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Best Practices in Stroke Quality Improvement

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Best Practices in Stroke Quality Improvement
Angelos Katramados MD
3rd Annual Detroit Stroke Conference
11/01/2019

(NO DISCLOSURES)

2019 GET WITH THE GUIDELINES STROKE
TARGET: STROKE HONOR ROLL ELITE PLUS
GOLD PLUS
American Heart Association.

Henry Ford MEDICAL GROUP
INVENIO COMMITTO
1915

The Joint Commission
American Heart Association
American Stroke Association
CERTIFICATION
Meets standards for
Comprehensive Stroke Center

1

Pre-quality era

July 21, 1888.] THE BRITISH MI

REMARKS
ON
THE DIAGNOSIS AND TREATMENT
OF DISEASES OF THE BRAIN.

Delivered at a Meeting of the Worcestershire and Herefordshire, Bath and Bristol, and Gloucestershire Branches.

By J. HUGHLINGS JACKSON, M.D., F.R.C.P., LL.D., F.R.S.,
Physician to the Hospital for Epilepsy and Paralysis; and Physician to the London Hospital.

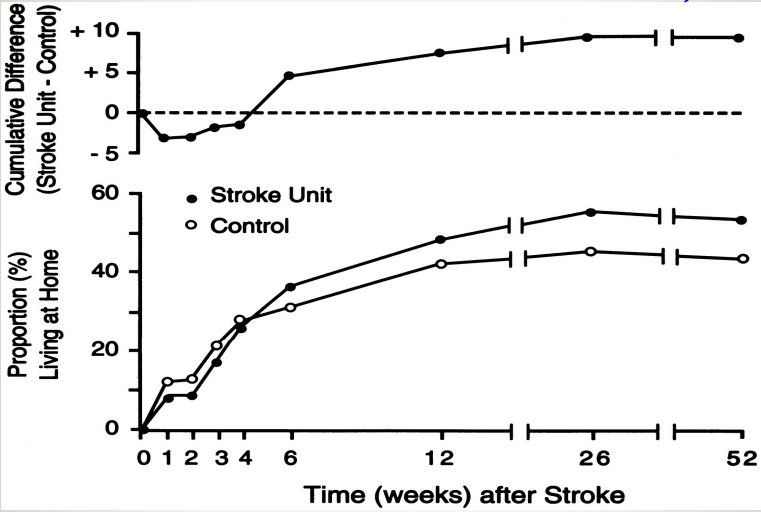
More generally, he who is treating by drugs hemiplegia owing to softening, however produced, or to clot, is treating a hole in the brain.

And if we had drugs which could dissipate the plug in the vessel (I know of none), they would have to do it with marvellous quickness, or the nerve tissue would be dead by starvation before circulation was re-established.

Henry Ford HEALTH SYSTEM

2

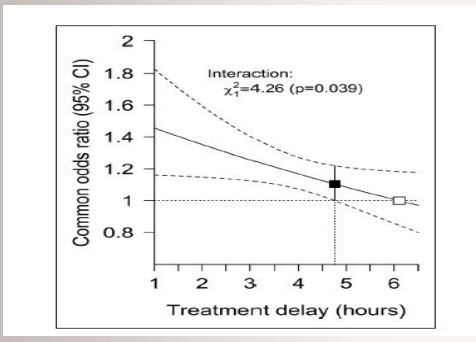
Proportion of patients living at home after the index stroke and cumulative difference between stroke unit and control subjects



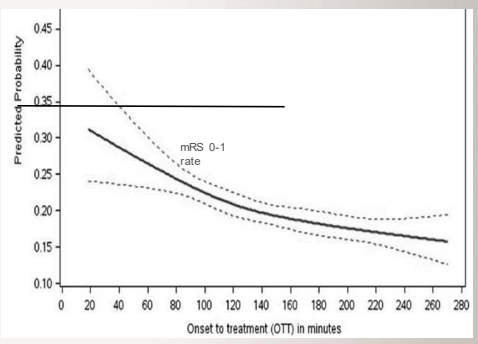
Unit Trialists' Collaboration. Stroke 1997

3

Effect of Intravenous Alteplase is Time Dependent



Trials – Pooled RCTs



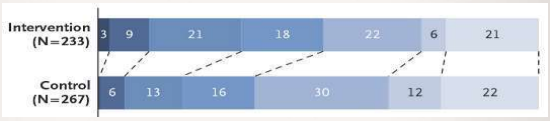
Practice – National GWTG-Stroke

Stroke 2016;47:2373-2379
Circulation 2017;135:128–139

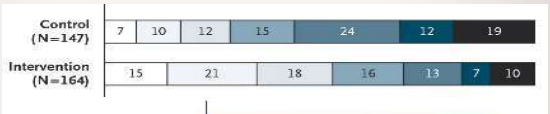
4

2015- Highly Effective Reperfusion (ET)

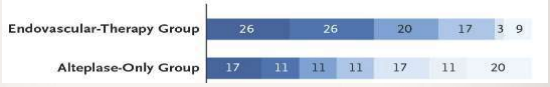
MR CLEAN
A Multicenter Randomized CLinical trial of Endovascular treatment for Acute ischemic stroke in the Netherlands



