### TeleStroke in Manitoba

Susan Alcock, RN, MN Department of Radiology University of Manitoba Winnipeg November 17<sup>th</sup>, 2023 Stroke Day

# Faculty/Presenter Disclosure

#### • Faculty: Susan Alcock

#### Relationships with financial sponsors:

- Any direct financial relationships including receipt of honoraria: NA
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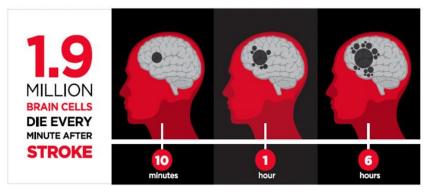
# Mitigating Potential Bias

- The speaker of this program has complete control over the content of this program. There has been no influence from the sponsors on the content.
- No personal conflict of interest or bias

# Learning Objectives

- To explore the evidence supporting TeleStroke
- To learn about the Manitoba TeleStroke Program
- To learn about our current TeleStroke research study

# Acute Stroke



- Is a time sensitive medical emergency
- The longer the delay before treatment the greater the risk of permanent brain damage and more impairment
- Acute ischemic stroke treatment:
  - tPA &TNK 4.5-hour window
  - EVT 24-hour window
- The benefit of reperfusion therapy is strongly time dependent

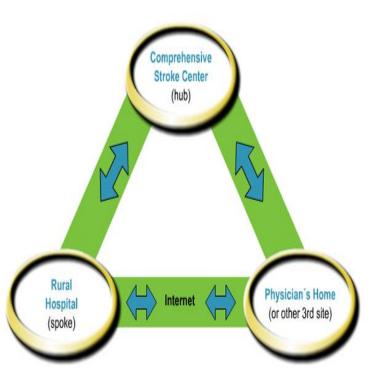
# Treatment Challenges

### Narrow treatment window

- Often made narrower by:
  - Lack of stroke recognition and understanding of its urgency
  - Patient unable to seek help
- Canada's vast rural geography (Ganesh et al., 2014)
- Lack of neurologists in rural areas

### What is TeleStroke?

- Innovative medium providing patients access to stroke care
- Real-time telecommunication linkage between 2 sites
- Facilitates rapid transmission of imaging
- Applications across the care continuum (spc, rehab, acute care, hyperacute)
- Mostly used for thrombolytic treatment
- EVT eligibility assessment



### www.strokebestpractices.ca

The Constition Journal of New singlest living as / Journal Constitution for an New singleses (2023), 1-33 doi:10.1017/j.j.2023.364



#### Canadian Stroke Best Practice Recommendations: Acute Stroke Management, 7th Edition Practice Guidelines Update, 2022

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Mana j Henn<sup>1</sup>, Patrice Lindsay<sup>2</sup> Q, Gord Gubtz<sup>14</sup>, Any Yu<sup>A4</sup> Q, Anwind Ganesh<sup>7</sup> Q, Rebecca Lund<sup>2</sup>, Sacha Amenau M, Drug Bidford<sup>4</sup>, Donnita Derhyshin<sup>10</sup>, Shannon Dou ette<sup>10</sup>, Eased deeg Chrooda<sup>20</sup>, Derin Hanh<sup>20,24</sup>, Nick Kanya-Fonten<sup>20,24</sup>, Eric Naplovich<sup>20,24</sup>, Zachary Ledeman<sup>4,10</sup>, Shanna Martiniuk<sup>14,10</sup>, Marie McCalland<sup>20</sup>, Geneview Mind<sup>20</sup>, Jeffey Mindk<sup>21</sup>, Erica Otto<sup>20</sup>, Jeffey Perry<sup>24</sup>, Rob Schlamp<sup>24</sup>, Donatala Tampieri<sup>20</sup> Q, Brian van Adel<sup>20</sup>, David Volden<sup>27</sup>, Ruth Wielen<sup>20</sup>, Samuel Vp<sup>24</sup>, Norte Foley<sup>94</sup>, Dric E. Smith<sup>7</sup> Q, Dar Dowletshaha<sup>21</sup>, Anita Mauntain<sup>20</sup>, Michael D, Hil<sup>2</sup> Q, Chelgy Martin<sup>2</sup> and Michel Shamy<sup>30</sup> Q<sup>0</sup>

