



More Fast and Less Furious: Lessons from the Door to Needle Campaign at the University of Alberta Hospital, Edmonton, AB

September 29, 2015

Thomas Jeerakathil BSc, MD, MSc, FRCP(C), FABN
Associate Professor
Division of Neurology
University of Alberta
Northern Stroke Lead CV/S SCN, AHS
Medical Lead and Co-Chair, Stroke Action Plan

Faculty/Presenter Disclosure

[Thomas Jeerakathil]

Grants/Research Support: CIHR, HSFC, CSN, AIHS, AHS, Alberta
Health

Speakers Bureau/Honoraria: BMS Pfizer Single Ad Board Meeting

Consulting Fees: N/A

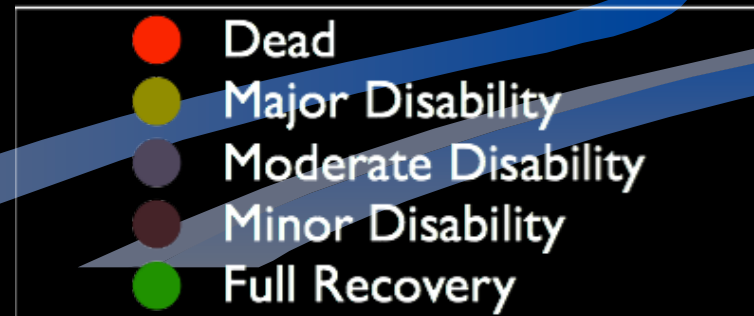
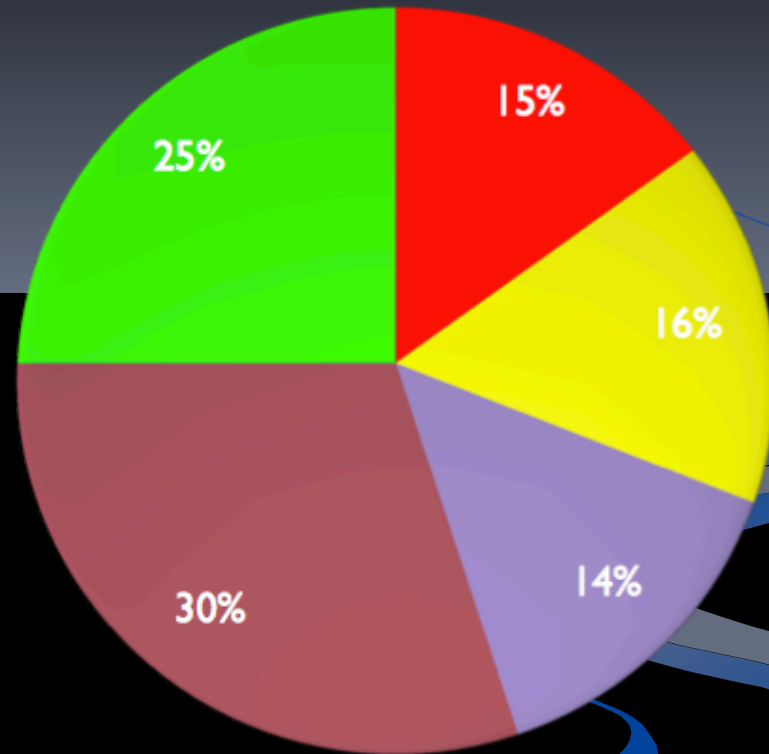
Other: N/A

Objectives

- To review the University of Alberta Door to Needle Time Quality Improvement Process

The Impact of Stroke

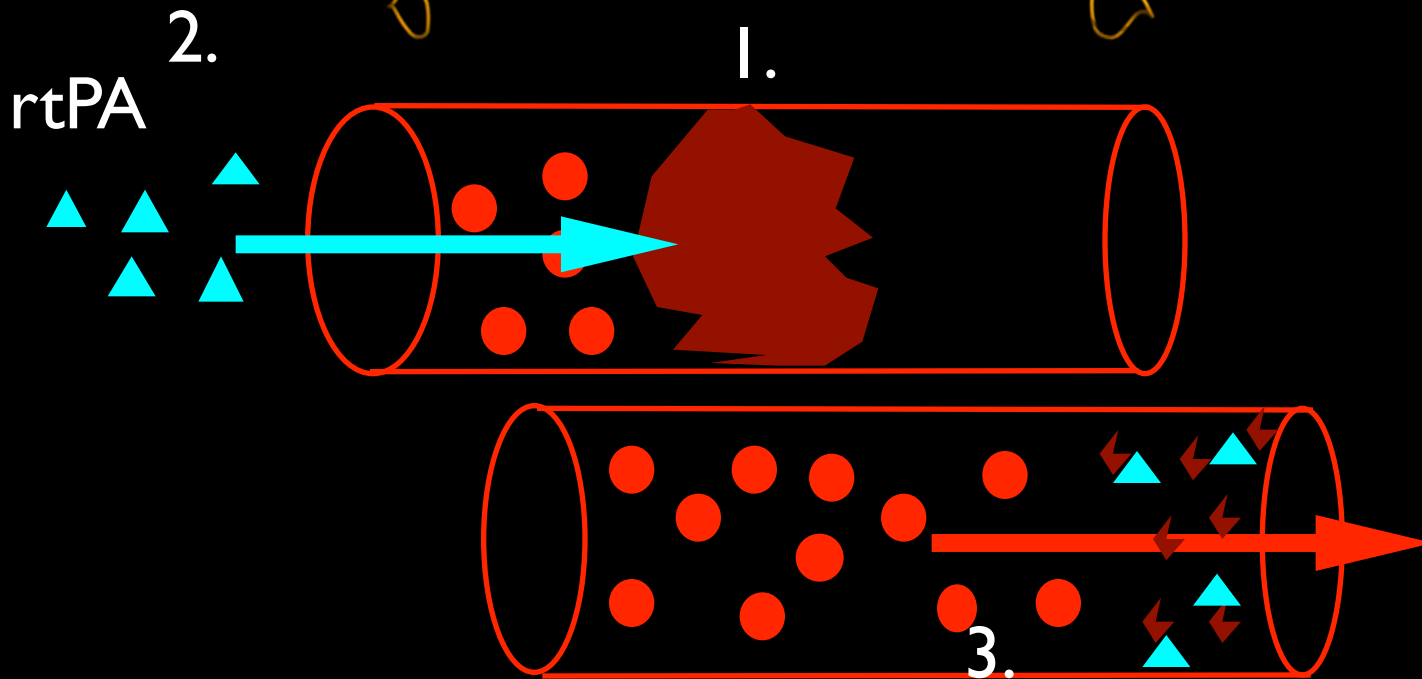
- Leading cause of disability in adults
- Causes 10% of all deaths in the world
- The cost to Alberta is approximately 300-400 million per year
- Stroke will present soon to an ED near you!



‘It is impossible to remove a strong attack of apoplexy and difficult to remove a weak one.’

Hippocrates 400 B.C.

