

# Centre Research Excellence (CRE) in Stroke Rehabilitation & Brain Recovery workshop

Smart Strokes 2018 Conference

Pat O'Leary  
October 2018

# Order of events

1. Studies in Stroke
2. Fatigue
3. Current trials 5 min presentations
4. Community services and meeting the needs of stroke survivors
5. Use of technology
6. Next big things

# 1. Studies in stroke

- Karen Borschmann: Aust Stroke Research Network: using consumer consultation, interstate collaboration, social media
- Julie Bernhardt: Responders and non-responders to rehab using
  - biomarkers of recovery,
  - core set of outcome measures,
  - intervention monitoring,
  - translation of basic science
- Liz Lynch: Implementation Science and template to reflect changes in behaviour and knowledge
- Monique Kilkenney: Data Linkage: linking TIA/Stroke to prior events, to A&E attendance, to AROC (clinical stroke)
- Leeanne Carey: Imaging – various studies profiling imaging to determine prediction models, markers, quality of white matter, functional connectivity to levels of impairment: **CoNNECT** cohort, **START**; correlates to depression
- Rohan Walker: Basic Science
  - **TOTO** – predictive biomarkers for haemorrhage,
  - **AuSPICE** – biomarkers for heart attack and stroke,
  - Viscosity – prediction of futile recanalisation,
  - Stress stroke study – biological metric: cortisol loading in hair

# 2. Post stroke fatigue and anxiety

Avril Drummond

- Chronic lack of energy, aversion to effort
- Unrelated to previous exertion levels
- Not ameliorated by rest
- Affected: 23 – 75% (50%) Adversely affects rehab, associated w poor functional outcome and increased mortality
- UK data 43% inadequately supported – now a priority in the Action Plan for Europe
- Relationship to depression – which first?
- **NoTFAST** (Nottingham fatigue after stroke)
- To investigate the frequency of fatigue without depression. Mild strokes
- Recruit/screened/ excluded/included (263 w 213 followed up).
  - Pre-stroke 14.9%, 4/52 43%, 6/12 51% (Not depressed – screened out).
  - Of those w fatigue, 61% had ongoing
  - Significantly higher fatigue at 6/12 than 4/52 (New fatigue in 38%)
  - Anxiety – main issue at 4/52 and 6/12
- How does it affect you? “Changed my whole life, takes the brightness out of life”
- What is best management – still unknown
- Need to investigate fatigue/depression relationship and look at anxiety

# Qualitative aspects

**Descriptions of reduced drive, stamina, and overall activity levels:**

*"I never felt this tired. Never felt tired like this before."*

**Spending longer / more frequent periods of time sitting down during the day:**

*"I have to keep stopping. Really short spurts. Whereas you could spend all day, now I'll perhaps do an hour and then I'll stop and then maybe start again a bit later."*

**Physical vs. mental fatigue:**

*"Thinking about what I'm actually going to say and what I'm actually saying, that's what makes me tired as well."*

**Lack of advice from healthcare professionals:**

*"I haven't really spoken to anybody about it."  
"Nobody else has mentioned it."*

# Drugs for Fatigue

Andrew Bivard

- Fatigue is common across many diseases - Immune response causes fatigue
- If >3/12 – likely to be ongoing
- Interventions:
  - CV training – not statistically significant
  - Cog training – changed expectations – impacted less by fatigue, did not reduce the fatigue
  - Fluoxetine (broad spectrum SSRI – not specifically targeting fatigue) no change
  - Other drugs – stimulants – problems in patients w CV risk factors
  - New trial **Modafinil** – feel more awake, not stimulated to “jump off things”, limited drug interactions, used already for OSA, narcolepsy. On PBS w good safety profile
  - Studies: Norway – no meaningful difference between groups
    - **MIDAS** – 3/12 post (200mg daily) min safe dose: sig improvement QoL - return to work. Stroke May 2017 vol 48 issue 5
    - MRI significant relationship w volume of deep white matter involvement (2° degen process). Probably how fatigue affects other conditions

**MIDAS 2**

# Cog behavioural techniques to improve fatigue and mood post stroke

Dana Wong

- CBT – shift patterns of behaviour
- Study by Sylvia Nguyen 2017 “Effect of motivational interviewing for anxiety and depression symptoms post TBI”
- Modules – fatigue x 5, sleep x 5
- Positive outcomes on sleep quality and fatigue (all maintained at follow up), anxiety and depression (better than a trial that specifically targeted depression)
- Body battery (used by OT) esp in those who make high demands of themselves from prior functioning). Cog restructuring is crucial
- Concurrent treatment of sleep and fatigue
- Underpinning biological causes – topography rather than size of infarct is important, increased energy required to recruit pathways
- Treatment targeting Sx rather than causes

Discussion: Julie Bernhardt “parallels chronic pain and fatigue –maladaptive element to fatigue?”

