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Sciences Centre
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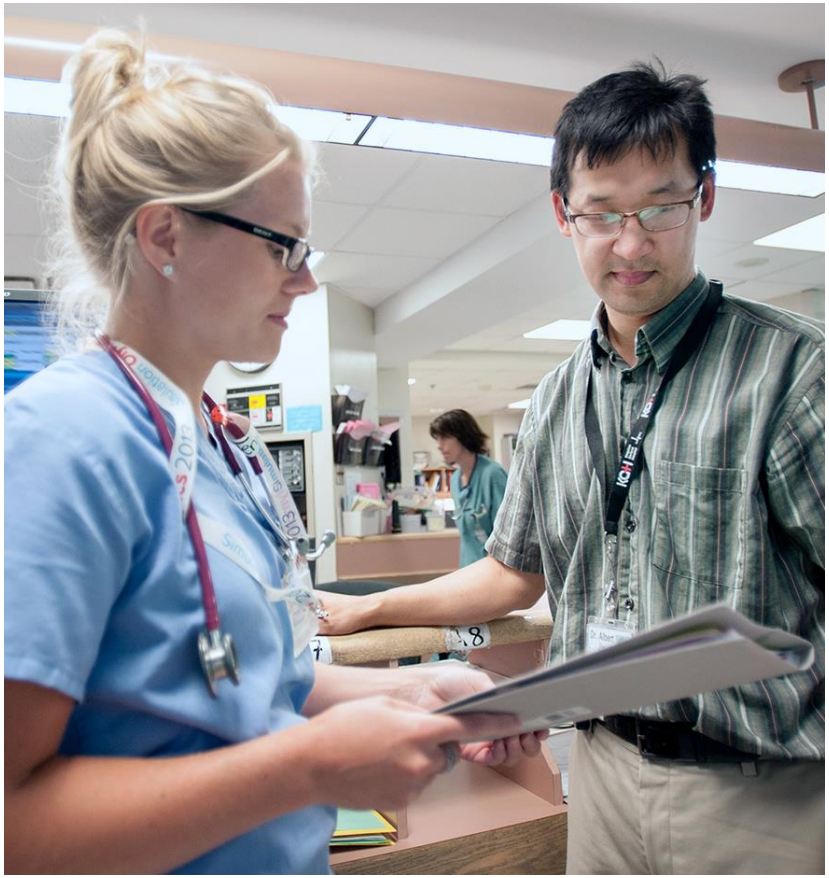
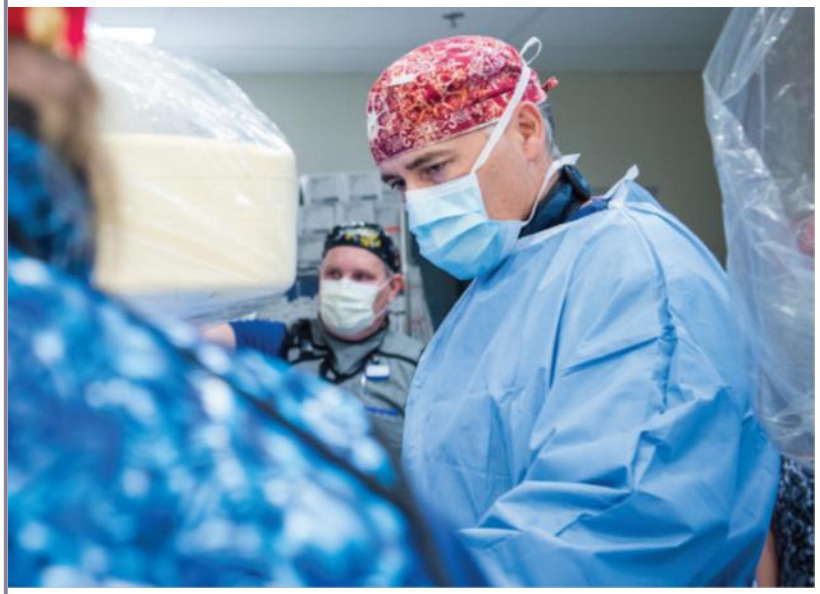
Transforming care, together™

Building Capacity for Stroke Endovascular Thrombectomy (EVT)

