

Stroke Severity and Routing

“Does anyone
know where
we’re going?”



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Wichita/Sedgwick County Kansas

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- Conflicts:
 - None but looking





Perspective...









Objective

- Discuss routing of EMS stroke patient and the relationship with symptom severity
- Review EMS system design components needed for systems based care



My **REAL** Objective

- Lets talk logistics...and from the patient's perspective.



Amateurs talk strategy.
Professionals talk logistics.

— Omar N. Bradley —

AZ QUOTES



The Issues

- What's this story about? Has it got any sports in it?
 - Are you kidding? *Fencing, fighting, torture, revenge, giants, monsters, chases, escapes, true love, miracles.*
- Doesn't sound too bad. I'll try to stay awake.

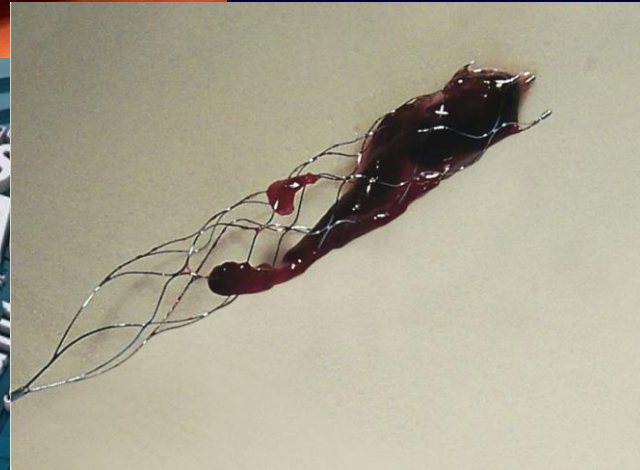




E
N
STP
SC



Fencing, fighting, torture, revenge, giants, monsters, chases, escapes, true love, miracles





Who's Hungry?

Frank and Ernest



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www.frankandernest.com



A “System of Care” approach

- Base of
- of
- do



none
e job

...and we need to work together.



A “System of Care” approach

- It’s the whole collection of what our programs do to meet the patient’s needs

the patient’s needs



So, as it pertains to stroke...



what is the role of EMS in meeting the patient's needs?



