The Hopkins Centre
Research for Rehabilitation and Resilience

Evaluating the effectiveness of on-road driving remediation following acquired brain injury: a wait-list feasibility study

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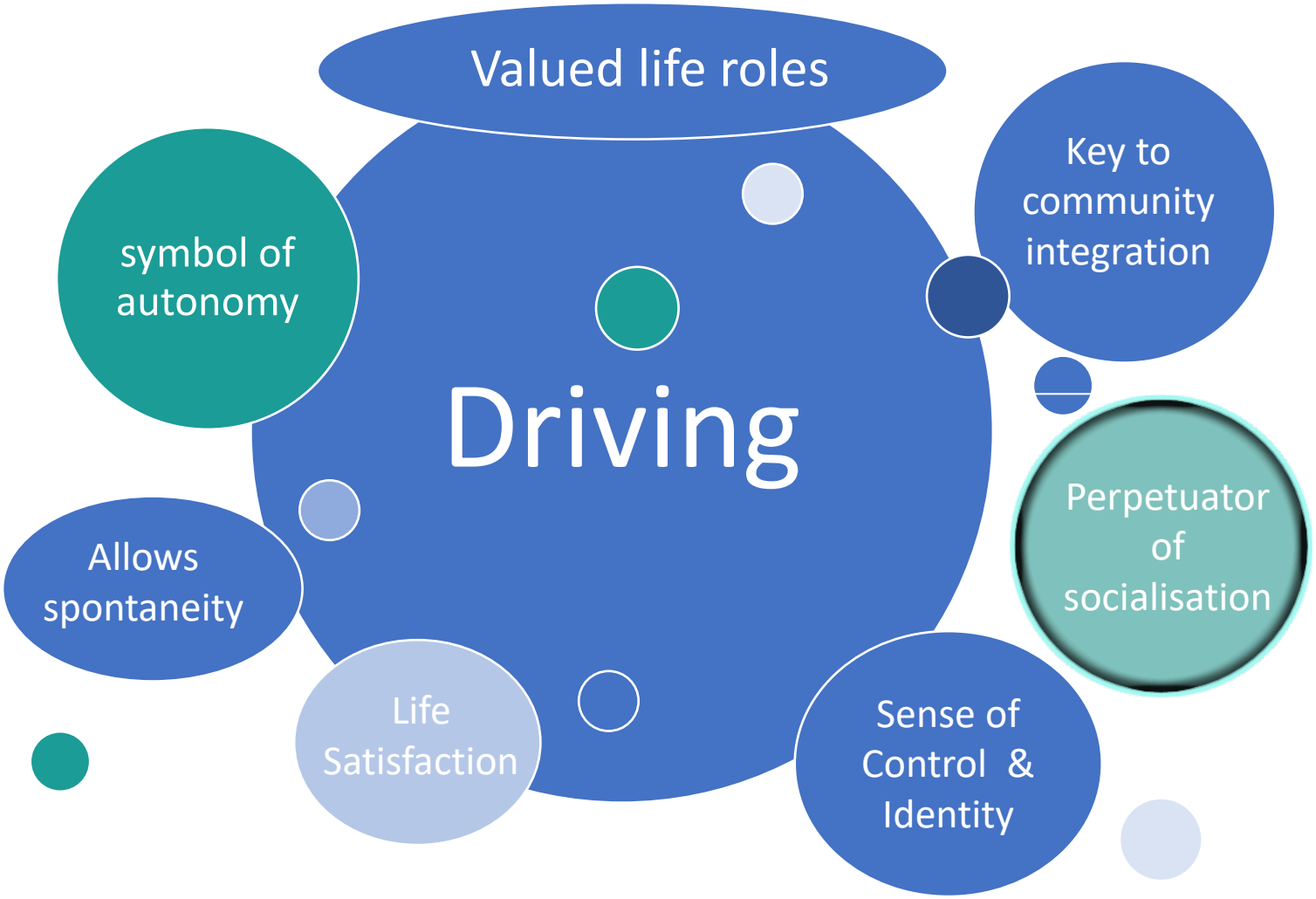
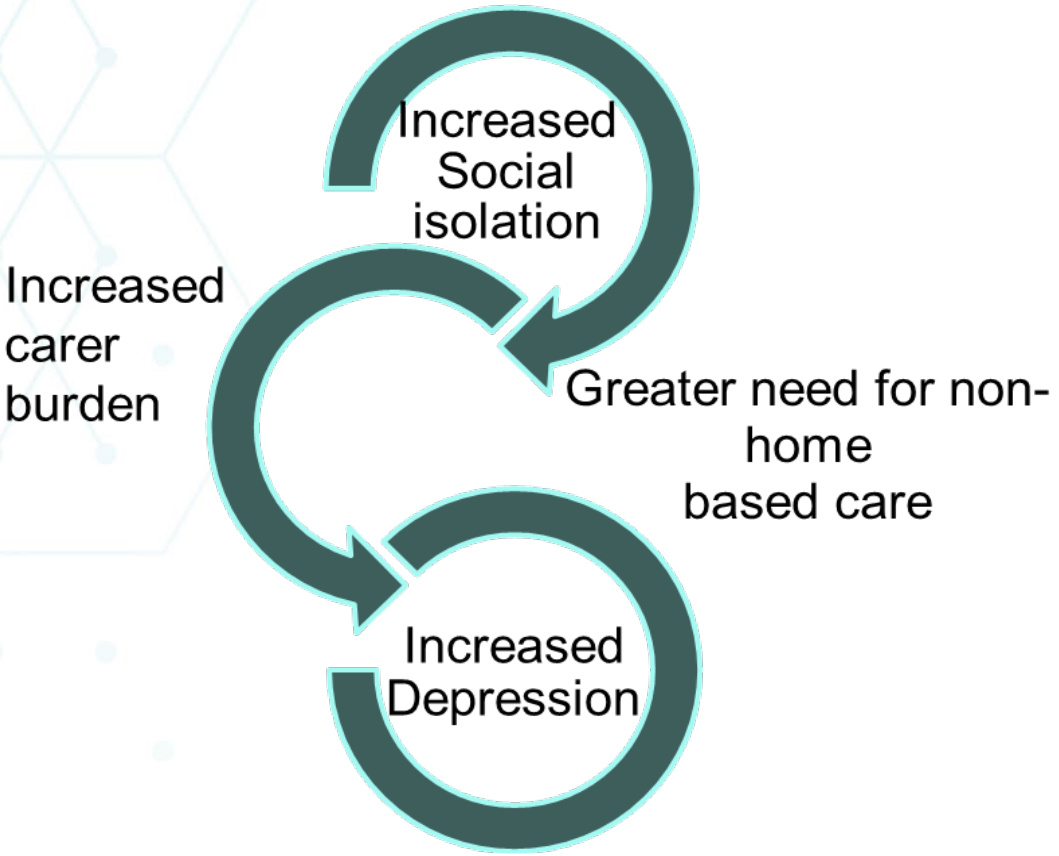
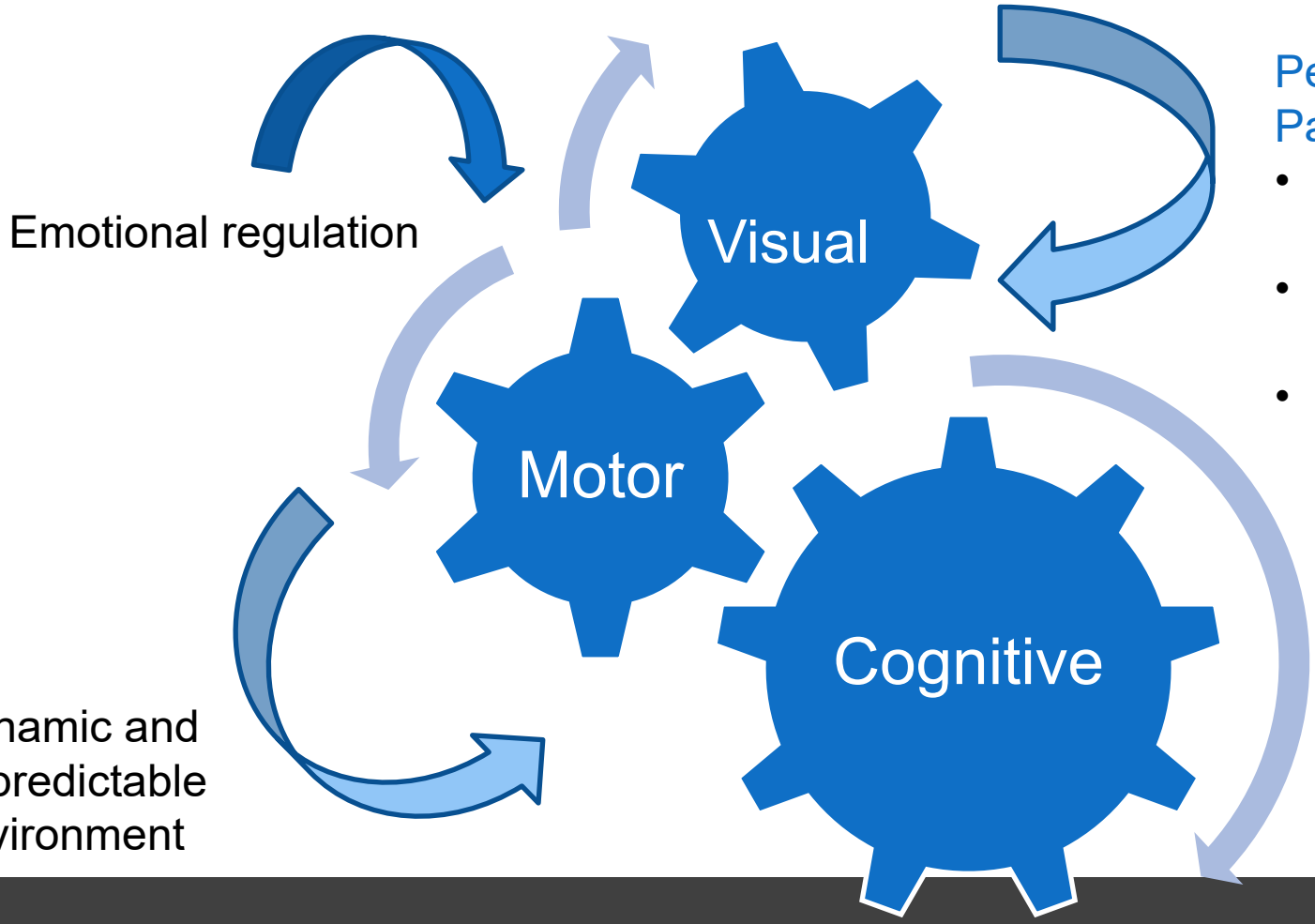
Overview:
1. Importance of driving following ABI
2. Our findings
3. Where to from here?

