

# Senior Exercise Park: A Novel Exercise Initiative for Older Adults



**Myrla Sales<sup>1</sup>,**

**Prof Remco Polman<sup>2</sup>, Prof Keith Hill<sup>3</sup>, A/Prof Pazit Levinger<sup>1</sup>**

<sup>1</sup> Institute of Sport, Exercise & Active Living (ISEAL) at Victoria University, Australia

<sup>2</sup> Bournemouth University, UK

<sup>3</sup> Curtin University, Australia

# Background

- Falls continue to be a major public health concern<sup>1</sup>
- 30-35% of older people living in the community and aged over 65 years falls at least once a year<sup>2</sup>
- Quality of life and functional decline<sup>2</sup>



1. Gillespie et al. (2012). *Cochrane Database Syst Rev*, 2(CD007146).

2. Granacher et al. (2011). *Gerontology*, 57(4), 304-315.

# Exercise and Falls Prevention Interventions

- Slow down functional losses<sup>1</sup>
- Improve quality of life and maintain functional independence<sup>1</sup>
- Participation in falls prevention interventions are rather low<sup>2</sup>
- Not perceived as beneficial or sufficiently appealing to them?

1. Paterson et al. (2007). Applied Physiology, Nutrition, and Metabolism, 32(S2E), S69-S108.  
2. Yardley et al. (2006). Health Education Research, 21(4), 508-517.

# Senior Exercise Parks





# Aims of this study



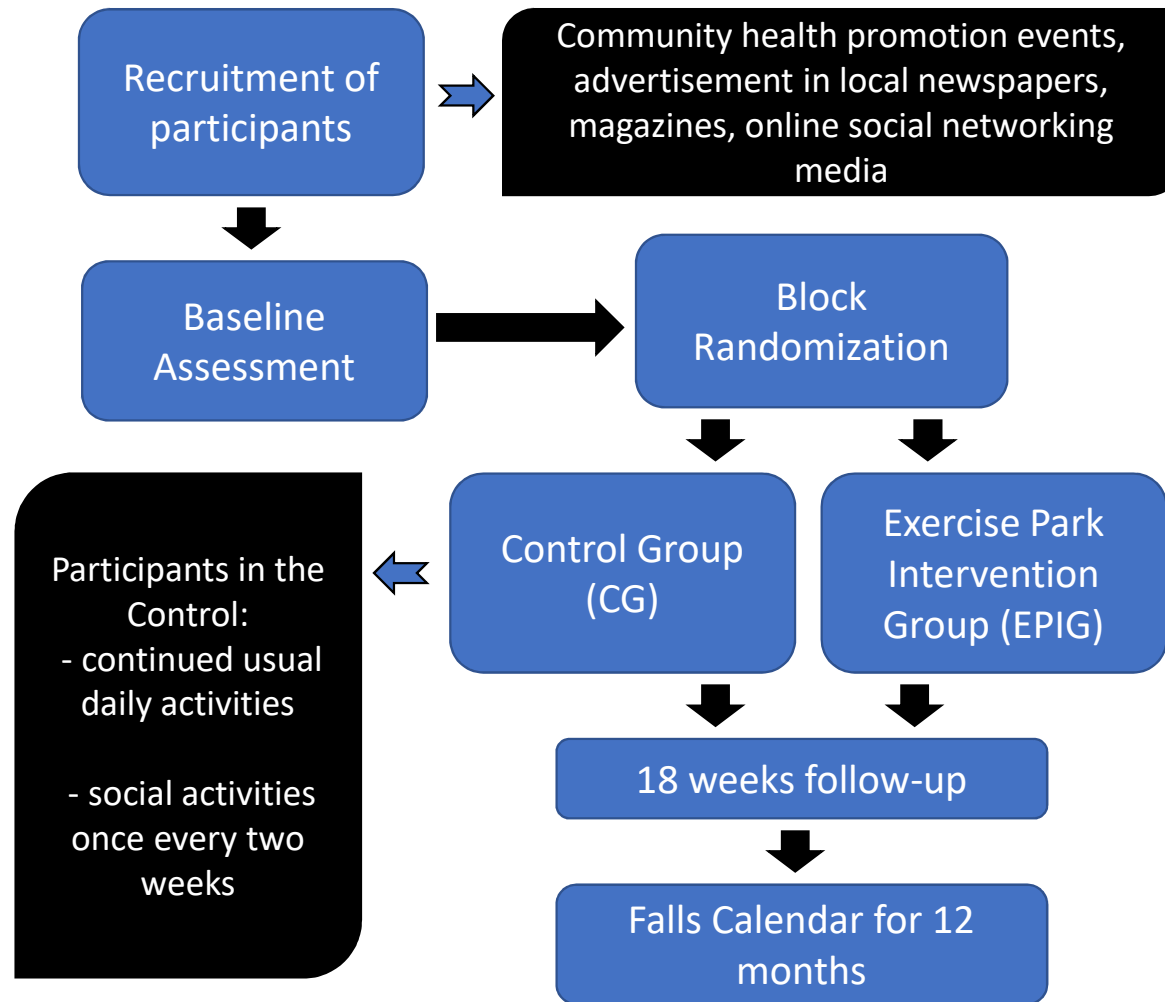
Investigate the **feasibility** and **effectiveness** of an exercise intervention using an outdoor exercise park in **improving balance, physical function and quality of life**.