Molecules - rtPA in 1995

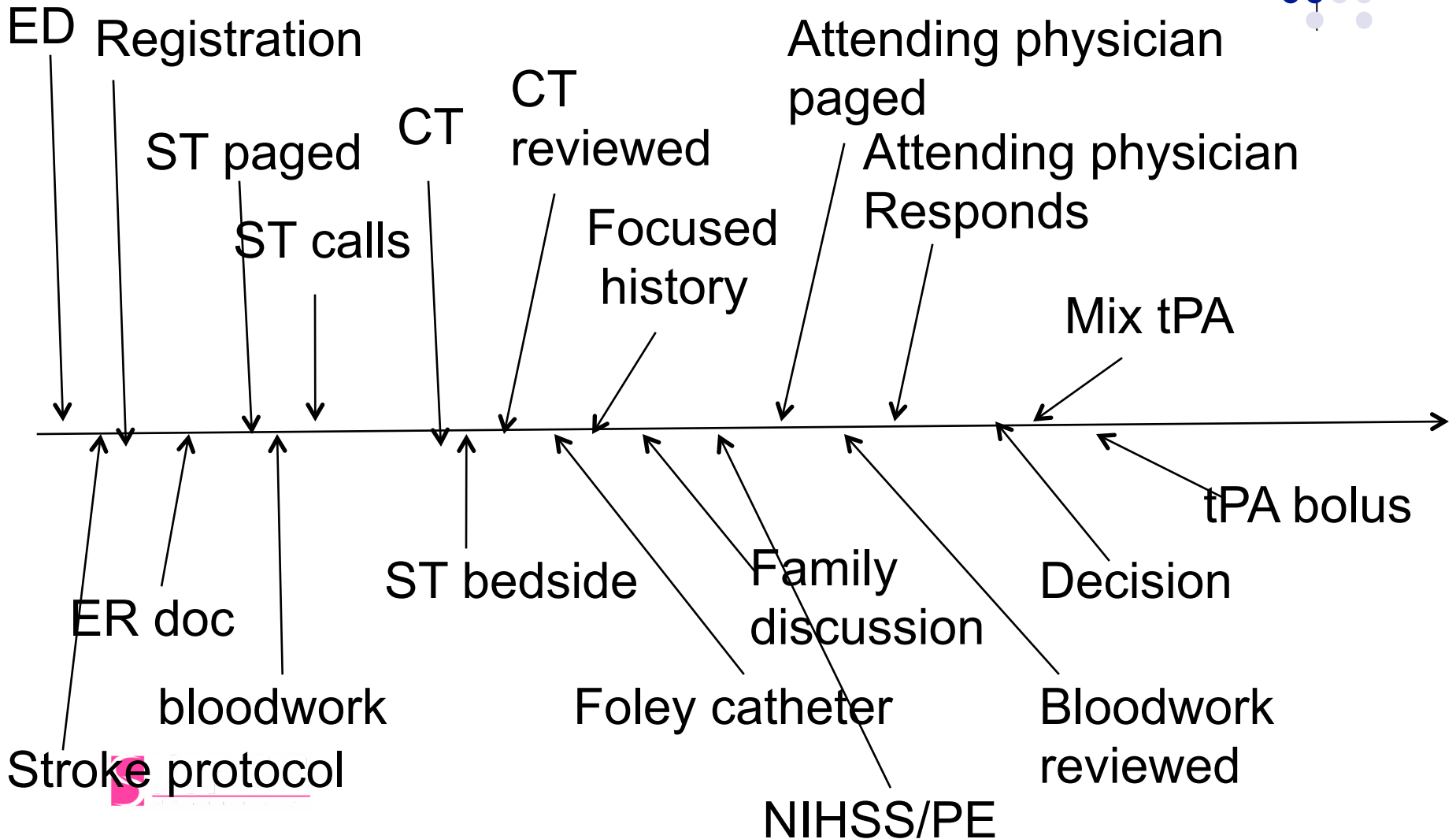
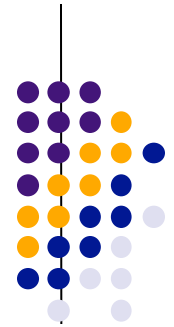


Bill

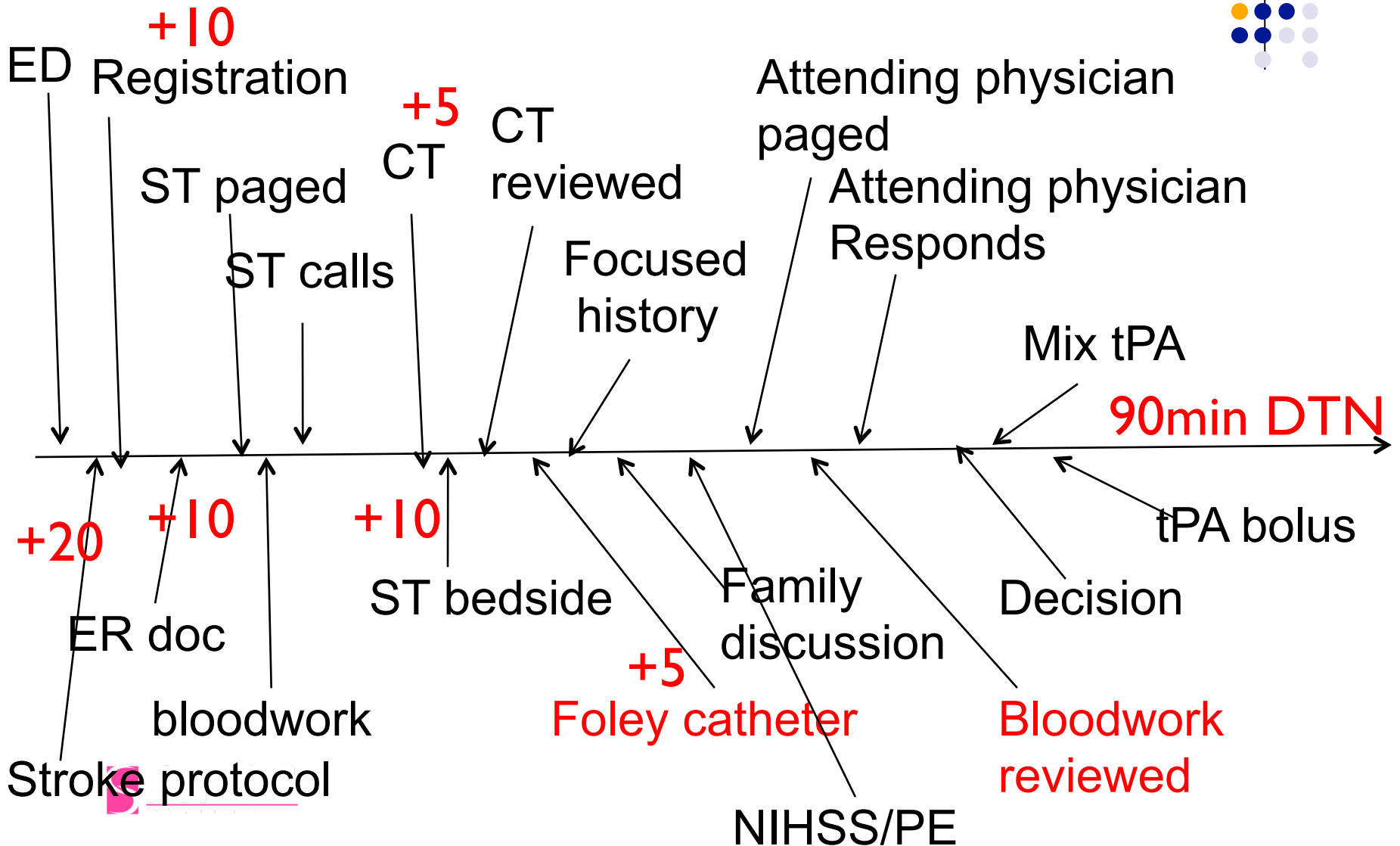
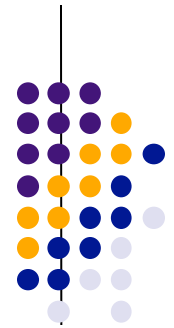
- June 2012
- 62 year old male with multiple risk factors
- Last seen well two hours ago
- Acute onset of aphasia and right sided weakness
- Presents via EMS to UAH
- Lives less than 10 minutes from the hospital