Driving: dis-identifier with both age and disability



Inability to drive and loss of driving privileges are characterised by:





Performance Patterns:

- Self awareness
- Driving context
- Activity modification

Driving = Complex Task

Occupational Therapy Driving Assessment

- Aim to determine the impact of ABI on a person's capacity to return to driving
- Consist of:
  - Off road review: Evaluation of skills required for driving:
    - Driving experience
    - Visual, physical and cognitive processes
    - Road law knowledge
  - On road review:
    - Open road course in a dual-controlled car
    - Individual is the driver
    - Driving instructor provides directions and ensuring safe passage of the vehicle
    - Occupational therapist observes and records driving performance and behaviour

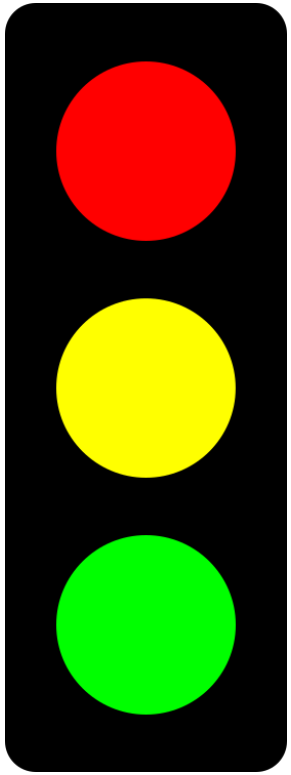
Occupational Therapy Driving Assessment

Possible Recommendations/Outcomes:

A. Medically fit to resume driving

B. Not ready to resume driving

C. Remediation/Rehabilitation program
   - Issues identified with operational, strategic and/or tactical driving skills



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What do we know about ABI & Driving?

- Benefits of ABI rehabilitation are well documented (Ross et all 2018)
- Little evidence regarding on-road driving rehabilitation programs (Unsworth & Baker, 2014)
- Capacity to sustain any gains made in driving rehabilitation over longer periods has not been researched (George et al, 2014)

Aims of the study:

1. Examine the effectiveness of individualised occupational therapy on-road driving remediation in achieving medical fitness to drive and maintaining that status 6-month post intervention following ABI.

