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Evaluation of a Community-based Strength Training Program to Promote Health & Well-being in Older Indigenous Australians

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Health of Indigenous Australians

- Indigenous Australian Population: ~3% of Australian population
- Compared to non-Indigenous Australians', Indigenous Australians have:
  - Higher mortality rate (8.8 times)
  - Higher hospitalisation (8 – 10 times)
  - Higher incidence of diabetes (3.4 times)
  - Lower life expectancy (17 years less)

Diabetes Prevalence

Age Group (years)	Indigenous Australians	General Population
15-24	1.0	NR
25-34	4.3	0.3
35-44	10.0	2.4
45-54	20.7	6.2
55+	32.1	13.1 – 23.0

Diabetes:

- Prevalence: 10 – 30%
- A major risk factor of cardiovascular disease and renal disease
- Contributing Factors:
  - Obesity/overweight - Indigenous men (58%), Indigenous women (55%)
  - Poor Diet
  - Physical Inactivity: 75% either sedentary or exercised at only a low level

Dunstan, D.W., et al., *The rising prevalence of diabetes and impaired glucose tolerance: the Australian diabetes, obesity and lifestyle study.* Diabetes Care, 2002. **25**(5): p. 829-834.

Australian Bureau of Statistics (2006) *National Aboriginal and Torres Strait Islander Health Survey: Australia, 2004-05* Canberra: Australian Bureau of Statistics

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Benefits of Strength Training

- Increased muscular strength and tone
- Lowered body fat and improved weight management
- Improvements in blood glucose levels
- Strengthening bones, thereby reducing the risk of fractures
- Improving flexibility, balance and posture
- Reducing pain and disability caused by arthritis
- Increased well being and self esteem
- Better management of stress and depression
- More feasible than aerobic exercise for some

Source: Kraemer & Ratamess (2005), Research Digest Series 6, No. 3

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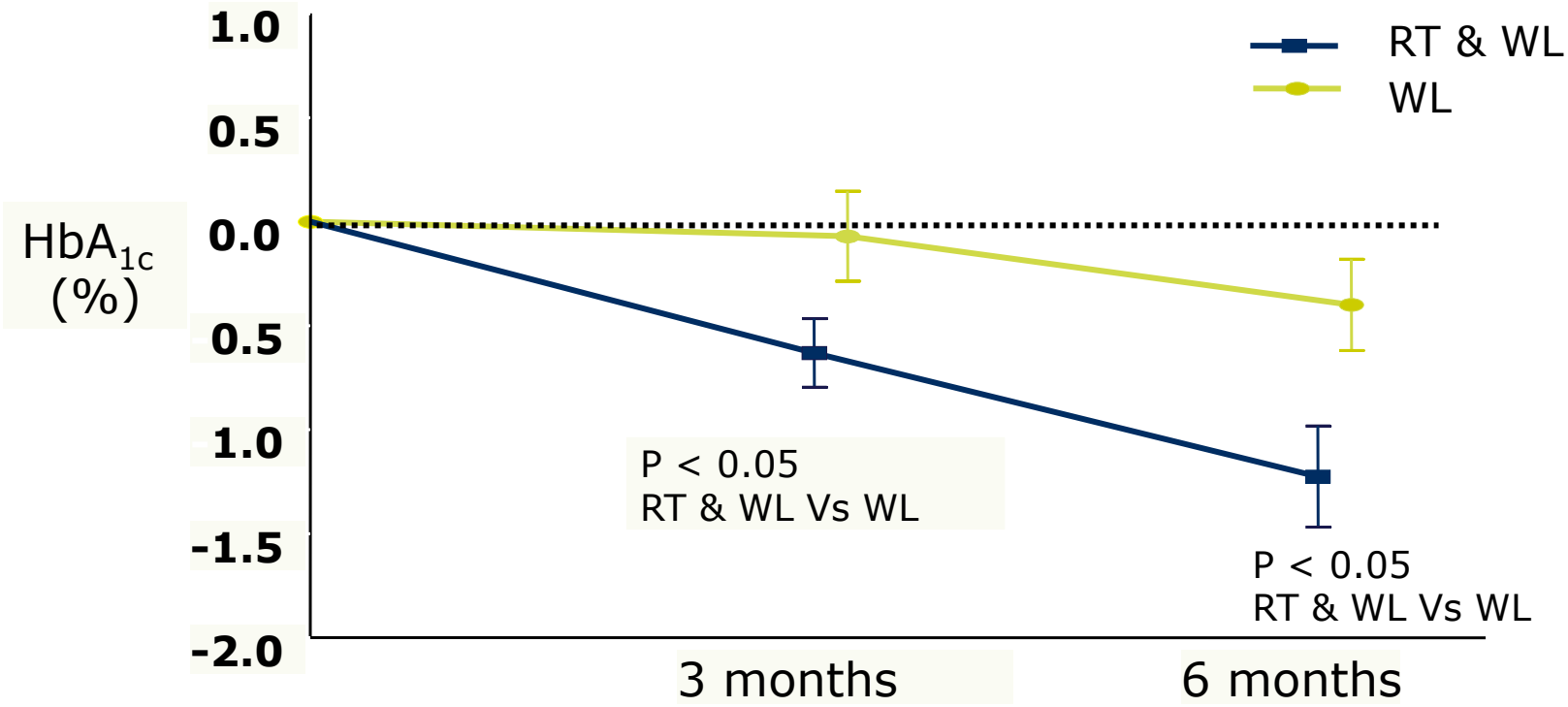
Change in blood glucose control (HbA_{1c})



