

## Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

Supplement to: Silbergleit R, Durkalski V, Lowenstein D, et al. Intramuscular versus intravenous therapy for prehospital status epilepticus. *N Engl J Med* 2012;366:591-600.

# Intramuscular versus Intravenous Therapy for Prehospital Status Epilepticus

## Supplementary Materials

### Appendix

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Table A1. Interactions of treatment, seizure cessation, rescue given, and ability to start IV  
(column width proportional to value)

Treatment	IM									
Met Primary	Yes				No					
Stopped	Yes				No					
Rescue	No				Yes		No			
Able IV	Yes		No		Yes	N	Y	N	Yes	N
	148		181		34	13	15	7	35	15

Treatment	IV									
Met Primary	Yes				No					
Stopped	Yes				No					
Rescue	No				Yes		No			
Able IV	Yes		No		Yes	No	Yes	N	Yes	No
	197		85		37	20	28	14	35	29

Figure A1. Subject level time interval data presented as Kaplan-Meier curves  
(Blue=IM, Red=IV)

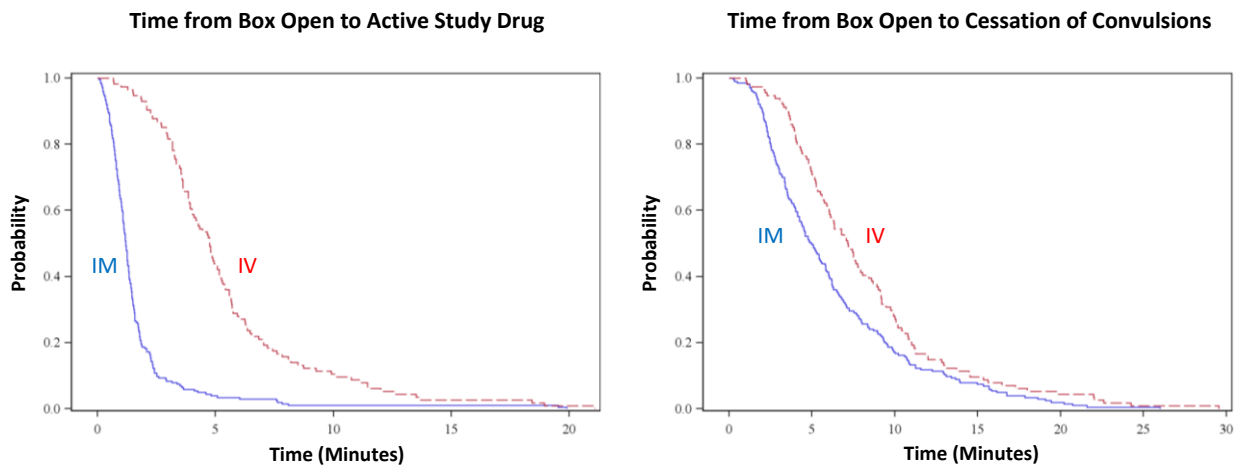


Table A2. Table of all serious adverse events

Serious Adverse Events	IM		IV		All Groups	
	N	%	N	%	N	%
Total Randomized Enrollments	514		509		1023	
Total Enrollments with an SAE	137	26.7%	156	30.6%	293	28.6%
Depressed level of consciousness	49	9.5%	45	8.8%	94	9.2%
Respiratory depression	33	6.4%	51	10.0%	84	8.2%
Convulsion	33	6.4%	39	7.7%	72	7.0%
Mental status changes	9	1.8%	10	2.0%	19	1.9%
Sepsis/SIRS/organ failure	8	1.6%	8	1.6%	16	1.6%
Pneumonia/ Aspiration pneumonia	2	0.4%	11	2.2%	13	1.3%
Myocardial infarction	5	1.0%	7	1.4%	12	1.2%
Hypotension	5	1.0%	7	1.4%	12	1.2%
Rhabdomyolysis	5	1.0%	5	1.0%	10	1.0%
Alcohol/Drug withdrawal syndrome	5	1.0%	5	1.0%	10	1.0%
Cerebral hemorrhage	4	0.8%	0	0.0%	4	0.4%
Renal failure acute	4	0.8%	0	0.0%	4	0.4%
Ischemic stroke	2	0.4%	2	0.4%	4	0.4%
Atrial fibrillation	0	0.0%	3	0.6%	3	0.3%
Hypoglycemia	2	0.4%	1	0.2%	3	0.3%
Anemia	1	0.2%	1	0.2%	2	0.2%
Bradycardia	2	0.4%	0	0.0%	2	0.2%
Cardiac arrest	2	0.4%	0	0.0%	2	0.2%
Deep vein thrombosis	2	0.4%	0	0.0%	2	0.2%
Hypothermia	0	0.0%	2	0.4%	2	0.2%
Pulmonary edema	0	0.0%	2	0.4%	2	0.2%
Pyrexia	0	0.0%	2	0.4%	2	0.2%
Apnea	1	0.2%	1	0.2%	2	0.2%
Brain masses	1	0.2%	1	0.2%	2	0.2%
Encephalopathy	1	0.2%	1	0.2%	2	0.2%
Pulmonary embolism	1	0.2%	1	0.2%	2	0.2%
