

**Australian Technology Network**  
**ATN Centre for Metabolic Fitness**

**SGRHS**  
 Spencer Gulf Rural Health School

## countering metabolic syndrome through sustainable dietary and physical activity modification

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## the project...

- Why Whyalla?
  - UniSA/ CRE only rural university campus in SA
  - representative population
  - circumscribed, minimal external contamination
  - high rates overweight/obesity
  - SGRHS' past community activity (COAG, QUM, CDSM)

## the rationale...

- ↓ physical activity ↑ energy intake
- ↑ metabolic syndrome
- ↑ risk of chronic disease
- urgent need for prevention by early intervention
- majority consider themselves to be of acceptable weight (63% males, 59% females)

Change in overweight/obesity according to BMI  
 Australian National Health Survey 2004-05

From Pettman et al 2008

## the gaps in knowledge...

- previously;
  - few studies show **sustainable** improvement
  - no consensus on best method for metabolic syndrome
  - no Australian studies to date

## the difference...

- we test a lifestyle program involving
  - an **ad-libitum** (non energy-restricted) dietary intake **combined** with **achievable** physical activity
  - change in body fat – not just body weight
  - feasibility and **sustainability** – to be maintained by a community long term, in a 'free-living', real world environment

## the study aim...

- to assess the efficacy and sustainability of a combined lifestyle program (dietary modification with moderate physical activity) to:
  - reduce **body fat**
  - improve **body shape**
  - increase **physical** and **metabolic fitness**
  - improve general **well-being** and **quality of life**
  - assess factors influencing **health behaviour**

## the method...

- 12-month **randomised, controlled, parallel group** comparison intervention study
- 130 participants block-matched and randomly allocated to 1 of 3 groups
  - **control group**
    - (assessments only)
  - **intervention group A**
    - (intervention + monthly support)
  - **intervention group B**
    - (intervention only)
- intervention: a structured 16-week lifestyle information program
  - nutrition and exercise education
  - action planning, problem solving and cognitive symptom management (modeled on Stanford University course for CDSM)
    - to build self-efficacy and promote health behaviour change



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## the assessments...

- **body composition**
  - DEXA, BIA
- **anthropometry**
  - waist and hip circumference, BMI
- **biomarkers**
  - total cholesterol, HDL, LDL, triglycerides, fatty acid profile, glucose and insulin
- **cardiovascular fitness**
  - blood pressure, arterial compliance
- **physical fitness**
  - physical work capacity, handgrip strength
- **quality of life**
  - WHO-QoL



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## the assessments...

- **dietary intake**
  - food frequency questionnaire (Anti-Cancer Council Vic)
    - less intensive than WFR
    - tested for validity
- **energy expenditure**
  - 3-day phys. activity record (C.Bouchard et al 1983)
    - estimate of energy expenditure
    - tested for reliability and validity
- **factors influencing food choices and lifestyle changes** (UTS)
  - discrete choice experiment



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## the criteria...

### inclusion

- meet IDF metabolic syndrome definition; central obesity ( $\geq 90$  cm, females  $\geq 80$  cm) *plus TWO of the following* (untreated)
  - $\uparrow$  **BP** (systolic  $>130$ mmHg or diastolic  $>85$ mmHg)
  - $\uparrow$  **TG** (serum fasting  $>1.7$ mmol/L)
  - $\downarrow$  **HDL** (serum fasting  $<1.03$ mmol/L men,  $<1.29$  women)
  - $\uparrow$  **FPG** (fasting plasma  $>5.6$ mmol/L)

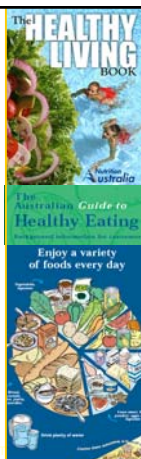
### exclusion

- participation in other weight loss interventions or another clinical trial
- existing significant chronic conditions (diabetes/CVD), concomitant medications likely to interfere with participation or affect outcome measures,
- pregnancy, lactation or intention to fall pregnant