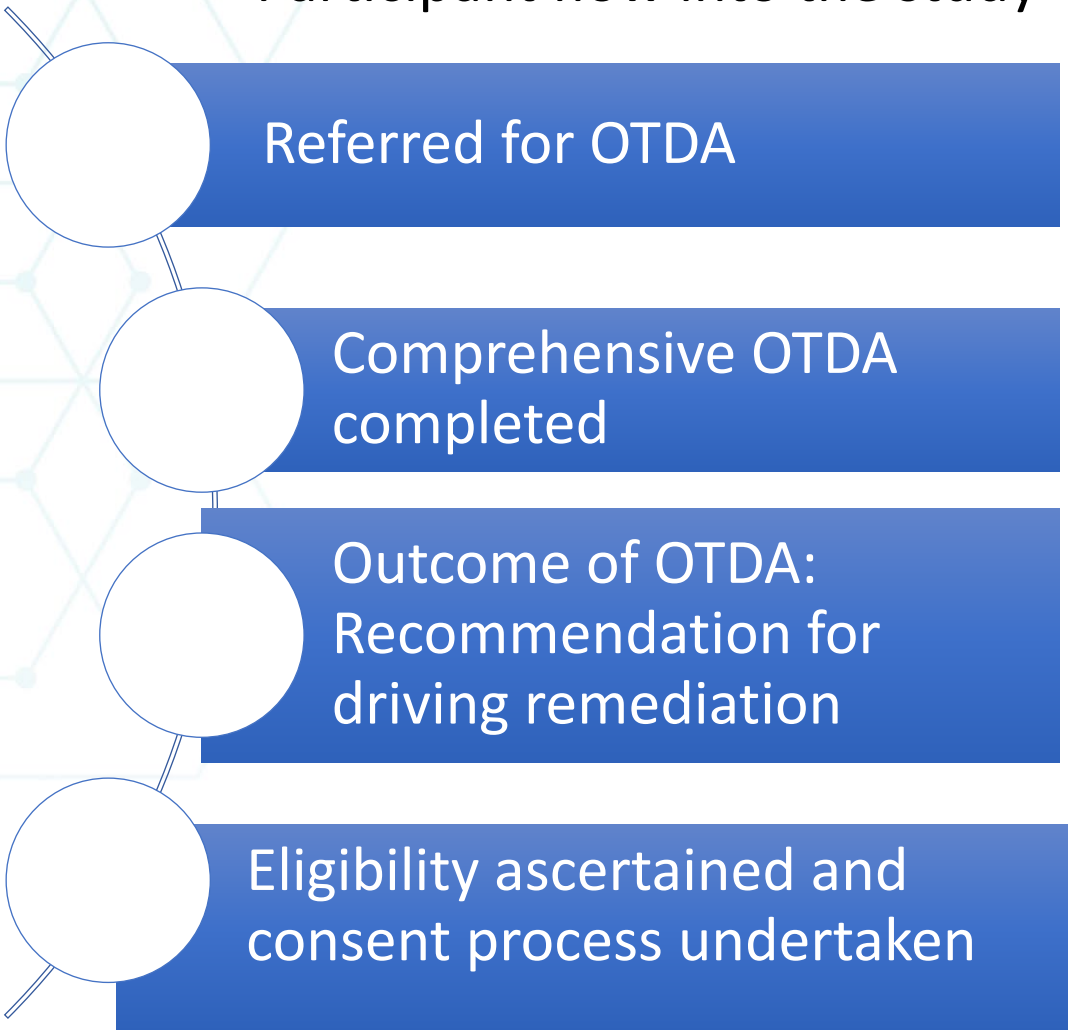
Conducted with CRWP Grant

Method

Trial design:

Wait-listed RCT with 6 month follow-up

Participant flow into the study

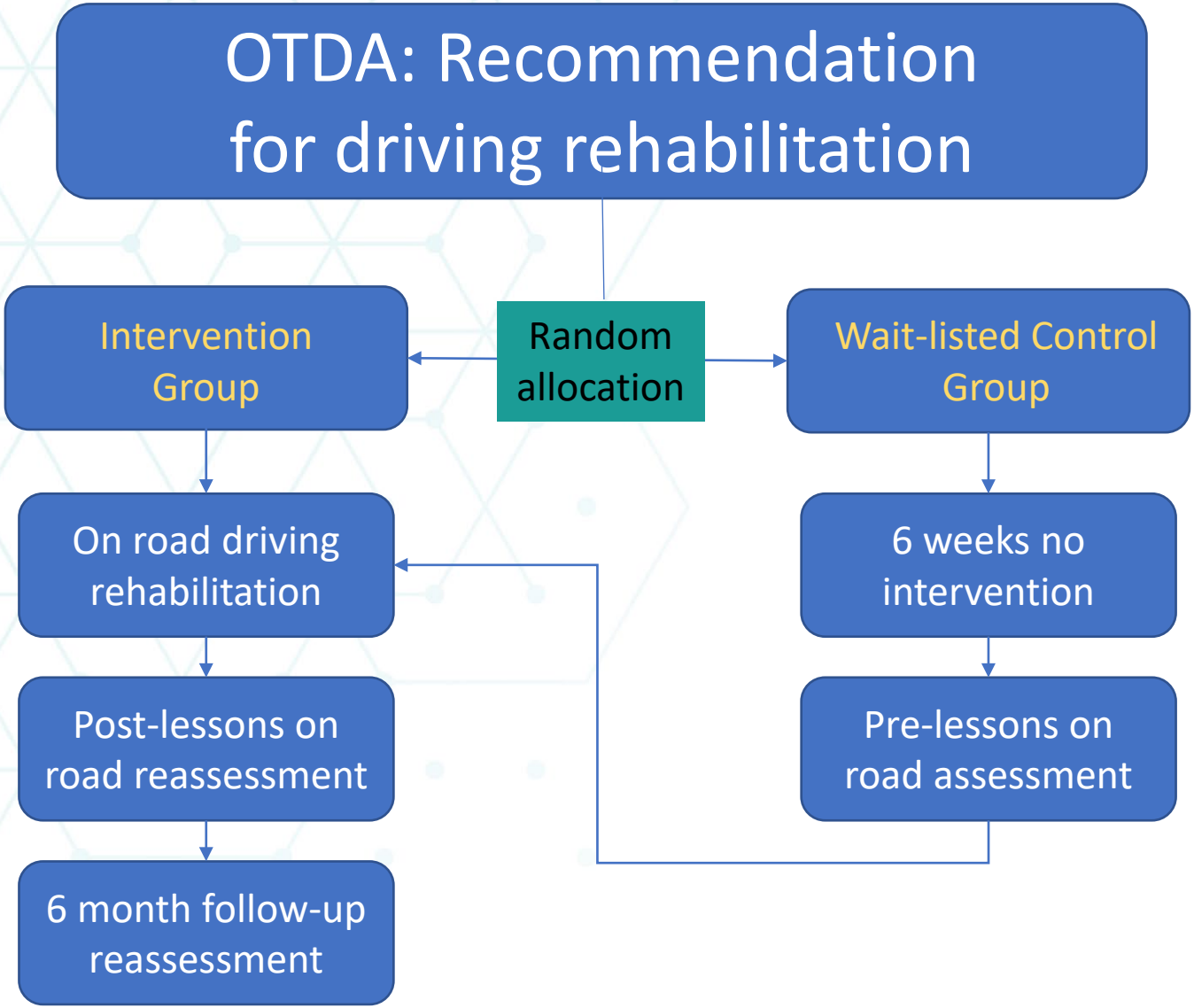


Method

- Inclusion criteria:
  - Aged: 18-65 years
  - Medical stable
  - Holder of a current and valid provisional or open drivers licence
  - Diagnosis of ABI including TBI, hypoxic brain injury, stroke

- Exclusion criteria:
  - Learner driver
  - Vehicle modification required
  - Previous neurological condition/incident
  - Communication deemed non-functional for the purpose of driver education and training

Participant flow through study:



Intervention: On-road driving remediation

- Developed by driver trained OT who conducted initial OTDA
- Implemented by qualified driving instructor in dual controlled car
- Frequency: 1-2 lessons/week over 6-8 week period
- Target areas:
  - observation and awareness of driving environment
  - planning and judgement
  - sustained and divided attention
  - lane positioning
  - operational control of the vehicle
  - driving behaviours