Lessons Learned in Starting an EVT Program





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Faculty/Presenter Disclosure

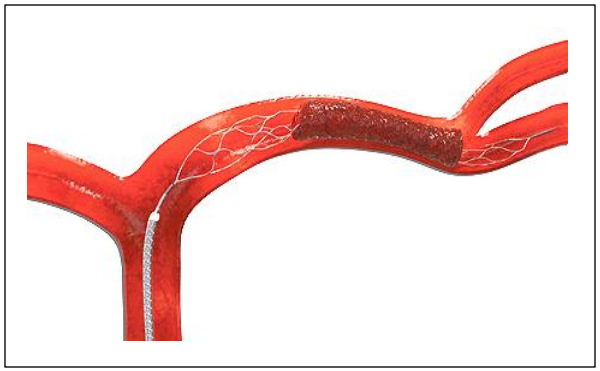
- **Faculty:** Dr Ramana Appireddy, Cally Martin

- **Relationships with commercial interests:**
  - **Grants/Research Support:** N/A
  - **Speakers Bureau/Honoraria:** N/A
  - **Consulting Fees:** N/A
  - **Other:** N/A

WHY? - Context for EVT

"*Most significant advance in stroke care in 20 years*"

- 5 Landmark Trials in 2015: strong evidence for mechanical retrieval of large clots
- Select cases with severe stroke
- Saves lives; decreases disability
- Can be given with or without tPA
- New Standard of Care: Canadian Best Practice Recommendations July 2015
- 7.3 hr time window for EVT; up to 24hrs in select cases
- *Time is Brain!*



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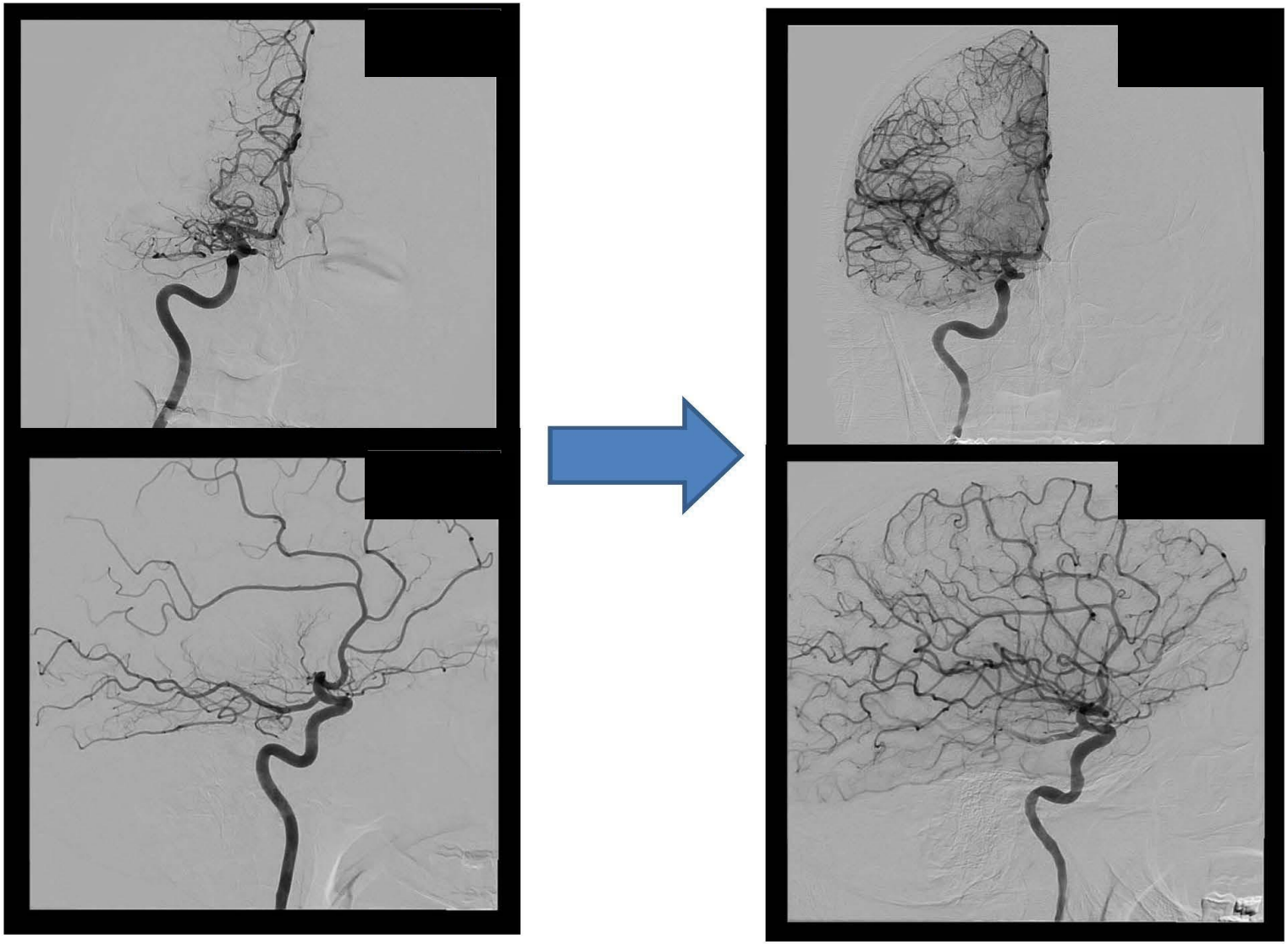
EVT: A Revolution in Stroke Care