Right Patient

Right Hospital

Right Treatment



Right Patient

Sort patients correctly

Right Hospital

Get patients to facilities that can provide the care that they need

Right Treatment

Deliver treatments that create better outcomes



The Game Changer

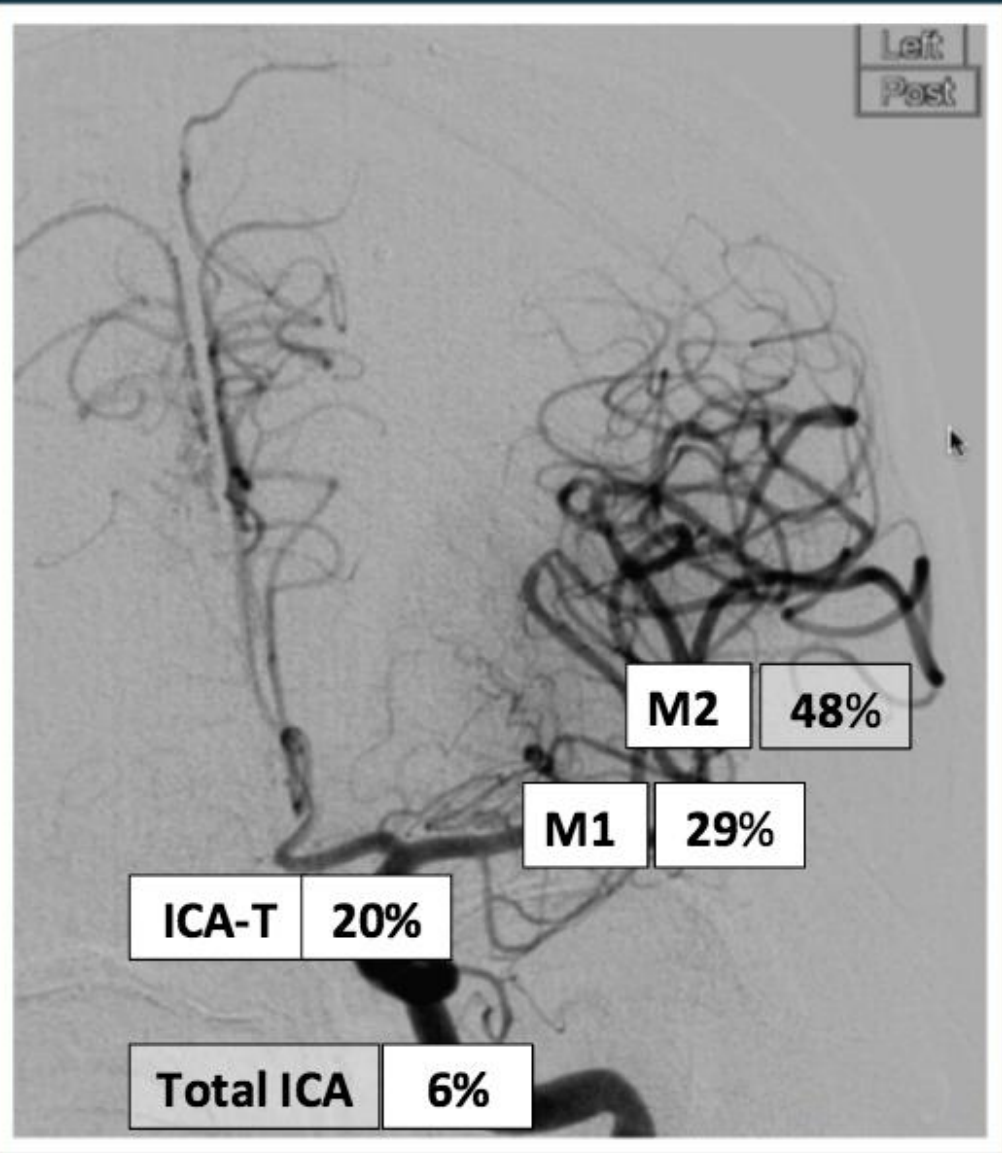
- TPA vs Retrievers



VERSUS



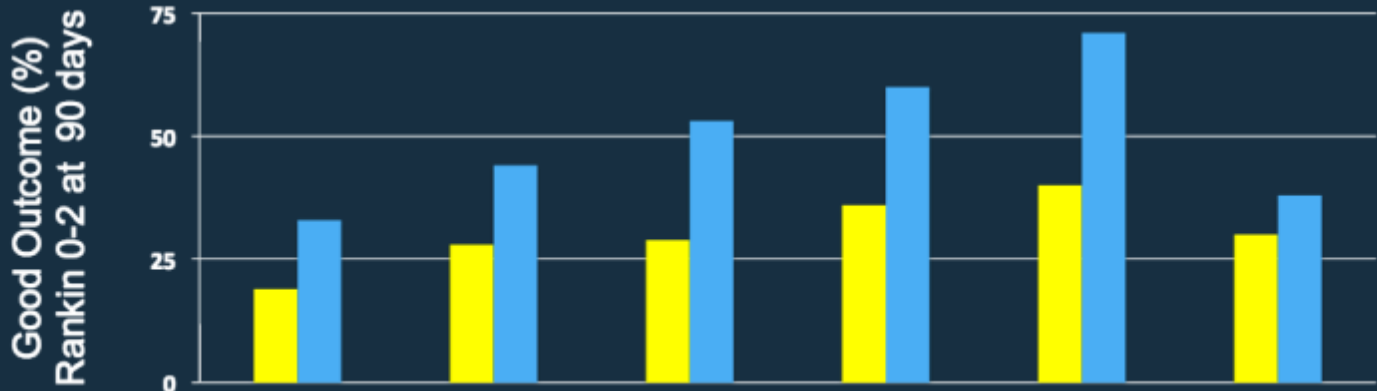
tPA success rates by location



Saqqur et al, Neurology 2008



Positive Endovascular Stroke Trials 2015



