

Pacific Perspectives: Health for New Zealanders 2006 and Beyond

Waipuna Lodge, Auckland
23-24 February 2006
Ministry of Health



Cardiovascular Risk Factors in Pacific Adolescents: The Auckland High-School Heart Survey (AHHS)

PhD thesis
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Why Cardiovascular disease?



- Leading cause of mortality in New Zealand
- The burden of cardiovascular disease is greatest among Maori and Pacific peoples
- Pacific cardiovascular mortality rates are consistently and significantly higher than those of the total population
- Pacific peoples have the highest mortality rate for cerebrovascular (stroke) disease
- If we look within Pacific we will find that there are intra-Pacific differences in mortality (ref WHO/WPRO)

What do we know about CVD?

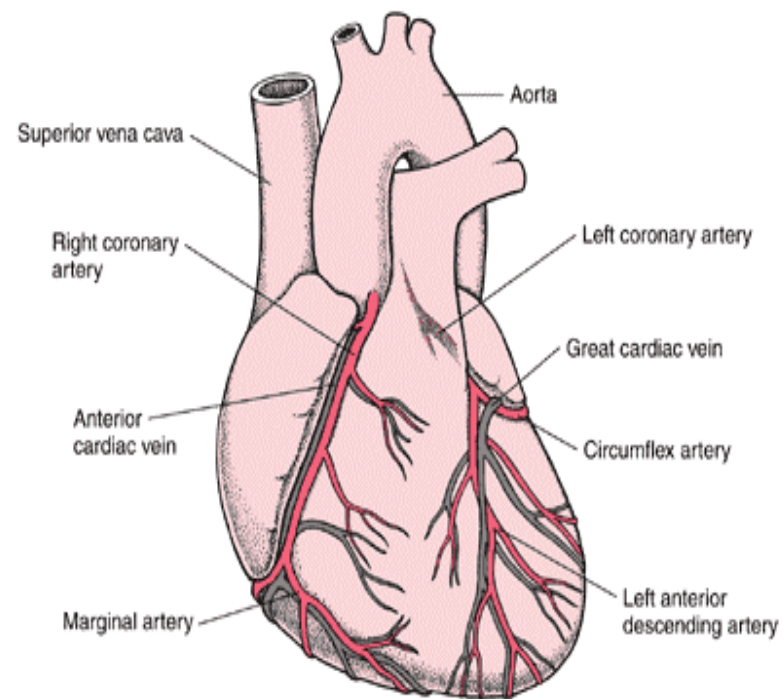
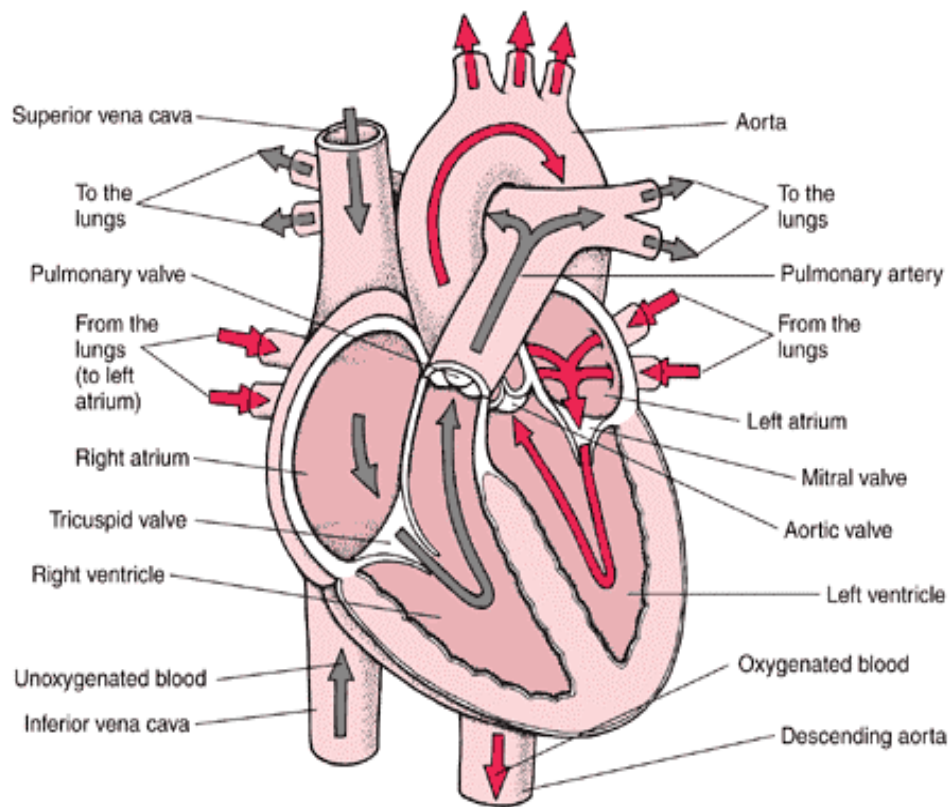
- There is substantial scientific evidence that cardiovascular disease has its origin early in life

Bogalusa Heart Survey

- Showed that in childhood and early adulthood (of those who died prematurely of non-cardiac causes), the same traditional risk factors for Coronary Heart Disease were associated with atheroma development (or atherosclerosis in the form of lesions), in the aorta and coronary arteries

Bogalusa Heart Survey *cont*

- ◆ The extent of these lesions in both the aorta and coronary arteries were linked to coronary heart disease risk factors in adults
- ◆ The extent of early atherosclerosis also increased with age
- ◆ Risk factors seemed to cluster in individuals and the more risk factors present, the more extensive the lesions, particularly in the coronary arteries



What we don't know about CVD?

