

# Evaluation of CHIP

## The Coronary Health Improvement Project (May 2005)

*Conducted at Perth, Australia*  
**-The Perth Cohort -**

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# **Evaluation of the Perth CHIP -The Perth Cohort – (May 2005)**

## **1 CHIP**

A four-week community-based intensive and comprehensive educational lifestyle intervention program designed to favorably affect the reversal and prevention of chronic disease and to improve employee health.

## **2 CHIP Objectives**

To markedly reduce the level of coronary risk factors, such as blood lipids, blood sugar, blood pressure, smoking, inactive lifestyle, overweight and stress. Furthermore to contribute to a lowering of medication requirements and to begin the reversal process of these chronic diseases commonly found in western society.

## **3 Evaluation**

Perth Cohort of 71 participants.

### **3.1 Demographics**

91 participants enrolled in the CHIP community project. Out of those, 71 had complete data sets that were evaluated.

Their gender composition was 24 males and 47 (66%) females. The age span ranged from 21-81 years. The majority was between 42 and 66 years of age. The average age for both males and females was 57 years.

### **3.2 Clinical Profile at Admission**

- 25% within normal weight range
- 7% “underweight”
- 18% “overweight,”
- 50% “obese”
- 66% LDL above 2.6 mmol/L
- 66% Cholesterol above 4.6 mmol/L
- 60% in normal blood sugar range
- Medications: 11% for diabetes, 34% for hypertension, 38% for high cholesterol.

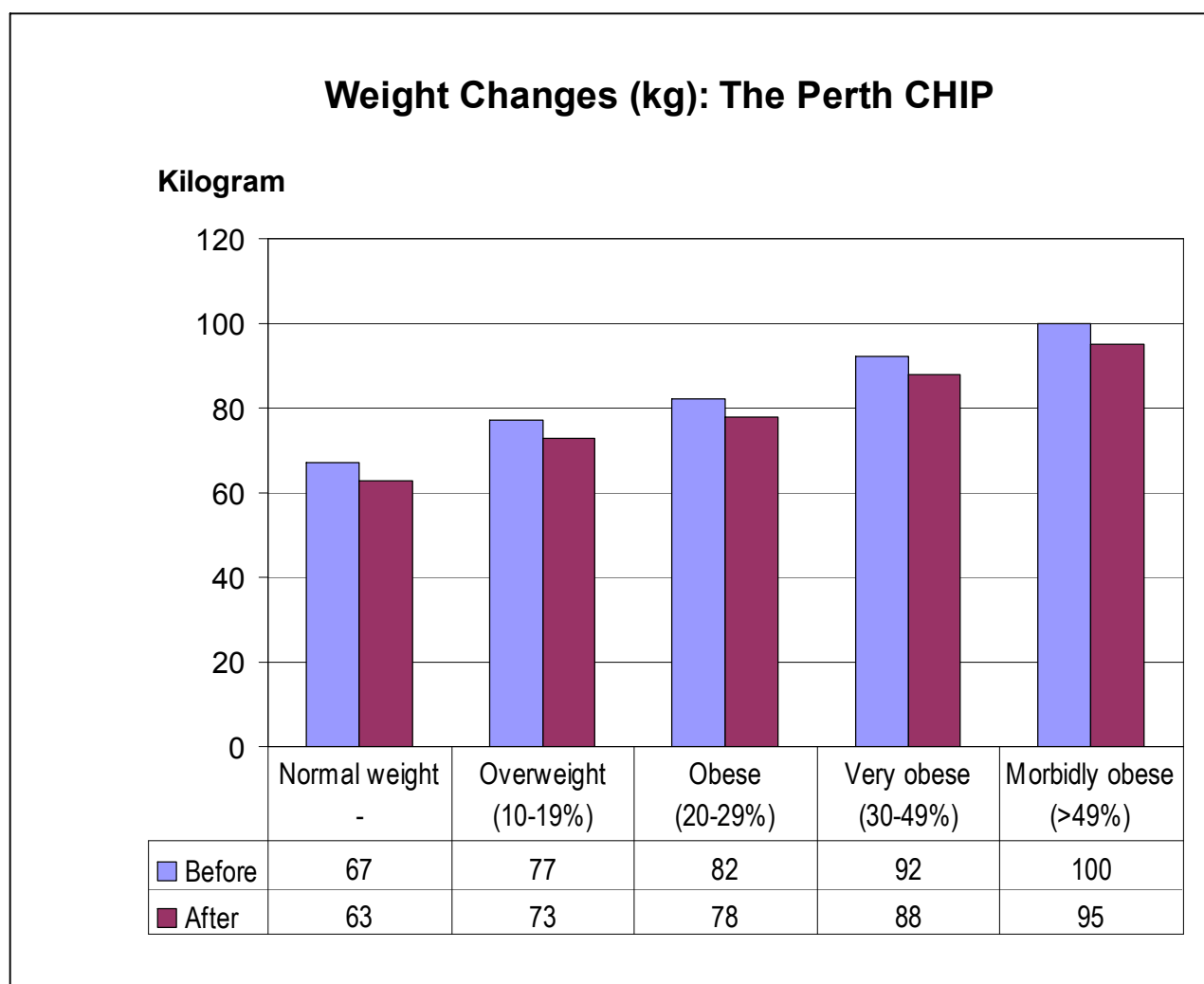
### 3.3 Effect of CHIP on Selected Clinical Parameters

