Implementing Type 2 Diabetes Prevention Programmes

Jaakko Tuomilehto

Department of Public Health
University of Helsinki
Helsinki, Finland
THE PREVENTION OF DIABETES MELLITUS
ELLIOTT P. JOSLIN, M.D.
BOSTON

On the broad street of a certain peaceful New England village there once stood three houses side by side, as commodious and attractive as any in the town. Into these three houses moved in succession four women of the United States was 10 per hundred thousand, and in 1915, 18 per hundred thousand. In the same period in Boston, it rose from 14 to 26 on the same basis. There are probably more than half a million diabetics in the United States. Therefore, it is proper at the present time to devote attention not alone to treatment, but still more, as in the campaign against typhoid fever, to prevention. The results may not be quite so striking or as immediate, but they are sure to come and to be important.
Prevalence of previously diagnosed and screen-detected type 2 diabetes
PRINCIPLES OF EFFECTIVE PRIMARY PREVENTION OF TYPE 2 DIABETES

• POPULATION APPROACH and HIGH RISK APPROACH are not mutually exclusive, but complementary to each other.

• POPULATION APPROACH will not be effective if proper services for high risk individuals do not exist in the community.

• HIGH RISK APPROACH will not be effective if the community is not prepared, informed and properly advised at the same time.
A large change in the risk in high-risk individuals will have a large change in their risk, but a small effect in the population.

A small change in the risk in the total population is having a small effect on the disease rate in high risk people, but a large effect in the population.
DPS: lifestyle goals

- Weight reduction > 5%
- Fat intake < 30 E%
- Saturated fat intake < 10 E%
- Fibre intake ≥ 15 g/1000 kcal
- Physical activity > 30 min/day

**Intervention group**
- Individually tailored diet based on 3-day food diaries
- 7 dietary counselling sessions during the first year, every 3 months thereafter
- Free-of-charge gym

**Control group**
- General advice about healthy diet and exercise habits
- No individualised counselling

Lindström et al. Diabetes Care 2003; 26:3230–6
## Changes in clinical and metabolic parameters in the intervention and control groups - DPS from baseline to year 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Intervention</th>
<th>Control</th>
<th>p for change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>-4.2</td>
<td>-0.8</td>
<td>** **</td>
</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>-4.4</td>
<td>-1.3</td>
<td>** **</td>
</tr>
<tr>
<td>fP-glucose (mmol/l)</td>
<td>-0.2</td>
<td>0.0</td>
<td>** **</td>
</tr>
<tr>
<td>2h-P-glucose (mmol/l)</td>
<td>-0.9</td>
<td>-0.3</td>
<td>** **</td>
</tr>
<tr>
<td>HbA\textsubscript{1c} (%)</td>
<td>-0.1</td>
<td>0.1</td>
<td>** **</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>-0.13</td>
<td>-0.10</td>
<td>ns</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td>+0.05</td>
<td>+0.02</td>
<td>ns</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>-0.19</td>
<td>-0.01</td>
<td>** **</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>-5</td>
<td>-1</td>
<td>**</td>
</tr>
<tr>
<td>Diastolic BP (mmHg)</td>
<td>-5</td>
<td>-3</td>
<td>*</td>
</tr>
</tbody>
</table>
Development of diabetes during the lifestyle intervention in the intervention and control groups - DPS

Risk reduction: 58%
Reduction in diabetes risk when achieving any of the 5 lifestyle targets - DPS

<table>
<thead>
<tr>
<th>TARGET</th>
<th>Risk Reduction (%) when target achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss &gt;5%</td>
<td>66 %</td>
</tr>
<tr>
<td>Total Fat &lt; 30E%</td>
<td>53 %</td>
</tr>
<tr>
<td>Saturated Fat &lt; 10 E%</td>
<td>54 %</td>
</tr>
<tr>
<td>Fiber &gt; 15 g/1000 kcal</td>
<td>71 %</td>
</tr>
<tr>
<td>Exercise &gt;4h/week</td>
<td>62 %</td>
</tr>
</tbody>
</table>
Proportion of subjects becoming diabetic by success in achieving the intervention targets at one-year examination - DPS
Lifestyle Risk Factors and New-Onset Diabetes Mellitus in Older Adults

The Cardiovascular Health Study

Conclusion: Even later in life, combined lifestyle factors are associated with a markedly lower incidence of new-onset diabetes mellitus.

Arch Intern Med. 2009;169(8):798-807
Cardiovascular Health Study

• Physical activity
• Dietary score
• Smoking
• Alcohol
• BMI
• Waist circumference

Learning from the best
Prevention of Type 2 Diabetes by Lifestyle Management: The Evidence

**DPS - Finland**
- Risk 58% ↓

**DPP - USA**
- Risk 58% ↓

**SLIM - Netherlands**
- Risk 58% ↓

**EDIPS Newcastle - UK**
- Risk 55% ↓

**Da Qing - China**
- Risk 43% ↓

**IDPP - India**
- Risk 28.5% ↓

- 6-year intervention hazard rate ratio 0.49 (95% CI 0.33-0.73)
- 26-year follow-up hazard rate ratio 0.57 (95% CI 0.41-0.81)
Prevention of Type 2 Diabetes by Lifestyle Intervention – Meta-Analysis of Results from Clinical Trials

NNT to prevent one case of diabetes = 6.4 (over 1.8 - 4.6 years)