Source: *Dunstan DW, Daly RM, Owen N, Jolley D, de Courten M, Shaw JE, Zimmet PZ (2002) Diabetes Care 25:1729-1736*

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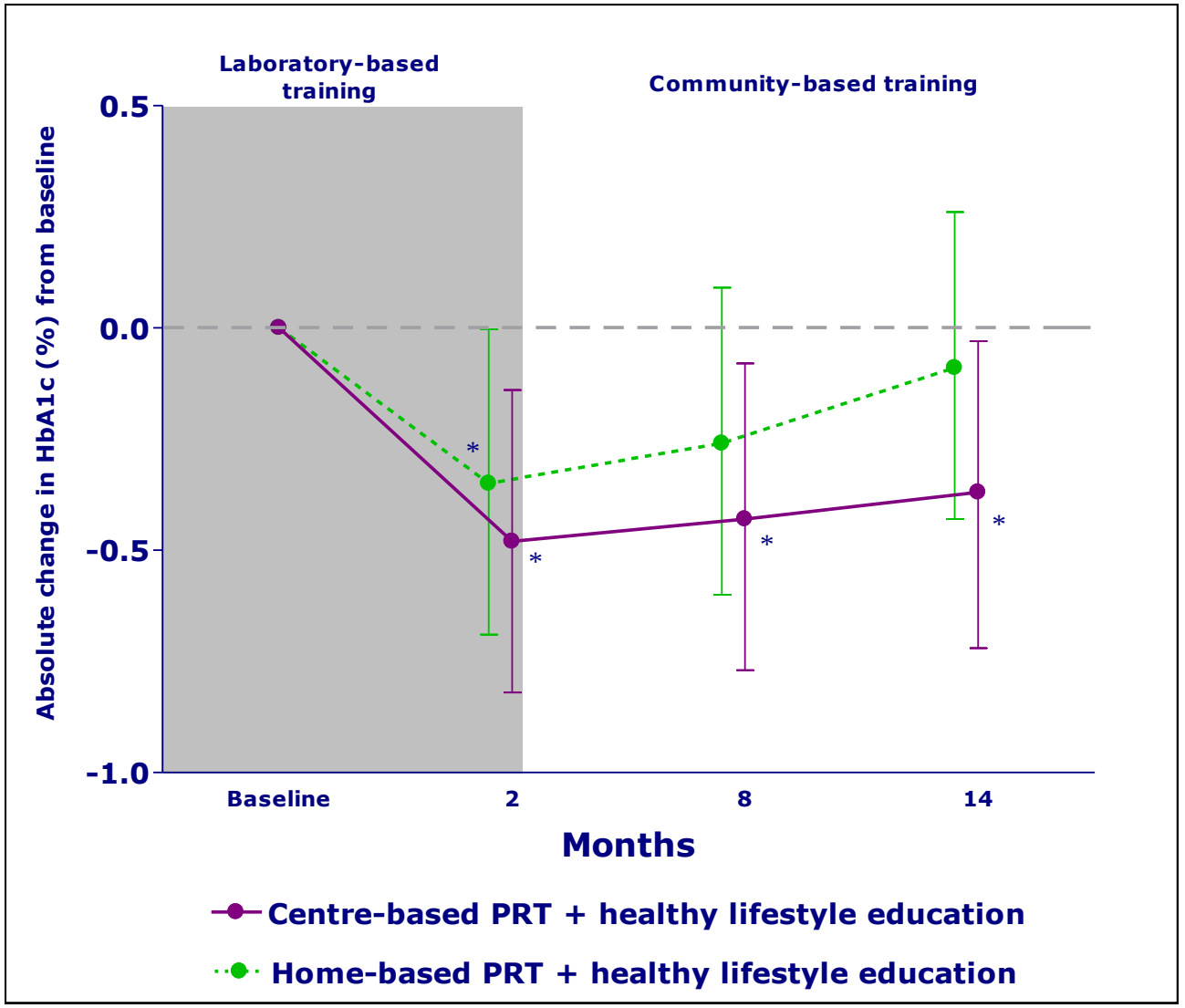
Change in HbA_{1c}