Primary Outcome Measure

Fitness to drive: Pass or fail

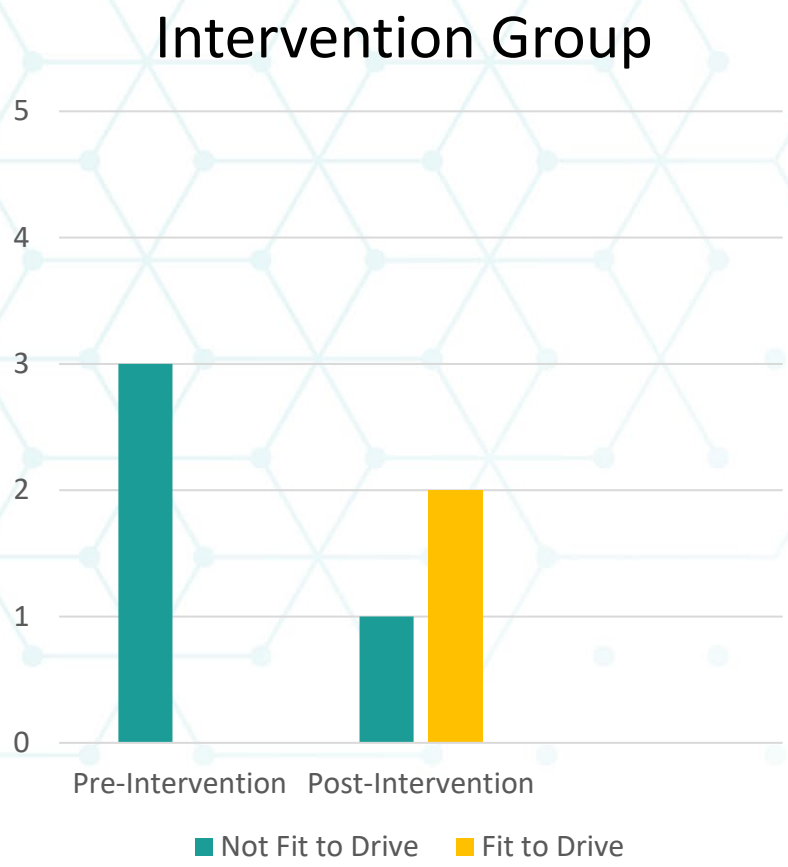
On-road driving assessment:

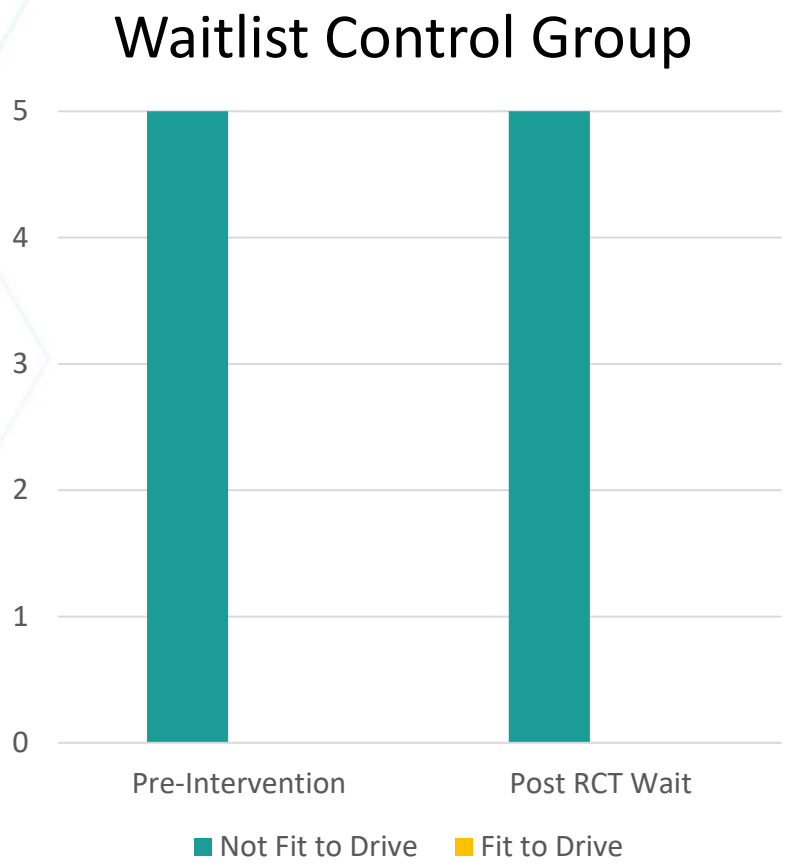
- 15 km open road route
- Conducted by a driver trained occupational therapist and driving instructor in a dual-controlled vehicle along a validated course (Mallon & Wood, 2014).
- Range of traffic situations including traffic light and non-traffic light controlled intersections, one-way and two-way traffic, single, dual and multi-lane roads, a shopping centre car park and a variety of manoeuvres, and included directed and self-directed navigational instruction.
- The same on-road course was followed for all participants in all on-road assessments.