"*1.9 million brain cells die every minute after stroke*"



Story-telling: the Lived Experience

- A person from the region - complete right sided weakness and inability to speak: "*Within minutes of the procedure, the patient was talking and shaking hands with us*"

- A young woman, her baby and husband arrived by EMS. She had severe left sided movement abnormality. A few days after EVT she went home able to care for her infant.

- A woman from the Brockville area identified her husband's stroke signs because of a fridge magnet and called 911. He had severe left sided weakness and neglect. She and her husband were transported together by EMS on bypass to KHSC where he received EVT. He is now happily home. *"I'm glad I got better cuz my neighbour needs me to mow his lawn - he had a big stroke last year."*

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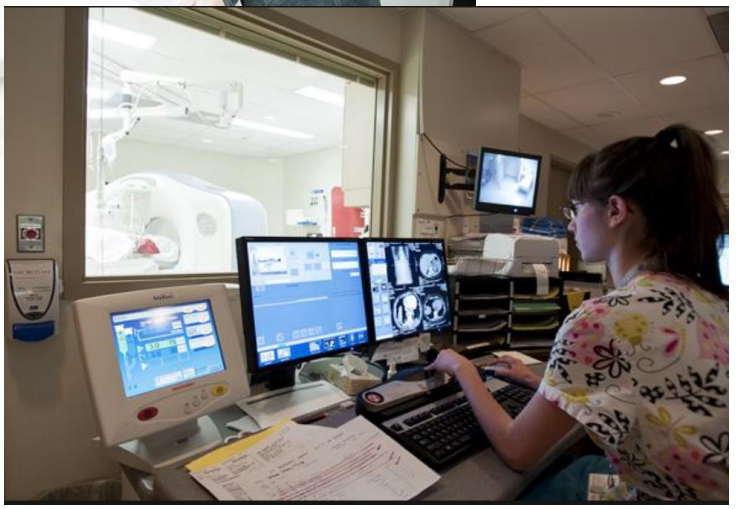
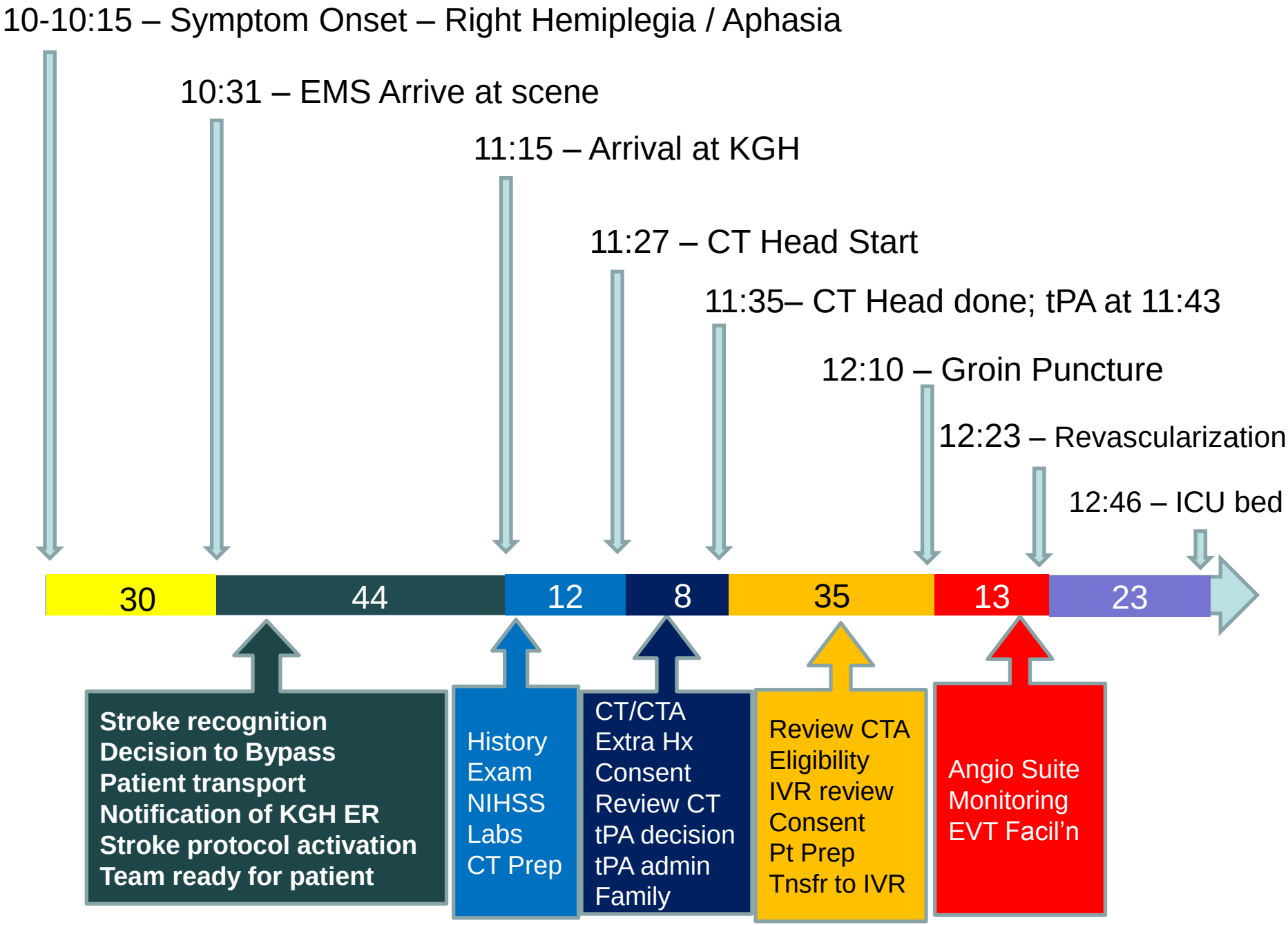
EVT Case

KGH Endovascular Stroke Team




10-10:15 – Symptom Onset – Right Hemiplegia / Aphasia
10:31 – EMS Arrive at scene
11:15 – Arrival at KGH
11:27 – CT Head Start
11:35– CT Head done; tPA at 11:43
12:10 – Groin Puncture
12:23 – Revascularization
12:46 – ICU bed
30
44
12
8
35
13
23
Stroke recognition
Decision to Bypass
Patient transport
Notification of KGH ER
Stroke protocol activation
Team ready for patient
History
Exam
NIHSS
Labs
CT Prep
CT/CTA
Extra Hx
Consent
Review CT
tPA decision
tPA admin
Family
Review CTA
Eligibility
IVR review
Consent
Pt Prep
Tnsfr to IVR
Angio Suite
Monitoring
EVT Facil'n