#### 3.3.1 Weight

All participants with excess weight lost weight. At the start of the 4-week CHIP lifestyle intervention pilot project:

- 7% were underweight
- 25% were within the normal weight range
- 18% were 'overweight' (10-19% above ideal weight)
- 6% were classified as 'obese' (20-29%)
- 27% were 'very obese' (30-49%)
- 17% were 'morbidly obese' (above 49% of ideal weight)

Prior to the CHIP program, the group's average weight was 82 kg (ranging from 50 to 124 kg). Four weeks later, at the completion of the program, the average weight was 78 kg (ranging from 49 to 120 kg). Those who had to lose the most weight, lost the most as depicted in Figure 1 and in Table 1.



**Figure 1:** Average Weight Changes (kg) in 4 weeks according to Initial Weight Categories (Metropolitan Life Insurance Tables, 1959)

**Table 1: Weight Changes** (according to initial weight categories): The Perth Project

Categories	# Initial	Initial Averages	4 week Averages	Change (in kg)	Change (in %)
Ideal weight (not over 10%)	23	67	63	-4	-4%
Overweight (10 - 19%)	13	77	73	-3	-4%
Obese (20 - 29%)	4	82	78	-4	-5%
Very Obese (30 - 49%)	19	92	88	-4	-4%
Morbidly Obese (> 49%)	12	100	95	-5	-5%
Total	71	82	78	-4	-5%