ESCAPE

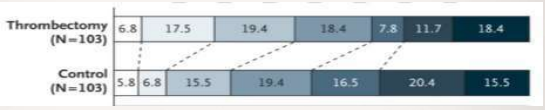


EXTEND-IA



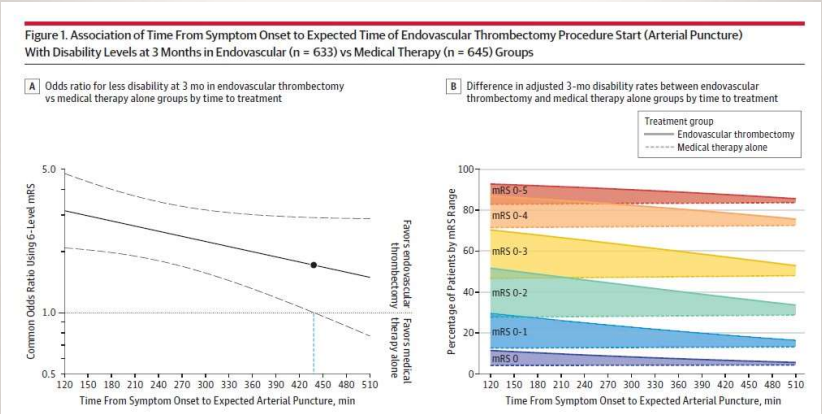
[SWIFT PRIME]

REVASCAT



5

Association Of Time From Symptom Onset To Start Of Endovascular Thrombectomy(Arterial Puncture) With Disability Levels At 3 Months In Endovascular (N = 633) Vs Medical Therapy (N = 645) Groups



Saveret al. JAMA. 2016 Sep 27;316(12):1279-88.

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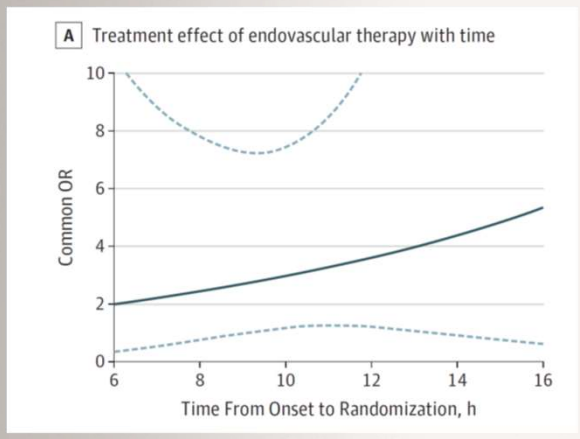

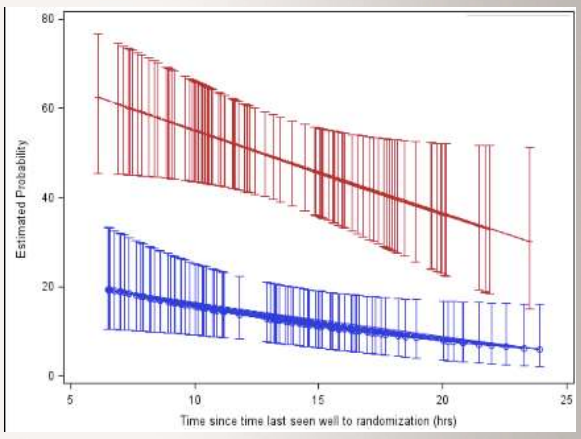

DEFUSE3 DAWN

JAMA Neurol. 2019;76(4):447-453.
N Engl J Med 2018; 378:11-21

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Table **Effect of treatments on stroke population**

	Proportion of patients with ischemic stroke applicable	Outcome	No. needed to treat to benefit	Estimated no. of patients with improved outcomes per 1,000 patients with ischemic stroke if intervention was given to all applicable patients
Stroke unit care	90%–100%	Death or long-term dependency	19	50
Thrombolysis	Up to 20%	Death or dependency	25	8
Thrombectomy	Uncertain, probably up to 10%	Dependency	3	33

Rudd, A., & Bray, B. (2017). Striving to improve the quality of stroke care in the USA.

8

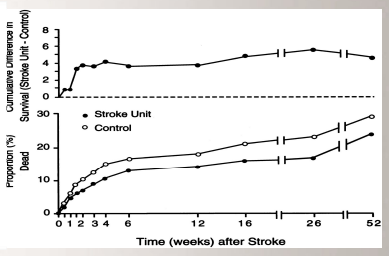
Birth of Stroke Quality

- Richard Stuart Stevens (1912-1998) Stroke Unit Care
- First well-designed RCT
- First well-designed stroke registry

A RANDOMIZED CONTROLLED TRIAL OF A STROKE REHABILITATION WARD

R. S. STEVENS, N. R. AMBLER, M. D. WARREN

Age and Ageing, Volume 13, Issue 2, 1 March 1984, Pages 65–75,
https://doi.org/10.1093/ageing/13.2.65
Published: 01 March 1984



Stroke Unit Trialists' Collaboration. Stroke 1997

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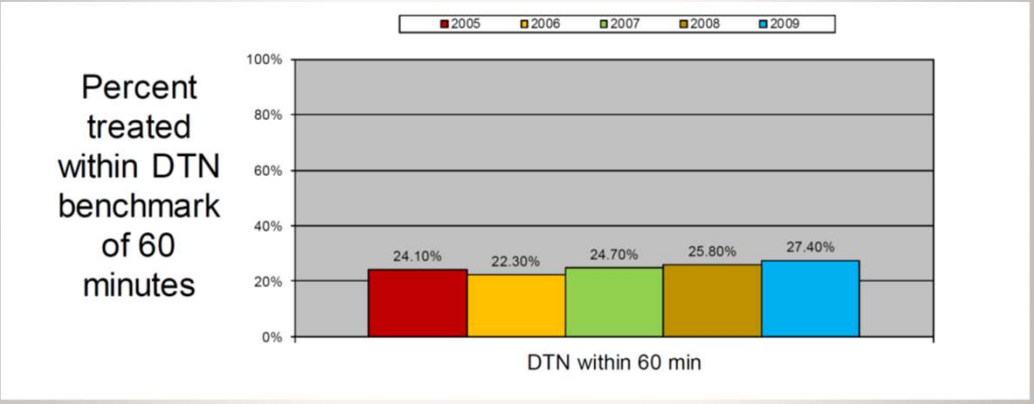
State of Stroke Care in 2000