Avril D: sleep pattern changes may precipitate physiological changes

DW: CBT addresses 2° changes

Effect of personality on fatigue persistence – highly likely – esp high functioning and perfectionists. Link w anxiety. Prior psych history also linked w fatigue

Avril D: Nothing answers whole question of fatigue – multi-factorial, therefore treatments need to be multi-factorial.

# Current pre-clinical studies on post stroke stress and cog impairment

Lin Ong

- 80% memory, learning and executive function impairment, 30% develop vascular dementia
- Structurally
  - loss of neurones – death and synaptic dysfunction
  - Neuro-inflammation – astrocytes, microglia, infiltrating immune cells
  - Accumulation of neurotoxic proteins (amyloid)
- Impact of chronic stress on brain recovery:
  - ↑ tissue loss (neurodegeneration), ↓ brain repair process, ↑ accumulation of amyloid, ↓ motor outcomes
- Growth hormone improves cognitive function in animal models
  - ↓ tissue loss, peri infarct ↑ neurotrophic factors, ↑ synaptogenesis, ↑ re-myelinisation, ↑ CV remodelling

# 3. Current trails

- **VESPUR:** Kate Hayward: Very early start to personalised UL rehab after stroke - when/who/how much to target for UL recovery
  - MEP +ve or -ve
  - Elicit movt/increase strength/increased dexterity, speed and control.
- **AExaCTT:** Sarah Valkenborghs: Aerobic exercise and combined TST trial
  - Hypothesis: increased neuroplasticity and UL function (in and of itself) from aerobic training. Prime brain for subsequent motor training
  - 42 enrolled over 17/12, 3x/wk for 10/52
  - 30 mins aerobic activity and 60 mins TS Training
- **VERSE:** Erin Godecke: Very early aphasia rehabilitation after stroke:
  - 0-14 days Group 1: usual care, group 2: usual care + group, Group 3 VERSE group for 35/7. endpoint 12/52, reviewed 6/12. screened 13,500 pts, 7% recruited (AVERT recruited 9%) 90% were followed up >480 clinicians involved, intervention sessions recorded and analysed and feedback supplied. Results in October 2018
- **HOME:** Dominique Cadhillac: OT discharge planning to facilitate transition from hospital to home: 360 IP with first time stroke – half OT in home, half OT as IP
- **AREISSA:** Heidi Janssen: Altering the rehab environment to improve stroke survivors activity Phase 2
  - Patient activity (physical, cognitive, social) levels, behavioural mapping
  - Adverse events
  - **Between and within variability in variables** at 90 days post stroke
  - SaSIERE: non enriched/enriched environment
  - IBIS: Investigating boredom in stroke survivors in rehabilitation
- **BUST-Stroke:** Paul Mackie: Breaking up sitting time after stroke – Reducing BP through sitting less:
  - frequent breaks in sitting time reduces BP after stroke; 22% more time sitting than healthy, only 24% light PA
  - Optimal dose of standing in prolonged sitting that will produce meaningful reductions in SBP, glucose and insulin responses
  - >3/12 after stroke w mod walking disability; Standing ex; 50 participants over 5 cohorts, 5 mins x 2/4/6/8/10x day (over 8 hours)

# Presentation by Natasha Lanin

## Implications for clinical practice

- Use walking speed to differentiate rehabilitation strategies
- $> 0.8$  m/s: train fitness - high intensity walking training
- $0.4-0.8$  m/s: high amount and intensity walking training, walking stick when out and about
- $< 0.4$  m/s: provide strategies for getting out into the community

# 4. Community services: meeting the needs of stroke survivors

Vincent Thijs- increased stroke in younger ages over past 10 years.

- Online survey using facebook and social media looking at unmet need 76 responses
- Hierarchy

Finances

Social participation

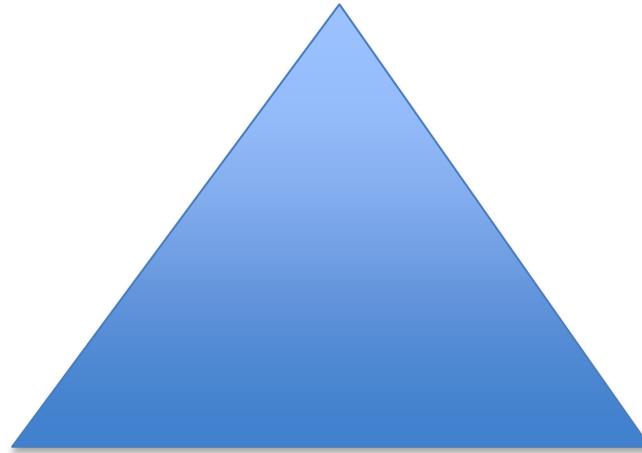
Impairment from stroke

Healthcare experiences

Work/study

ADL/work

Daily activities



Qualitative analysis by J Shipley showed that

1. Psycho-emotional support – early psych involvement and emotional support in the IP environment, lack of attention to cognitive injuries
2. Isolation – lack of information and structured support – problems with retention of information, age appropriate information, care at discharge, lifelong follow up
3. Failure to deliver age relevant patient centred care (generic care geared towards older clientele)