Chest pain	1	0.2%	0	0.0%	1	0.1%
Delirium	1	0.2%	0	0.0%	1	0.1%
Hematoma	1	0.2%	0	0.0%	1	0.1%
Hematuria	1	0.2%	0	0.0%	1	0.1%
Hyperglycemic hyperosmolar nonketotic syn.	1	0.2%	0	0.0%	1	0.1%
Pancreatitis acute	1	0.2%	0	0.0%	1	0.1%
Pneumothorax	1	0.2%	0	0.0%	1	0.1%
Subarachnoid hemorrhage	1	0.2%	0	0.0%	1	0.1%
Suicidal ideation	1	0.2%	0	0.0%	1	0.1%
Transfusion reaction	1	0.2%	0	0.0%	1	0.1%
Ventricular tachycardia	1	0.2%	0	0.0%	1	0.1%
Pseudoseizures	1	0.2%	0	0.0%	1	0.1%
Cardiogenic shock	0	0.0%	1	0.2%	1	0.1%
Cellulitis	0	0.0%	1	0.2%	1	0.1%
Fracture	0	0.0%	1	0.2%	1	0.1%
Hypertension	0	0.0%	1	0.2%	1	0.1%
Hypoxia	0	0.0%	1	0.2%	1	0.1%
Post-extubation stridor/airway obstruction	0	0.0%	1	0.2%	1	0.1%
Psychosis	0	0.0%	1	0.2%	1	0.1%
Stridor	0	0.0%	1	0.2%	1	0.1%
Thrombocytopenia	0	0.0%	1	0.2%	1	0.1%
Toxic epidermal necrolysis	0	0.0%	1	0.2%	1	0.1%
Vomiting/Nausea	0	0.0%	1	0.2%	1	0.1%

Table A3. Detailed Race (supplement to Table 1).

Race – n(%)		
Black	229 (51)	224 (50)
White	165 (37)	183 (41)
American Indian	3 (0.67)	5 (1)
Asian	8 (2)	14 (3)
Native Hawaiian	2 (0.45)	1 (0.22)
>1 race	9 (2)	5(1)
Other	7 (1.56)	2 (0.45)
Unknown	25 (6)	11 (2.5)

## Part B. The Neurological Emergencies Treatment Trials investigators

The Neurological Emergencies Treatment Trials investigators that performed the RAMPART study are listed by center or hub. Hubs are ordered by the number of subjects enrolled. Participating EMS agencies are listed with each hub.

**The Neurological Emergencies Treatment Trials investigators are:**

**Clinical Coordinating Center**

Robert Silbergleit, MD, Daniel Lowenstein, MD, William Barsan, MD, Arthur Pancioli, MD, Valerie Stevenson, BAS, RRT, CCRP, Erin Zaleski, MA, Deneil Harney, MPH, MSW, Donna Harsh, MS, Joy Pinkerton, BSN, RN, MS, Allison Kade, BA, Nicholas Siewert, BA, Ashley Pinawin, BS, Catherin Ring, Phebe Brenne

**National EMS Coordinator**

Kay Vonderschmidt, MPA, MS-EM, NREMT-P

**Statistical Data Management Center**

Valerie Durkalski, PhD, Yuko Palesch, PhD, Catherine Dillon, Keith Pauls, Qi Wu, Wenle Zhao, PhD

**National Institutes of Health**

Robin Conwit, MD, Scott Janis, PhD, David Jett, PhD, Brandy Fureman, PhD

**Hubs (ordered by number of subjects enrolled)**

Wayne State University (178)