MR CLEAN P<0.05 REVASCAT P<0.05 ESCAPE P<0.001 SWIFT PRIME P<0.001 EXTEND-IA P<0.01 THERAPY NS

Endo-vascular

33% 44% 53% 60% 71% 38%

Control

19% 28% 29% 36% 40% 30%



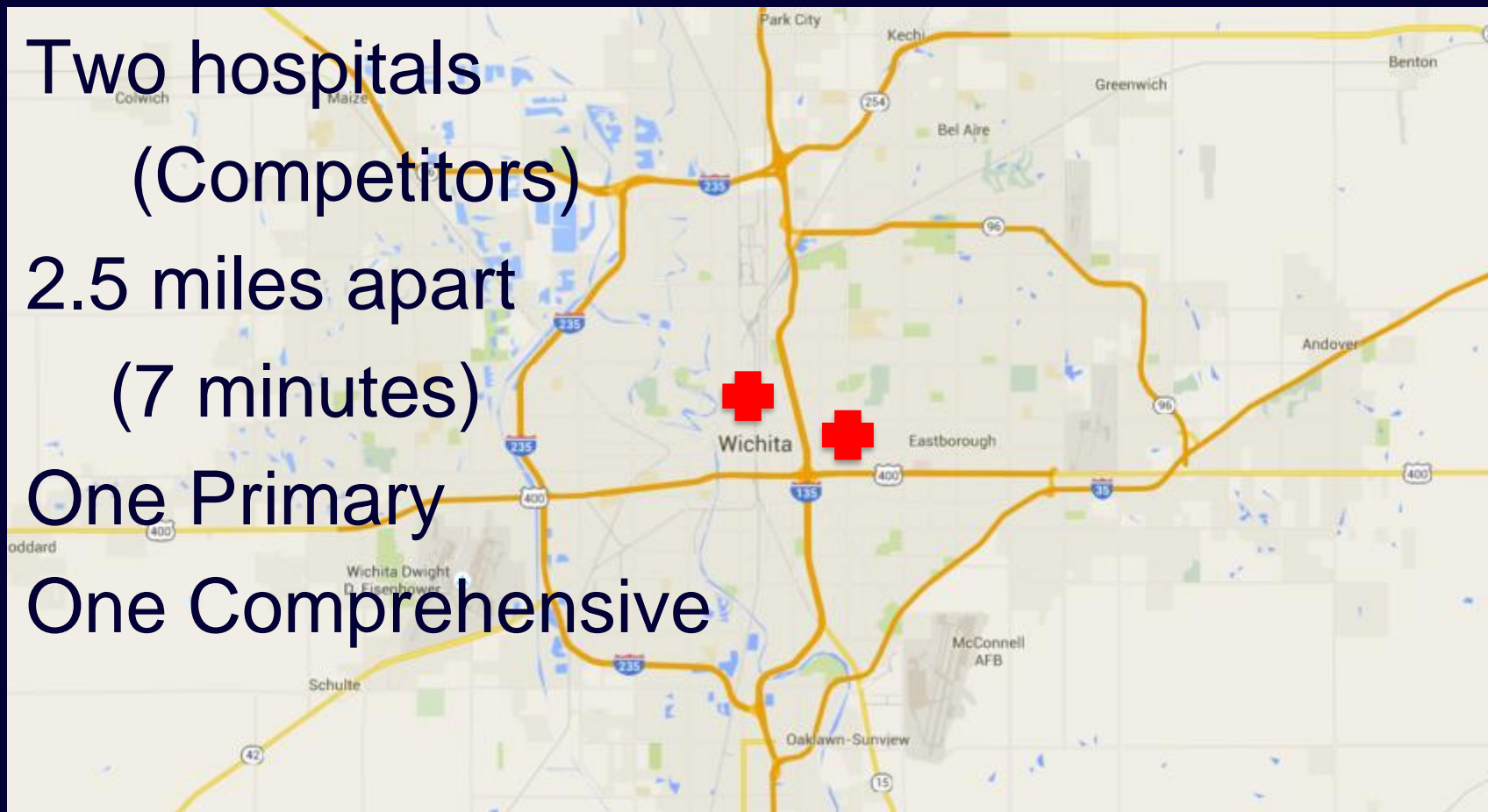
Two hospitals
(Competitors)

2.5 miles apart

(7 minutes)

One Primary

One Comprehensive





The theory...

- Patients with a large vessel occlusion that are identified in the field can be preferentially routed to a center capable of performing endovascular therapy and will result in better outcomes.

...well, I'm gonna need some things.

