A novel systems implementation trial to streamline acute stroke workflow towards improved reperfusion therapy delivery and better patient outcomes

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Disclosures
Nil pertinent to the presentation.
Overview of the Talk

Case Study: Scoping Challenges
- Background: The Clinical Need
- Objectives
- Methods
- Results
- Conclusions: Roadblocks and success
Case Study: Scoping Challenges
ACUTE STROKE CALL
“TIME IS BRAIN”

Every minute delay in thrombolytic treatment causes destruction of 2 million neurons, 14 billion synapses, and 12 km of myelinated fibers.
Inconsistent care practices adversely affect outcomes, patient safety, performance measures and cost.

Wasteful Clinical Spending Is One-Fifth of the Total Cost of Healthcare

- The answer lies in a combination of capabilities that rest on:
  - Consistency
  - Standardization
  - New knowledge
  - More effective patient care

Variation in clinical care cuts across...
Variation in clinical care cuts across...

Learning for action across health systems

https://www.opml.co.uk/projects/learning-action-health-systems
Background: 
The clinical need
**Endovascular Therapy for Stroke — It’s about Time**

Anthony J. Furlan, M.D.

New Eng J Med 2015:
- 5 Positive randomized trials
- 2 Editorials

**ORIGINAL ARTICLE**

A Randomized Trial of Intravenous Treatment for Acute Ischemic Stroke


**ORIGINAL ARTICLE**

Stent-Retriever Thrombectomy after Intravenous t-PA vs. t-PA Alone in Stroke


**ORIGINAL ARTICLE**

Endovascular Therapy for Ischemic Stroke with Perfusion-Imaging Selection


**ORIGINAL ARTICLE**

Randomized Assessment of Rapid Endovascular Treatment of Ischemic Stroke


**ORIGINAL ARTICLE**

Thrombectomy within 8 Hours after Symptom Onset in Ischemic Stroke

Endovascular thrombectomy: dawn of a new era in stroke
“Time is brain” → Minimise treatment delay → Early treatment, improved clinical outcome, healthcare costs savings, and improved process of care workflows → Ethical Policy design and roll-out
TEFLON – Thrombolysis and Endovascular Flow Network – a systems based trial

Develop a multifactorial, systems based TEFLON intervention strategy involving a multidisciplinary stroke care pathway to reduce treatment delays in reperfusion treatment delivery.

Initial testing of TEFLON implementation, across southwest (Liverpool) and southeast (Prince of Wales) Sydney hospitals, incorporating baseline audit, and intervention arms.
OBJECTIVES
Clinical Practice Improvement – TEFLON Model

What are we trying to accomplish?
Clinical Practice Improvement – TEFLON Model

What changes can we make that will result in an improvement?
How will we know that a change is an improvement? That is, what do we need to measure?
AIMS

Design: **pre-test post-test controlled trial design**

AIM:

Specific Aims

- Identify existing systemic gaps and barriers to improved systems for reperfusion treatment delivery.

- To develop the design of TEFLON and test the feasibility of TEFLON package in delivering optimal care to AIS patients in south-west and southeast Sydney.

- To test the efficacy of TEFLON in improving treatment delays compared to the conventional model.

- Reduce treatment delay in reperfusion therapy by 20 minutes.
METHODS
Methods

• This is an implementation and knowledge transfer trial of a package intervention aiming to identify and address system of care gaps in acute stroke reperfusion treatment delivery across two Comprehensive Stroke Centres in Sydney.

• Following a baseline phase, processes of care are being mapped and measured, clinicians and management stakeholders are being consulted, and a new system-based “TEFLON” workflow model of care is being developed.
The TEFLON Cycle – The Improvement “Wheel”

1. Project phase
   What you are trying to accomplish?
   Who should be involved.

2. Diagnostic Phase
   Establish the full extent of the problem
   Changes needed to make improvement
   How to measure improvement

3. Intervention Phase
   Implement changes identified in the diagnostic phase

4. Impact and Implementation
   Measure and record the effect of the changes

5. Sustaining improvement phase
   Continue monitoring and planning further improvement
PSDA Cycles – single test

Hunches, theories, and ideas

Changes that result in improvement

PSDA Cycles – multiple tests

Month 1
Month 2
Month 3
Future Plans

Proposed future rollout of TEFLON implementation based on a stepped wedge cluster randomised trial design across Sydney, NSW and Australia.
Expectations/targets

If successful, TEFLON model will provide improved efficiency in the delivery of reperfusion therapy across two major hospitals in south-west and south-east Sydney.