Program or Service	Facilities		Proportion of Population, %
	No.	%	
Diagnostic tests			
Brain CT scan	109	88	94
Carotid ultrasonography	102	82	93
Brain MRI scan	97	78	92
Transthoracic echocardiography	77	62	82
MR angiography	71	57	80
Transesophageal echocardiography	56	45	74
Cerebral angiography	48	38	70
CT angiography	44	35	55
Transcranial Doppler ultrasonography	34	27	55
Diffusion-weighted MRI	25	20	44
Services			
Emergency department	110	88	96
Neurologist on staff	69	55	81
tPA protocol	54	43	74
Carotid endarterectomy	54	43	72
Interventional radiology	29	23	51
Programs' organizational features			
Stroke-care map	42	34	58
Community awareness program	34	27	57
Inpatient rehabilitation	31	25	47
Stroke acute care unit or equivalent	23	18	45
Organized stroke team	23	18	42
Rapid patient identification program	22	18	38
Anticoagulation clinic	8	6	23

Goldstein, Larry B., Lloyd A. Hey, and Ronnie Laney. "North Carolina stroke prevention and treatment facilities survey." Stroke 31.1 (2000): 66-70.

10

Substantial Opportunity to Improve Timeliness of IV alteplase in Ischemic Stroke



Fonarow GC, Smith EE, Saver JL, Reeves MJ, Bhatt DL, Grau-Sepulveda MV, Olson DM, Hernandez AF, Peterson ED, Schwamm LH. Timeliness of tissue-type plasminogen activator therapy in acute ischemic stroke: patient characteristics, hospital factors, and outcomes associated with door-to-needle times within 60 minutes. Circulation. 2011;123(7):750-758.

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History of Stroke Centers

- 2000 -The Brain Attack Coalition (BAC) published:
  - "Recommendations for the Establishment of Primary Stroke Centers" (JAMA, June 21, 2000)
- Identified:
  - 66% of hospitals did not have stroke protocols
  - 82% did not have rapid identification for patients experiencing acute stroke
- Recommended the development of primary stroke centers (PSC) and defined the elements of a PSC

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History of Stroke Centers

- 2003 - PSC certification program launched by the Joint Commission (TJC)
- 2005 - BAC published recommendations for Comprehensive Stroke Centers (CSC)
- 2012 - CSC certification launched by TJC
- 2013 - Acute Stroke-Ready Hospital (ASRH) recommendations were published
- 2015 - ASRH certification launched by TJC
- 2018 - TSC certification launched by TJC

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TARGET: STROKE PHASE I

- Target: Stroke was initiated by the AHA/ASA as a national collaborative comprising a broad alliance of hospitals and clinicians.
- The goal of Target: Stroke was for GWTG participating hospitals to treat at least **50% of alteplase treated acute ischemic stroke patients within 60 minutes of hospital arrival.**
- An expert working group performed a literature review to identify 10 key evidence-based strategies associated with timely alteplase administration that could be most rapidly and feasibly adopted by hospitals.

Fonarow GC et al. JAMA. 2014;311(16):1632-1640.

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TARGET: STROKE
10 KEY BEST PRACTICE STRATEGIES

1. Hospital pre-notification by Emergency Medical Services
2. Rapid triage protocol and stroke team notification
3. Single call/paging activation system for entire stroke team
4. Use of a stroke toolkit containing clinical decision support, stroke-specific order sets, guidelines, hospital-specific algorithms, critical pathways, NIH Stroke Scale and other stroke tools
5. Rapid acquisition and interpretation of brain imaging
6. Rapid Laboratory Testing (including point-of-care testing) ifindicated
7. Pre-mixing alteplase medication ahead of time for high likelihood candidates
8. Rapid access to intravenous alteplase in the ED/brain imaging area
9. Team-based approach
10. Rapid data feedback to stroke team on each patient's DTN time and other performance data

Fonarow GC et al Stroke. 2011;42:2983-2989.

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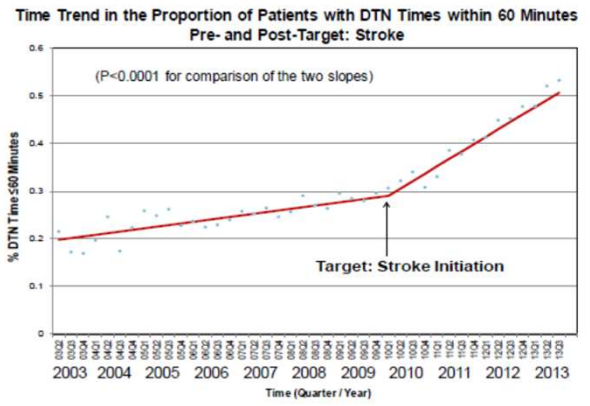

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TARGET: STROKE PHASE II

NATIONAL GOAL:

- Achieve DTN times within 60 minutes for 75% of eligible patients
- Achieve DTN times within 45 minutes for 50% of eligible patients

ADDITIONAL HOSPITAL RECOGNITION

- Target: Stroke Honor Roll: existing criteria
- Target: Stroke Honor Roll Elite: DTN ≤ 60 minutes in 75% of eligible patients
- Target: Stroke Honor Roll Elite-Plus: DTN ≤ 60 minutes in 75% of eligible patients and DTN ≤ 45 minutes in 50% of patients