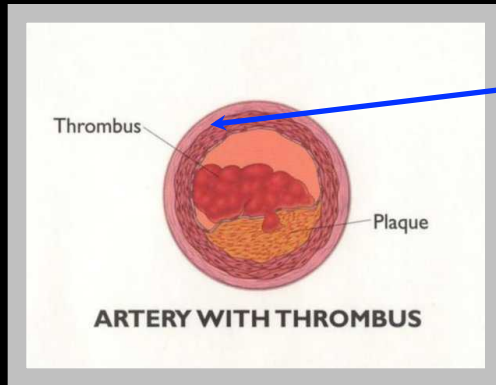
Timelines in tPA use



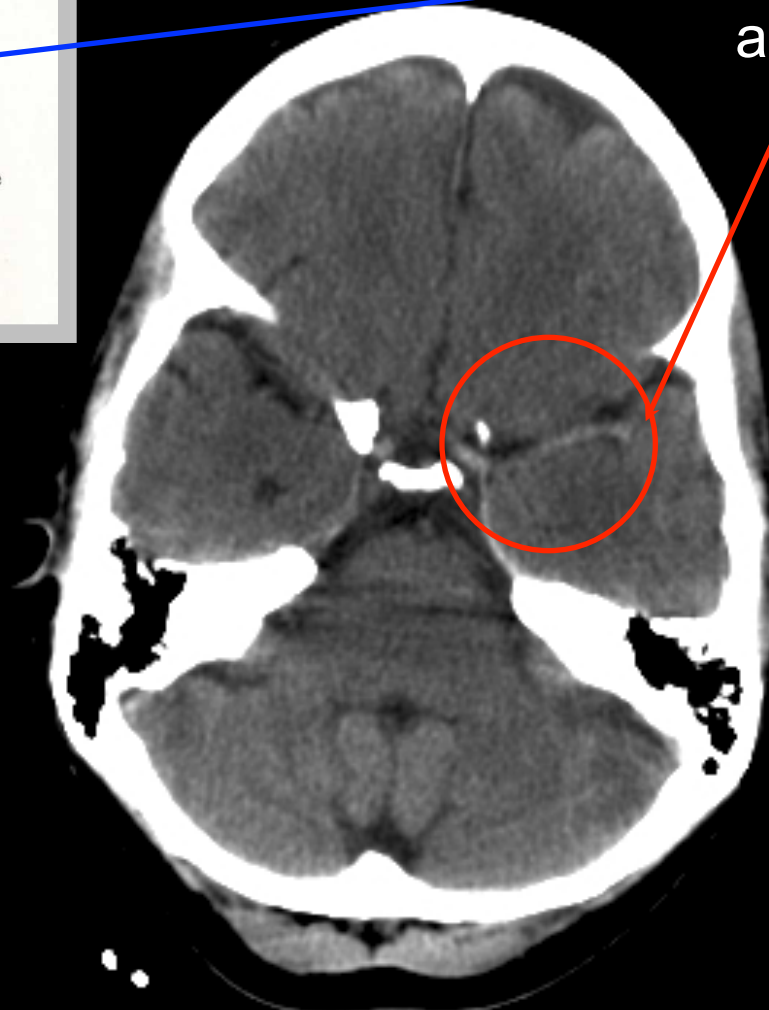
Timelines in tPA use



Ischemic Stroke:



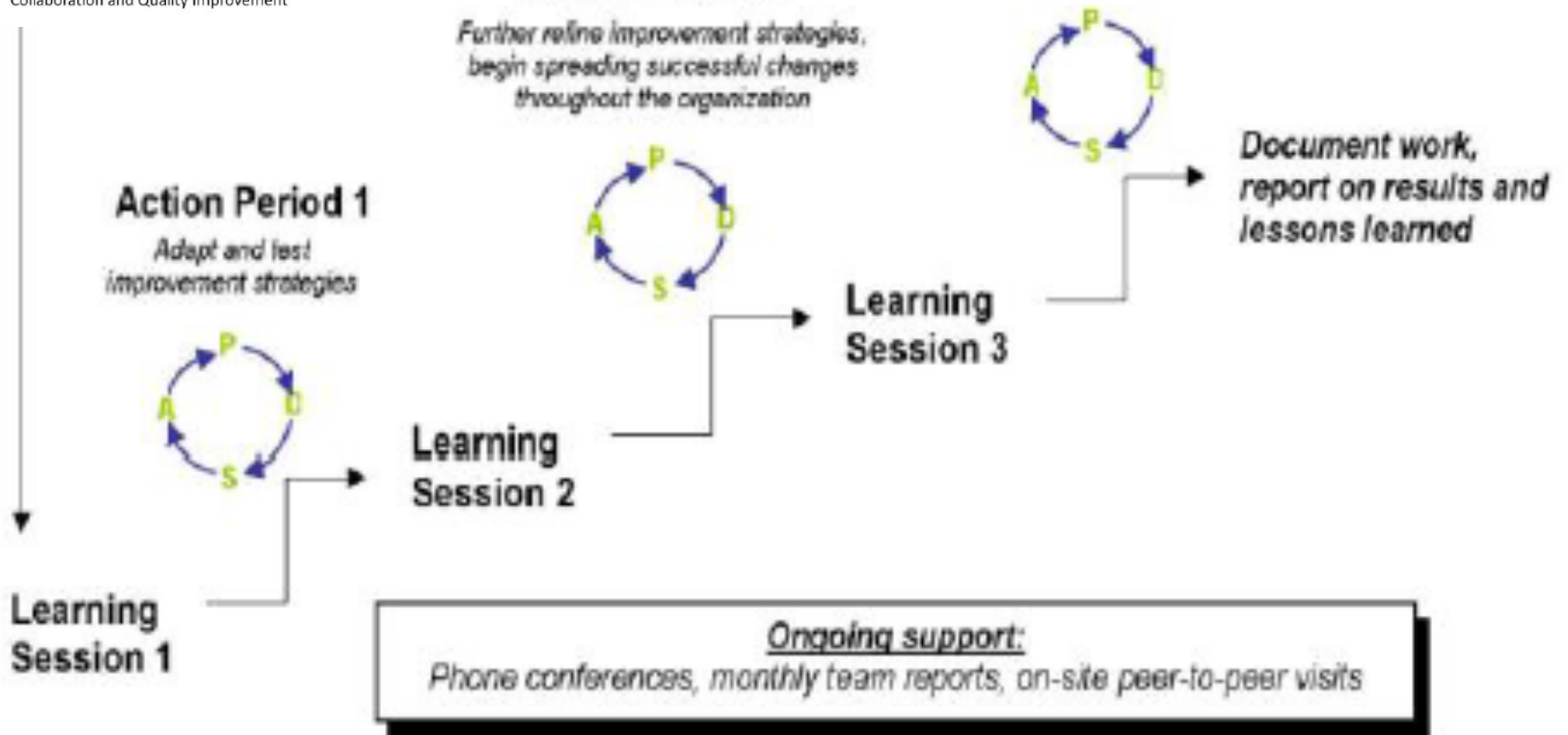
Clot visible blocking the middle cerebral artery (inside artery)