# Study Design

- Parallel randomised controlled trial with pre and post intervention design
- Outcome assessments at baseline and at 18 weeks after participation commencement
- Number of falls over a 12-month period
- Participants: One hundred twenty community-dwelling people between 60 and 90 years old



# Recruitment and Randomization



# Exercise Park Intervention

- Study protocol<sup>1</sup>



1. Sales et al. (2015). BMC Geriatrics, 15(1), 68.



# Primary Outcome Measure

- Balance Outcome Measure for Elder Rehabilitation (BOOMER)<sup>1</sup> :
  - Step Test
  - Functional Reach
  - Static Balance
  - Timed-up-and-go



1. Kuys et al. (2011). Archives of Physical Medicine and Rehabilitation, 92(1), 101-105.

# Secondary Outcomes Measures

- Strength and Physical Function:

- Balance tests
- Lower limb strength
- Hand grip strength
- Gait speed and sit-to-stand



- Questionnaires:

- The Short Falls Efficacy Scale International (Short FES-I)<sup>1</sup>
- The Short Form (12) Health Survey (SF-12v2™)<sup>2</sup>

1. Kempen et al. (2008). *Age and Ageing*, 37(1), 45-50.  
2. Ware Jr et al. (1996). *Medical Care*, 34(3), 220-233.

# Secondary Outcomes Measures

- Feasibility:
  - Total adherence: Number of participants recruited and retained (exercise group)
  - Total attendance
  - Seasonal attendance
  - Safety: Falls? Injuries?
  - Adverse effects: Muscle soreness?