- *Very little* is known about CVD risk factors in each Pacific Island community

Research Design

- Cross-Sectional Survey of form 5, 6 and 7 form students in South, Central and West Auckland
- total 120 schools with form 5-7 students
- 32 schools in the above areas had 15% \geq PI students (82% of all PI students)
- Selected 10 schools and invited all 5-7 form students to take part
- Sampling was done class by class

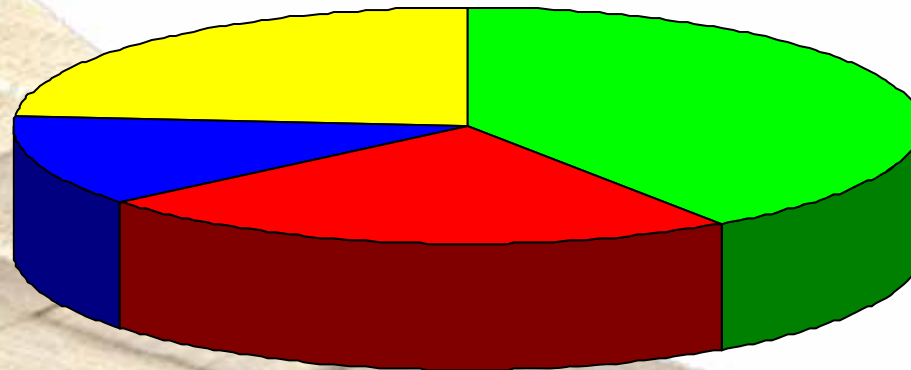
Student Interviews

- Collection of 20ml fasting venous blood sample to measure glucose and serum lipids
- Collect urine sample (VIP)
- Complete a self-administered questionnaire
- Measure of body composition 'Bio-electrical impedance' (BIA)
- Anthropometric measurements (height, weight, waist/hip ratio)
- Blood Pressure
- Aerobic fitness
- Diet (FFQ) 'not presenting'

Methodology: Participants

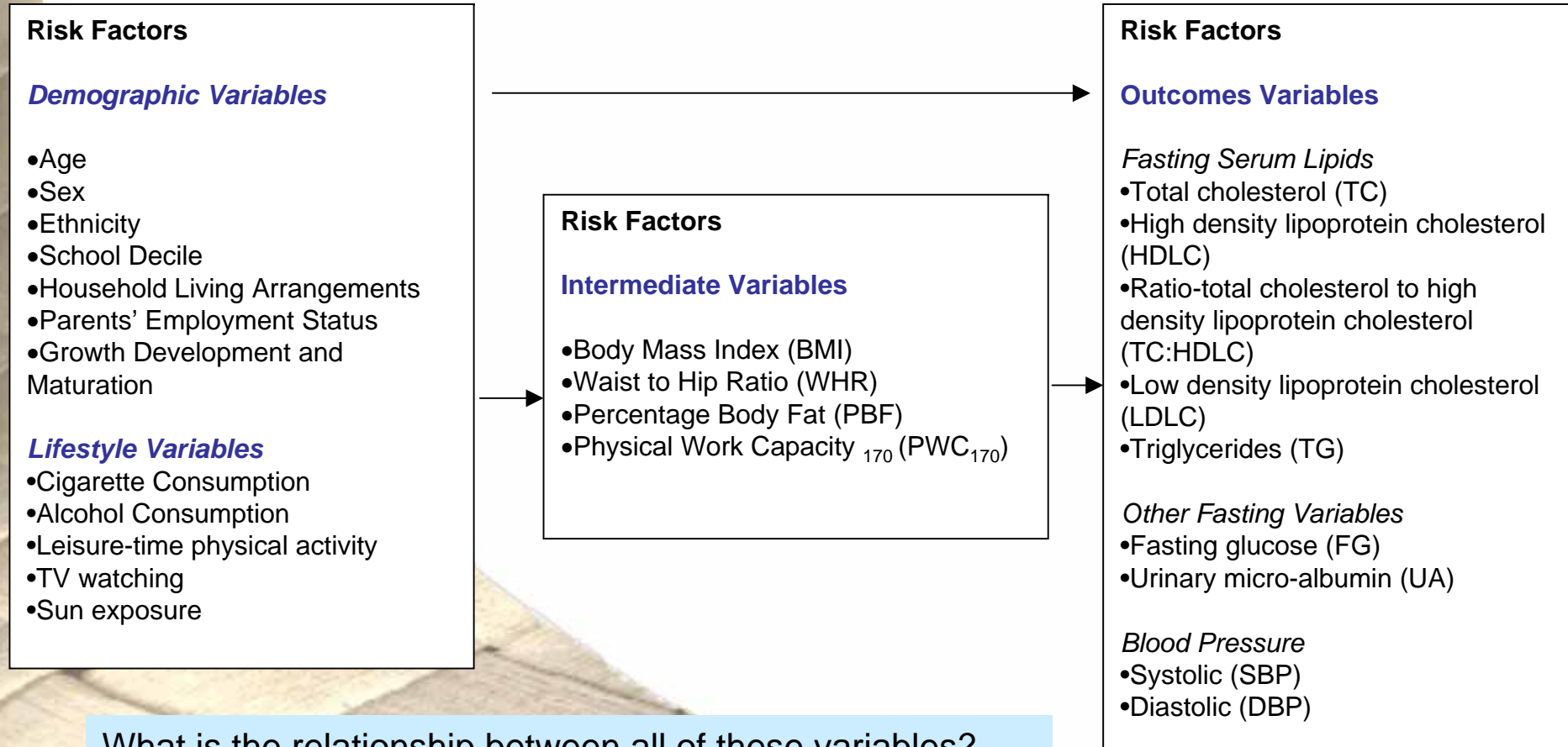
	Male	Female	Total
Pacific Island	530 (38%)	501 (44%)	1031 (40%)
European	373 (26%)	228 (20%)	601 (24%)
Maori	160 (11%)	155 (14%)	315 (12%)
Asian	359 (25%)	243 (22%)	602 (24%)
Total	1422 (56%)	1127 (44%)	2549

Over-sampled
for Pacific to
enable ethnic
specific
comparisons



■ Pacific Island ■ European ■ Maori ■ Asian

Causal Pathway Model for CVD



What is the relationship between all of these variables?
Which variables are significant?
Are there ethnic differences in these variables?
What explains ethnic differences in CVD?