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#### CANADIAN STROKE BEST PRACTICE RECOMMENDATIONS

#### **Acute Stroke Management**

7<sup>th</sup> Edition, Update 2022

Acute Stroke Management Scientific Writing Group: Leadership: Manraj Heran (Co-Chair), Michel Shamy (Co-Chair), Patrice Lindsay (Senior Editor), Rebecca Lund (Project Lead), Chelsy Martin (Project Lead), Gord Gubitz (Senior Advisor), Anita Mountain (Advisory Co-Chair), Eric E. Smith (Advisory Co-Chair). Members: Amy Yu, Aravind Ganesh, Sacha Arsenault, Doug Bickford, Donnita Derbyshire, Shannon Doucette, Esseddeeg Ghrooda, Devin Harris, Nick Kanya-Forstner, Eric Kaplovitch, Zachary Liederman, Shauna Martiniuk, Marie McClelland, Genevieve Milot, Jeffrey Minuk, Erica Otto, Jeffrey Peny, Rob Schlamp, Donatella Tampieri, Brian van Adel, David Volders, Ruth Whelan, Samuel Yip, Norine Foley

on behalf of the Canadian Stroke Best Practice Recommendations Advisory Committee, in collaboration with the Canadian Stroke Consortium.

https://doi.org/10/10/07/p.2022.366/Published online by Cambridge University Press

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# TeleStroke Systems

- Safety, feasibility, and efficacy of Hub & Spoke TeleStroke models has been established in Europe and North American (Lamote et al., 2003; Wilborg et al., 2003; Schwamm et al., 2004; Audebert et al., 2005; Waite et al., 2006; Vaishnav et al., 2006; Legris et al., 2016)
- Zhai et al., 2015- meta-analysis of 8 studies comparing outcomes of AIS patients treated with tPA through TeleStroke vs. in-person care. <u>No increased risk of mortality</u> and <u>no increased risk of sICH</u> associated with TeleStroke.

# Canadian TeleStroke Systems

Ontario and Alberta leaders.

- Porter et al., 2018- outcomes of patients treated with tPA with the Ontario TeleStroke Program (n=214) were compared to those treated with tPA at regional centres (n= 1855).
  - The administration of tPA using TeleStroke was not associated with an increased risk of death within 7 or 90-days (adjusted HR=1.29, 95% 0.68-2.44 and adjusted HR=1.01, 95% CI 0.67-1.50, respectively)
  - The administration of tPA using TeleStroke was not associated with an increased risk sICH or poor outcome (adjusted HR=0.71(95% 0.29-1.71 and adjusted HR=0.75, 95% CI 0.46-1.23, respectively)

# The Manitoba TeleStroke Program

# TeleStroke-Hyperacute Framework



amework

#### ≻<u>Structure</u>

- > Equipment
- Stroke Protocols
- Skilled Workforce
- ➢ Process
  - Best practices
  - Process metrics
- ➢<u>Outcome</u>
  - Access to care
  - Patient outcomes

TeleStroke Action Framework Heart and Stroke Foundation and Canadian Stroke Network, 2013

### Structure – Setting

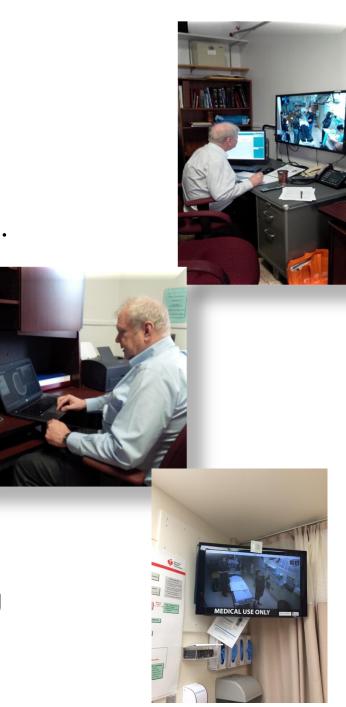
• Work started in 2013 with MB Health and HSFM.