1. Kempen et al. (2008). *Age and Ageing*, 37(1), 45-50.
2. Ware Jr et al. (1996). *Medical Care*, 34(3), 220-233.

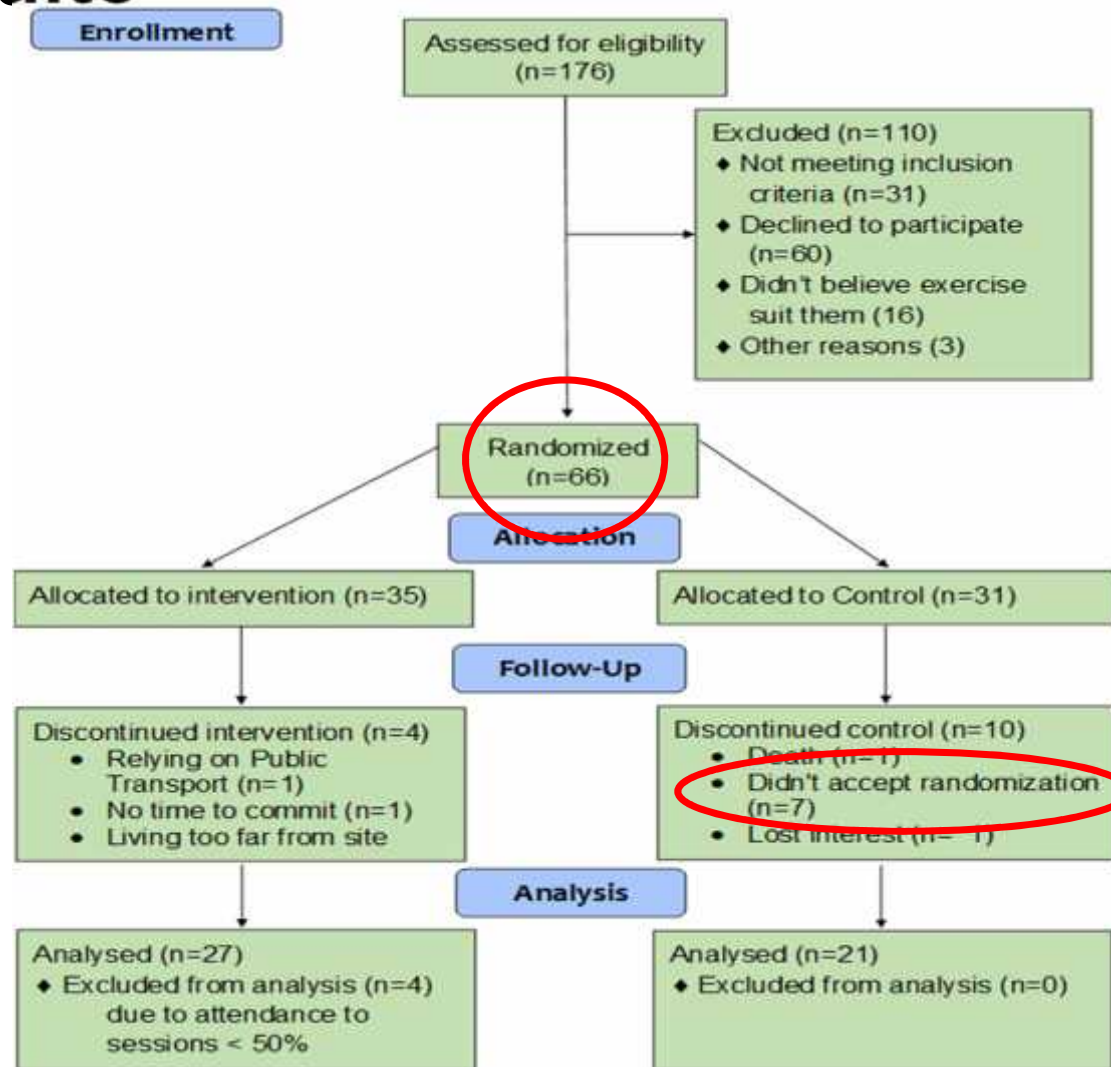
# Statistical analysis

- Repeated measures ANCOVA **univariate** analysis: BOOMER battery test
- Repeated measures ANCOVA: for all secondary measures
- Difference between groups and groups over time (baseline vs 18-week assessment)





# Results



# Results

## Participants' characteristics

	<b>Control Group (n=21)</b>	<b>Exercise Intervention Group (n=27)</b>
<b>Age (Years)</b>	70.2±8.2	75.1±7.9
<b>Gender (Females, %)</b>	77	64
<b>BMI (kg/m<sup>2</sup>)</b>	28.1±5.0	28.9±5.3
<b>Previous Falls History ( 1 fall, %)</b>	61.9	62.9
<b>Follow-up Falls Over 12 months (%)</b>	47.6	40.7

# Results - Physical and Functional Measures

Single Leg Stance (sec)



**p<0.01 (95% CI -8.35 to -.54)**

Knee Strength (N.m)



**p<0.01 (95% CI -29.1 to -5.8)**

Two Minute Walk (m)



**p<0.01 (95%CI -19.1 to -.85)**

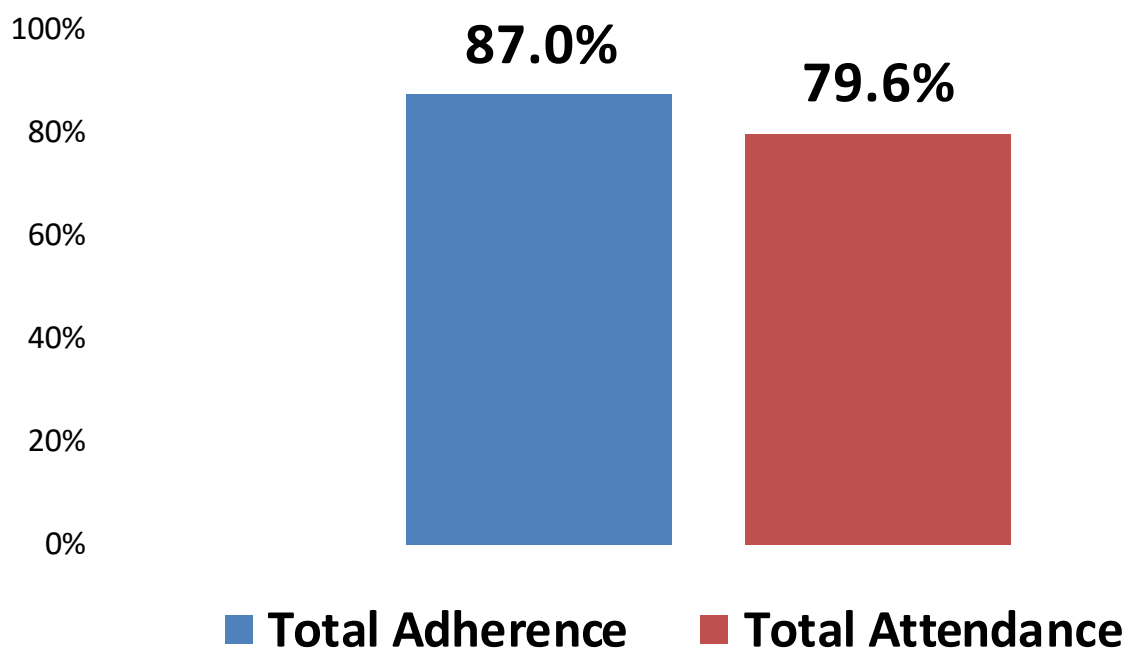
Sit to Stand (reps)