Source: Dunstan DW, Daly RM, *et al.* (2005) *Diabetes Care* 28:3-6

*** P < 0.05 vs baseline**

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The Lift for Life® community-based strength training program

- Individually prescribed ST exercise
- Covers all muscle groups in 8 exercises
- 2-3 sessions per week for 24 weeks
- Accredited trainers
- Nationally implemented
- Social benefits

LIFTFORLIFE®
exercise made easy

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Aim

To undertake a pilot study to assess the feasibility and efficacy of an adaptation of the Lift for Life strength training program for older Indigenous Australians.

Study Organization

- Rumbalara Football & Netball Club
- Rumbalara Aboriginal Health Co-operative
    - Rumbalara Aboriginal Health Service
- Recruitment – Flyers, word of mouth

Participants

- 22 male and female Indigenous members of the Rumbalara community, screened; 14 enrolled
- Exclusions: ACSM contraindications to exercise
- Inclusions: Indigenous, age 35+, doctor's permission

Study Design

Stage	Week(s)	Focus
Baseline Assessment	--	GP visit; Collect baseline measurements
Strength Training	1 – 12	Supervised sessions, 2-3 per week
Final Assessment	12	Repeat Baseline Measurements

Assessment Items

- **Anthropometric: Waist measurement, BMI**
- **Functional: Tests of strength, agility and flexibility**
- **Laboratory: Fasting glucose, lipids, insulin and glycated haemoglobin**
- **Questionnaire: Physical activity level, barriers to strength training, and general health and well-being**

Statistical Analysis

- **Baseline: Descriptive statistics**
- Net differences: Assessment period – baseline
- Pooled time series regression analysis with random effects models
- Change analyses - Adjusted for age and sex

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Participant Characteristics

Characteristic	Baseline
N	14
Gender (M/W)	(4/10)
Employment (%)	
Full-time	46
Part-time	23
Pensioner	23
Home duties	23
Age groups in years (%)	
30-39	21
40-49	43
50-59	36
Body Mass Index (kg/m^2)	
Mean	33.7 ± 4.6
Median	35.9
Waist Circumference (cm)	W: 111.2 ± 15.8
Mean	M: 118.8 ± 9.0
Median	W: 118.0
	M: 117.0
Melbourne-based L4L Mean	104.8 ± 14.9
Married/Partnered (%)	15
Children (%)	92
Educational Attainment (%)	
Some High School	62
University/TAFE	23
Abstain from Alcohol (%)	36
Smoking (%)	36

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Functional and Laboratory Tests

Functional Test	Baseline Measurement	Melbourne L4L
Chair sit to stand, n (SD)	14.8 ± 3.4	13.1 ± 3.9
Arm curl test, n (SD)	20.3 ± 3.6	16.4 ± 4.4
Two-minute step, n (SD)	77.3 ± 22.0	NR
Timed up and go, sec (%)	5.7 ± 1.1	6.5 ± 1.7
Chair sit and reach, cm (SD)	-4.9 ± 7.5	NR
Backstratch, cm (SD)	-8.7 ± 4.5	NR

Laboratory Parameters (SD)	Baseline Value
Triglycerides (mmol/L)	2.0 ± 1.0*
Cholesterol (mmol/L)	5.2 ± 1.5
HDL Cholesterol (mmol/L)	1.0 ± 0.3*
LDL Cholesterol (mmol/L)	3.2 ± 1.2
HDL/LDL ratio	3.0 ± 1.1*
Glucose (mmol/L)	4.7 ± 0.5*