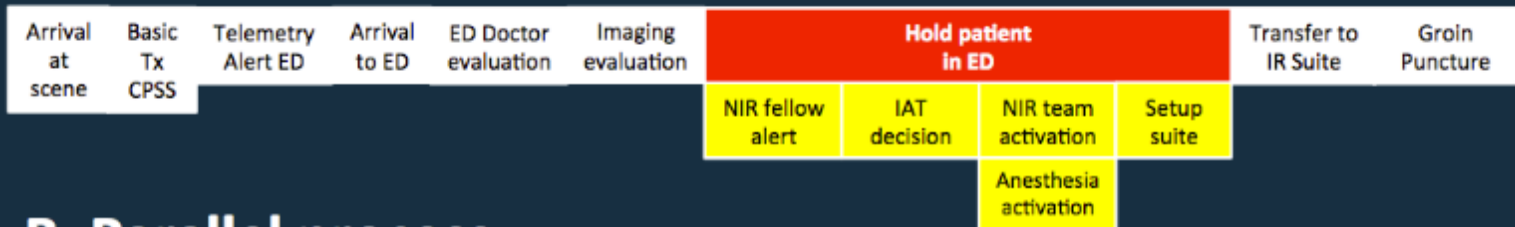


	LAMS	3ISS	RACE	C-STAT
Publication Year	2001	2005	2014	2015
Derivation n	119	171 Prospective	654	624
Goal of scale	LVO	LVO Severe Stroke	LVO	Severe Stoke LVO
Independently Validated	Yes (Abstract)	No	Yes	Yes
Validation n			357	650
# of items scored	3	3	5-6	4
Time to complete	20-30 second	20-30 second	Variable	< 60 seconds
Sensitivity/specificity severe stroke		NIHSS 14 86%/95%	N/A	NIHSS 15 89%/72% NIHSS 10 79%/89%
Sensitivity/specificity LVO	81%/89%	67%/92%	85%/65%	83%/40%
Evaluated -- prehospital setting	Yes (FAST-MAG)	No	Yes	Yes

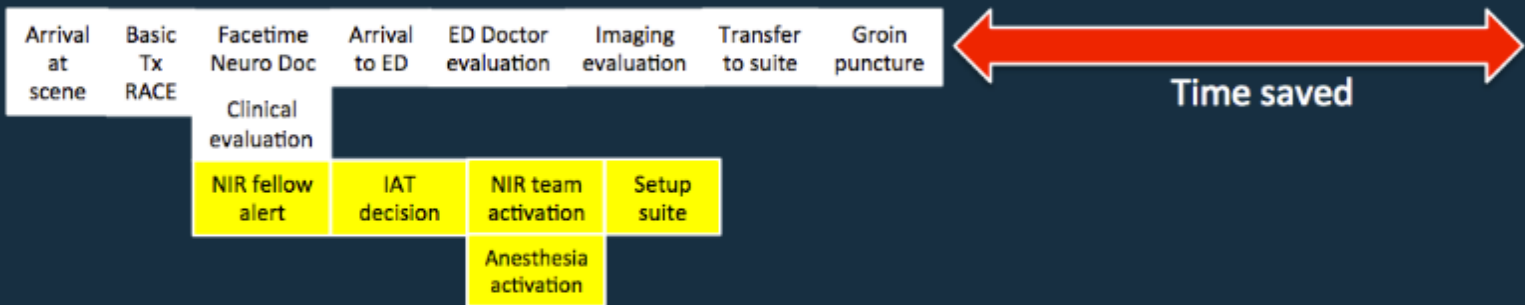


Parallel Workflow

A. Linear process



B. Parallel process





Stroke Alert

Date: 2/19/2016

Gender: M **Age:** 66

Chief Complaint:
Difficulty speaking, R
weakness

LKW time: 1845

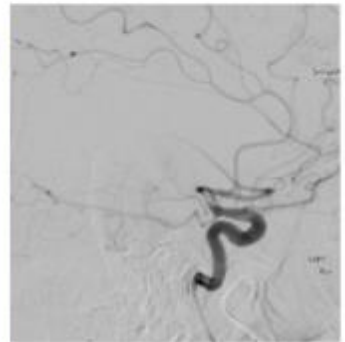
EMS:SCEMS M39
R.A.C.E.: 7

Sudden onset at home difficulty speaking and R weakness. Hx a fib, AVR and back surgery 2 day prior. NIHSS 15 (aphasia R side flaccid) CTA showed complete occlusion L M1 MCA. Successful intervention with retrieval of the fibrin plug extending from the L carotid T into L MCA M1 segment using both suction and stent retriever procedure.

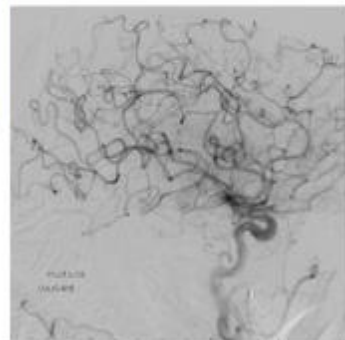
Day 3 NIHSS 3 for mild aphasia and mild R arm weakness. DC Dispo Home.