Patient 1

ASI

Alberta Stroke Improvement
Collaboration and Quality Improvement

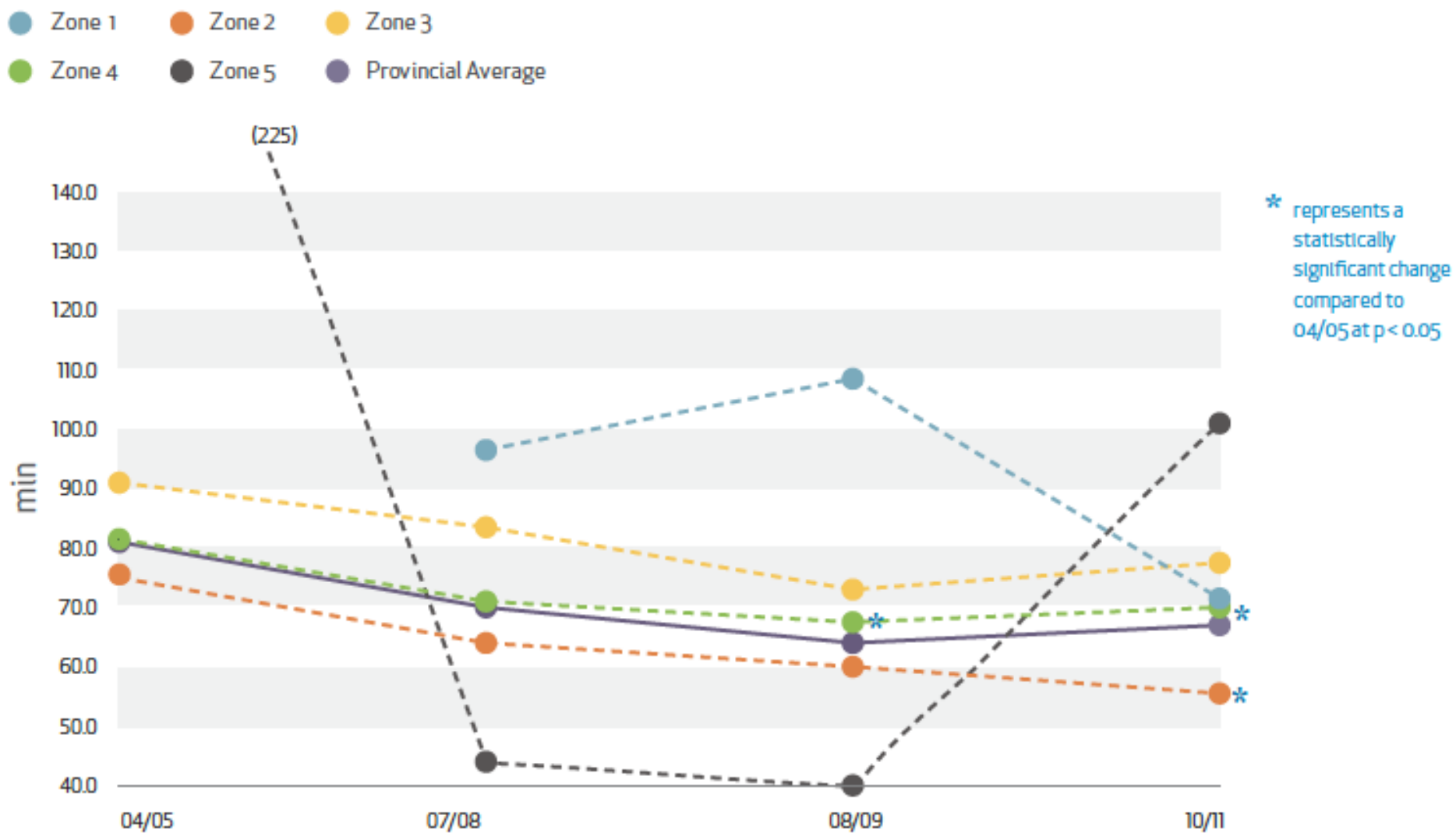


Alberta Stroke Improvement (APSS)

- Our first attempt at cross provincial QI
- Assembled 7 cross provincial and cross-disciplinary working groups
- Worked on 7 areas of priority including door to needle times
 - In 2011/12 we dropped provincial DTN from an average of 83 minutes to 69 minutes (still a ways to go)
- The UAH was stuck between 72-83 minutes!

FIGURE 4.3

Median Door to Needle Times for Ischemic Stroke Patients Receiving IV or IV+IA tPA (minutes)





'Mr Furious' From 'Mystery Men'

Challenges at UAH

- Trauma, neurosurgery, neurology, transplant program, heart institute, pediatric hospital, pediatric heart program, 6 intensive care units, all other services
 - All under one roof
 - One ED; one ED CT scanner, one after hours CT scanner
- Overloaded ED Triage
- Out of hospital stroke fellow call
- Simultaneous telestroke service requirements

A

● Comprehensive Stroke Centres

● Primary Stroke Centres

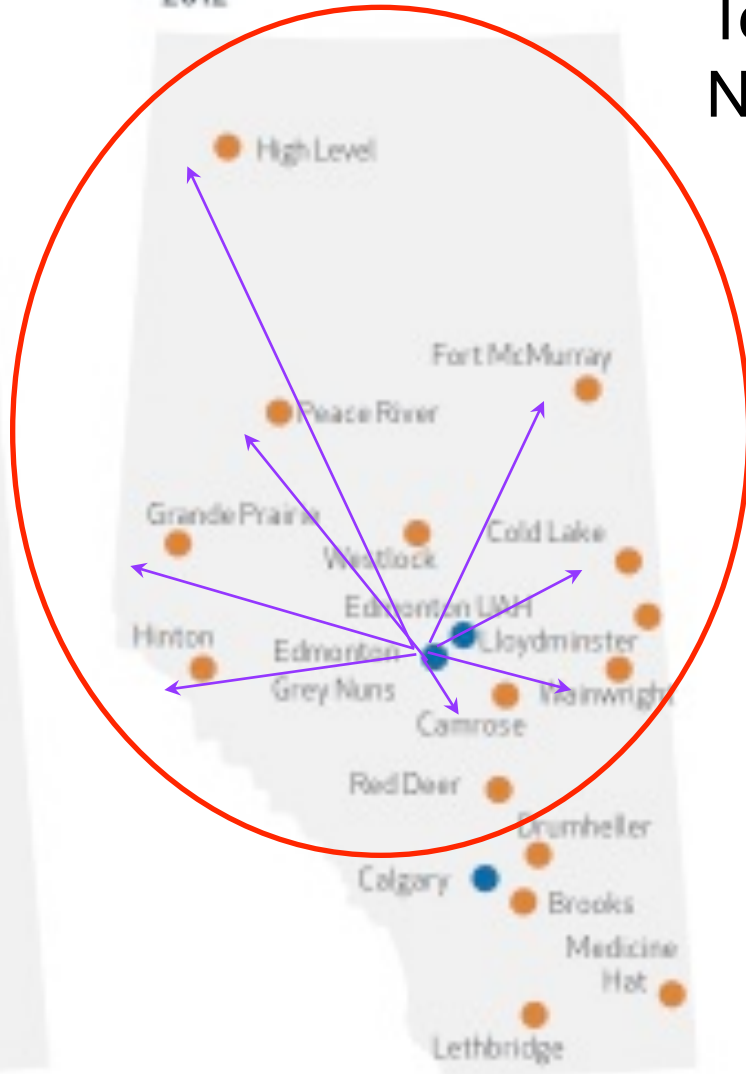
Telestroke link

Northern
Telestroke
Network

2005



2012

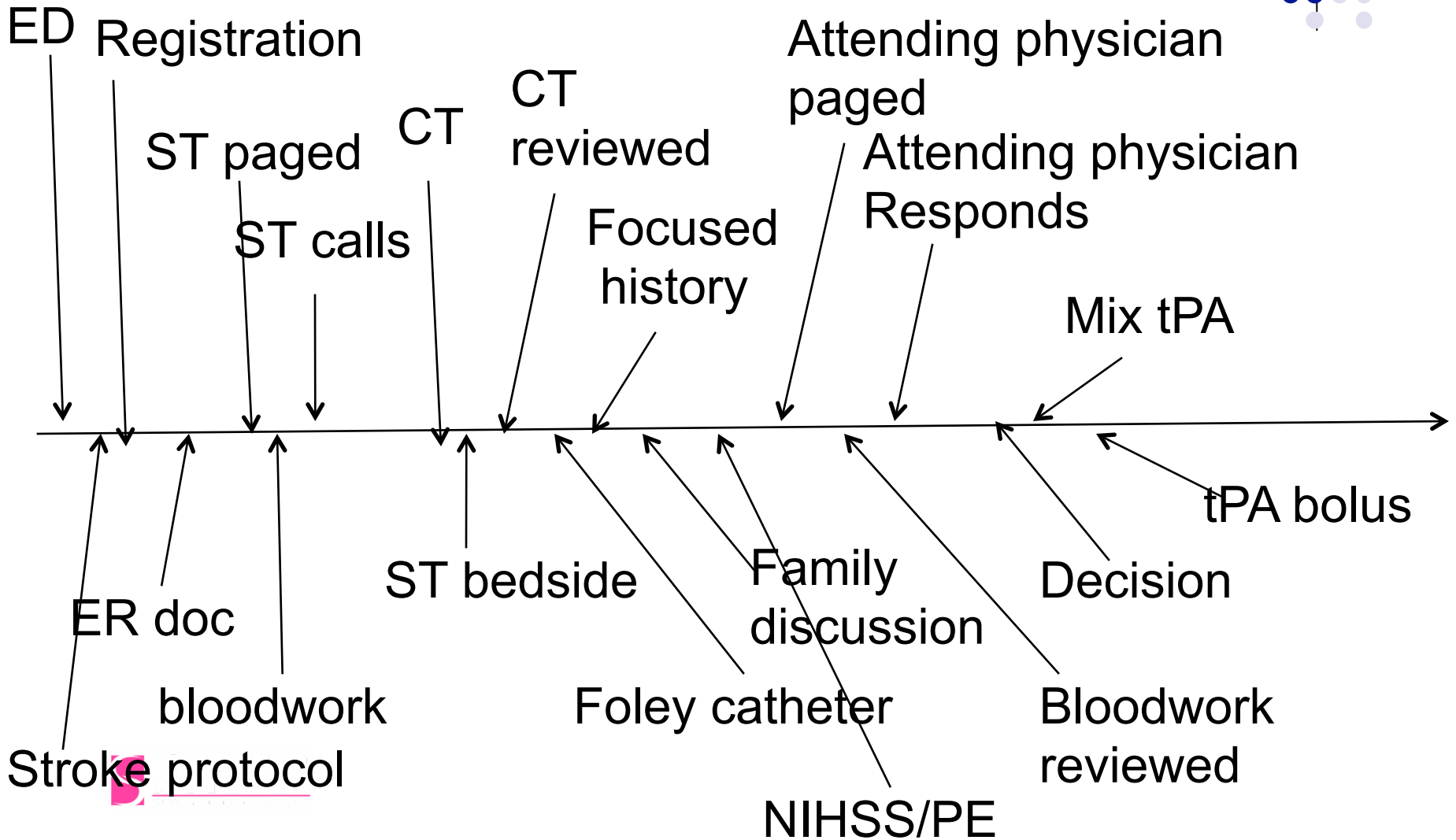
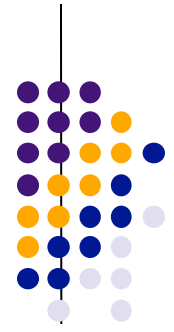