SUBTRACTION

Shutter

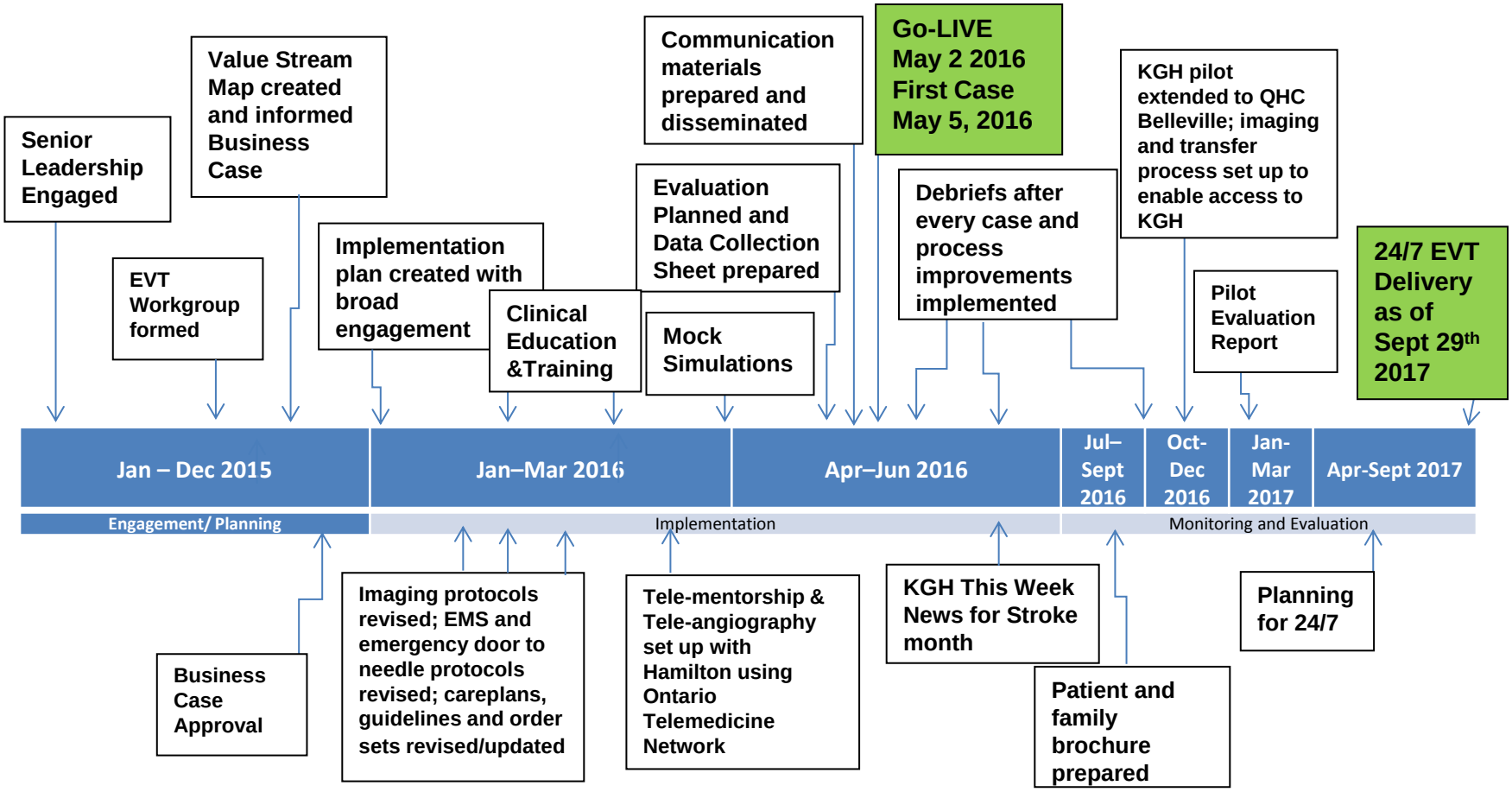

SUBTRACTION
LAO 6°
CRAN 9°
FD 31 cm
LEFT
0:00
5:00
12:16:30
2
13-10


SUBTRACTION
LEFT

Post-procedure

- In the angio suite, started conversing in full sentences while on the table and shook hands with people in the room
- Patient made an almost complete recovery in the angio suite
- The next day – no deficits, CT scan showed no infarction
- Patient went home in 4 days, living alone