### 3.3.2 Lipid Changes

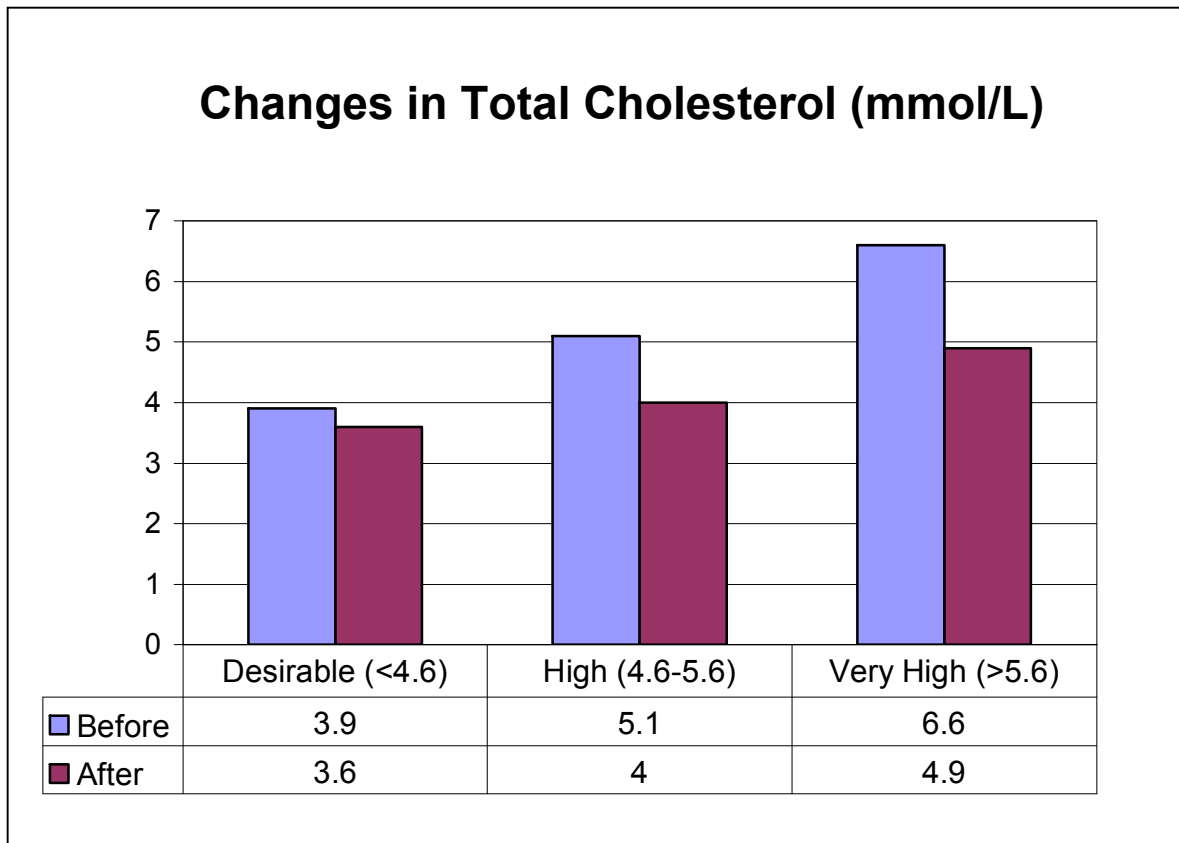
Of the 71 participants, 15 were on hypolipidemic drugs. The cohort of participants experienced significant reductions in blood lipids. The average Total Cholesterol prior to the program was 5.2mmol/L (ranging from 2.3 to 8.2mmol/L). This number declined to 4.2mmol/L (ranging from 2.5 to 6.4mmol/L) at the end of the program.

For instance, prior to the CHIP program, 66% of the participants had Total Cholesterol values higher than 4.6mmol/L. At the end of the program, however, this number had decreased. Now only 27% of the participants had values higher than 4.6mmol/L. This marked decrease was accomplished without adding hypolipidemic drugs.