Technology - Telestroke



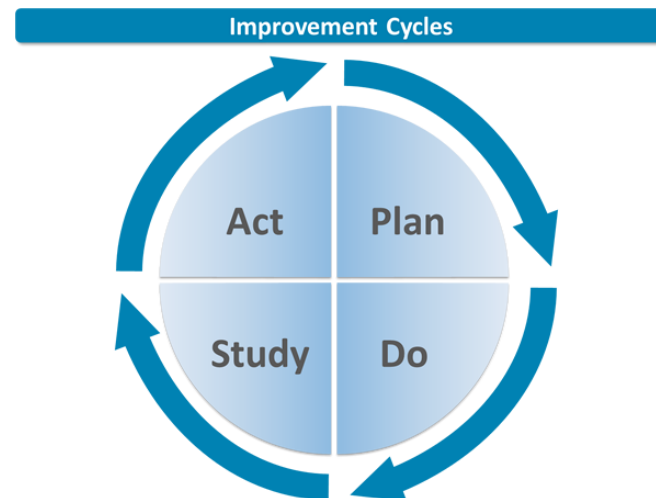
Timelines in tPA use



- Statistician
- Expert in quality control
- Created PDSA (plan do study act)
- Helped Japanese industry to create a quality culture and rise to economic power post WW2



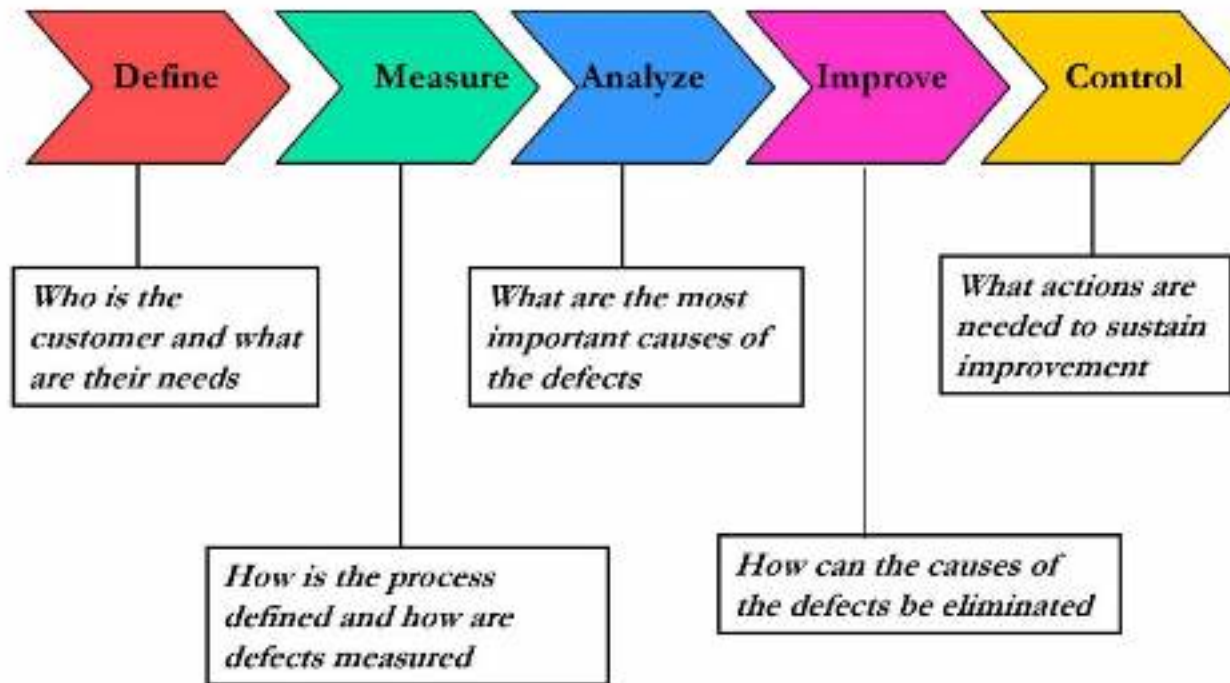
W. Edwards Deming



Six Sigma



Phases of Six Sigma



Methods- Quality Improvement for the UAH

- Process mapping
 - Fishbone Diagrams, swim lane charts
- PDSA cycles
- Time in motion study
- Case reviews – every lysis assessment every week!
- Intense involvement of the Edmonton Zone Stroke Program

Methods- Engagement

- Engaging stakeholders
 - Intensive involvement by the ED
 - Diagnostic imaging
- Building relationships
- Education sessions

‘ In God we trust. All others bring data.’

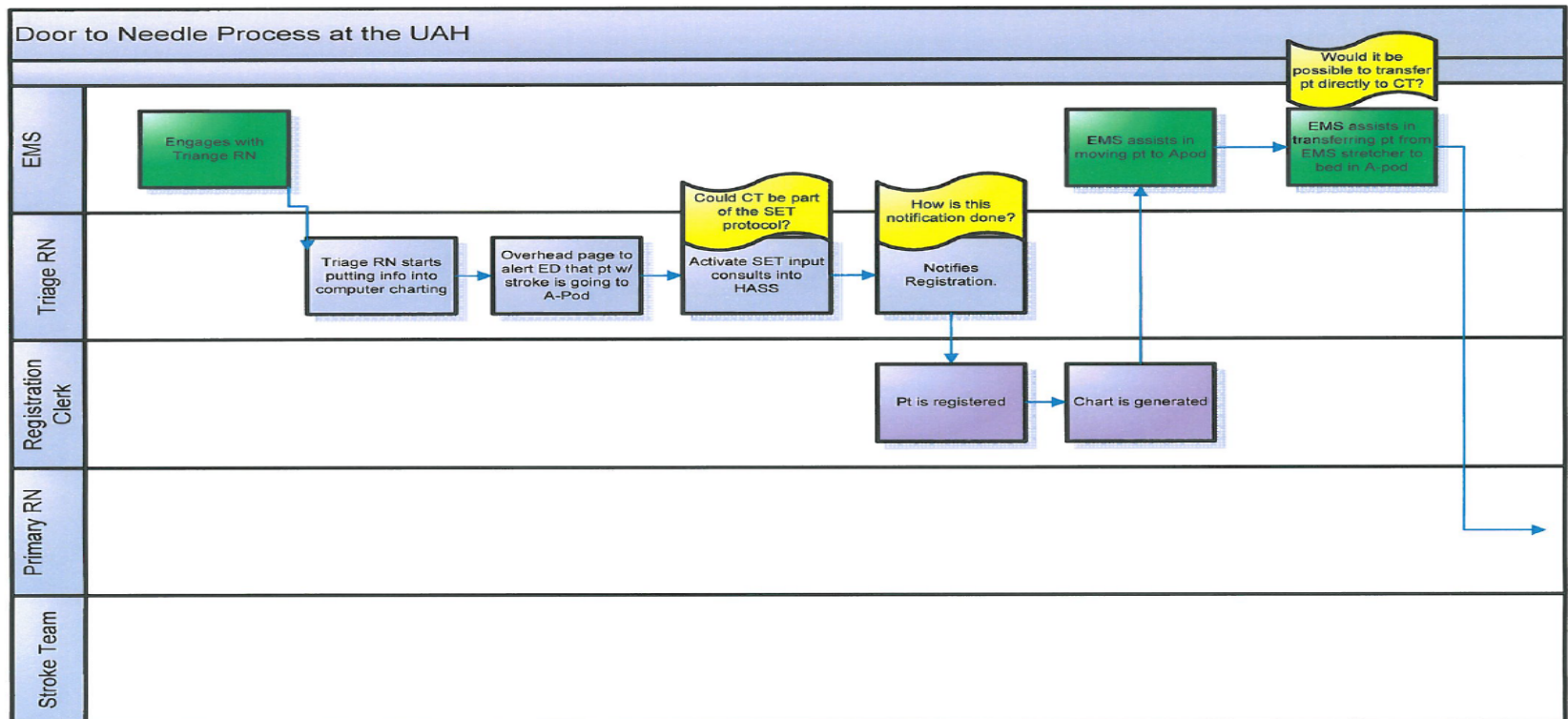
‘There is no substitute for knowledge .’