Hub Principal Investigator: Robert D. Welch, MD, MS

Primary Study Coordinators: Lynnmarie Mango, MPH, Valerie H. Mika, MS

EMS Director(s)/Coordinator: Jenny Atas, MD

Other Site Investigators: Robert Dunne, MD, Douglas Wheaton, MD, Phillip Levy, MD, MPH, Marc-Anthony Velilla, MD, Robert Sherwin, MD, Brian O'Neil, MD, Angela Groves, MD, Marc Rosenthal, DO, PhD

Participating EMS Service: Detroit EMS

University of Cincinnati (133)

Hub Principal Investigator: Arthur Pancioli, MD

Primary Study Coordinators: Irene Ewing, RN, BSN, Peggy Waymeyer, RN

EMS Director(s)/Coordinator: Jason McMullan, MD, M. Kay Vonderschmidt, MPA, MS-EM, NREMT-P

Other Site Investigators: Hamilton Schwartz, MD, Brian Stettler, MD, William Knight, MD, Opeolu Adeoye, MD, Rhonda Cadena, MD, Jordan Bonomo, MD, Erin Grise, MD, Laura Heitsch, MD, Nick Gagai, CCRP, Pamela Schmit, RN BSN, Sara Stark, MD, Traci Doellman, RN

Participating EMS Services: Cincinnati Fire Department, BlueAsh Fire Department, Forest Park Fire Department, Green Township Fire Department, Florence Fire Department, Independence Fire Department

University of California San Francisco (121)

Hub Principal Investigator: J. Claude Hemphill, III, MD, MAS

Primary Study Coordinators: Michele Meeker, RN, BSN, Kelley Rosborough, BA

EMS Director(s)/Coordinator: Jeany Duncan EMT-P

Other Site Investigators: Karl Sporer, MD, FACEP, FACP, Alan Gelb, MD; Wade Smith, MD, PhD, Prasanthi Ramanujam, MD, Kazuma Nakagawa, MD, Asma Moheet, MD, Hooman Kamel, MD, Bharath Naravetla,

MD, Mary Mercer, MD, Christine Wong, MD  
Participating EMS Services: San Francisco Fire Department, EMS Division

University of Texas -Houston (81)

Hub Principal Investigator: Elizabeth Jones, MD  
Trial Principal Investigator: Truman J. Milling, MD  
Primary Study Coordinators: Misty Ottman, RN, BSN, Ben King, Laura LaChance  
EMS Directors/Coordinators: Jeff Brockman, RN, Pete Didonato, EMT-P  
Other Site Investigator: Paul Hinchey, MD  
Participating EMS Service: Austin-Travis County EMS

Emory University (75)

Hub Principal Investigator: David W. Wright, MD  
Trial Principal Investigators: Matthew D. Bitner, MD, Gerald W. Beltran, DO  
Primary Study Coordinator: Harriet Howlett-Smith, RN, CCRC  
EMS Director/Coordinator: Andrea G. McDougal  
Other Site Investigators: Jeffrey F. Linzer Sr, MD, Lisa H. Merck, MD MPH, Tamara Espinoza, MD  
Participating EMS Service: Grady EMS

Henry Ford Health System (64)

Hub Principal Investigator: Christopher A. Lewandowski, MD  
Trial Principal Investigator: Taher T. Vohra, MD  
Primary Study Coordinators: Paula L. Crouse, RN, BSN., MA., Anna E. Baker, RN, BSN  
EMS Director/Coordinator: Dean R. Creech EMT-P, I/C  
Other Site Investigator: Andrew N. Russman, DO  
Participating EMS Services: Detroit EMS, West Bloomfield Fire and EMS Services

Stanford University (62)

Hub Principal Investigator: James V. Quinn, MD, MS  
Primary Study Coordinators: Stephanie Casal, RN, CNS, Anke Hebig, Mark Liao  
EMS Director/Coordinator: Peter D'Souza, MD  
Participating EMS Services: Palo Alto Fire Department, San Jose Fire Department, Redwood City Fire Department, San Mateo Fire Department

University of Arizona (58)

Hub Principal Investigator: Kurt R. Denninghoff, MD  
Trial Principal Investigator: Daniel W. Spaite, MD  
Primary Study Coordinator: Bruce Barnhart, RN, CEP  
EMS Director(s)/Coordinator: Willie Haro, CEP  
Other Site Investigator: Bentley J. Bobrow, MD  
Participating EMS Service: Glendale Fire Department

Virginia Commonwealth University (55)