Project Implementation Summary



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Key Implementation Issues

- Funding!!
- Telementorship; telefluoroscopy
- Support: Hamilton & Calgary teams
- Imaging protocols
- Revised ED processes to ↓ time
  - Stay on EMS stretcher to CT
  - tPA delivery in CT suite
- Interprofessional debriefs
- Learning applied to each new case
- Continuous process improvement
- Belleville transfer protocol
- Moved to 24/7 fall 2017
- Monitoring & accurate data

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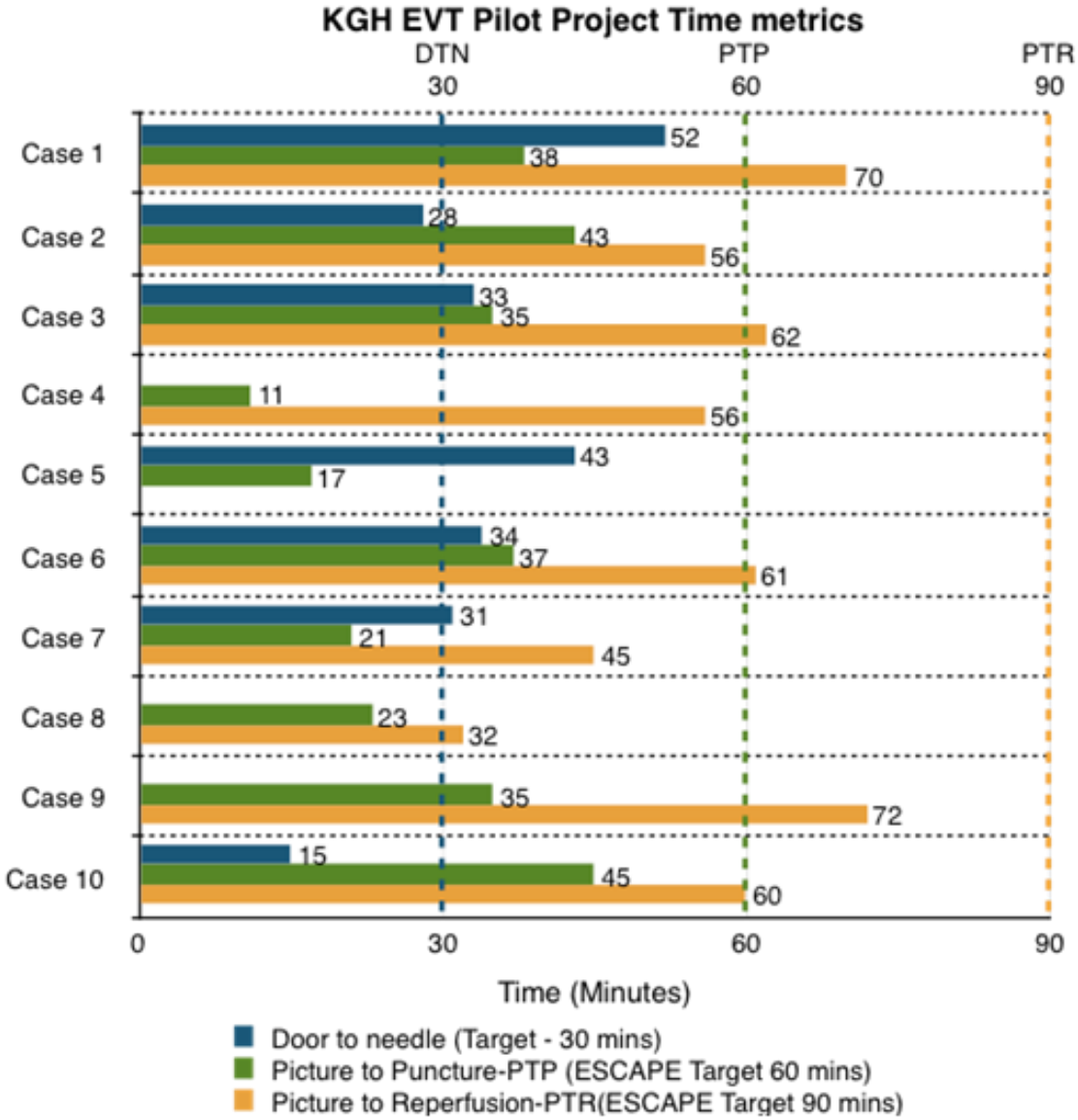
Results: KHSC Pilot Process Times
(vs ESCAPE Trial)



