


**South Carolina EMS  
Transport Study**

Experience of Creating an EMS and Hospital  
Linked Database

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Director of Chronic Disease Epidemiology & Evaluation



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**Conflict of Interest**

- Partial funding from Genentech



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### Team Composition

- Emergency Medicine Neurologist (MUSC)
- EMS director and data manager (DHEC)
- Epidemiologists (DHEC)
- Informatician (ORS)
- Neurologist (USC School of Medicine)
- Heart Disease and Stroke Program (DHEC)



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### Synopsis

- EMS use is a recommended strategy for improving evaluation and treatment for ischemic stroke
- Lack of systematic collection of EMS data and electronic linkage of these data to state-wide hospital data limit our ability to effectively study the impact of pre-hospital care on hospital outcomes
- SC EMS runs during 2010 linked to hospitalization using a deterministic linking procedure to evaluate the impact of pre-hospital care on stroke care and outcomes



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### EMS Linking Project Goals:

1. Evaluate EMS data quality and its potential use for surveillance & research
2. Enhance SC Stroke surveillance:
  - a) Pre-hospital length of time
  - b) Pattern of stroke transport routing
  - c) Stroke outcome among EMS & Non-EMS admissions
  - d) Use of IV-tPA
3. Develop policy and procedure to assist EMS staff with their responsibilities



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### Priority Questions

1. What are IV-tPA rates in regions with a JC certified PSC, non-PSCs, telestroke and GWTG hospitals?
2. Are there any delays in hospital arrival by EMS in the following areas: urban vs. rural, areas that have a JC certified stroke center vs. areas that do not, between different hospital types?
3. Is EMS use (vs. private vehicles) associated with improved care and outcomes ?
4. Is pre-hospital identification of stroke by EMS associated with improved care and outcomes?
  - Outcomes measures include transportation time, admission to PSCs, IV-tPA use, and discharge status




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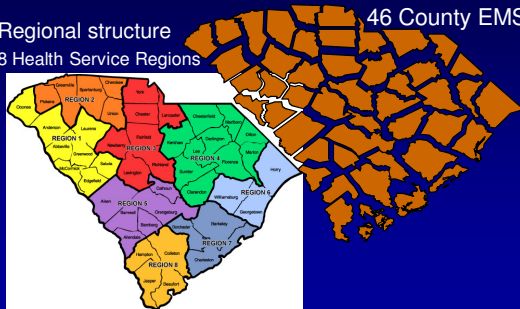
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### A State Divided...

Regional structure  
8 Health Service Regions  
46 County EMS



4 EMS Regional Councils




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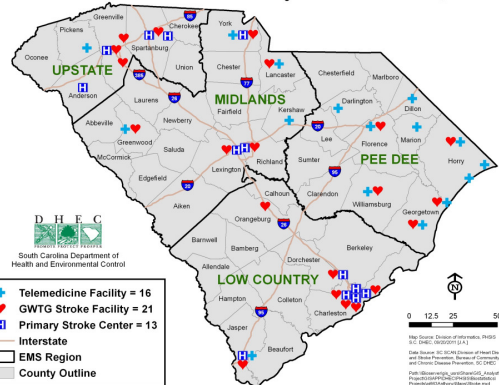
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### South Carolina Stroke System of Care, 2011




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### SC Primary Stroke Centers

2005	2008	2009	2010	2011
1. Spartanburg Regional (Spartanburg, SC)	2. AnMed Health Medical Center (Anderson, SC)	4. Greenville Memorial Medical Campus (Greenville, SC)	8. Bon Secours - St. Francis Hospital (Charleston, SC)	11. Mary Black Memorial Hospital (Spartanburg, SC)
	3. East Cooper Medical Center (Mount Pleasant, SC)	5. MUSC Medical Center - University Hospital (Charleston, SC)	9. Piedmont Medical Center (Rock Hill, SC)	12. Palmetto Health Richland (Columbia, SC)
		6. Roper Hospital (Charleston, SC)	10. Coastal Carolina Medical Center, Inc. (Hardeeville, SC)	13. Lexington Medical Center (Lexington, SC)
		7. Trident Medical Center LLC (Charleston, SC)		

\* as of September, 2011




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### Hospital Stroke Designation

PSC	TeleStroke	GWTG	#
Yes	Yes	Yes	2
Yes	Yes	No	1
Yes	No	Yes	6
Yes	No	No	1
No	Yes	Yes	7
No	Yes	No	5
No	No	Yes	10
No	No	No	74
Hospitals			104




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- ### Goal 1: Evaluate EMS data quality
- Use of stroke scale or the word "stroke" in the First Impression text field resulted in 29,563 cases
  - Cincinnati Stroke Scale or the LA Stroke Scale were among the pull down menu but not the Miami Emergency Neurologic Deficit (MEND). NEMSs Version 3.0 will include the MEND option
  - To confirm stroke diagnosis, we had to link EMS records to ED/IP records
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### Goal 2: Protocol for determining EMS-identification of stroke Stroke Scale vs. First Impression

Stroke Scale:	EMS Stroke First Impression:	Frequency	Percent
NA	1	19	0.55
1	1	609	17.78
1	2	170	4.96
1	3	155	4.53
2	1	363	10.6
2	2	229	6.69
2	3	455	13.28
3	1	1,425	41.61
<b>Total</b>		<b>3,425</b>	<b>100%</b>

Stroke Scale 1 - Positive Stroke Scale  
Stroke Scale 2 - Done but not Positive  
Stroke Scale 3 - Not Done

EMS Stroke 1 - Stroke in Complaint/ First Impression  
EMS Stroke 2 - Other Stroke Symptoms in Complaint  
EMS Stroke 3 - Other Complaint

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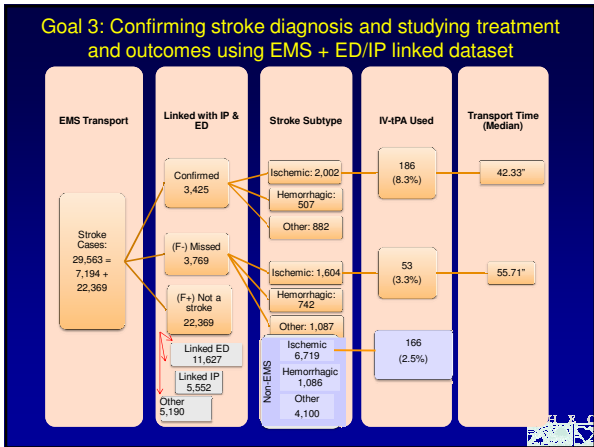
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- ## Next Steps
- ISC presentation of the current study results Feb 2013
  - Future activities will focus on more recent (completed) data linkages between EMS runs, ED, Hospitalization and Rehab to paint a holistic picture of Stroke in SC

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