Results

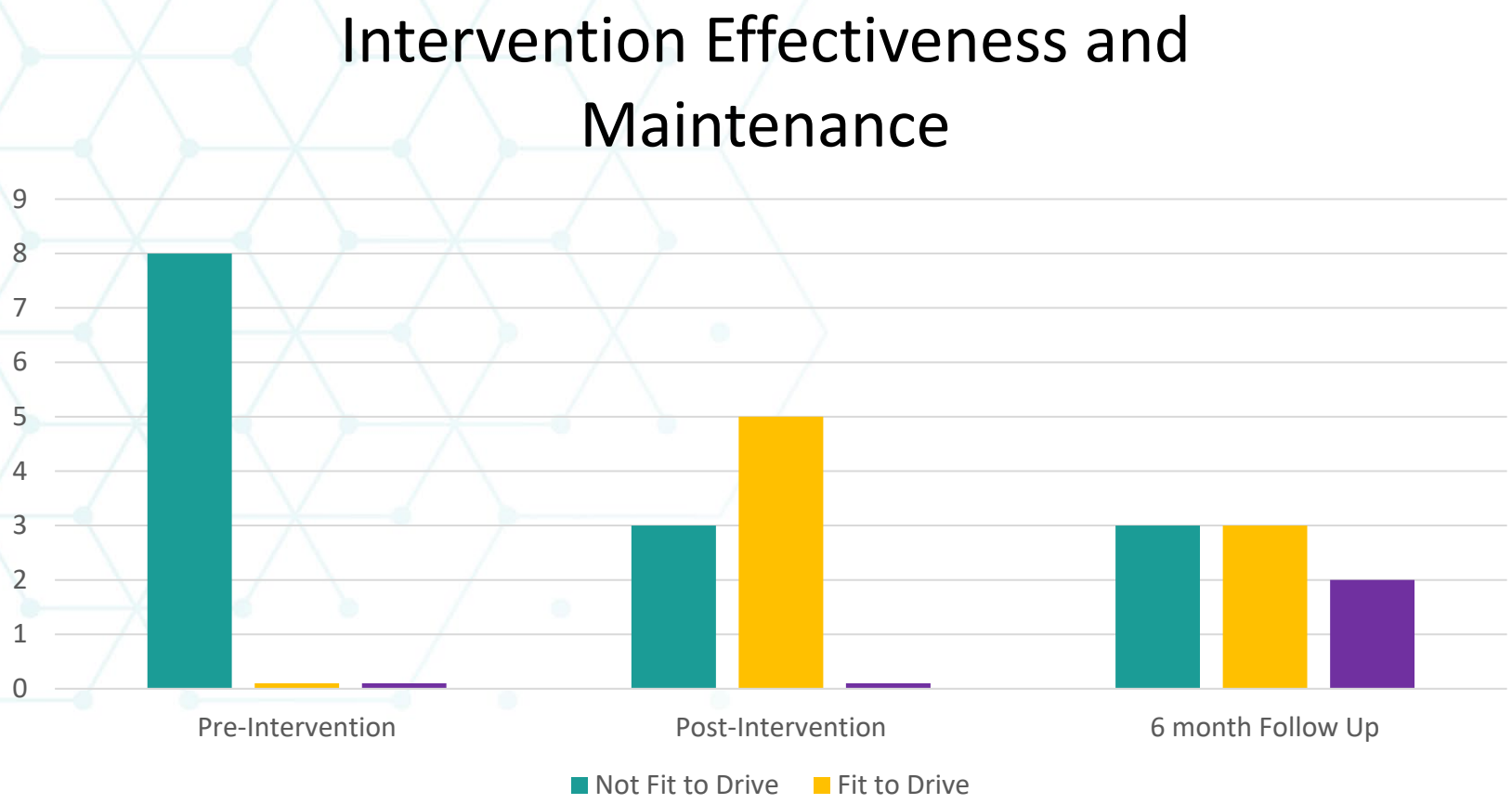
- Eight participants (87.5% male)
- Aged between 24 and 64 years, average age of 46 years.
- Six participants TBI and two of stroke.
- Years of driving experience prior to ABI ranged from 18 months to 50 years with a mean of 26.3 years of driving experience.
- All participants received the on-road remediation either during the intervention or wait-list intervention period.
- Two participants did not complete the 6-month follow-up.

