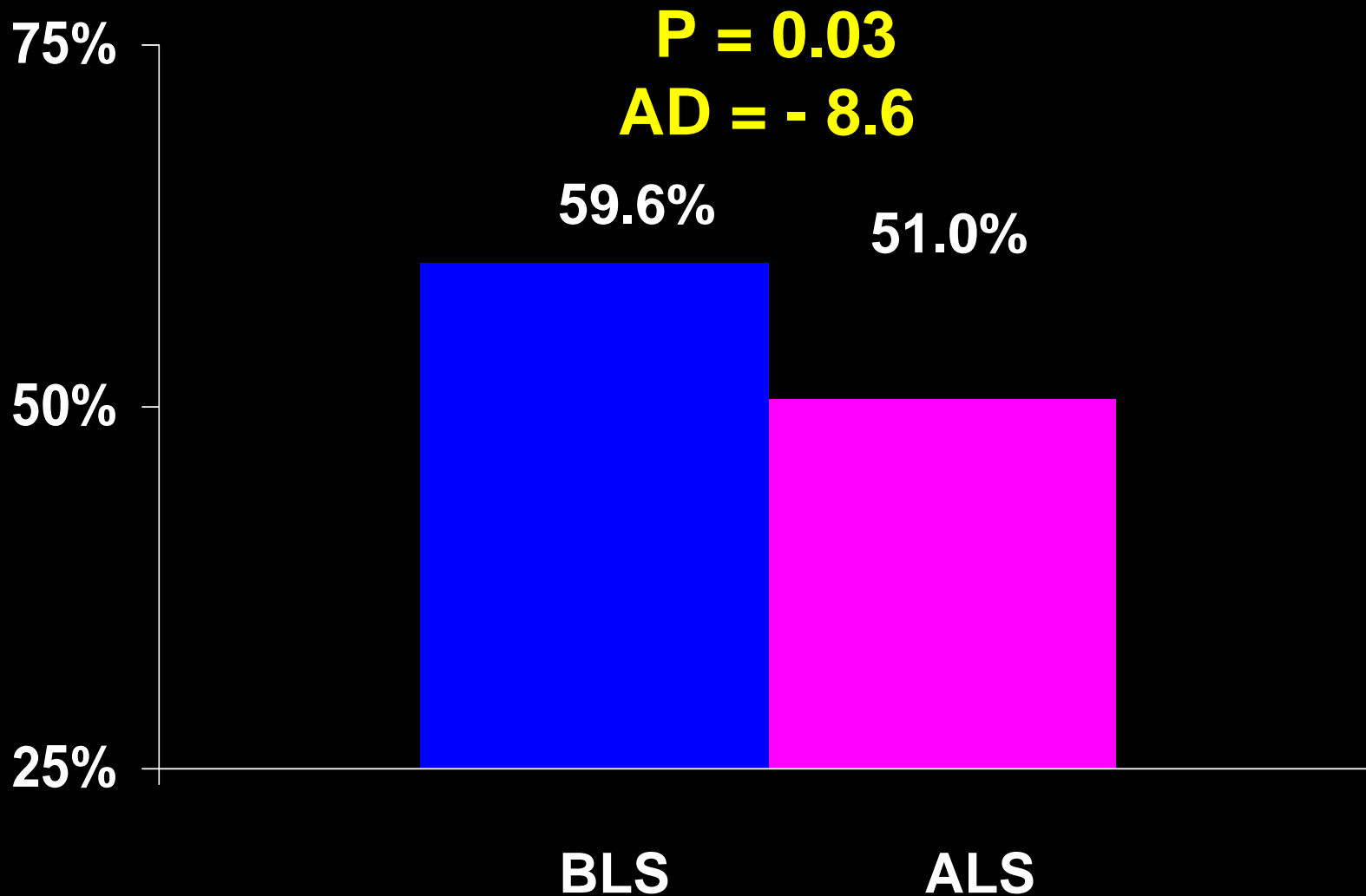
Response time - min

Age - years

ISS score



Subgroup GCS < 9: Overall Survival (N=664)