## the dietary advice...

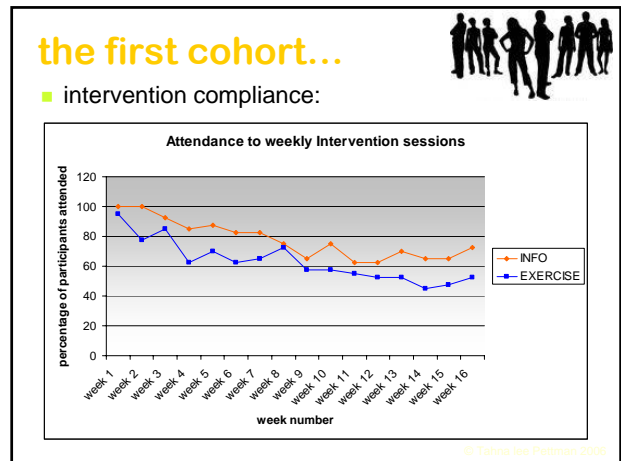
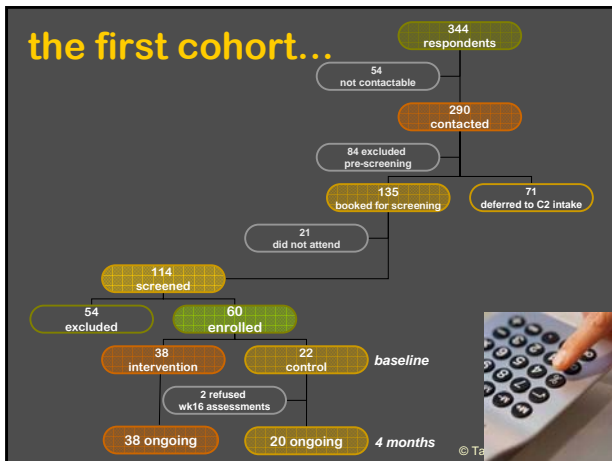
- adopt Australian dietary guidelines
- encourage foods that are:
  - low saturated fat, rich in polyunsaturated FA (esp. omega-3)
  - low glycemic index, high in fibre
- improve diet **quality**, not restrict calories/kilojoules
- education, group discussion, cooking demonstration
- monitor progress by FFQA



## the activity advice...

- aim for level of PA recommended by
  - national physical activity guidelines
- aerobic, flexibility and resistance
- 1 x supervised session/week
  - 45min, 75% age-predicted max HR
- aerobic and resistance gym
- progress tracked in PA diary





### the cohort...

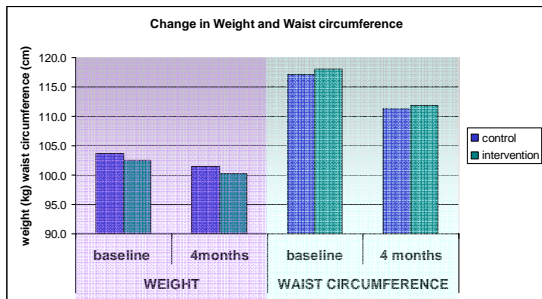
- baseline characteristics cohort 1:

	Overall	Intervention	Control
N	60	38	22
Age (yrs)	43.7 ± 9.4	44.4 ± 10.3	42.5 ± 7.7
% body fat DXA	47.3 ± 7.6	46.8 ± 7.9	48.0 ± 7.2
Abdominal Fat DXA (g)	5108 ± 1031	4842 ± 1019	4698 ± 1182
Weight (kg)	102.9 ± 15.6	102.5 ± 15.7	103.7 ± 15.8
BMI	37.2 ± 5.3	37.0 ± 5.2	37.7 ± 5.7
Waist (cm)	117.6 ± 12.0	117.9 ± 11.3	117.0 ± 13.2
Hip (cm)	125.2 ± 13.6	124.4 ± 12.6	126.6 ± 15.4
Waist Hip Ratio	0.94 ± 0.08	0.95 ± 0.07	0.93 ± 0.08
Physical Work Capacity (watts/kg)	0.914 ± 0.308	0.893 ± 0.303	0.953 ± 0.322



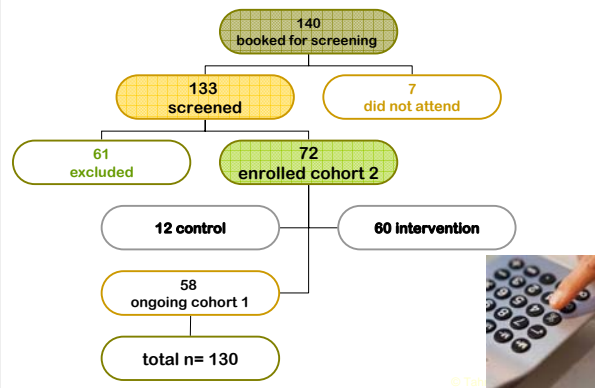
## the results...

- waist circumference and body weight



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## the current enrolment...



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## summary...

- preliminary data show:
  - greater reduction in **body fat** in the intervention group and the rate of decrease has been greater
  - significant** reduction in **abdominal fat** in the intervention group and the rate of decrease has been greater
  - no significant changes in **lean tissue**
- study timelines:
  - ethical approval October 2005, study was commenced February 2006 (cohort 1)
  - commencing cohort 2 intervention September 06
  - Anticipate completion September 2007



*thankyou...*

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