ADDITIONAL TARGET: STROKE RESOURCES

- Updated time tracker and new tools
- Additional strategies (transfer patient directly to CT, timer or clock at bedside) and evidence
- New educational resources

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TARGET: STROKE PHASE II 12 KEY BEST PRACTICE STRATEGIES

1. Hospital pre-notification by Emergency Medical Services
2. Rapid triage protocol and stroke team notification
3. Single call/paging activation system for entire stroke team
4. Use of a stroke toolkit containing clinical decision support, stroke-specific order sets, guidelines, hospital-specific algorithms, critical pathways, NIH Stroke Scale and other stroke tools
5. Timer or clock attached to chart, clipboard, or bed
6. Transfer directly to CT/MRI scanner
7. Rapid acquisition and interpretation of brain imaging
8. Rapid Laboratory Testing (including point-of-care testing) if indicated
9. Pre-mixing alteplase medication ahead of time for high likelihood candidates
10. Rapid access to intravenous alteplase in the ED/brain imaging area
11. Team-based approach
12. Rapid data feedback to stroke team on each patient's DTN time and other performance data

Updated from Fonarow GC et al Stroke. 2011;42:2983-2989.

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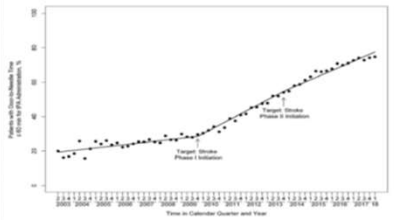
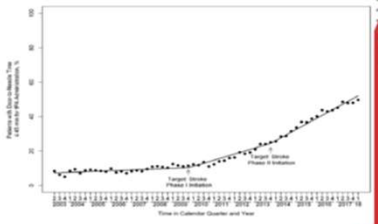
Time Trend in DTN Times within 60 and 45 Minutes Pre-Target: Stroke, Target: Stroke Phase I, and Target: Stroke Phase II

DTN ≤ 60 Minutes



DTN ≤ 45 Minutes



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TARGET: STROKE PHASE III NATIONAL GOALS

PRIMARY GOALS:

- Achieve door-to-needle times within 60 minutes in 85% or more of acute ischemic stroke patients treated with IV thrombolytics
- Achieve **door-to-device** times (arrival to first pass of **thrombectomy** device) in 50% or more of eligible acute ischemic stroke patients within 90 minutes (for direct arriving patients) and within 60 minutes (for transfer patients) treated with endovascular therapy (EVT)

SECONDARY GOALS:

- Achieve door-to-needle times within 45 minutes in 75% or more of acute ischemic stroke patients treated with IV thrombolytics
- Achieve door-to-needle times within 30 minutes in 50% or more of acute ischemic stroke patients treated with IV thrombolytics

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Target: Stroke Phase III Door-to-Device Time Key Best Practice Strategies

1. Rapid Administration of Alteplase
2. Rapid Acquisition and Interpretation of CT/MR Angiography
3. Rapid Acquisition and Interpretation of Additional Imaging
4. Pre-Notification and Rapid Activation of the Neurointerventional Team
5. Rapid Availability of the Neurointerventional Team
6. Timer or Clock Attached to Chart, Clip Board, or Bed
7. Transfer Directly to Neuroangiography Suite
8. Transfer Directly from Brain Imaging Suite to Neuroangiography Suite
9. Endovascular Therapy Ready Neuroangiography Suite
10. Team Based Approach
11. Anesthesia Access and Protocols
12. Prompt Data Feedback

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Current JC Stroke Centers

Stroke Centers	2018	2019
Acute Stroke-ready Centers	80	101
Primary Stroke Centers	1185	1149
Advanced Comprehensive Stroke Centers	179	190
Thrombectomy-capable Stroke Centers	14	45

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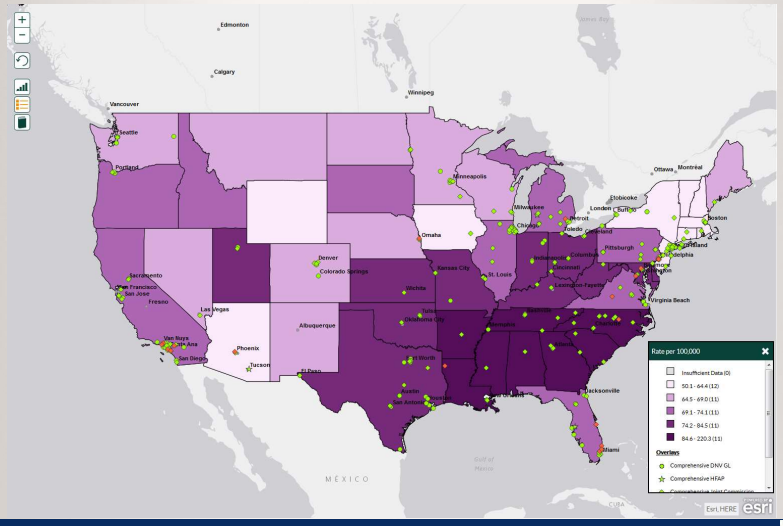
TSC/CSCs and stroke mortality