W. Edwards Deming

Time in Motion Study

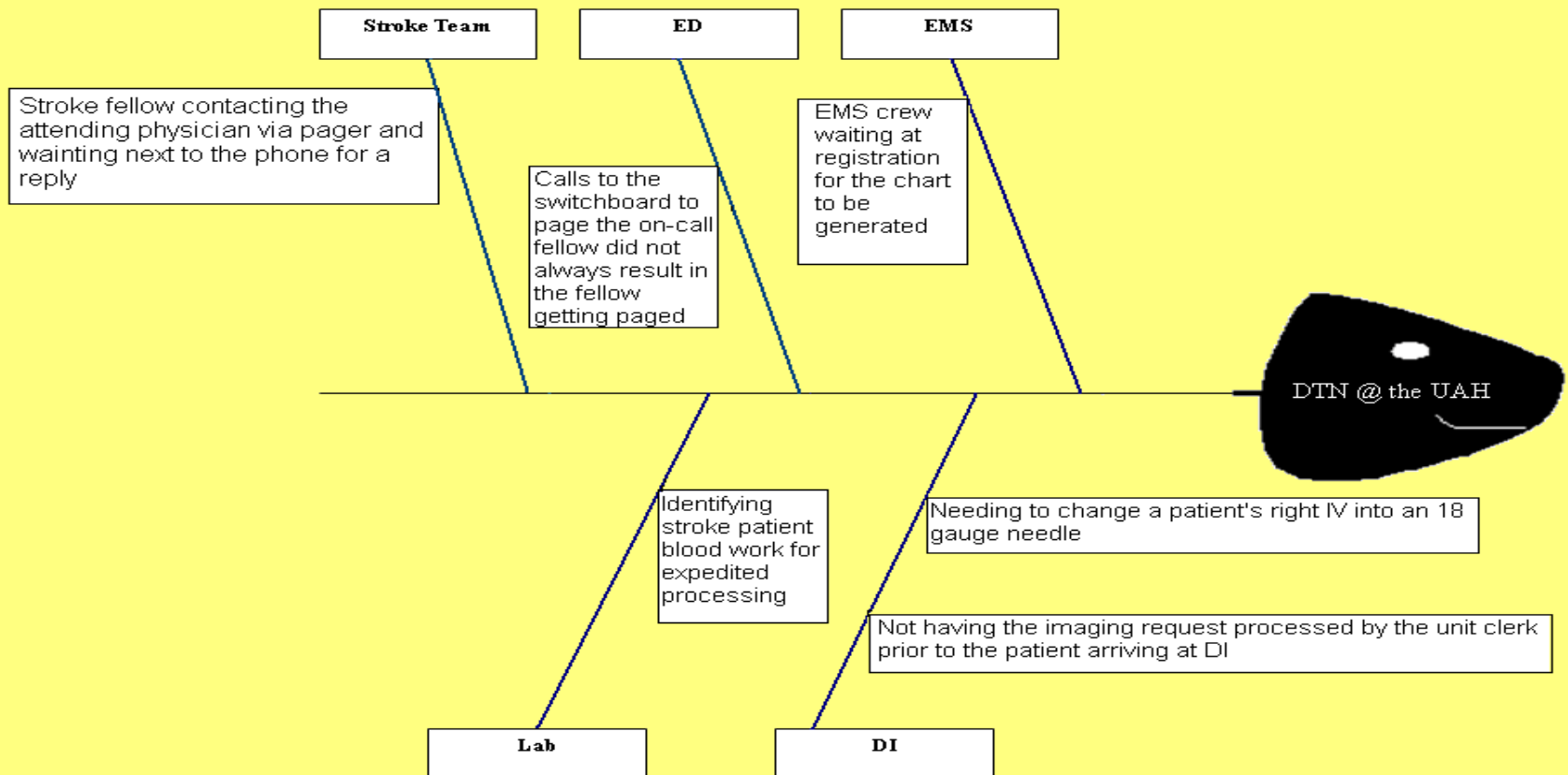
- Stroke Services Coordinator (Mary Lou) tracked all prospective thrombolysis assessments in real time
- Carried a SET pager
- Detailed notes about staff behaviour in relation to time flow
 - Delays in stroke team arrival
 - Delays in blood draws
 - Activities occurring in series rather than in parallel
 - Time points (ED, CT, tPA etc)
- Immediate feedback with process revision

Results- Process Mapping For EMS and Triage



Results- Fishbone Diagram

Title: Fishbone diagram for the Door to Needle Times at the UAH



Results- Evolution of a Process

EMERGENCY PROCEDURE
For Stroke Emergency Team

READY

Sroke Charge Nurse/Triage Nurse
EMS - enroute with suspected stroke patient

Emergency Call 33# – ask for **STROKE EMERGENCY TEAM** to be paged to **999**- they will not call back, just come to ED

*****TIME OF PAGE MUST BE RECORDED*****

Team Stroke Emergency Team arrives - await patient's arrival and Emergency team initial assessment

GO

Alberta Health Services



EMERGENCY PROCEDURE
For Stroke Emergency Team

READY

Sroke Charge / Triage RN
Call :780-445-2215
Page 999
The Stroke Fellow will go to A Pod
They will not call Triage back

*****TIME OF PAGE MUST BE RECORDED*****

Emergency Transfer Patient to A Pod Immediately
Overhead page "Stroke Patient to Area A"

Team Ensure Registration generates a CHART STAT

AVOID Delays

GO

Alberta Health Services

Results-Blood Work Super Stat!