Results: Pre-Post RCT

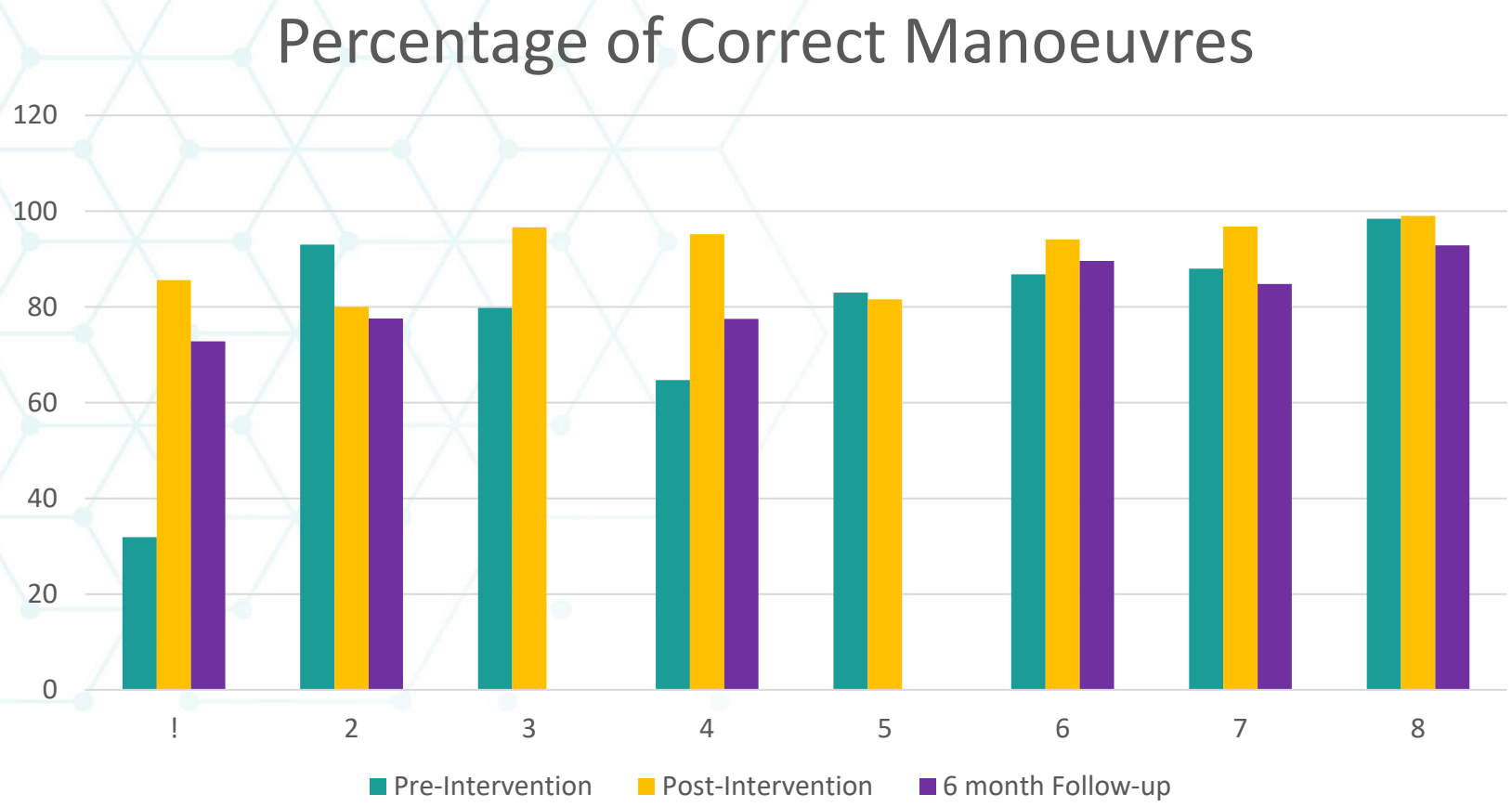




Results:


Intervention Effectiveness and Maintenance
9
8
7
6
5
4
3
2
1
0
Pre-Intervention
Post-Intervention
6 month Follow Up
Not Fit to Drive
Fit to Drive

Results


Percentage of Correct Manoeuvres
120
100
80
60
40
20
0
!
2
3
4
5
6
7
8
Pre-Intervention
Post-Intervention
6 month Follow-up

Discussion: Effective of intervention

- For some, improved driving skills can be achieved through individualised on-road driving rehabilitation
- 6-month follow-up assessment identified that there was universal deterioration in driving performance with one participant losing their medical clearance for driving
  - Forslund et al. (2019): 37% deterioration in the Glascow Outcome Scale- Extended score in survivors of moderate to severe TBI over time, confirming brain injury as a long term health concern where outcomes are not static.
  - McKerral et al. (2019): identified discrepancy between self-perceived driving behaviours of individuals with TBI who had been determined fit to drive post-injury and objective driving measures (such as acquisition of demerit points and involvement in accidents). Individuals with TBI may miscalculate driving decisions, even after being deemed medically fit to drive.

Future directions

- Implementation of RCT
- Explore trends to determine significance
  - Identify if additional supports are required to ensure skills are maintained post driving remediation
- Life space assessment: How does participation in the OTDA process impact upon how, when, where and with whom people access their community following ABI?