Significant associations ($p < 0.5$) between the 3 main demographic variables and the life style variables

Demographic Variable	Lifestyle Variable					
	Regular Smoking	Alcohol Consumption		TV watching	Sun-exposure	Physical activity
		Regular	Binging			
Sex	↑ Females		↑ Males		↑ Males	↑ Males
Age (years)		↑ 16	↑ 16	↓ Increasing Age		
Ethnicity	↑ Maori, ↓ Asian	↓ Asian ↓ Pacific ↑ Maori	↑ Maori	↑ Maori ↑ Pacific	↓ Asian ↑ Maori	↓ Asian ↓ Pacific ↑ Maori
Among Pacific only	↑ Cook Islands Females	↑ Cook Islands ↑ Niue				

Significant associations ($p < 0.05$) among life style variables adjusted for age, sex and ethnicity

Outcome (Y) variable)		Independent (X) variable				
		Regular Smoking	Regular Alcohol Drinking	TV watching	Sun-exposure	Leisure-time physical activity
Current Smoking			+		+	
Alcohol	Current Drinking	+			+	
	Weekly Binging	+				
Vigorous leisure-time physical activity					+	
TV watching (≥ 29 hr/week)					+	-
Sun exposure (≥ 29 hr/week)		+	+	+		

Significant associations (p<0.05) from final models for intermediate variables (i.e. independent of demographic or other lifestyle variables) – all participants.

		Intermediate Variables			
Variables		BMI	WHR	PBF	PWC ₁₇₀
Demographics	Sex	↑ Females	↑ Males	↑ Females	↑ Males
	Age		U-shape		
	Ethnicity	↑ Pacific ↑ Maori ↓ Asian		↑ Pacific ↑ Maori ↑ Asian	↓ Pacific ↓ Maori ↓ Asian
Lifestyle	Regular Smoking				+ Confounded by Alcohol
	Regular Alcohol Drinking				∩-shape
	TV exposure	+		+	-
	Sun exposure				+
	Leisure-time physical activity			-	+

Significant associations ($p < 0.05$) from final models for intermediate variables (i.e. independent of other demographic variables) – Pacific only.

		Intermediate Variables			
Variables		BMI	WHR	PBF	PWC ₁₇₀
Demographics	Sex	↑ Females	↑ Males	↑ Females	↑ Males
	Age	↑ Increasing age			
	Ethnicity				↑ Cook Islands

Key Results: Outcome variables for the main ethnic groups

Lipids:
TC:HDLC and
TG levels
higher in Pacific

Blood Pressure:
levels of DBP
in Pacific
significantly
higher

Ethnic Differences in Cardiovascular Disease Outcomes Variables

Fasting Serum Lipids

- Total cholesterol (TC)
- High density lipoprotein cholesterol (HDLC)
- Ratio-total cholesterol to high density lipoprotein cholesterol (TC:HDLC)
- Low density lipoprotein cholesterol (LDLC)
- Triglycerides (TG)

Other Fasting Variables

- Fasting glucose (FG)
- Urinary micro-albumin (UA)

Blood Pressure

- Systolic (SBP)
- Diastolic (DBP)

Remember these are young people

Key Results: Outcome variables for Pacific only

Lipids:

Tongan levels were significantly lower in TC; TC:HDLC and LDLC compared with Samoans except for TG which remained higher after adjusting for lifestyle or intermediate variables

Ethnic Differences in Cardiovascular Disease Outcomes Variables

Fasting Serum Lipids

- Total cholesterol (TC)
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Other Fasting Variables

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Blood Pressure

- Systolic (SBP)
- Diastolic (DBP)

What explains ethnic differences in CVD?

Risk Factors

Demographic Variables

- Age
- Sex
- Ethnicity
- School Decile
- Household Living Arrangements
- Parents' Employment Status
- Growth Development and Maturation

Lifestyle Variables

- Cigarette Consumption
- Alcohol Consumption
- Leisure-time physical activity
- TV watching
- Sun exposure

Cardiovascular Disease Intermediate Variables

- Body Mass Index (BMI)**
- Physical Work Capacity** ¹⁷⁰
- Waist to Hip Ratio (WHR)
- Percentage Body Fat (PBF)

Obesity &
overweight

Ethnic Differences in Cardiovascular Disease Outcomes Variables

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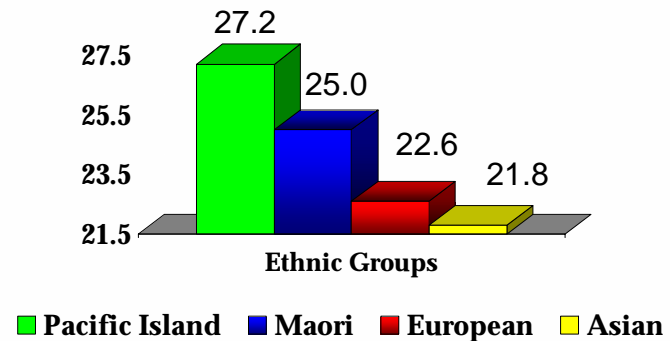
Blood Pressure

- Systolic (SBP)
- Diastolic (DBP)

Key Finding: The Role of BMI

BMI was the most significant variable in determining the ethnic differences in outcome variables (*lipids, blood pressure and fasting glucose*).