KGH mean times:

- DTN : 34 mins
- CT to Puncture: 31 mins
- CT to Reperfusion: 57 mins

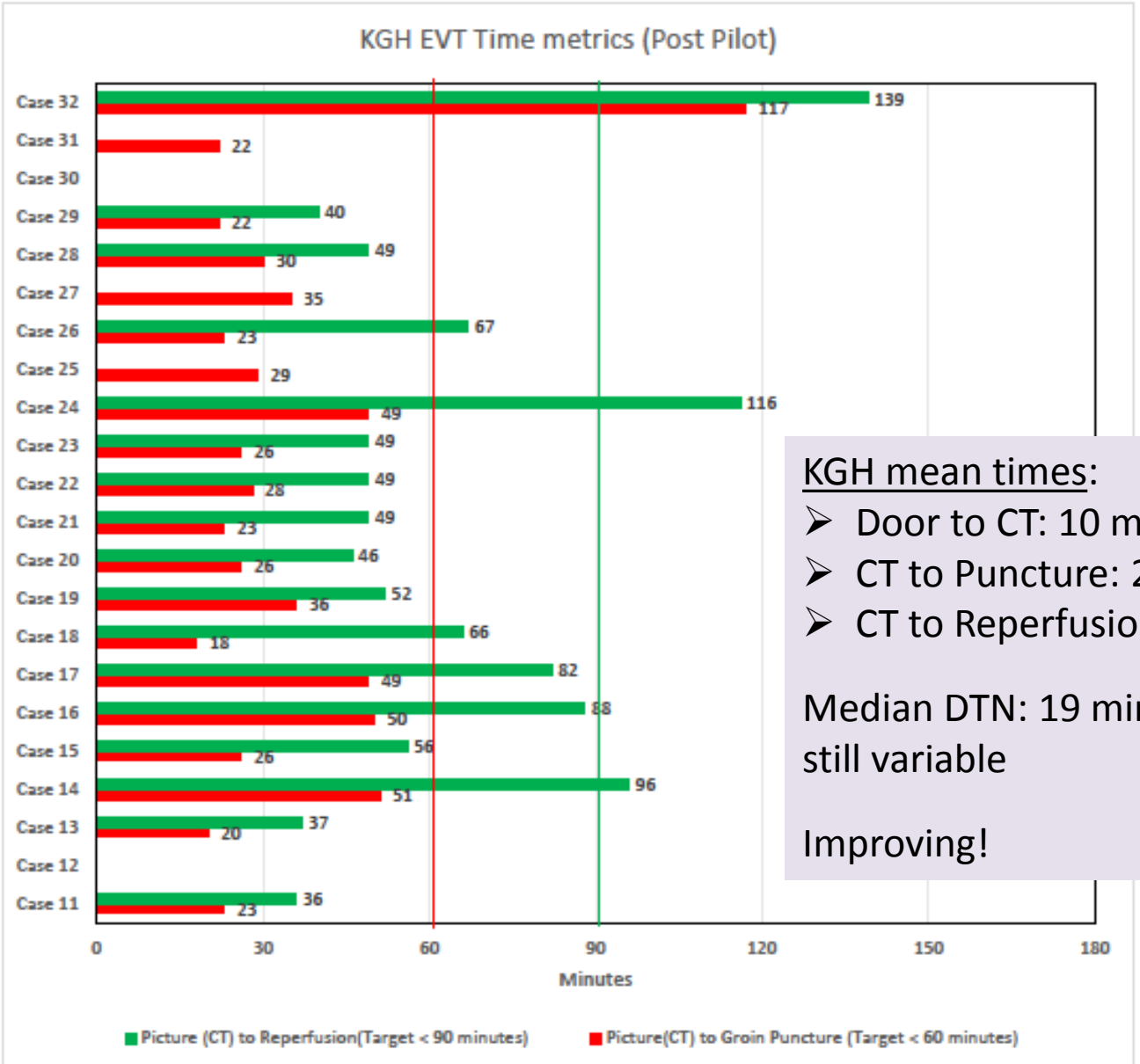
Assessment: KGH could save Door to Needle time

Action:
Trial of tPA in CT suite

Notes:
Cases 1, 5, 9: stroke occurred in-hospital.