**Stroke Blood
Work**

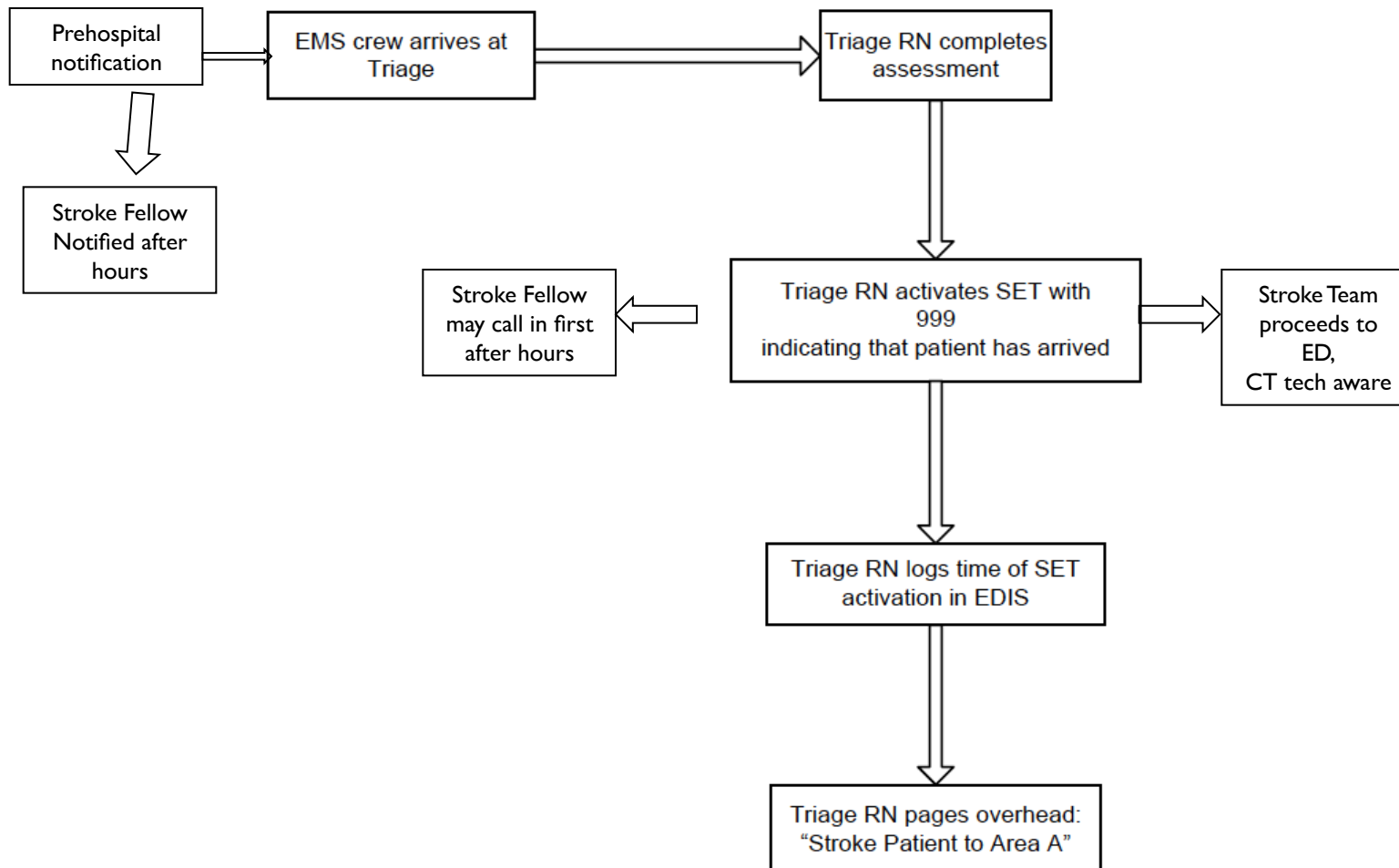
Process Super STAT

Please return Flag to ED

PATIENT ARRIVAL to TRIAGE



1. Triage RN completes assessment.
2. Triage RN activates SET Protocol by paging 780-445-2215 with 999 indicating that the patient has arrived to the ED.
3. Triage RN logs the time at which SET was activated in EDIS.
4. Triage RN to page overhead: "Stroke Patient to Area A".



Results UAH- Monthly

Door to Needle Reports



Summary of Door to Needle Times for IV tPA at the UAH

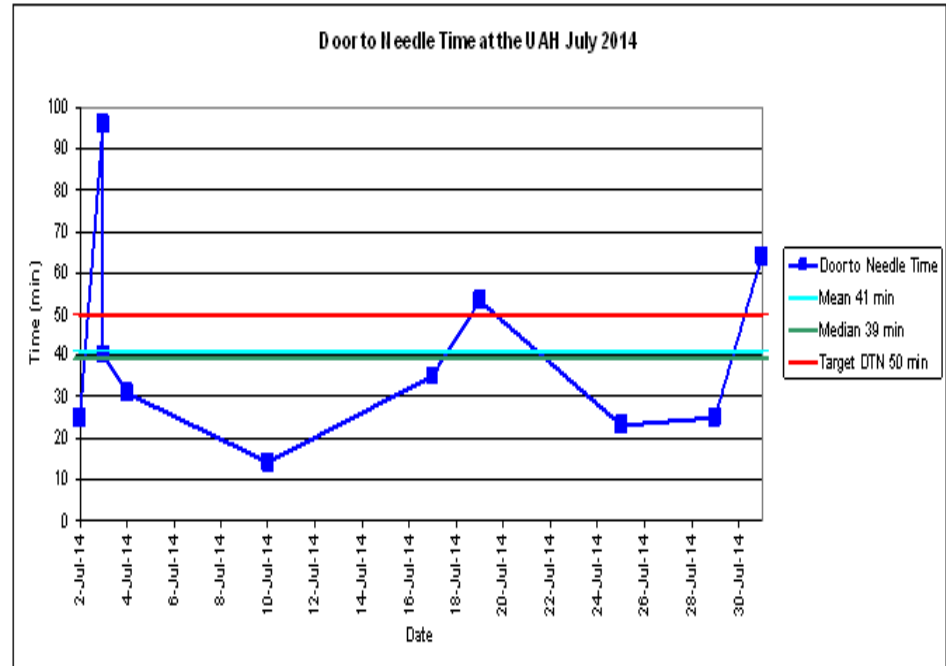
Month		Arrival to Triage (min)	Triage to ED MD A(x) (min)	Stroke Team Consult to Stroke Team A(x) (min)	Triage to Completion of First Brain Image (min)	Completion of First Brain Image to tPA Initiation (min)	Door to Needle Times (min)
Aug., 2013	Mean	2	9	10	25	66	83
	Median	3	9	11	25	35	52
Sept., 2013	Mean	3	14	11	28	31	59
	Median	3	11	6	21	32	54
Oct., 2013	Mean	7	10	8	31	39	71
	Median	8	9	7	30	28	66
Nov., 2013	Mean	2	8	16	30	43	79
	Median	3	7	16	33	42	78
Dec., 2013	Mean	2	6	5	27	42	63
	Median	3	5	2	28	18	47
Jan., 2014	Mean	4	11	16	30	27	56
	Median	4	6	13	27	17	41
Feb., 2014	Mean	3	11	8	25	22	54
	Median	3	5	10	27	15	44
Mar., 2014	Mean	4	12	15	28	24	55
	Median	2	8	15	29	22	54
Apr., 2014	Mean	6	12	7	27	19	46
	Median	5	10	9	27	19	41
May, 2014	Mean	19	9	N/A	21	24	45
	Median	20	3	N/A	21	28	47
June, 2014	Mean	3	5	10	22	30	52
	Median	3	4	12	27	33	46
July, 2014	Mean	4	11	4	20	21	41
	Median	3	6	2	20	18	33

Door to Needle is calculated from triage to tPA bolus.

Last Year, Last Quarter, Year to Date

N	Time frame		Triage to Completion of First Brain Image (min)	Completion of First Brain image to tPA Initiation (min)	Door to Needle Time (min)
117	April 2013-March 2014 (LYr)	Mean	28	33	63
		Median	28	24	55
18	May 2014-July, 2014 (LQ)	Mean	22	28	45
		Median	22	24	42
32	April 2014- (YTD)	Mean	24	24	45
		Median	23	19	41