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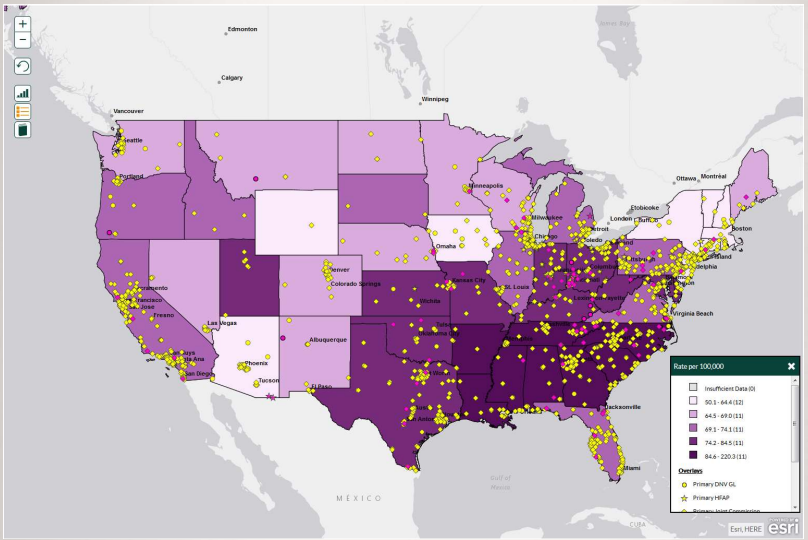
ASRH/PSCs and stroke mortality



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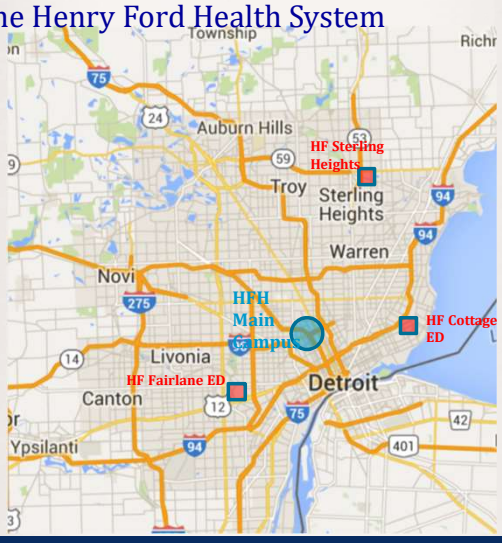
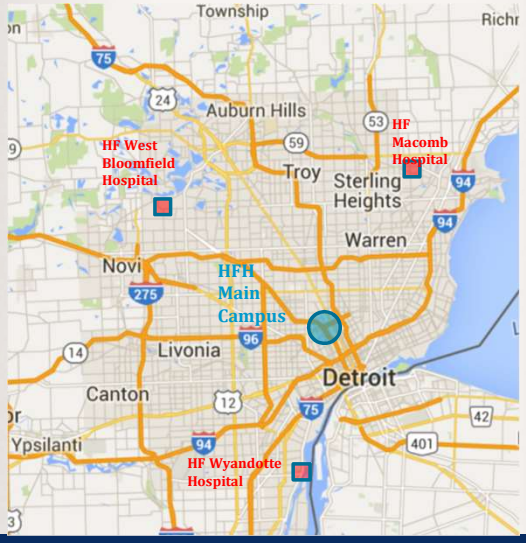
Free Standing Emergency Departments (Equivalent to Acute Stroke Ready Hospitals) within the Henry Ford Health System



25

Comprehensive Stroke Center and Primary Stroke Centers within the Henry Ford Health System in Metro Detroit



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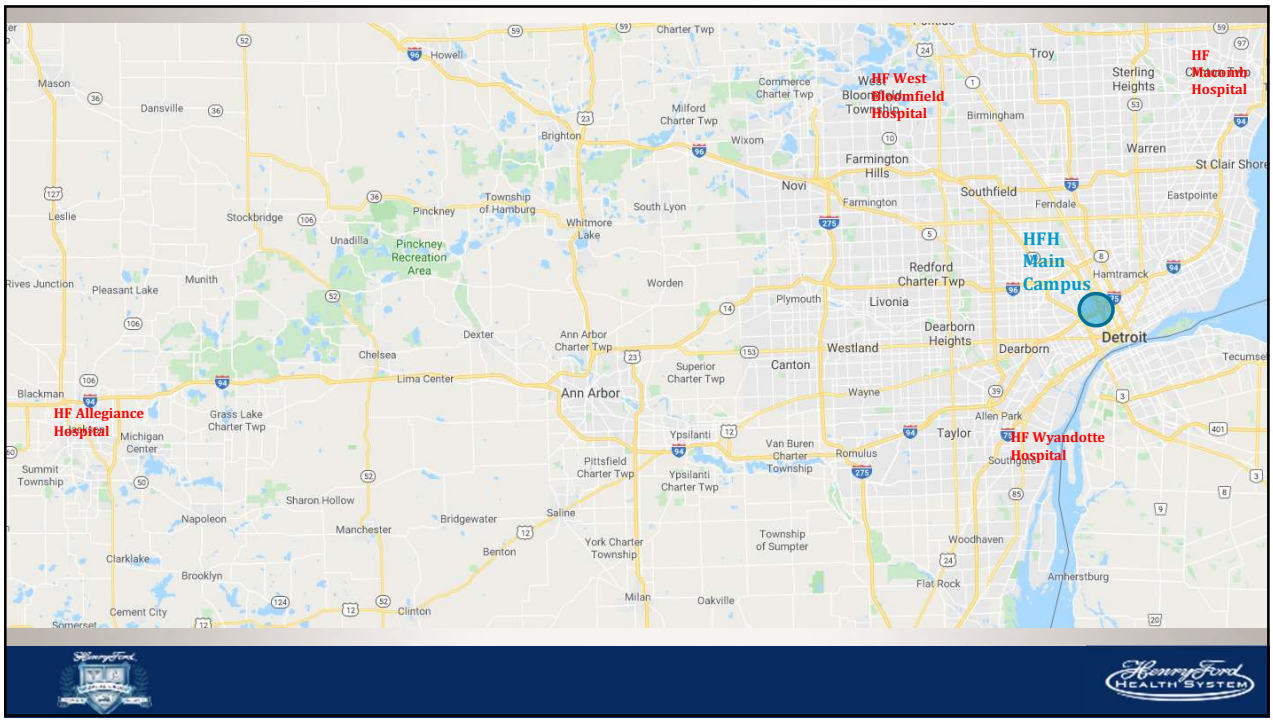