*Laboratory Normal ranges (fasting)
Glucose: 3.0-6.0 mmol/L
Triglycerides: <2.00
Total cholesterol: <4.0
HDL cholesterol: <1.00
LDL cholesterol: <2.5
LDL/HDL ratio: <4.0

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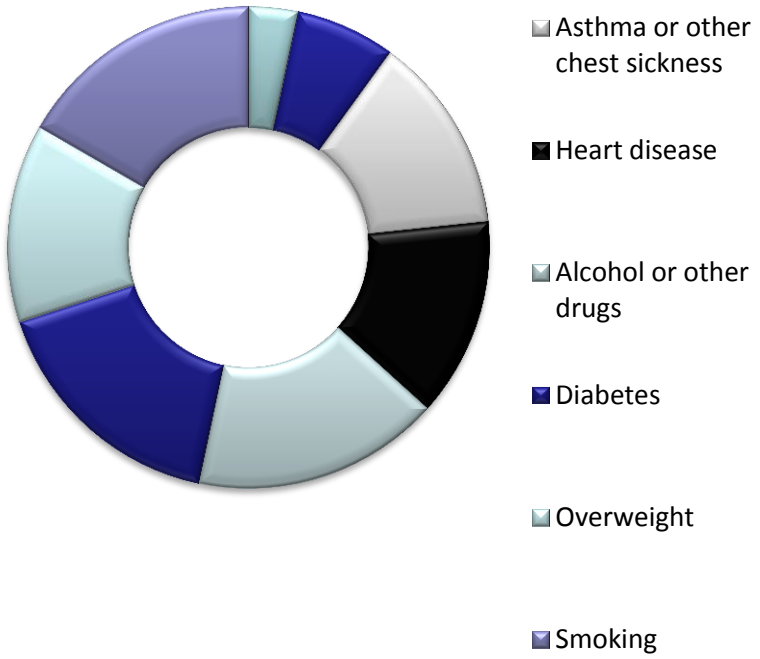
Self-Reported Health Status

Characteristic	Baseline
Self-perceived Overweight (%)	93
Self-perceived Health (%)	
Excellent	7
Very Good	14
Good	36
Fair	43
Poor	0
Diabetes (n)	2
Duration (years)	7 & 30
Heart Problems (%)	29
High BP (%)	29
Eye Problems (%)	29
Kidney Problems (%)	0
Taking Medications (%)	64
Mean (n)	3.4 (3.9)



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Physical Activity Behavior

Physical Activity Behavior	Baseline
Physical Activity Location (n)	
Home	10
Parks	6
River	4
TV Leisure Time Per Day (%)	
< 1 hour	21
1-2 hours	35
3-4 hours	21
5+ hours	21
Computer Use Time Per Day (%)	
< 1 hour	57
1-2 hours	7
3-4 hours	14
5+ hours	7

Physical Activity Behavior	Baseline
Recreational Walking	
Frequency (per week)	2-5
Duration (min) (SD)	56.4 ± 68.9
Labored House Work	
Frequency (per week)	0-2
Duration (min) (SD)	39.9 ± 66.7
Labored Excluding House Work	
Frequency (per week)	0-3
Duration (min) (SD)	44.5 ± 46.3
Other Moderate Phys Activity	
Frequency (per week)	0-2
Duration (min) (SD)	37.1 ± 75.5

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Barriers to Physical Activity

Least Deterrent Factors	Likert scale: mean (SD)	Most Preventative Factors	Likert scale: mean (SD)
Diabetes Complications	2.0 ± 1.5	Family Demands	3.9 ± 0.9
Fear of Injury	2.8 ± 1.5	Lack of Time	3.8 ± 1.2
Poor Health	2.9 ± 1.5	Lack of Money	3.7 ± 1.3
Bad Weather	2.9 ± 1.5	Too Overweight	3.6 ± 1.3

Conclusions

- Because Lift for Life...
  - Has proven beneficial effects for older adults with and at risk of diabetes.
  - And given that this is a high risk population
  - ST could have significant benefits for this Rumbalara group.
  - (... and have significant implications for the health of all Indigenous Australians)
- Collect and analyse final data in 6 weeks
  - Feasibility
  - Efficacy

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Acknowledgements

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FULBRIGHT AUSTRALIAN-AMERICAN FULBRIGHT COMMISSION

RUMBALARA FOOTBALL & NETBALL CLUB

RUMBALARA ABORIGINAL CO-OPERATIVE LTD.

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