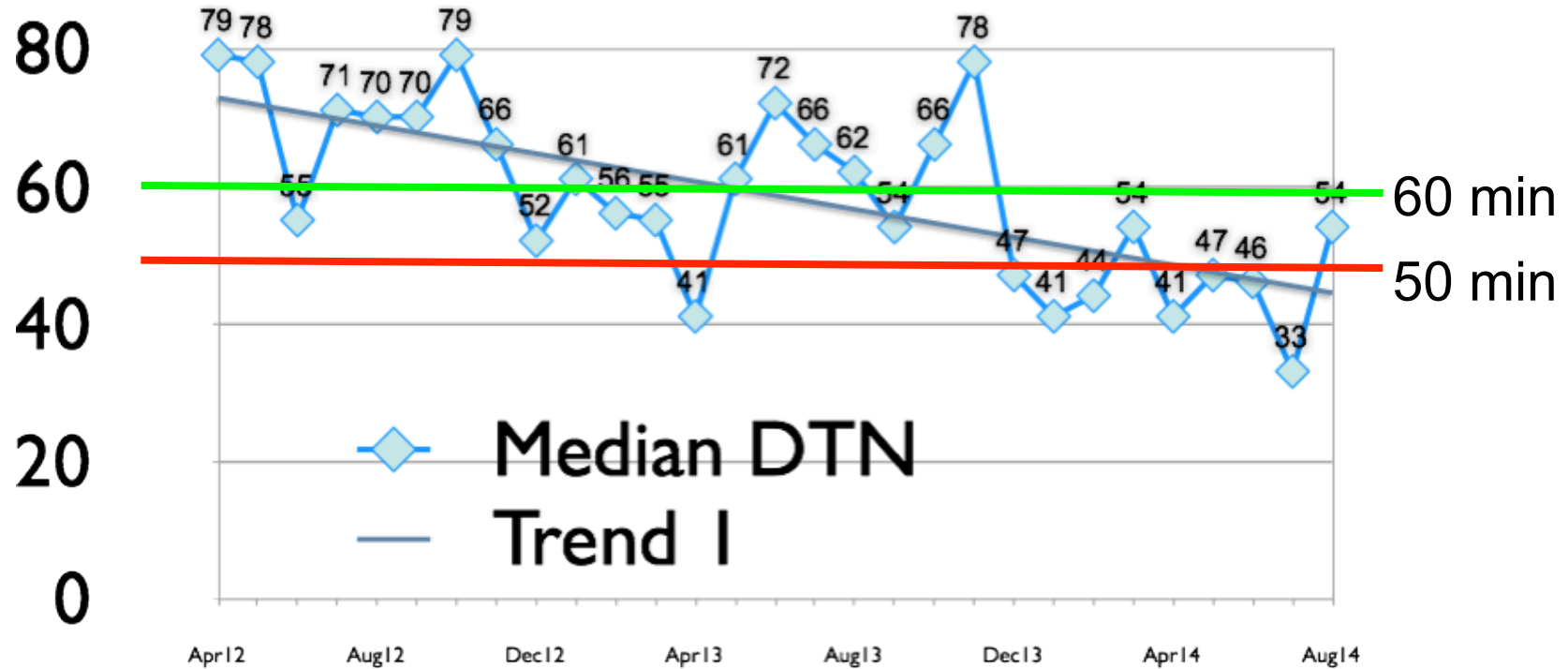
Door to Needle is calculated from triage to tPA bolus.



In July, 7/10 cases were completed in less than 50min.

Results- Go for the Gold!





Monthly from April 12 to Aug 14

UAH Edmonton; DTNs after an intensive QI program

Summary of Door to Needle Times for IV tPA at the UAH

Month		Arrival to Triage (min)	Triage to ED MD A(x) (min)	Stroke Team Consult to Stroke Team A(x) (min)	Triage to Completion of First Brain Image (min)	Completion of First Brain Image to tPA Initiation (min)	Door to Needle Times (min)
Jan, 2015	Mean	4	12	4	29	22	49
	Median	3	10	3	26	13	40
Feb, 2015	Mean	3	9	9	25	33	59
	Median	4	8	9	22	32	65
Mar, 2015	Mean	1	13	10	22	16	39
	Median	0	9	8	22	14	39
Apr, 2015	Mean	4	10	6	28	18	46
	Median	5	9	5	28	15	46
May, 2015	Mean	4	10	8	28	13	39
	Median	4	8	9	25	11	38
June, 2015	Mean	3	13	8	34	15	49
	Median	4	11	8	33	10	43
July, 2015	Mean	3	10	21	30	10	40
	Median	4	8	16	28	9	35

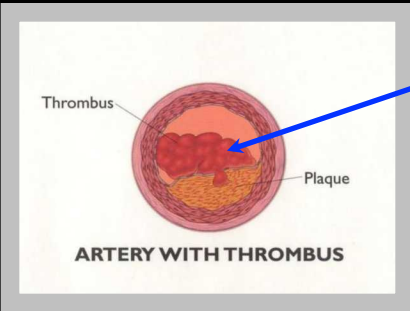
Summary of Door to Needle Times for IV tPA at the GNCH

Month		Arrival to Completion of First Brain Image (min)	Completion of First Brain Image to tPA Initiation (min)	Door to Needle Times (min)
	Median	8	47	64
Feb, 2015	Mean	14	27	41
	Median	14	27	41
Mar, 2015	Mean	17	38	55
	Median	17	38	55
Apr, 2015	Mean	26	35	61
	Median	30	30	61
May/ June	Mean	20	32	52
	Median	18	31	52

Patient 2

Clot visible blocking the middle cerebral artery (inside artery)

Thrombus resolved after IV tPA



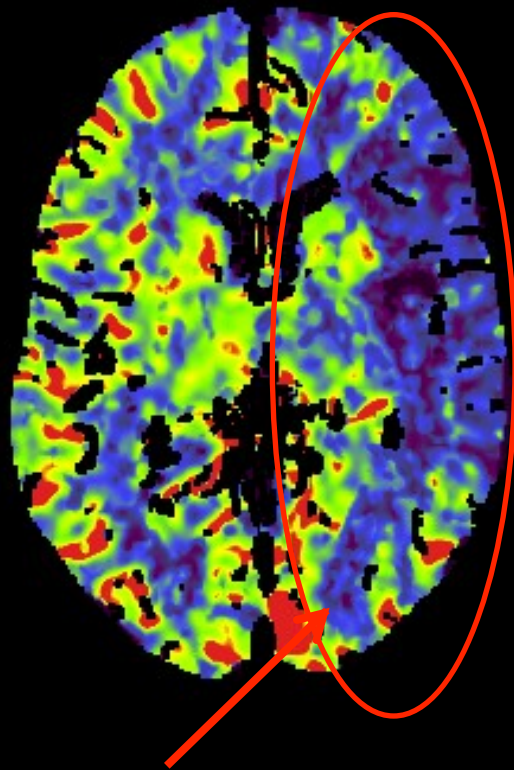
Monica made an excellent recovery !

Technology: CT Angiogram – sometimes slows DTN but important information if done fast!

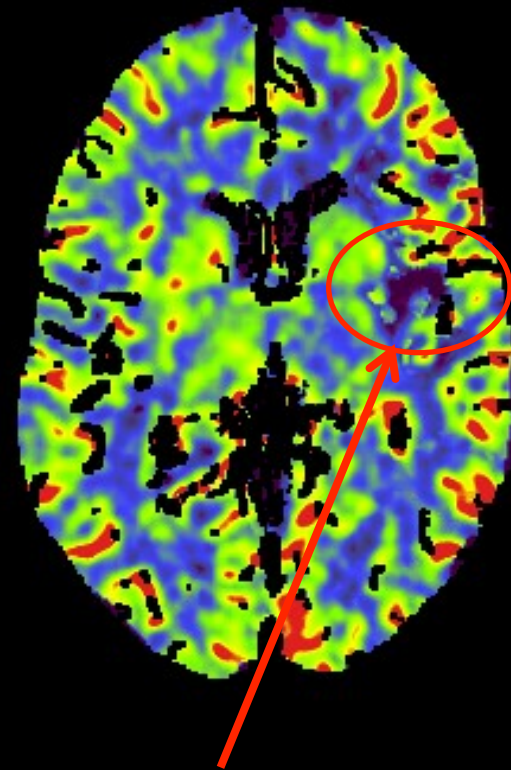
CTA speed is highly centre dependent
Ideally the first scan is a rapid CT+CTA.
Sometimes it makes more sense to initiate tPA with a plain CT then proceed afterwards with CTA.
At UAH we give the bolus in scanner after plain CT and then go to CTA



CT Perfusion: blood flow to brain cell microvasculature



100.0



6.0



Brain at risk -
in purple

Brain
infarcted

Patient I



Delivering quality care costs less, not more

- Dr Brent James, MD, former CEO of Intermountain Health





Summary

- Stroke is a major public health threat
- Alberta is a leader and still improving
- Fast treatment saves brain, reduces disability and reduces complications
- It takes a systematic approach and buy in from everyone to treat faster

Thank-you!

Edmonton Zone Stroke Program

-Mary Lou Halabi, Shy Amlani, Colleen Taralson

ED – Margaret Dymond, Karen Latoshek

Stroke Fellows!

Diagnostic Imaging

Laboratory Services

Quality Improvement