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RECOGNITION CRITERIA

	TARGET: STROKE PHASE II	TARGET: STROKE PHASE III
HONOR ROLL	Time to thrombolytic therapy within 60 minutes in 50% or more of acute ischemic stroke patients treated with IV tPA	DTN times within 60 minutes for at least **75%** of applicable patients are required.
HONOR ROLL ELITE	Time to thrombolytic therapy within 60 minutes in 75% or more of acute ischemic stroke patients treated with IV tPA	DTN times within 60 minutes for at least **85%** of applicable patients are required.
HONOR ROLL ELITE PLUS	Time to thrombolytic therapy within 60 minutes in 75% or more of acute ischemic stroke patients treated with IV tPA AND time to thrombolytic therapy within 45 minutes in 50% of acute ischemic stroke patients treated with IV tPA	DTN times within **45 minutes** for at least 75% of applicable patients and DTN times within **30 minutes** for at least 50% of applicable patients.
HONOR ROLL ADVANCED THERAPY	-	DTD times in at least 50% of applicable patients within 90 minutes for direct arriving and within 60 minutes for transfers

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American Heart Association.
Target: Stroke™
American Heart Association.
Get With The Guidelines.
Stroke
The American Heart Association and
American Stroke Association proudly recognize
Henry Ford Hospital and
Health Network
Detroit, MI
Get With The Guidelines®-Stroke GOLD PLUS with Honor Roll Elite Plus
Achievement Award Hospital
The American Heart Association and American Stroke Association recognize this hospital for its continued success in using the Get With The Guidelines®-Stroke and Target: Stroke℠ programs. Thank you for applying the most up-to-date evidence-based treatment guidelines to improve patient care and outcomes in the community you serve.*
Nancy Brown
Chief Executive Officer
American Heart Association
Lee Schwamm, MD, FAHA
Chairperson, Quality Oversight Committee
Ivor Benjamin, MD
President American Heart Association
*For more information, please visit Heart.org/GWTGQualityAwards.
2019
GET WITH THE GUIDELINES
STROKE
TARGET: STROKE HONOR ROLL ELITE PLUS
GOLD PLUS
American Heart Association.