# BEEPERS: Gaps in QLD Health Service

Ingrid Rosbergen, lead was Rohan Grimley

- Access to Rehab – building efficient and equitable pathways. Different pathways e.g. straight to ASU, Inpt rehab, Rural Hospital, Comm Rehab and pathways from and between these services to GEM unit, comm rehab, TCS.
- Looking at how much rehab stroke survivors receive and how this varies by setting. 7 centres: 2 comp metro, 3 regional, 2 small metro. 504 patients
- Rehab dose median across all sites 43 hours/patient: varied from intense to TCS/Comm rehab 4 hours total per patient
- Varied from 107 mins/day in Acute stroke rehab to 20 mins day TCS and 11 mins/day Comm rehab
- Often lots of assessments at transition from one entity to the next, possibly not needed if good handover
- Referred if dependent at 72/24 (mRS 3-5)
  - From 7 sites, rehab provided in 83 different services
- Conclusions:
  - Rehab flows are complex and disorganised
  - Dose of rehab varies widely by setting
  - ASU provide most of initial and sig proportion of all rehab in QLD
  - Community rehab (OP and TCS) associated w very low rehab doses and intensity
  - Clinicians need to consider the amount of rehab required as part of their decision of where to refer.

# International Perspectives: Canada and UK

## Marie-Louise Bird “Lived experience of stroke”

- Development of FAME in rural sites (partnership w Rec centres – training fitness instructors in post stroke group exercise). As recognition of high priority to develop and implement community based exercise program for treatment AND PREVENTION of stroke.  
[www.cdha.nshealth.ca](http://www.cdha.nshealth.ca) Easiest to google: FAME exercise program
- Tele-rehab/e-health literacy
- Partnering w community support groups in consumer driven research

## Avril Drummond European Action Plan. Review scientific evidence, look at state of current services and set targets for decades to follow (2018 – 2030)

- 7 topics: 1° prevention, org of stroke services, management of SS, 2° prevention, rehab, evaluation of outcomes/QI, life after stroke
- LAS: includes all affected (childhood strokes), families, LT consequences – finance, community, loneliness, ongoing fatigue, RTW, marriage breakdown
- Research needs: experience and needs of stroke survivors at different parts of the life span, Needs, Models of care/LT Care, self mgt - IT
- Targets for 2030: stroke champions for min standards in life after stroke, links between stroke survivors, national plans, self management and peer support, digital platforms

Discussion: People w aphasia are often excluded from trials, ethical issue that these people are NOT included? Canada appoint “patient voice group” to assist w this

RTW: Don’t be too quick to assess that they can’t return to work – phased return

Assessment for Rehab: standardised tool from NSF “Australian Ax for Rehab Tool” only used by 3%. Good even if it identifies unmet need

# NSF Assessment for Rehabilitation

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## Appendix 3 – Assessment for Rehabilitation: Decision-Making Tool

### Assessment for Rehabilitation: Decision-Making Tool

**Name and history:**

**Date of completion:** **Completed by:**

Domain	Current level of function (brief description plus I A D)	Rehab Indicated (Y/N)	Management level available at:		Initials
			Home	Inpatient	
Specialty needs (e.g. IV, PEGS)					
Swallowing					
Hydration, nutrition					
Contenance					
Mobility - transfer, gait					
Activities of daily living (incl personal+/- instrumental)					
Eating and drinking					
Communication					
Cognition, insight					
Level of alertness, engagement					
Vision - sensory systems					

# Lunch



## 5. Using technology to enhance access to EB Care in stroke recovery

Michael Nilsson

- CITRS: Centre for Innovative technologies in Rehab Settings and how technology can keep people at home.
- Costs: acute care \$\$\$, residential \$\$, home \$