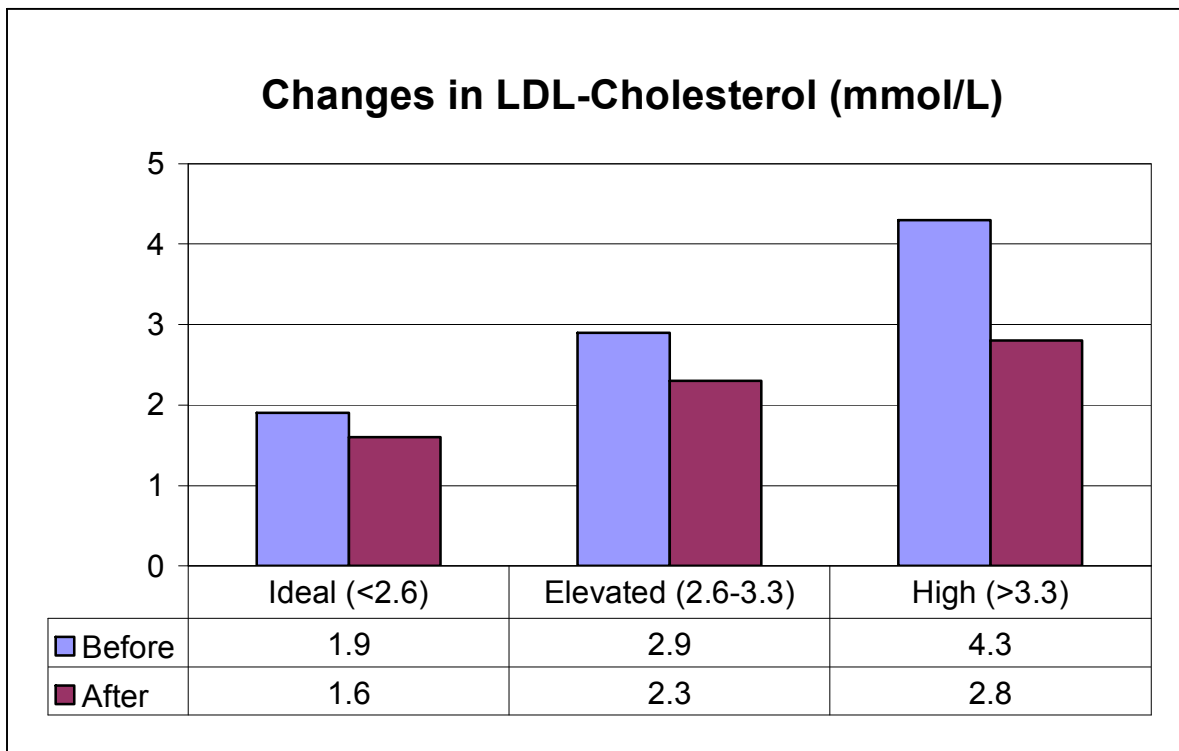
Similarly, the group's average LDL-Cholesterol level declined from 3.0mmol/L (ranging from 0.6 to 5.7mmol/L) to 2.3mmol/L (ranging from 1.0 to 2.6mmol/L), and the average Triglyceride levels dropped from 1.6mmol/L (0.5 to 4.2) to 1.2 (0.4 to 3.5mmol/L). These changes were accompanied by a similar decline in the HDL-Cholesterol levels, which lose clinical significance as LDL levels drop.

Figures 2 to 4 and Tables 2 to 4 depict the lipid changes stratified according to initial (baseline) categories. During the analysis phase, it became obvious that a stratified analysis model had to be employed, in order to better understand the dynamic nature of the changes.

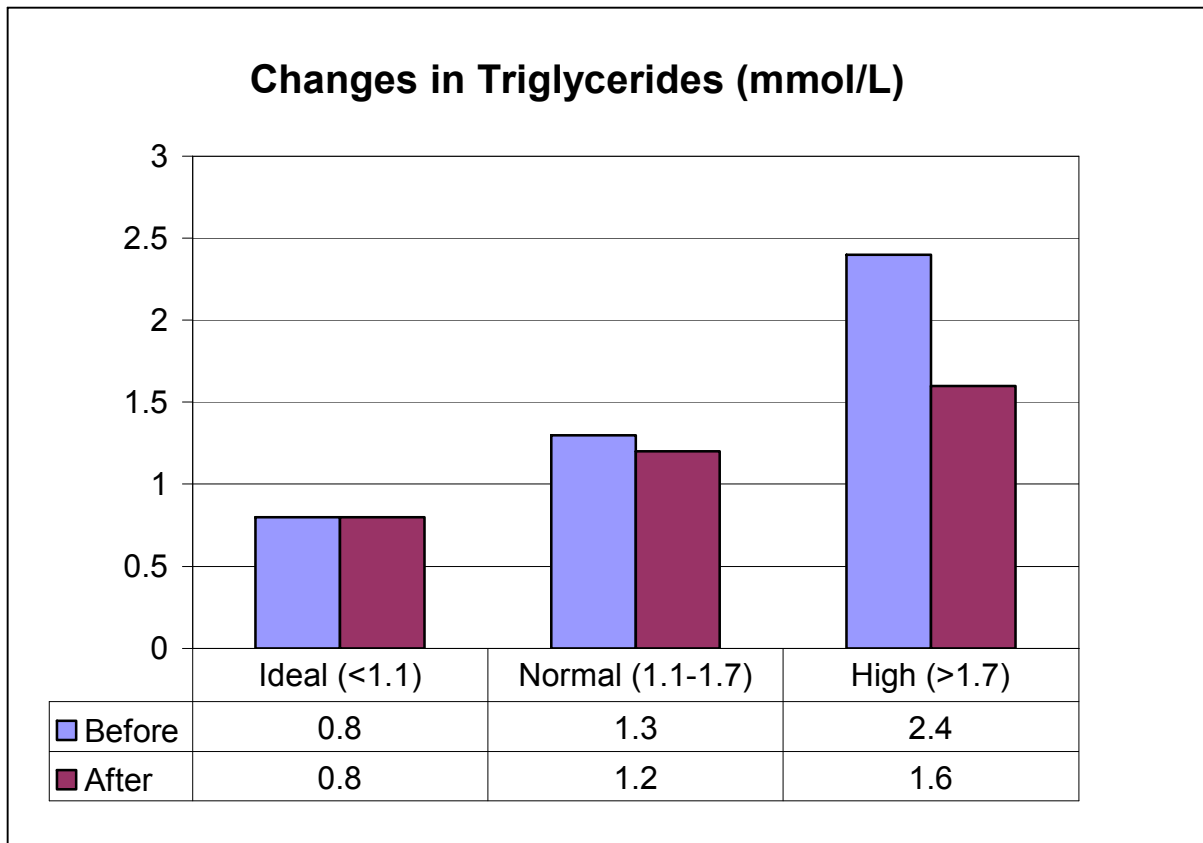
This is especially true for Triglyceride levels. Some participants with Triglyceride levels below 1.1mmol/L actually experienced a clinically non-significant increase, while those with high levels (>1.7mmol/L) usually had statistically and clinically significant reductions.