Door to Puncture time exceptional at 66 min. Excellent teamwork and recognition of LVO by EMS.

Pre



Post







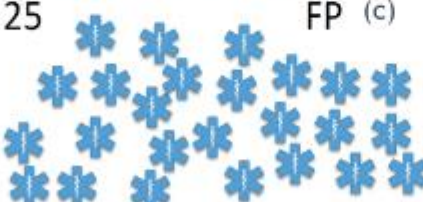

The theory...

- Patients with a large vessel occlusion that are identified in the field can be preferentially routed to a center capable of performing endovascular therapy and will result in better outcomes.

...this all sounds good, but how does it work in the real world?



Wichita/Sedgwick County EMS System Office of the Medical Director

	RACE Score 5+	RACE Score 0-4	
LVO positive	27 TP (a) 	7 FN (b) 	34
LVO negative	25 FP (c) 	8 TN (d) 	33
	52	15	



Results

Statistic	Formula	Value	95% CI	Validation
Sensitivity	$\frac{a}{a + b}$	79.41%	62.10% to 91.30%	85
Specificity	$\frac{d}{c + d}$	24.24 %	11.09% to 42.26%	68
Positive Likelihood Ratio	$\frac{\textit{Sensitivity}}{1 - \textit{Specificity}}$	1.05	0.81 to 1.36	
Negative Likelihood Ratio	$\frac{1 - \textit{Sensitivity}}{\textit{Specificity}}$	0.85	0.35 to 2.08	
Disease prevalence	$\frac{a + b}{a + b + c + d}$	50.75% (*)	38.24% to 63.18%	
Positive Predictive Value	$\frac{a}{a + c}$	51.92% (*)	45.49% to 58.30%	42
Negative Predictive Value	$\frac{d}{b + d}$	53.33 % (*)	31.85% to 73.65%	94

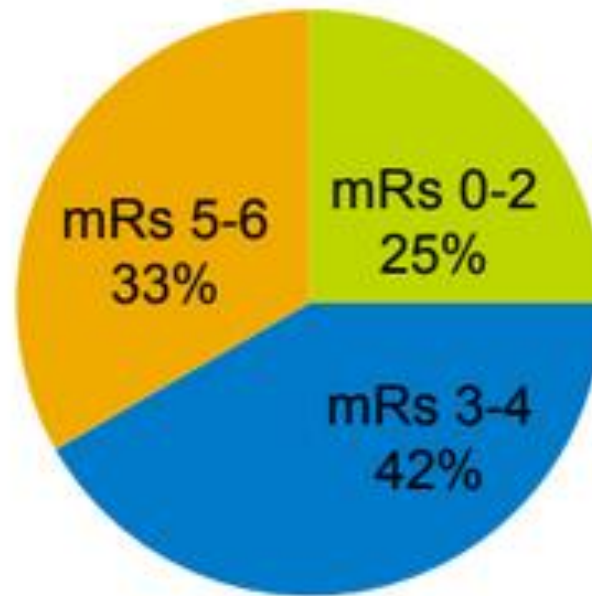


How about on the hospital side...



Via Christi 2017 (Q1-2) SCEMS LVO Alert Endovascular Treatment

90 day outcome
n=13





In order to move forward...

- Can we accurately sort patients in the field?
 - So far in my system...no.
- Are we measuring outcomes instead of just times?
 - Kinda...but with lots of misleading data points



We need a plan.

- “To succeed in America, you need three things: A smile, a gun, and a plan. If you have to give up one, give up the smile. If you have to give up two, give up the gun – whatever you do, don’t give up your plan.”



- Al Capone



The Plan and the Trap 1/5

Plan

Systems of Care focused on the patient



Trap

Pursuing outcomes or metrics that are directed at profits, recognition, market share, or personal advancement



The Plan and the Trap 2/5

Plan

Measuring high-quality metrics



Trap

Selecting easy to measure metrics that are poorly tied to patient outcomes



The Plan and the Trap 3/5

Plan

Eliminate waste, implement quality



Trap

“The way we’ve always done it.”



The Plan and the Trap 4/5

Plan

Right care for the right situation



Trap

**Not being honest with ourselves about
the quality and accuracy of our
performance**



...and last but not least...



The Plan and the Trap 5/5

Plan

To take simply the best care of our families, friends, neighbors, and loved ones



Trap

Forgetting why we got into this game in the first place

Questions?

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