Mean Levels (kg/m²) adjusted for age, sex



- Pacific participants had the highest BMI levels of all the ethnic groups, followed by Maori.
- Television watching was the one lifestyle risk factor that was positively associated with BMI.
- To reduce the ethnic differences in outcome variables, interventions should target television watching and other lifestyle variables known to be risk factors for high BMI, (e.g. diet)

Research Team and Funder

Principal Investigators

- Mr David Schaaf
- Assoc Prof Robert Scragg
- Dr Colin Tukuitonga
- Dr Patricia Metcalf



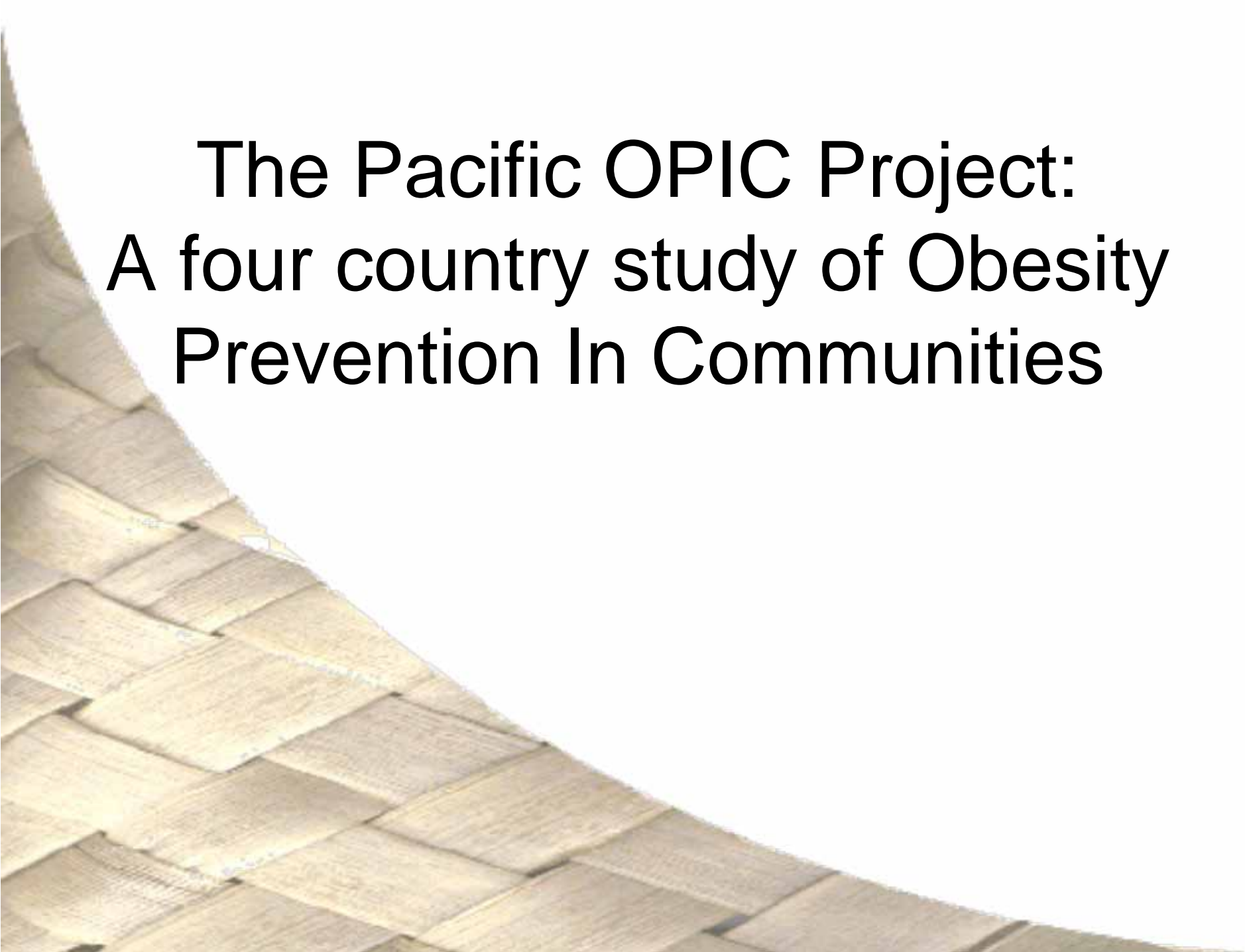
Funded by the

- Health Research Council





Are we doing anything
to fix the problem?



The Pacific OPIC Project: A four country study of Obesity Prevention In Communities

Pacific OPIC Study

- Study sites in 4 Countries
 - Australia (Deakin University, Victoria)
 - New Zealand (University of Auckland)
 - Tonga (Ministry of Health)
 - Fiji (Fiji School of Medicine)
- Funding for 5 years from
 - Wellcome Trust (UK)
 - National Health & Medical Research Council (Aus)
 - Health Research Council (NZ)

Rationale

- Pacific populations have the highest obesity rates worldwide
- Very little evidence of what works and what doesn't work
- Need
 - National, Community, Individual levels
 - Multiple strategies (eg education, policies, environments, social marketing, legislation?)
 - All community settings (eg villages, [churches](#), [schools](#), sport & recreation, food outlets, PHOs)
 - Very good evaluation
 - Sustainability beyond 5 years

The research questions

1. What is the effect of 'whole-of-community' programs on obesity prevention?
2. What is the feasibility & impact of each of the interventions?
3. What are the social & cultural factors and how can they be influenced?
4. What are the related policies and how can they be influenced?
5. What is the cost of obesity?