**Figure 2:** Average Changes in Total Cholesterol (mmol/L) in 4 Weeks according to Initial Categories: The Perth CHIP.



**Figure 3:** Average Changes in LDL-Cholesterol (mmol/L) in 4 Weeks according to Initial Categories: The Perth CHIP.



**Figure 4:** Average Changes in Triglycerides (mmol/L) in 4 Weeks according to Initial Categories: The PerthCHIP.

**Table 2: Total Cholesterol Changes** (according to initial cholesterol categories)

Categories	#	Initial	Initial Averages	4 week Averages	Change (in mmol/L)	Change (in %)
< 4.6mmol/L (desirable)	24		3.9	3.6	-0.3	-8%
4.6-5.6 mmol/L (high)	25		5.1	4.0	-1.1	-21%
5.6 mmol/L (very high)	22		6.6	4.9	-1.7	-25%
<b>Total</b>	<b>71</b>		<b>5.2</b>	<b>4.2</b>	<b>-1.0</b>	<b>-19%</b>

Cholesterol in mmol/L; 27 participants were on hypolipidemic medications. The dosage was not altered during the program.

**Table 3: LDL-Cholesterol Changes** (according to initial LDL categories)

Categories	# Initial	Initial Averages	4 week Averages	Change (in mmol/L)	Change (in %)
< 2.6mmol/L (ideal)	24	1.9	1.6	-0.3	-16%
2.6-3.3mmol/L (elevated)	26	2.9	2.4	-0.5	-18%
>3.3mmol/L (high)	21	4.3	2.8	-1.5	-34%
Total	71	3.0	2.3	-0.7	-23%

LDL Cholesterol in mmol/L. 27 participants were on hypolipidemic medications. The dosage was not altered during the program.

**Table 4: Triglyceride Changes** (according to initial TG categories)

Categories	# Initial	Initial Averages	4 week Averages	Change (in mmol/L)	Change (in %)
< 1.1mmol/l (ideal)	26	0.8	0.8	0	0%
1.1-1.7mmol/L (normal)	12	1.3	1.2	-0.1	-7%
>1.7mmol/L (high)	33	2.4	1.6	-0.8	-33%
Total	71	1.6	1.2	-0.4	-23%

### 3.3.3 Glucose Changes

Table 5 shows the effect of the CHIP program on blood glucose levels in normal and diabetic participants. Those with the highest glucose levels and at greatest risk, had the greatest reductions and improvements.