#### HSC Hub

- 6- 10 TeleStroke Neurologists
- On-call 24/7
- Fixed equipment
- Mobile equipment

#### TeleStroke Sites

- Fixed TeleStroke equipment
- Dedicated stroke bed, clot box, stroke pkg
- I-Pad backup solution



### Structure – Stroke Protocols

 Pre-Hospital Stroke (rapid recognition and transport to stroke centre)

EMS

- Community Sites
- TeleStroke Site
  - Pre-notification
  - ED stroke protocol (order sets)
  - CT & Lab protocol
  - Dysphagia screen, stroke deficit tool
  - Post ED care



### Structure – Skilled Workforce

- Skilled workforce in Hyperacute stroke care
  - Neurologist
  - EMS & community sites (pre-hospital phase)
  - Stroke Centres: nurses, physicians, technologists
  - Acute Inpatient
- Formal Stroke Education
- Telehealth equipment training
- Mock trial (walk through and test)
- On going resources & education



### Measure Process and Outcome Metrics

### Process

- The care we provide in Hyperacute stroke Care
- Time driven
- Process metrics (DTN)

### <u>Outcomes</u>

- Patient (mortality, functional outcomes, adverse events)
- Organizational (access to care)

# TeleStroke Sites





Thompson: Nov 2014



The Pas: April 2015



Dauphin: May 2016

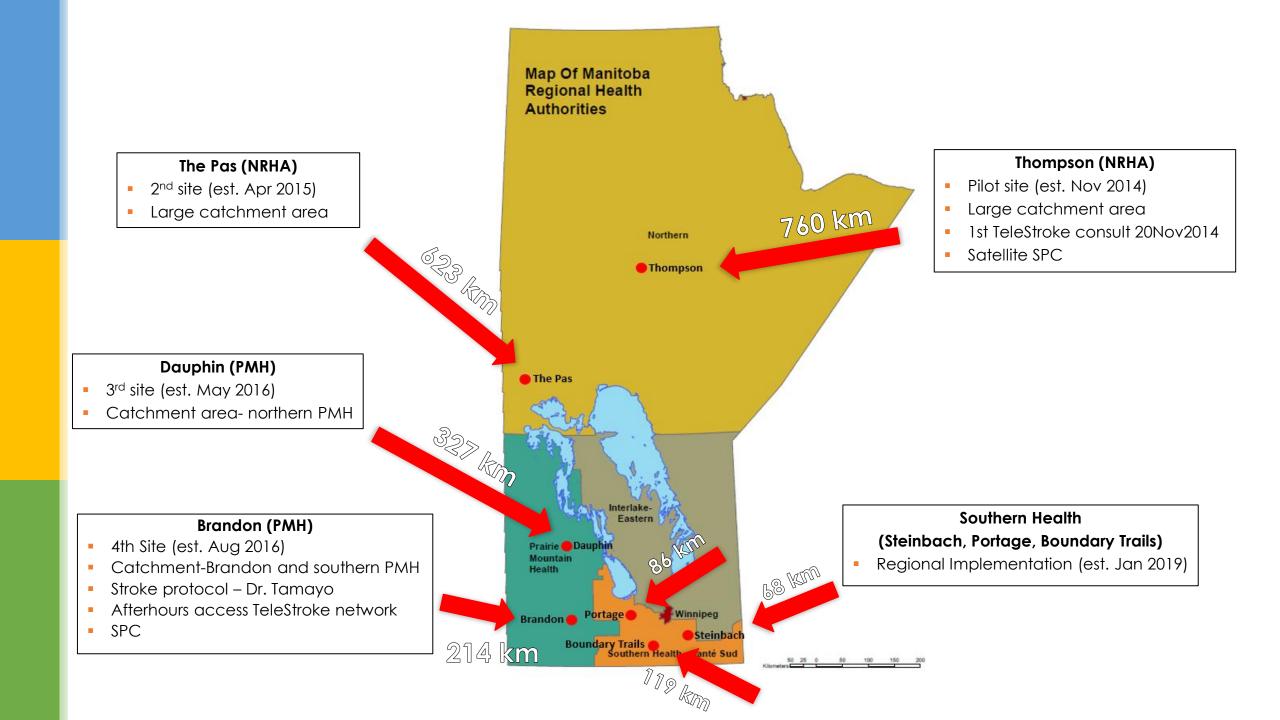


Brandon, Aug 2016









Implementation of the Manitoba TeleStroke Program: Lessons learned from the first eight years and the path forward

> Funding: Heart & Stroke Foundation REB Number: HS25492 (H2020:163) SH Number: SH2020:092 PHRPC Number: P2022-89

# Methodology

### Study Design

Retrospective observational study

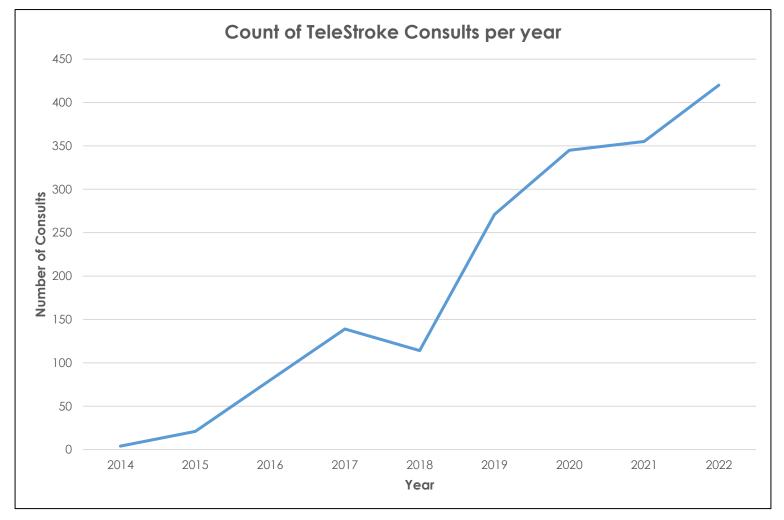
### Sample

- All consecutive TeleStroke consults during the study period (Nov 2014- December 31<sup>st</sup> 2022)
- N = 1749