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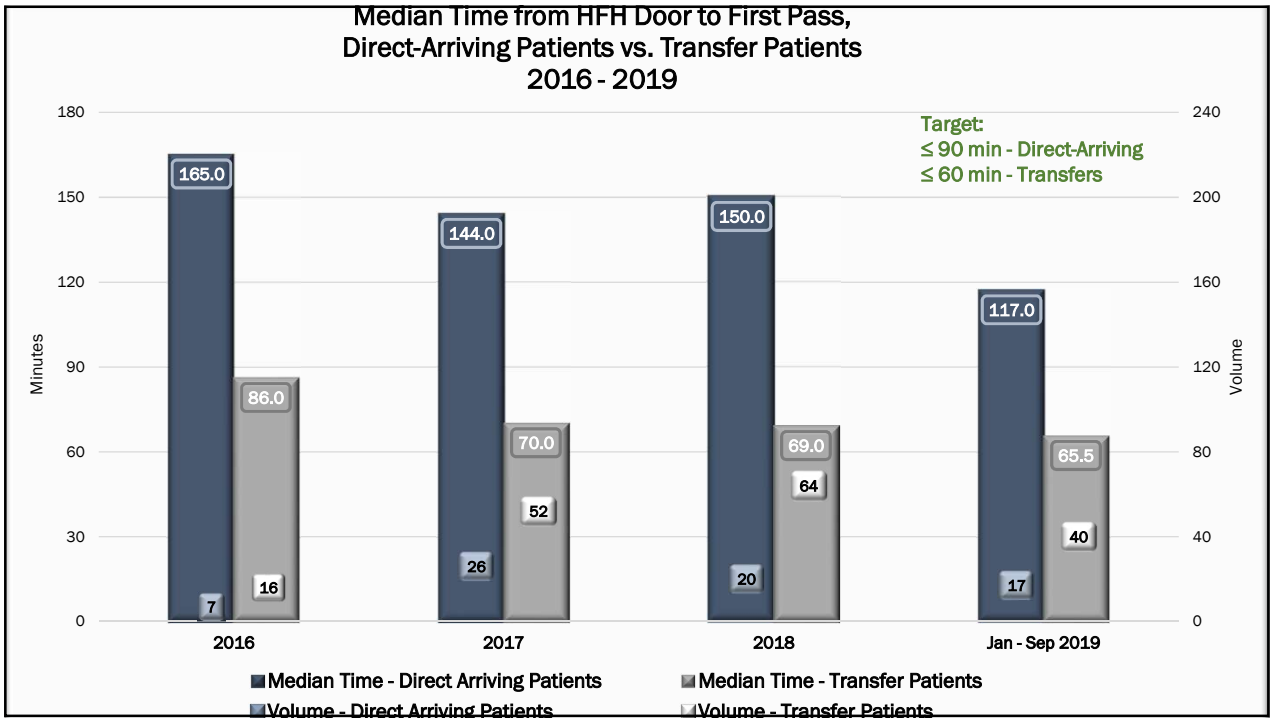
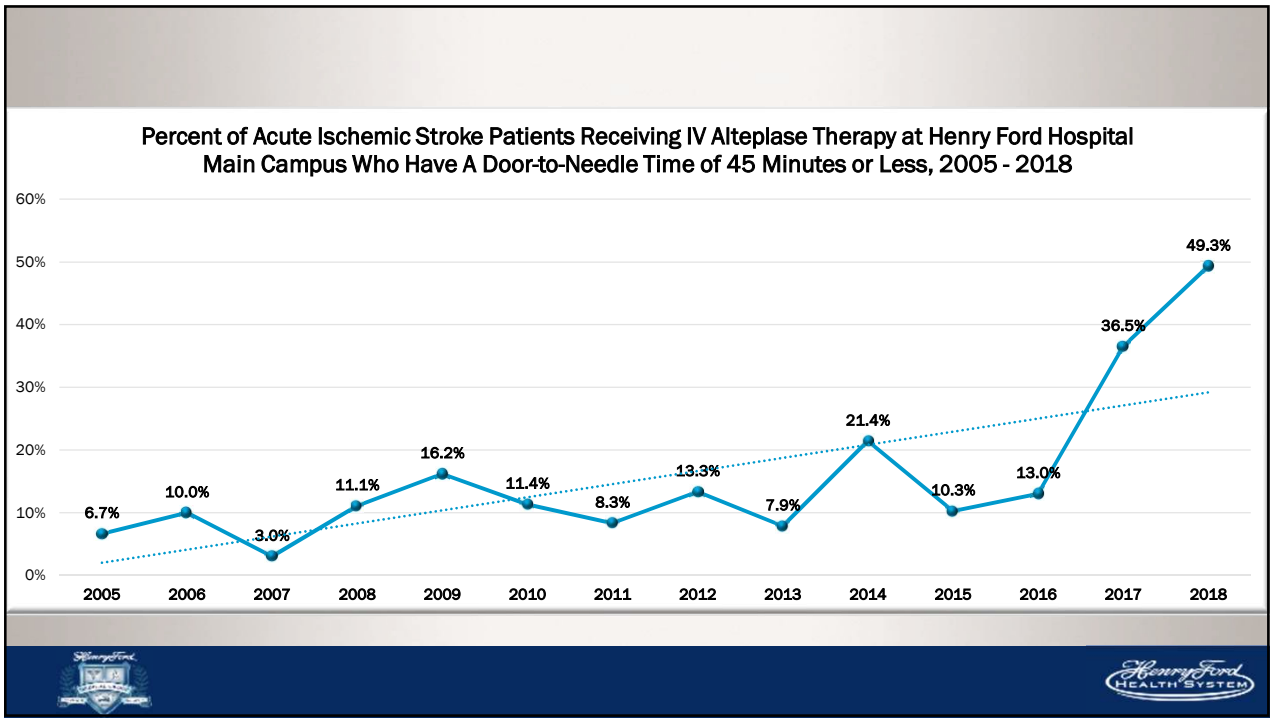

Median Time from HFH Door to First Pass,
Direct-Arriving Patients vs. Transfer Patients
2016 - 2019
Target:
≤ 90 min - Direct-Arriving
≤ 60 min - Transfers
Minutes
Volume
180
150
120
90
60
30
0
240
200
160
120
80
40
0
165.0
7
86.0
16
144.0
26
70.0
52
150.0
20
69.0
64
117.0
17
65.5
40
2016
2017
2018
Jan - Sep 2019
Median Time - Direct Arriving Patients
Median Time - Transfer Patients
Volume - Direct Arriving Patients
Volume - Transfer Patients