*Opportunity for a strong platform for city-wide (Sydney), state-wide (NSW), and potentially national rollout of a system-based reperfusion implementation plan.*
TEFLON Cycle

- Diagnostic phase
  - Process flow charts
  - Customer focus groups
  - Brainstorming
- Solution development
- Implementation
- Measurement
- Review re-Cycle
RESULTS
### REPERFUSION THERAPY

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TEFLON PACKAGE:
- Ensure direct availability of CT room in ED
- History, medication use, and point of care glucose measurement during ambulance transport
- Education of EMS staff to recognise and prioritise acute stroke – reducing pre-hospital delays
- Collective pager warning of stroke team prior to patient’s arrival
- Benchmarking door in door out time (40-45 minutes) at a primary stroke centre

IN-HOSPITAL PHASE Process improvements:
- 1. Getting pts thrombolysed on CT table – already underway – plan to have a 24 * 7 service
- 2. Expediting CT reporting especially during after-hours
- 3. Availability of reporting radiologists
- 4. Ambulance pre-communication to ED so that the ED is better prepared to receive patients. Including pre-registration of pts who might not be known to the “hospital system”
- 5. Direct transfer onto CT table upon hospital arrival??
- 6. Simultaneous EMS briefing, neurological evaluation and blood withdrawal on CT table??
- 7. PRIORITY: To thrombolys patients within 1 hour of acute admission (since the door time)??
CONCLUSIONS: ROADBLOCKS AND SUCCESS
Conclusions

• Our baseline audit phase has led to recognition of processes and shared development of multidisciplinary collaborative TEFLON intervention package.

• The package has been developed and introduced in cycles over the intervention period.

• TEFLON model holds promise for improved care, cost savings, improved stakeholders satisfaction, and improved clinical outcome.

• This will provide a strong platform for state-wide reperfusion therapy policy framework and an opportunity for national roll-out.
What I’ve learnt...

• The single biggest driver remains: “behavioral change”
• Human factors can “make or break”
• Insufficient support from senior leadership and bias against uptake of ”new processes”/workflows are top barriers
• Embedding evidence-based research into healthcare settings is challenging and frustrating but... (there is light at the end of the tunnel)
• There is incentive in bringing or ensuring value to research and we must continue to wheel the “improvement wheel”
• Clinical research, translation, policy design is a collaborative endeavour
• Fostering a supportive environment would go a long way in improving aspects of health-care delivery to our patients
• Resilience and kindness pays.
Road Ahead: Opportunities for innovation and practice improvement amidst challenges
Harmonizing brain clot pathology analysis and workflow across NSW
Professor Murray Killingsworth  
Dr Sonu Bhaskar  
Liverpool Hospital  
Ingham Institute for Applied Medical Research  
Correlative Microscopy Facility  
1 Campbell St  
Liverpool NSW 2170

Dear Professor Killingsworth and Dr Bhaskar

**NSW Biospecimen Collection Grants – Expression of Interest**

I refer to the application from Liverpool Hospital/Ingham Institute for the NSW Biospecimen Collection Grants Expression of Interest entitled *NSW Brainclot Bank*.

I am pleased to advise that your application has been successful to progress to full application (Stage 2). The NSW Health Statewide Biobank (NSWHSB) Scientific Advisory Group reviewed all applications and has the following feedback for you to address:
Acknowledgements

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Thank you
Department of Neurology,
Neuroradiology, Pathology and Emergency medicine

You’re only as good as your team.
STOP LOOKING AT ME..

I`M HAVING A STROKE

Questions?

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