School Intervention decided at Community Meeting in 2004

- Attended by:
 - Teachers & students from intervention schools
 - Local churches
 - Local & Central Government
 - Funders & Providers of obesity prevention programs
- Process
 - Inform meeting about main causes of obesity
 - Meeting decided the action plan for the intervention

Main causes of obesity

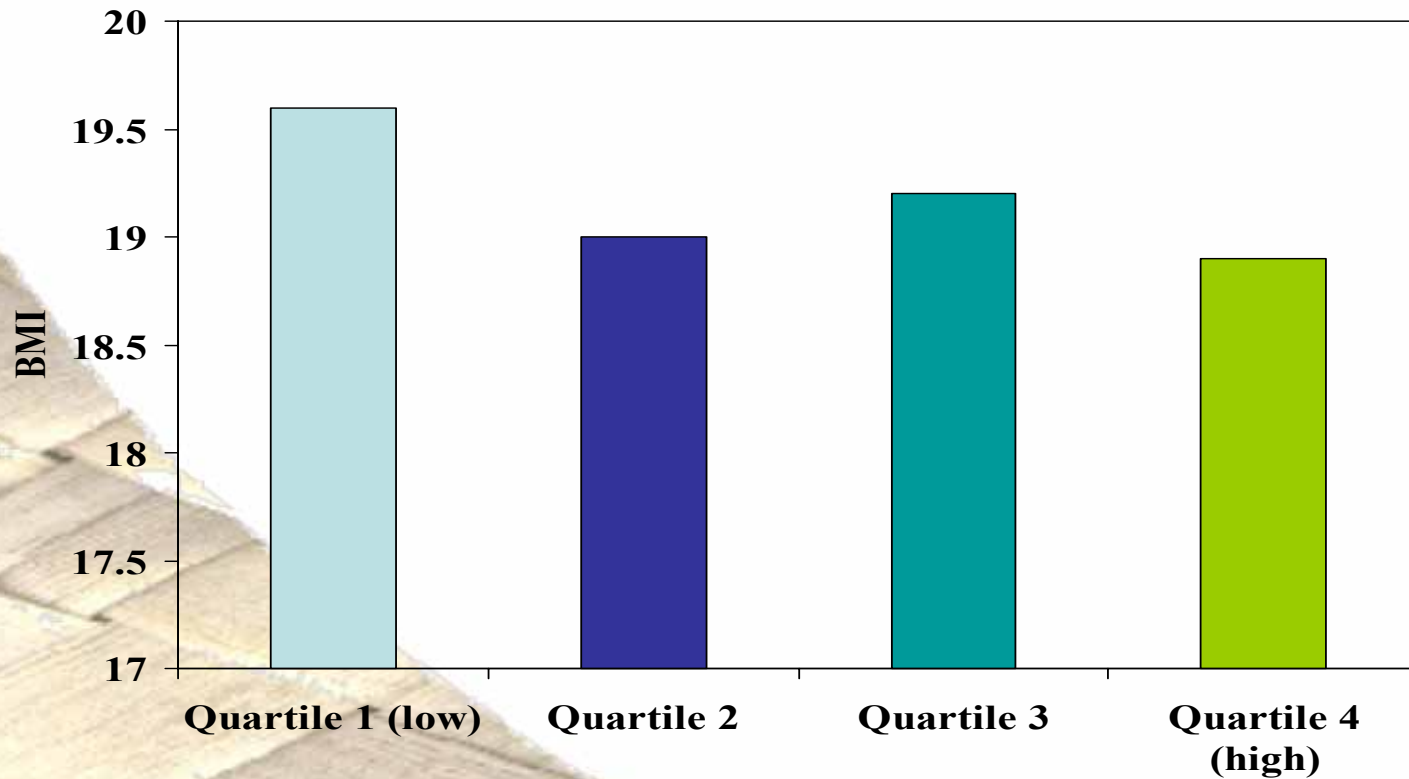
results from 2002 national children's nutrition survey

- Physical inactivity
- Missing breakfast
- Missing lunch
- Purchasing school food from dairy
- Soft drinks (eg. coke, sprite)
- Watching TV