**Table 5: Glucose Changes** (according to initial glucose categories)

Categories	# Initial	Initial Averages	4 week Averages	Change (in mmol/L)	Change (in %)
< 5.6mmol/L(ideal)	52	5.1	4.8	-0.3	-5%
5.6-5.9mmol/L(elevated)	5	5.7	5.2	-0.5	-9%
6.0-6.9mmol/L(pre-diabetic)	5	6.4	6.0	-0.4	-6%
> 6.9mmol/L (diabetic)	9	10.4	7.7	-2.7	-27%
Total	71	5.9	5.3	-0.6	-11%

Glucose in mmol/L. Of the 71 participants, 8 were on oral antidiabetic medication. The dosage was not altered during the program.

### 3.3.4 Blood Pressure Changes

Tables 6 and 7 show the effect of the CHIP program on systolic and diastolic blood pressure.

**Table 6: Systolic Blood Pressure Changes** (according to initial SBP categories)

Categories	# Initial	Initial Averages	4 week Averages	Change (in mmHg)	Change (in %)
< 120mmHg (ideal)	8	111	111	0	0
120-130 mmHg (elevated)	11	127	111	-16	-13
> 130mmHg (high)	52	155	135	-20	-13
<b>Total</b>	<b>71</b>	<b>146</b>	<b>128</b>	<b>-18</b>	<b>-12</b>

Of the 71 participants, 24 were on blood pressure medication. The dosage was not altered during the program.

**Table 7: Diastolic Blood Pressure Changes** (according to initial DBP categories)

Categories	# Initial	Initial Averages	8 week Averages	Change (in mmHg)	Change (in %)
< 80mmHg (ideal)	32	71	71	0	0
80-85mmHg (elevated)	9	82	76	-6	-7
> 85mmHg (high)	30	93	82	-11	-12
<b>Total</b>	<b>71</b>	<b>82</b>	<b>77</b>	<b>-5</b>	<b>-6</b>

Of the 71 participants, 24 were on blood pressure medication. The dosage was not altered during the program.

### 3.3.5 Changes in Physical Activity

There was a significant improvement in the participants' physical activity: at the beginning 30% reported no physical activity at all, 34% reported mild exercise (2-3 days/week), 34% reported to do moderate physical activity (3-5 days/week) and 2% reported to do vigorous physical activity (4-6 days/week). After the 4 week program, only 1% reported no physical activity at all, 17% reported mild exercise, 48% reported moderate physical activity and 34% reported vigorous physical activity.

### 3.3.4 Changes in Smoking

The only person who entered as a smoker was still a smoker at the conclusion of the program.

## 4 Effect of the CHIP program on Medication Status

Table 8 summarizes medication status at the beginning of the program by disease categories according to the participants' personal physicians. The CHIP program usually affects particularly medication requirements for participants with diabetes, hypertension, hypercholesterolemia, gastric reflux, and also depression. These medication changes, however, were not documented in this pilot project.

**Table 8:** Medication use by disease category in 71 participants attending the CHIP program

<b>Medication for</b>	<b>Initially on medication</b>
Diabetes	8 (11%)
Hypertension	24 (34%)
Hypercholesterolemia	27 (38%)

## 5 Summary

This pilot phase of the CHIP project showed the impact of an intense educational lifestyle intervention program. Most measurable clinical parameters associated with circulation-related diseases showed marked improvements at 4 weeks. Clinical improvements in symptomatology and general attitude and level of wellness were observed.

## 6 Discussion

In general, the results in risk reduction are not dissimilar to CHIP data published in peer review journals. CHIP participants usually experience significant reduction in prescribed medications within four weeks, especially in the areas of diabetes, hypertension, hypercholesterolemia, gastric reflux, constipation and depression. This, however was not documented in this pilot study.

The results in weight loss were achieved by recommending an ad libitum diet, where serving size was not the issue but the kind of food (processed vs. whole food, animal vs. plant protein).

## **7 Recommendations**

1. Have more complete data sets.
2. Encourage and incentivize spouse attendance wherever possible.
3. Document meticulously medication (incl. HRT) and depression changes (Beck Depression Inventory).
4. Develop strong alumni chapter with monthly group meetings conveniently scheduled. Follow up with risk assessment every six months. Encourage CHIP graduates and their significant others to volunteer their time to assist with the next program. Facilitate their attendance of the next 2-3 CHIP programs as “refresher” courses at no cost.