Cases 4, 8,9 did not receive tPA.

Results: KHSC Current Process Times
(vs ESCAPE Trial)



KGH mean times:

- Door to CT: 10 mins
- CT to Puncture: 28 mins
- CT to Reperfusion: 52 mins

Median DTN: 19 mins in Q1 but still variable

Improving!

Results: KHSC Pilot Outcomes

Positive outcomes indicated by reperfusion scores of TICI 2b or 3 AND 90 day Modified Rankin Scale (MRS) score of ≤ 2 indicating minimal to no disability.

Case #	NIHSS Stroke Scale		tPA given	CT APECTS on arrival	Collateral score/ Clot on arrival	Reperfusion Score	LOS + DC		MRS at 90 days
	arrival	day 1					KGH	DC	
1	7	8	y	8	4 L M1 - FMD	TiCi 2b	5	death	6
2	23	0	Y	10	4 LMCA	TiCi 3	4	home	0
3	23	13	Y + IA	9	4 L M2	TiCi 2b	19	Rehab in NS, Home	2
4	20	0	N	8	4 RMCA	TiCi 3	4	home	0
5	20	N/A	Y	9	1 RMCA & M1	aborted	1	death	6
6	22*	4	Y	9	4 R MCA	TiCi 2b	2	BrGH 3 days, home	0
7	16	4	Y	9	3 RMCA & M1	TiCi 2b	6	BrGH home	0
8	16	9	N	7	3-4 RMCA & M1	TiCi 3	14	rehab; died of compli-cations	3* (*best score at acute discharge)
9	15	0	N	7	5 L MCA, M1	TiCi 3	6 From CVA	home	0
10	12	8	Y	10	4 R MCA, M1	TiCi 3	18	Slow stream rehab	4

6/10 with minimal to no disability
2/10 with moderate disability
2/10 deaths

Results: KGH Current Outcomes

Target: 53% 90 day Modified Rankin Scale (MRS) score of ≤ 2 (minimal to no disability)

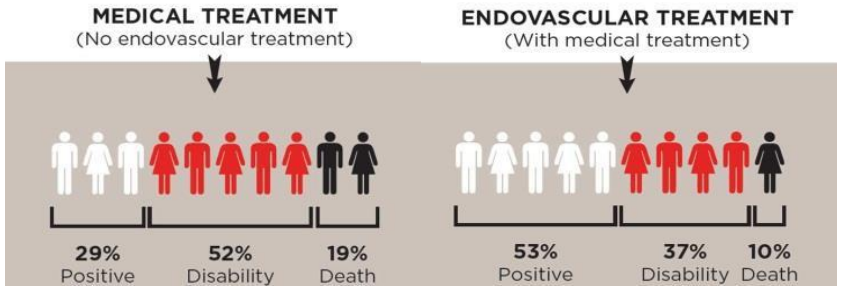
30 anterior cases from across the region since pilot completion

- 17 female, 13 male
- Average age: 72 years, range 52 – 92 years
- 4-5 cases per month since moving to 24/7 delivery
- Geographic distribution: HPE - 8; KFLA - 16; LLG - 6

Still awaiting 90 day outcomes on many; results vary each quarter:

- 50-55% with minimal to no disability
- 21-23% with moderate disability
- 5-7% with severe disability
- 20-24% mortality; less if remove aborted cases

Compare to ESCAPE trial 2015:



M. Hill (ESCAPE) 2015 Figure 1

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Story-telling: the Challenges

- Time delays - travel
- Technically difficult procedures:
  Tortuous, calcified arteries
- Posterior Circulation Stroke
  - Evidence is unclear
  - Selection? – MRI
  - Time window uncertain

- Medically Complex - in-hospital stroke; intubated
- Increasing volumes; timely repatriation; secondary prevention

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Conclusions

- Demonstrated feasibility at KGH.
- KGH has operational capacity & technical ability to perform EVT safely and effectively with outcomes in line with published trials.
- Many patients stand to benefit

Commitment to:

- 24/7 EVT delivery
- Regional access
- Continuously improving

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Questions / Discussion

Care

Stroke EVT Team

Kingston General Hospital
Outstanding care, always™

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