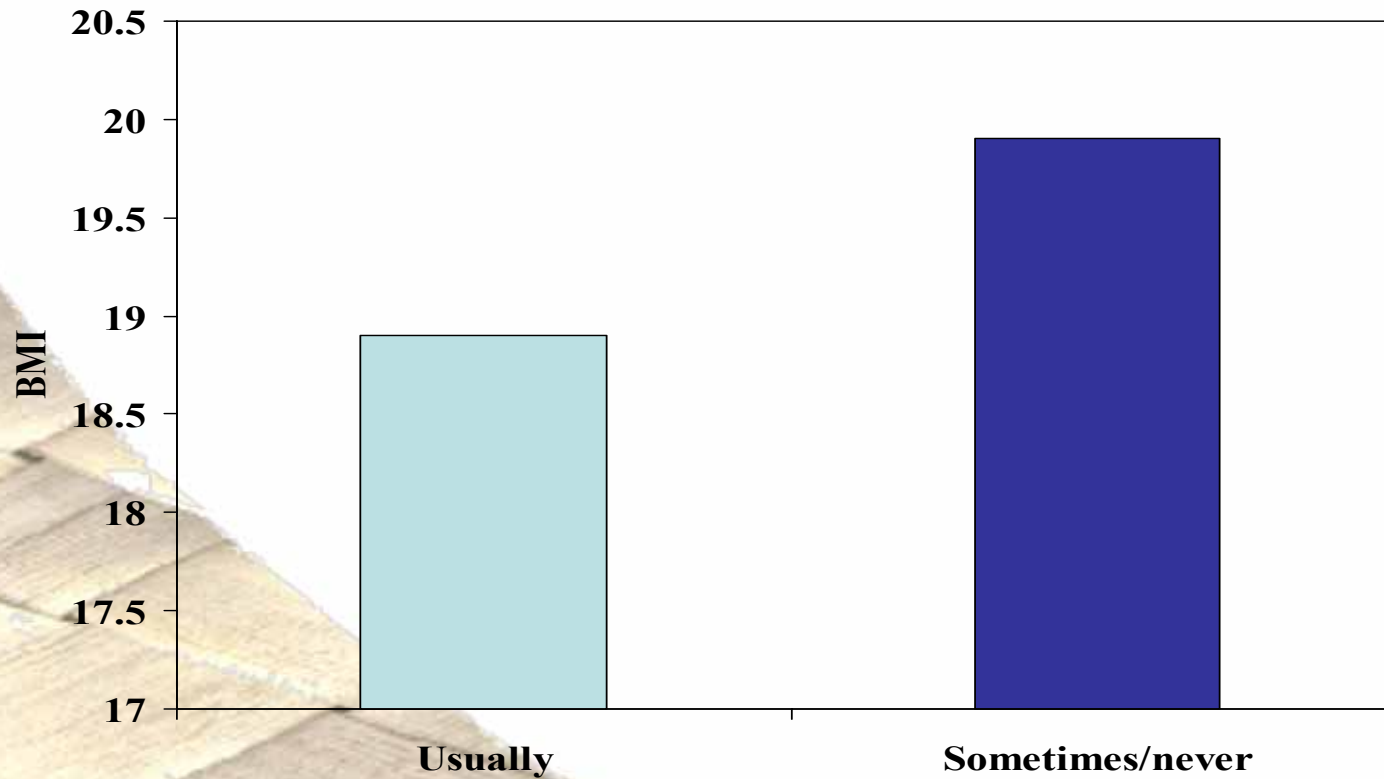
BMI

- Calculated: weight (kg) / square of height (m)
- 1 unit increase in BMI equals:
 - 2.2 kg** for a person 50 kg, and 1.5 m high
 - 2.6 kg** for a person 60 kg, and 1.6 m high
 - 3.2 kg** for a person 70 kg, and 1.8 m high
- Obesity = BMI >30 adult equivalent
- Overweight = BMI 25-30 adult equivalent

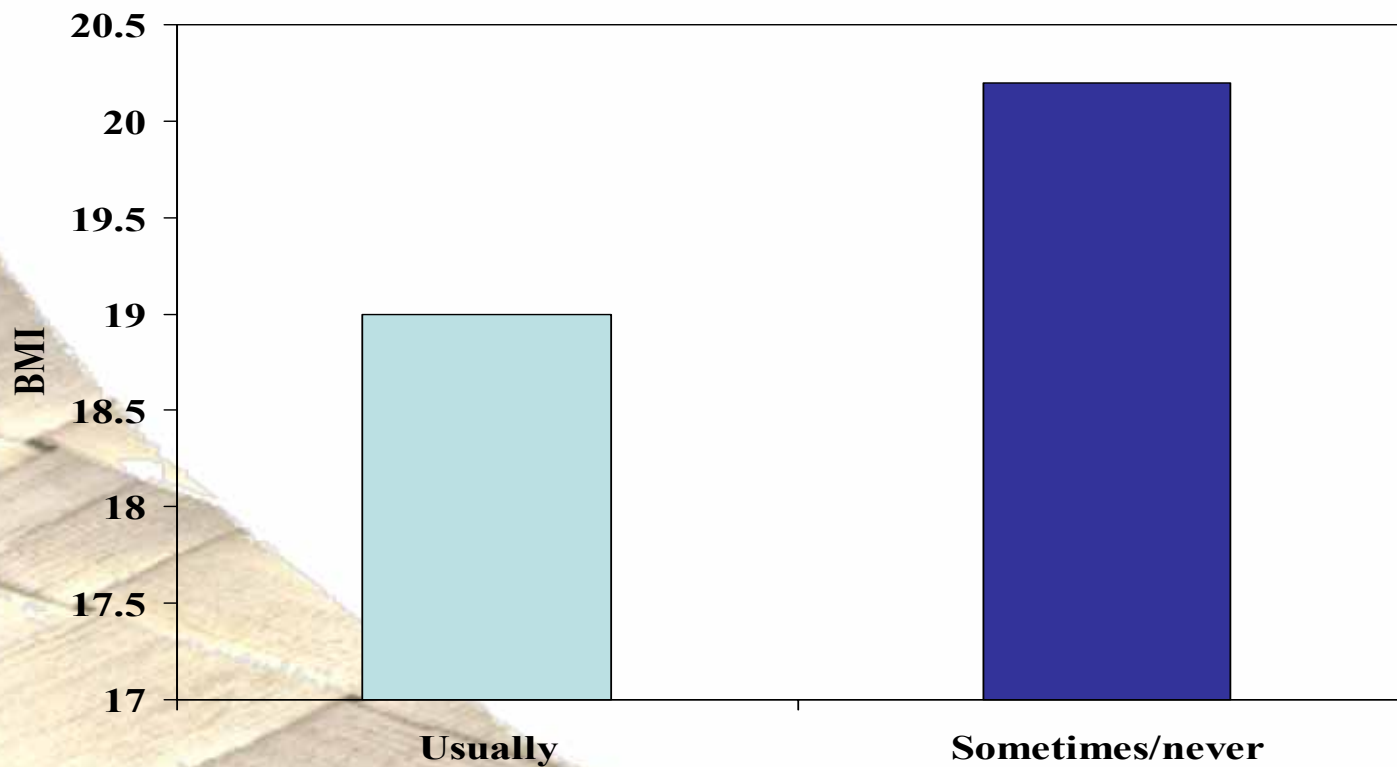
Mean BMI by *physical activity* score adjusted for age, sex, ethnicity