Cathie Sherrington

- Greater dose, better results
- 2015 paper of the year J of Physio: Corbetta D, Imeri F, Gatti R. Rehabilitation that incorporates virtual reality is more effective than standard rehabilitation for improving walking speed, balance and mobility after stroke: a systematic review.
- Used Nintendo Wii fit, X box Kinect, Fitbit, Smartphone PA apps, Humac – Wii balance board, UTS stepping tiles, Fysiogaming, Walk forward: matched the technology to the problem (tailored approach) Physio 6/24 – visits and phone
- Mobility outcomes – short physical performance battery – 3 and 12 point versions gait speed, no of sit to stands, st balance (all timed).
- Results: Increased no of steps, more impact on those more impaired at baseline, DEMMI, max balance, step test, SLS all improved at 6/12  
More enjoyable, QoL better but not stat sig
- Conclusion: tailored, targeted Interventions in addition to usual care – feasible, enjoyable w PT support improved mobility and some aspects of physical activity especially for younger patients

# Cog rehab in telehealth

Rene Stolwyk

- Only 4% rural strokes have access to psych, engagement in rehab can be affected
- Echuka project – tele-neuropsychology
- 70 stroke admissions, no neuropsych, difficult to attract to part time position in rural area
- Used existing desk tops w Zoom VC software, existing PC and tablets
- Started w education series to build knowledge and competence of staff/clinicians – 8/52 program where patients were discussed
- Linked to OT memory/cognition/mood
- Behavioural investigation for challenging behaviours on ward
- Neuropsych Ax and psych interventions
- Economic value – business case accepted, funded for 2 years
- Data 12/12 pre implementation compared to 12/12 post implementation – access to psych improved from 0-73%
- 90% telehealth 10% F2F, 89% satisfied/v satisfied

# Smart Homes

- Smart Assistive Technology – enables older and disabled people to live independently in their homes for longer. Sunshine Coast. Couple - engineers w CSIRO – she is still working
- Access by phone app: GP, care providers, on line community.
- Surveillance
  - Floor sensors throughout the home – wear dog tags 3-4/52 to differentiate routines between residents, therefore interpret data for different people in house
  - Power meters on appliances – what time of day they are used
  - Bidet, iPad – audio books, electric chair lifter, black non slip benches w tools visually displayed in kitchen, call link alarm
- Has led to ↑ socialisation, ↑ mobility, appropriate timing for funded services, indicates when needing more support, ↓ carer stress, improved goal setting, self directed, links to service providers (counts steps)
  - Acceptability – privacy implications

# 6. Next Big Things

Julie Bernhardt : AVERT DOSE: determining optimal early rehabilitation after stroke: a multi arm co-variate adjusted, response adaptive RCT

- 4 potential treatment regimens – amt/frequency per day. 5 years, to start soon.

Liz Lynch: Investigating implementation of 2017 Stroke Clinical Guidelines in inpt stroke rehab.

- Stroke patients disempowered – goals not meaningful, not enough rehab
- Carers – don't know what questions to ask – looking at provision of information at different time points across rehab
- Robust care plans for transition to home
  - Provision of education – what do they want?, what format is most effective? Who should be the source of the information.
  - Amt of practice – how can services co-ordinate more practice? Safety vs mobility. Falls policy

Nadine Andrews: Evaluation of enhanced models of 1° Care in the mgt of stroke and other chronic diseases

- PRECISE: comparing CD management via MD care w self management

GP Mgt Plan – more structured approach to Team Mgt Plan w variety of AH access (must have needs Ax) ?Improved outcomes/cost effectiveness

- Using big data – AuSCR, Medicare data, Hospital admission and Emergency data, Pharmaceutical data, Nat Aged Care Data Clearing House, Purposefully collected survey data

Leeanne Carey: Network of sites and up-skilled therapists to deliver BP stroke rehab of UL especially into sensory loss. Using SENSE as exemplar

- Network of people “hub/champion therapist/ delivery by therapist”
- Looking at different models of care
- 8 health networks, 97 PT/OT recruitment completed
- Therapy protocols/training and economic analysis

Rohan Walker: Stroke induced disturbances in glymphatic clearance

- Brain uses 10% of all energy – what happens to the waste? Glymphatic system. Impaired removal of waste post stroke. Accumulation of neurotoxins exacerbated by stress and associated with cognitive impairment
- Looking at methods to kick-start excretion mechanisms
- Microglia have a role in directly eating the waste, but microglia paralysis seen in post stroke neurodegeneration. Post stroke – brain is not stable, progressive degeneration – particularly white matter tract degeneration
- ↑ Levels of microglial activity w assoc neuronal loss (they are related)
- If ablate 1 neurone “compartmentalise the injury” – microglia clean up, but at sites of 2° neurodegeneration – microglia become paralysed
- Predictors of ↓ microglial activity – receptor clustering (P2Y12) – clopidogrel is a P2Y12 antagonist and may prematurely turn off the repairing cells of microglia - accelerating degeneration

# Questions?

