# **Title** Mortality, morbidity, weight and metabolic outcomes 15 years after very low calorie diet therapy

**Authors** Paisey RB[1], Daniels C[2], Howitt W[3], Bromige R[4], Greatorex D[5], Campbell C[1], Paisey CF[6], Frost J[1]

**Institutions** 1 Diabetes research unit, Torbay Hospital, Torquay, TQ2 7AA; 2 Chilcote surgery, Torquay, TQ1 3LA; 3 Pembroke House surgery, Paignton, TQ3 2EZ; 4 Compass House Medical Centre, Brixham, TQ5 9TH 5 Kingsteignton Medical Practice, Newton Abbot,TQ12 3NW, 6 University of Nottingham Medical School

## Introduction

The administration of very low calorie meal replacement (VLCD) to induce rapid weight loss in simple obesity and diabetes is frequently attended with short term success and resolution of type 2 diabetes (1). The effects were lost after 5 years in one study (2). Longer term follow up in larger numbers have not been reported.

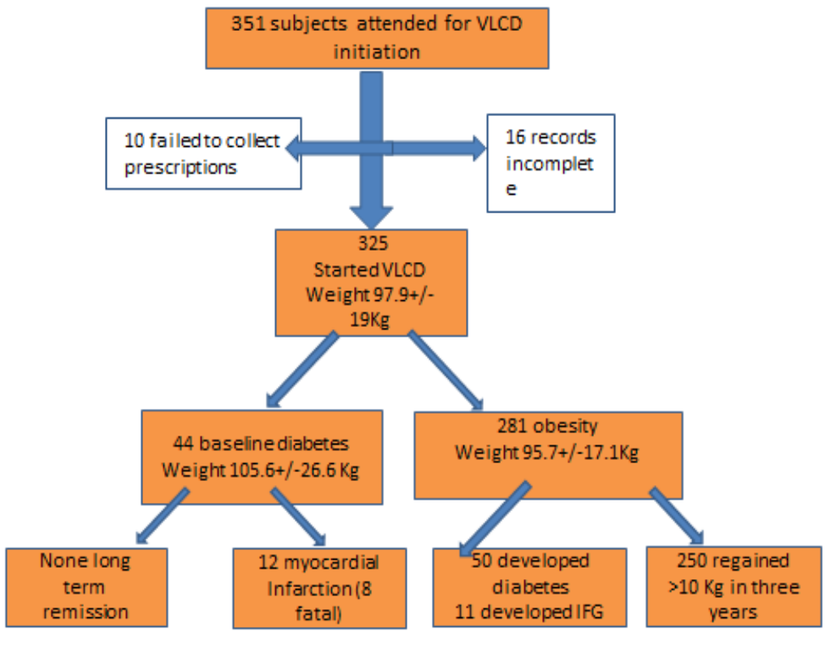
## Aims

To audit outcome for maintenance of weight loss, development of diabetes, mortality and morbidity 10 to 18 years after administration of a VLCD programme of complete meal replacement in 325 self- selected obese subjects in South Devon, UK.

## Methods

Hospital records and 4 general practice data bases were interrogated for subjects coded for Lipotrim VLCD use in the 1990's with evidence that prescriptions were collected. Weight loss, final weight, blood pressure, serum lipids, renal function and diabetes status were extracted from practice records. The meal replacement comprised 450 Kcal/day for women, 650 for men. Causes of death, occurrence of vascular disease and remission or development of diabetes were recorded from practice and hospital records, Minap and stroke data-bases.

**Results 1** Recruitment and outcome




**Results 2** Characteristics of groups with and without diabetes

| | Whole cohort n=325 | Type 2 diabetes baseline n=44 | Developed diabetes/IFG (61) | Never diabetes n=220 |
|---|---|---|---|---|
| Baseline weight Kg | 97.9 +/- 19.0 | 105.6 +/- 26.6 | 102.0 +/- 21.5 | 95.7 +/-17.1 |
| Baseline BMI Kg/M$^2$ | 36.1 +/-6.8 | 38.1+/-6.9 | 38.2+/-7.2 | 35.1+/-6.4 |
| Weight loss Kg | 14.8 +/- 11.2 | 12.4 +/- 12.3 | 15.5 +/-11.9 | 15.1 +/- 10.7 |
| Weight 15 years Kg | 100.0 +/- 20.8 | 107.2 +/- 25.4 | 102.2 +/-22.2 | 98.4 +/-19.5 |
| % maintaining >10 % weight loss | 16.6 | 13.6 | 28.5 | 13.2 |

**Results 3** Prediction of diabetes status model after VLCD

Independent variables Age, gender, baseline BMI, weight lost on VLCD, time after VLCD, final weight loss, interacted against developed or did not develop diabetes over the 15 years.
**Only baseline BMI was found significant., P=0.0048**
n=281, model F statistic = 0.29 on 4 and 274 DoF

**Results 4** Prediction of cardiovascular events after VLCD

Cardiovascular complications model: dependent variable any cardiovascular disease event against any diabetes, baseline BMI, weight lost on Lipotrim, final weight lost, gender, age on VLCD. n=325, model F statistic = 0.92 on 3 and 311 DoF
**Any diabetes P=0.0002; Age on VLCD P= 0.0001: baseline BMI P =0 .006 predicted CVD**.

## Conclusions

This 15 year follow up of VLCD intervention has **not shown** convincing evidence of

**1 Sustained remission in diabetes,**
**2 An effect on incident diabetes**
**3 Weight loss maintenance.**

A high incidence of cardiovascular events in those with baseline and incident diabetes requires further study.

## Clinical implication

Strategies to prevent obesity may be more likely to reduce diabetes incidence and CVD than reversible intensive weight loss programmes in obese middle aged individuals