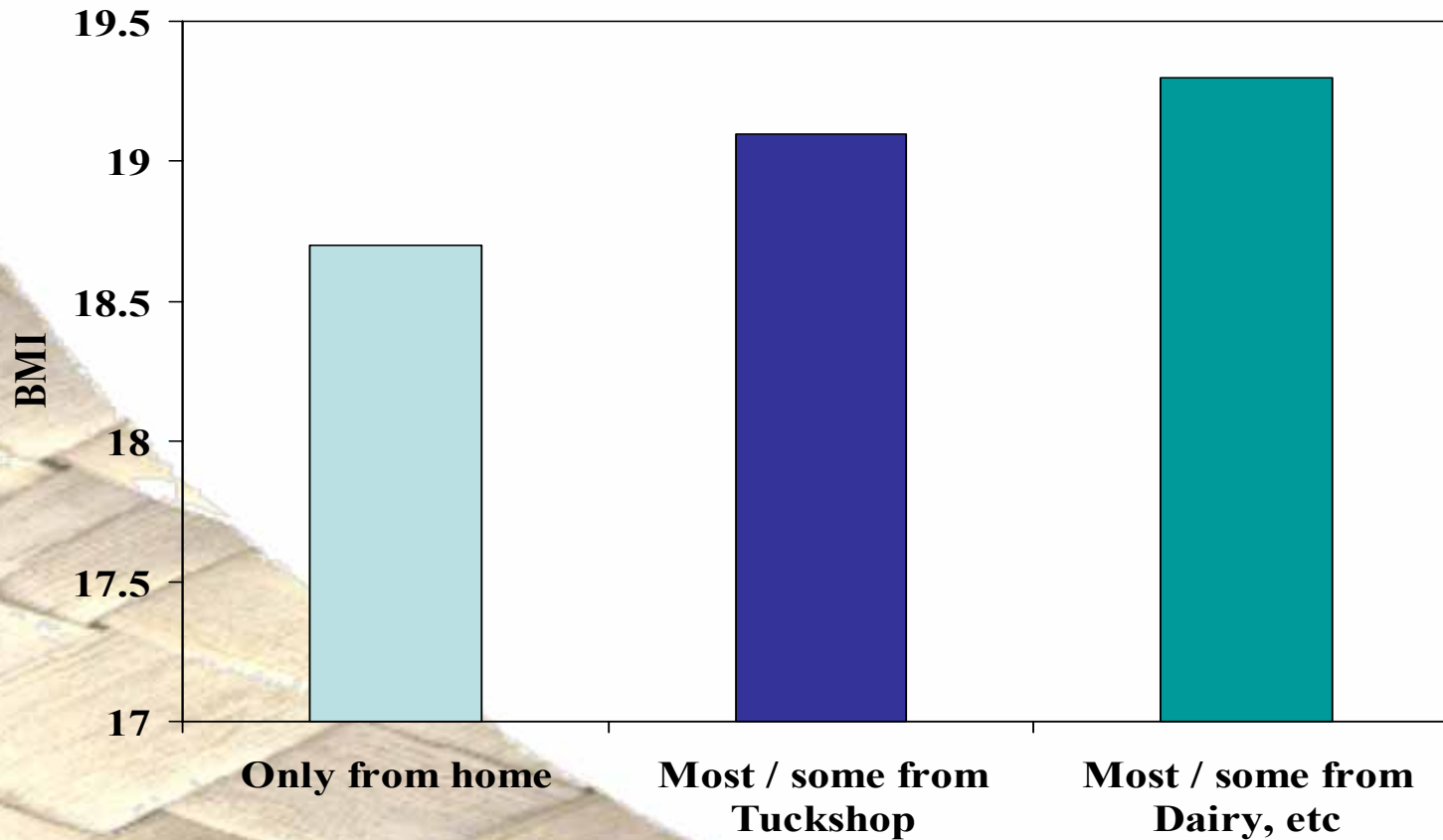
Mean BMI by *Eating Breakfast* adjusted for age, sex, ethnicity, NZDep



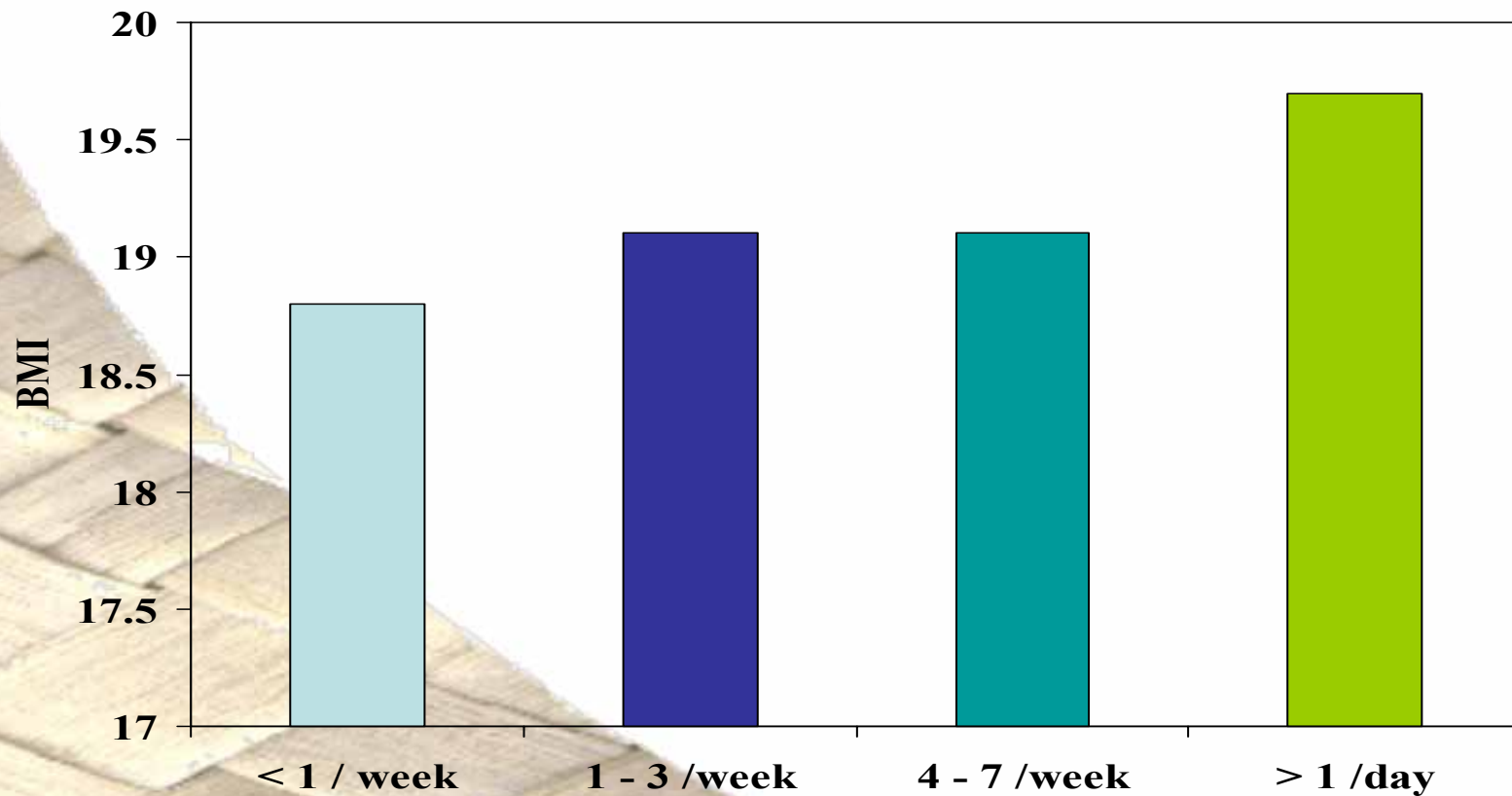
Mean BMI by *Eating Lunch* adjusted for age, sex, ethnicity, NZDep