Hub Principal Investigator: Joseph P. Ornato, MD



Primary Study Coordinator: Sallie L. Noe, RN  
EMS Director/Coordinator: Alan D. Payne, CCEMTP  
Other Site Investigators: Alan R. Towne, MD, Michael C. Kurz, MD, John T. Carmack, MD  
Participating EMS Service: Richmond Ambulance Authority

University of Minnesota (47)

Hub Principal Investigator: Michelle Biros, MD  
Trial Principal Investigator: Brian Mahoney, MD  
Primary Study Coordinator: Corey Sargent  
Other Site Investigators: David Hildebrandt, Chris Kummer, Doug Gesme  
Participating EMS Services: Hennepin County EMS

Medical College of Wisconsin (47)

Hub Principal Investigator: Tom P. Aufderheide, MD  
Primary Study Coordinator: Joseph T. Brandt Jr., BS, EMT-P  
EMS Director/Coordinator: M. Riccardo Colella, DO  
Other Site Investigators: Ron Pirrallo, MD, MHSA, Walter Bialkowski, MS, Benjamin Hermanson, BS, Christopher Sandoval, BS, EMT-P, Kevin Morrow, MFA, Kelly McCormick, BS, MBA, Katherine Burpee, BA, Geri Price, BS, Dawn Kawa, BA  
Participating EMS Services: Milwaukee County EMS, Milwaukee Fire Department, Franklin Fire Department, Greenfield Fire Department, North Shore Fire Department, Oak Creek Fire Department, South Milwaukee Fire Department, Wauwatosa Fire Department, West Allis Fire Department

University of Kentucky (31)

Hub Principal Investigator: Roger L. Humphries, MD  
Primary Study Coordinator: Linda Dechtenberg, RN, BSN, CCRC  
EMS Director/Coordinator: Christofer Sweat  
Other Site Investigator: L.Creed Pettigrew, MD, MPH  
Participating EMS Service: Lexington-Fayette Urban County Government Division of Fire & Emergency Services

University of Pennsylvania (26)

Hub Principal Investigator: Jill M. Baren, MD, MBE  
Trial Principal Investigator: R. Daniel Bledsoe, MD  
Primary Study Coordinator: Barbie Stahlman, MS, Katherine Lamond, BA, Pamela G. Nathanson, MBE  
Other Site Investigator: Scott E. Kasner, MD, MSCE, Peter D. Le Roux, MD  
Participating EMS Services: York Hospital Medic 97, White Rose Ambulance, Grantley Fire Company, Jacobus Lions Ambulance Club, West York Ambulance

Oregon Health & Science University (24)

Hub Principal Investigators: Craig R. Warden, MD, MPH, Robert A. Lowe, MD, MPH  
Primary Study Coordinator: Rachel N. Stone, CCRP  
Participating EMS Service: Clackamas Fire District #1

New York Presbyterian Hospital (10)

Hub Principal Investigator: Stephan Mayer, MD, FCCM

Trial Principal Investigator: Neal Flomenbaum, MD

Primary Study Coordinators: M. Cristina Falo, PhD, Lisa-Vanessa Magitbay, RN, Chirag Surti

EMS Directors/Coordinators: Heidi Cordi, MD, Daniel Ribaudó

Other Site Investigators: Axel Rosengart, MD, PhD, Matthew Vibbert, MD, Santiago Ortega-Gutierrez, MD, H. Alex Choi, MD, Emily Gilmore, MD, Rishi Malhotra, MD, Lawrence Berger

Participating EMS Services: New York Presbyterian

Temple University (8)

Hub Principal Investigator: Nina T. Gentile, MD

Trial Principal Investigators: Alvin Wang, DO, Christopher Vates, MD, Ben Usatch, MD

Primary Study Coordinators: Brent B. Freeman, Stacey L. Cleary

Participating EMS Services: Volunteer Medical Services Corps of Lower Merion and Narberth (Narberth Ambulance), Life Lion EMS

University of Maryland (3)

Hub Principal Investigator: Barney Stern, MD

Trial Principal Investigators: Tricia Ting, MD, Gregory Krauss, MD

Primary Study Coordinators: Virginia Ganley, RN, Susan Rice, RN, Jennifer Ronald

EMS Director/Coordinator: Michelle Stevens, RN

Other Site Investigators: Brian Browne, MD, Robert Rosenthal, MD, Peter Hill, MD

Participating EMS Services: Maryland Institute for Emergency Medical Services Systems (MIEMSS), Baltimore City EMS