Adjusted Odds Ratios for Mortality

H-L G of Fit P = 0.03

Intubation in field

IV in field

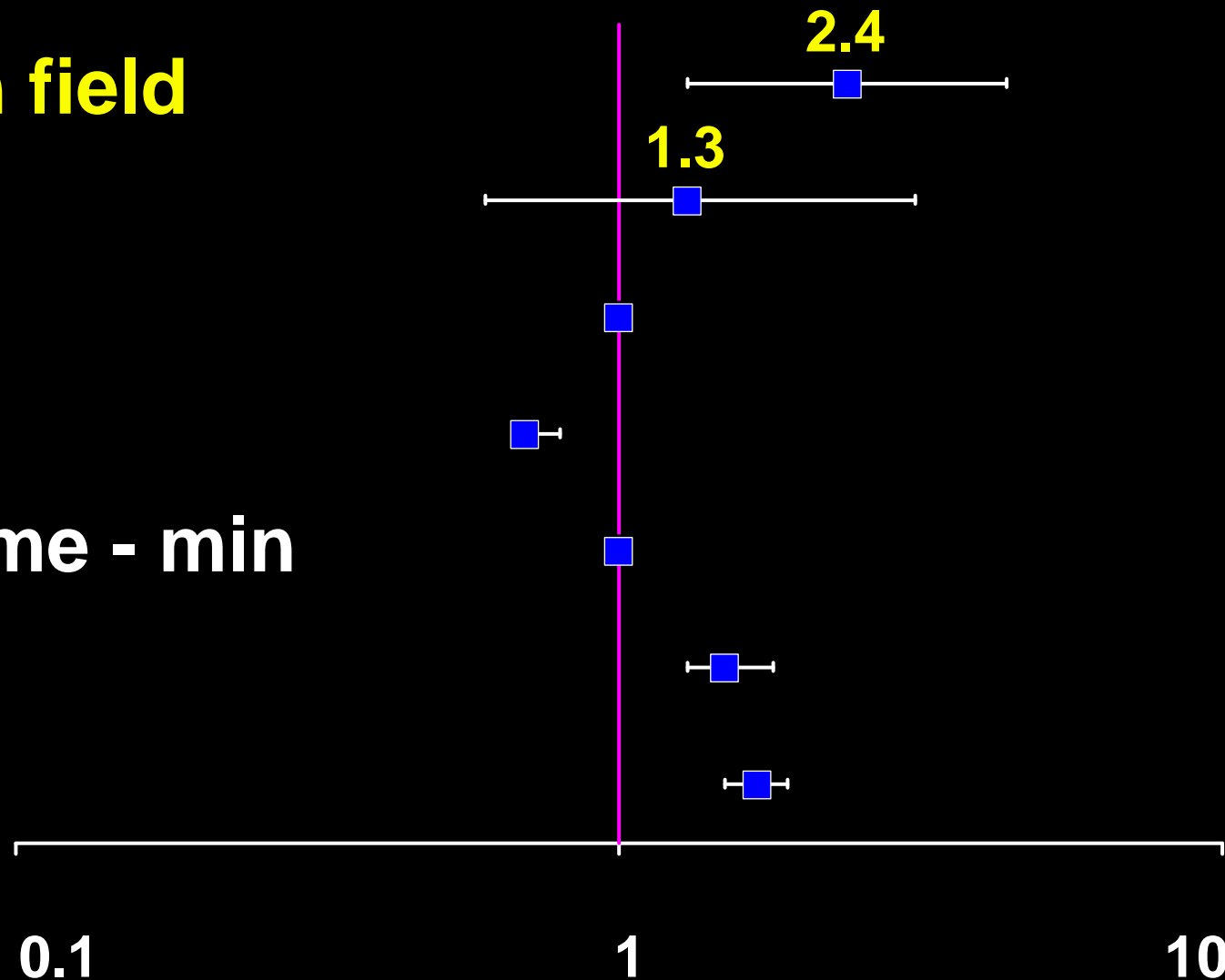
SBP initial

GCS initial

Response time - min

Age - years

ISS score



Summary of Evidence from the OPALS Study: Cardiac Arrest

- Bystander CPR (2nd Link) increases survival 3-4x
- Rapid defibrillation (3rd Link) increases survival 3x
- ALS (4th Link) no clear additional benefit
- PAD has limited potential impact
- Quality of life of survivors very good

Summary of Evidence from the OPALS Study: Critically Ill Patients

- **Respiratory Distress:**
 - Clear benefit from ALS
 - Most important treatments not clear
- **Chest Pain:**
 - Also clear benefit from ALS
 - Which drugs most useful?
- **Major Trauma:**
 - No benefit and potential harm from ALS

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