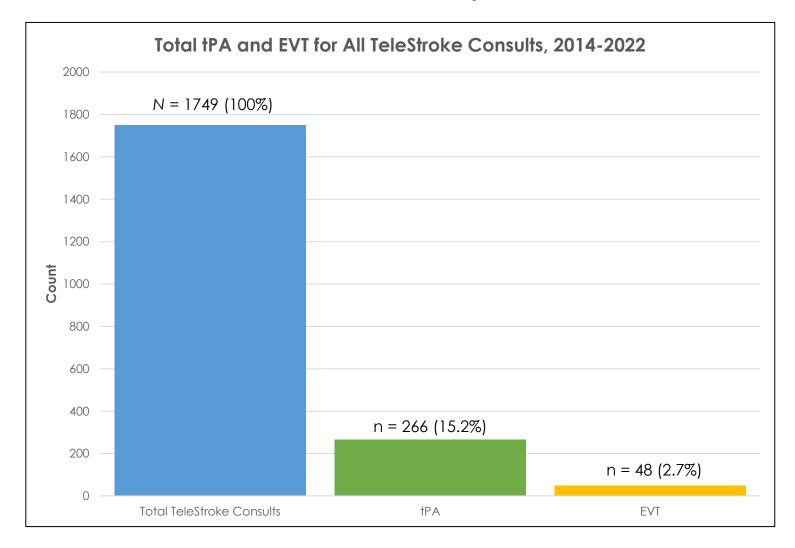
### **Data Collection**

- TeleStroke Consult form
- Missing data EPR
- CT- CTA times IMPAX

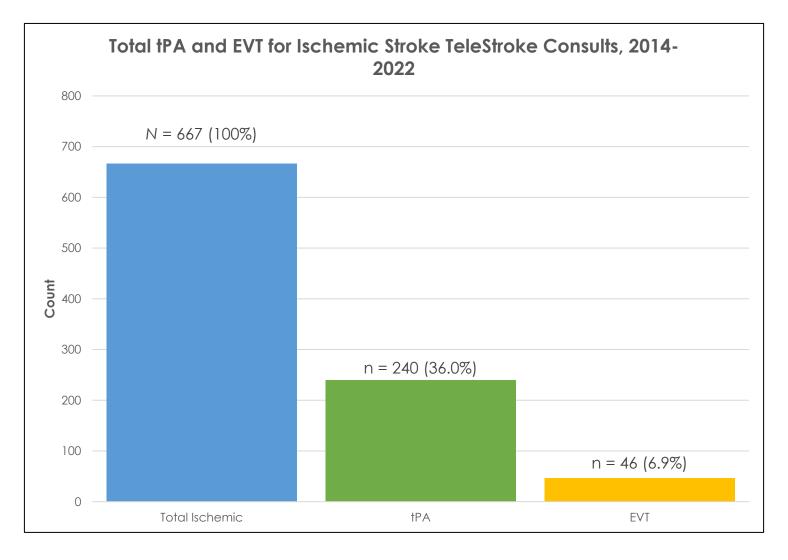
# Access to Care: TeleStroke Consult Volumes



### tPA Administration and EVT Procedures Among All Patients seen by TeleStroke



### tPA Administration and EVT Procedures Among Acute Ischemic Stroke Patients seen by TeleStroke



## Type of Reperfusion Therapy for AIS Patients seen by TeleStroke

Туре	Ischemic Stroke Consults N = 667 (%)
tPA only	214 (32.1)
tPA with EVT	26 (3.9)
Primary EVT	20 (3.0)

Most tPA (24.8%) and EVT (29.2%) cases from Brandon

### TeleStroke Consults: Reasons tPA Not Administered n= 1749

Reason	Count (%)	
Minor deficits	502 (28.7)	
Out of window	325 (18.6)	
Not a stroke	294 (16.8)	
Symptoms resolved	223 (12.8)	
On a DOAC or INR >1.7	149 (8.5)	
Hemorrhagic stroke	103 (5.9)	
Unknown onset	69 (3.9)	
Established infarct	63 (3.6)	
Patient declined	32 (1.8)	
Other	23 (1.3)	
Sub-acute infarct	13 (0.7)	

Note: patients can have multiple reasons indicated

Mortality of AIS patients who received tPA through the Manitoba TeleStroke Program as compared to the Ontario TeleStroke Program

	Manitoba TeleStroke Program	Ontario TeleStroke Program (Porter, 2018)	p-value
Time period	2014-2022	FY 2010-2011 and 2012-2013	
n	266	214	
7-Day mortality n (%)	23 (8.6)	28 (13.1)	$0.15 \\ \chi^2 = 2.0141, df = 1$
90-Day mortality n (%)	41 (15.4)	47 (22.0)	0.08 $\chi^2 = 2.9739, df = 1$

# Acknowledgements

- Dr. J. Shankar
- Dr. E. Ghrooda, Dr. N. Singh & Dr. D. McMillan
- Diagnostic Imaging Research Unit
  - Roman Marin
  - Benjamin Blackwood
  - Reva Trivedi
  - Marco Ayroso







# Questions?

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