30


Percent of Acute Ischemic Stroke Patients Receiving IV Alteplase Therapy at Henry Ford Hospital Main Campus Who Have A Door-to-Needle Time of 45 Minutes or Less, 2005 - 2018
60%
50%
40%
30%
20%
10%
0%
6.7%
10.0%
3.0%
11.1%
16.2%
11.4%
8.3%
13.3%
7.9%
21.4%
10.3%
13.0%
36.5%
49.3%
2005
2006
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2014
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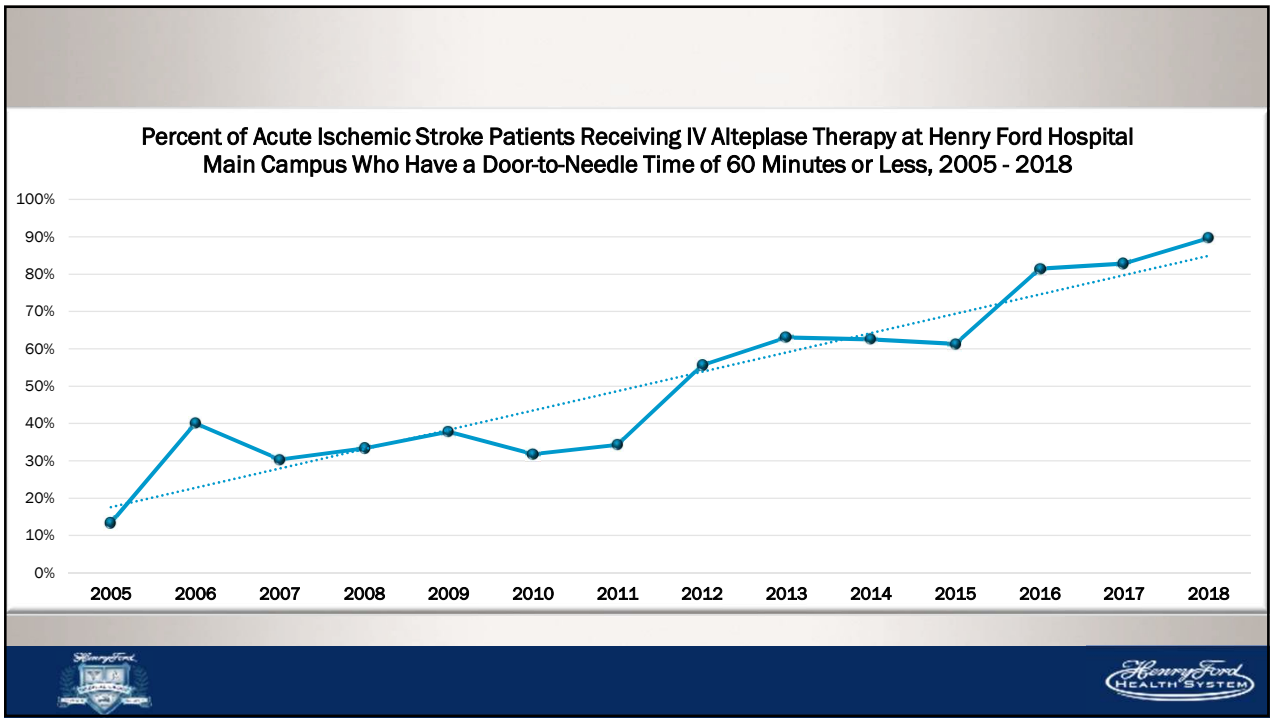
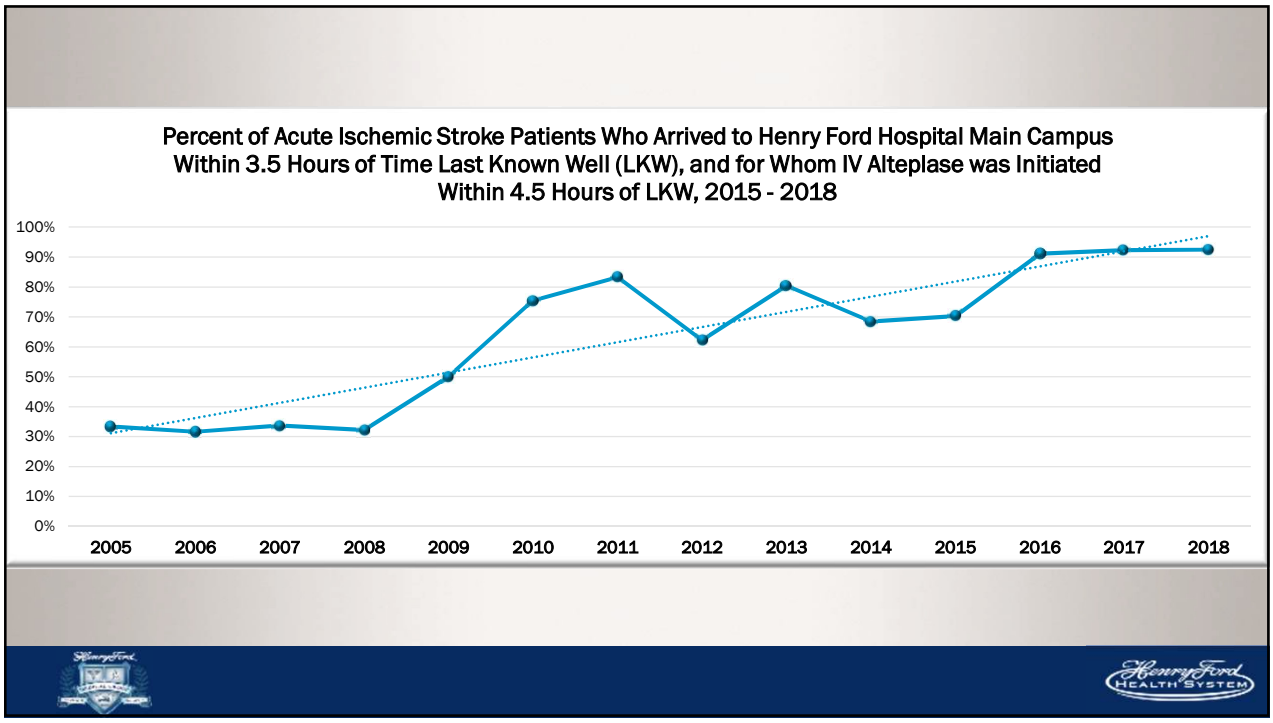
2016
2017
2018

31


Percent of Acute Ischemic Stroke Patients Receiving IV Alteplase Therapy at Henry Ford Hospital Main Campus Who Have a Door-to-Needle Time of 60 Minutes or Less, 2005 - 2018
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

32



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QUALITY CHALLENGES

- How to prepare for growth and maintain quality?
- How to offer stroke care as close to where the patients are?
- How to leverage informatics?
- How to incorporate advanced imaging and artificial intelligence
- How to integrate stroke care at a system/regional/state/national level?

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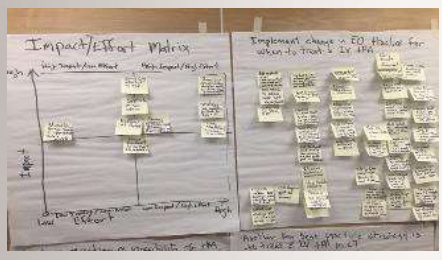
THANK YOU



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