**p<0.01 (95% CI -2.26 to -.143)**

# Results - Feasibility

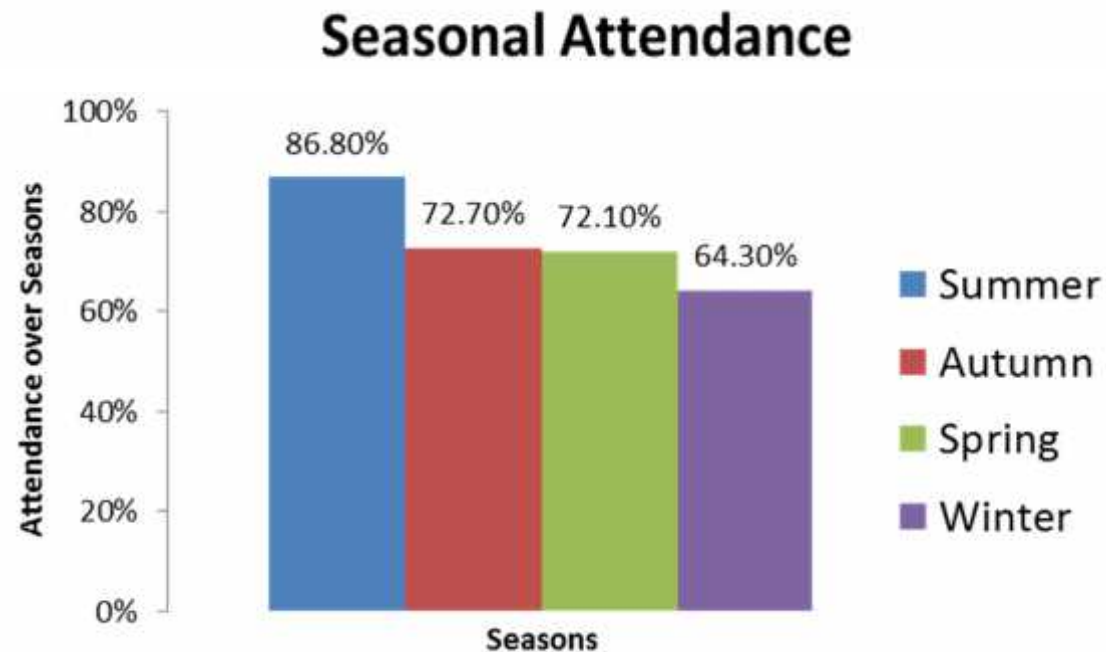
## Total Adherence and Attendance



- No injuries or adverse effects reported



# Results - Feasibility



- Only 9.6% of sessions had to be cancelled due to rain.

# Discussion

- No improvement on the BOOMER test: potential ceiling effect



Measure	CG (n=21)		EPIG (n=27)		P value Group by Time Interaction (95% CI)
	Pre	Post	Pre	Post	
<b>BOOMER (Out of 16)</b>	✗ 13.5±1.7	✗ 13.9±1.4	✗ 13.6±1.4	✗ 13.7±1.3	0.6 (-.354 to .830)

- No improvement in quality of life and fear of falling: Participants more independent and physically capable<sup>2,3</sup>

1. Haines et al. (2007). Archives of Physical Medicine and Rehabilitation, 88(12), 1614-1621.
2. Tucker et al. (2010). Quality of Life Research, 19(7), 1069-1076.
3. Kempen et al. (2008). Age and Ageing, 37(1), 45-50.

# Discussion

- Improvement in key measures of function, balance and strength
- Maintenance of independence, mobility and vitality in old age<sup>1</sup>
- ADLs - Positive effect on confidence and self-efficacy<sup>2</sup>
- Social interaction - a playful and relaxed atmosphere – Adherence and attendance<sup>3</sup>

1. Haines et al. (2007). Archives of Physical Medicine and Rehabilitation, 88(12), 1614-1621.

2. Lee et al. (2008). International Journal of Nursing Studies, 45(11), 1690-1699.

3. Brassington et al. (2002). American Journal of Preventive Medicine, 23(2), 80-86.

# Key messages

- The senior exercise park – feasible, effective and safe in improving balance, muscle strength and physical function among older adults
- Reduction of falls risk
- Relatively high adherence/ attendance rates
- Social Interaction





# Where to next?

- Future trial with a larger sample size to investigate if the senior exercise parks are effective in reducing falls among older adults



# Acknowledgements

## Partner Organizations:



## Funding Body:



✉: [myrla.reissales@vu.edu.au](mailto:myrla.reissales@vu.edu.au)