Mean BMI by *Source of Food eaten at School* adjusted for age, sex, ethnicity, NZDep

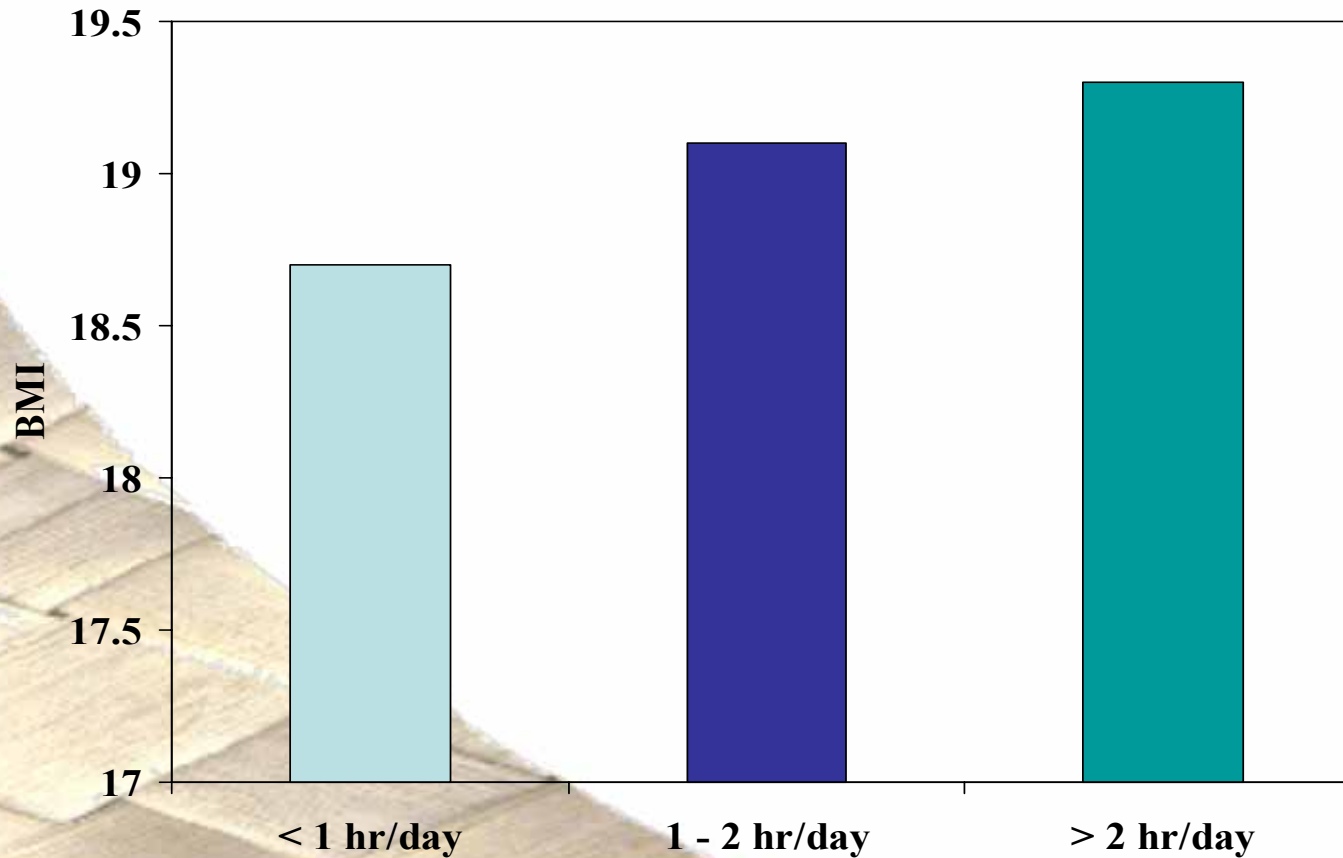


Mean BMI by Intake of *Soft Drinks* (eg. coke) adjusted for age, sex, ethnicity, NZDep



Mean BMI by *TV hours/day*

adjusted for age, sex, ethnicity, NZDep



School interventions

1. Significantly ↑ the proportion eating **breakfast** before school
 - Social Marketing (SM) with students & parents (S+P), school breakfast options
2. Significantly ↓ **high sugar drinks** and **promote water** consumption
 - SM (S+P), water policies, soft drink & vending machine policies, water fountains, canteen menu

School interventions

3. Significantly ↑ the **healthiness of school food** consumption
 - Food/nutrition policies (& enforcement), contracts with canteen providers, NHF HB Awards, SM (S+P)
4. Significantly ↓ **recreational screen time**
 - Curriculum, events, SM (S+P)
5. Significantly ↑ **PA** at lunchtime and after school
 - Programs, links with clubs & RST, PA policies, volunteer recruitment, SM (S+P)

High Acceptance by Students