Gillies et al. BMJ 2007;334:299
DPP – diabetes incidence by ethnicity

Cases per 100 person years

Caucasian
n=1,768

African American
n=645

Hispanic
n=508

American Indian
n=171

Asian
n=142

DPP: Diabetes Prevention Program
Change in **total duration of leisure-time physical activity** and the reduction in incidence of diabetes – DPS: the highest tertile (3.8 h/wk) versus the lowest tertile (-3.2 h/wk)

* Adjusted for all baseline and during-study variables
Change in **strenous structured leisure-time physical activity** other than walking and the reduction in incidence of diabetes – DPS: the highest tertile (1.1 h/wk) versus the lowest tertile (-0.2 h/wk)
Change in duration of lifestyle leisure-time physical activity: the highest tertile (1.9 h/wk) versus the lowest tertile (-1.8 h/wk) and the reduction in incidence of diabetes – DPS
Change in total duration of leisure-time physical activity and weight change - DPS

Adjusted for baseline weight and amount of physical activity

-3.2 h/wk  0.5 h/wk  3.8 h/wk
Lifestyle intervention studies reveal a correlation between incidence of diabetes and baseline BMI

(1) Japanese trial
(2) Malmo Feasibility Study in Sweden
(3) DaQing IGT and Diabetes Study in China
(4) Finnish Diabetes Prevention Study in Finland
(5) Diabetes Prevention Program 2002 in the USA

Pan et al. *Diabetes Care* 1997; 20:537–44;
Pearson correlation coefficients between changes in anthropometric variables from baseline to year 2

<table>
<thead>
<tr>
<th></th>
<th>Fat mass</th>
<th>Waist</th>
<th>Hip</th>
<th>Sagittal diameter</th>
<th>Transverse diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>.89</td>
<td>.74</td>
<td>.78</td>
<td>.67</td>
<td>.50</td>
</tr>
<tr>
<td>Fat mass</td>
<td>.68</td>
<td>.58</td>
<td>.68</td>
<td>.54</td>
<td>.43</td>
</tr>
<tr>
<td>Waist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sagittal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diameter</td>
<td></td>
<td></td>
<td></td>
<td>.54</td>
<td>.49</td>
</tr>
</tbody>
</table>
The risk of diabetes by the changes in weight and waist circumference from baseline to year 1

Weight change

Increase
Reduction

%
Univariate hazard ratios for diabetes incidence by lifestyle score components at year 3

Lancet 2006:368;1673-79
Multivariate hazard ratios for diabetes incidence by lifestyle score components at year 3

HR

Lancet 2006:368;1673-79
Weight and waist circumference (wc) change from baseline to year 3 by quartiles of dietary fibre - DPS

Fiber, g/1000 kcal

*Adjusted for treatment group, sex, age, VLCD-use, baseline weight/wc, baseline and intervention period physical activity, and baseline intake of explanatory nutrient
Dietary changes by 2-year weight reduction adjusted for sex and baseline intake

*** p<0.001
Weight reduction (%) from baseline by success score (number of intervention goals achieved) at year 3

Lancet 2006:368:1673-79
<table>
<thead>
<tr>
<th>Age tertile (years)</th>
<th>Relative Risk Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 51</td>
<td>49 %</td>
</tr>
<tr>
<td>51 - 60</td>
<td>57 %</td>
</tr>
<tr>
<td>61 -</td>
<td>65 %</td>
</tr>
</tbody>
</table>
Incidence of diabetes according to the FH and intervention group; solid line for control group

FH-

p=0.13, p*=0.006

FH+

p=0.0004, p*=0.002
Long-term incidence of diabetes by group - DPS

Log-rank test: $p<0.001$
Hazard ratio = 0.55 (95% CI 0.41 - 0.75)

Number at risk, Intervention/Control:
265
257
...  
Follow-up time, years

Intensive intervention ceased after about 4 years

Lindström et. al. Lancet 2006
The long-term effect of lifestyle interventions to prevent diabetes in the China Da Qing Diabetes Prevention Study: a 20-year follow-up study

Guangwei Li, Ping Zhang, Jinping Wang, Edward W Gregg, Wenying Yang, Qiu Hong Gong, Hui Li, Hongliang Li, Yayun Jiang, Yali An, Ying Shuai, Bo Zhang, Jingling Zhang, Theodore J Thompson, Robert B Gerzoff, Gojka Roglic, Yinghua Hu, Peter H Bennett

Summary

Intensive lifestyle interventions can reduce the incidence of type 2 diabetes in people with impaired glucose tolerance, but how long these benefits extend beyond the period of active intervention, and whether such interventions reduce the risk of cardiovascular disease (CVD) and mortality, is unclear. We aimed to assess whether...

Lancet 2008; 371: 1783–89
See Comment page 1731
Department of Endocrinology,
Cumulative Incidence of Diabetes

HRR 0.57 (95% CI, 0.41 – 0.81)

*Age and cluster variable clinic adjusted
10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study

Diabetes Prevention Program Research Group*

Published Online October 29, 2009
DOI:10.1016/S0140-6736(09)61457-4
Baseline age: 25-44 yrs
45-59 yrs
60 + yrs
DPP: Cumulative incidence of diabetes by baseline age

Baseline age:
- 25-44 yrs
- 45-59 yrs
- 60+ yrs
Log-rank test: p<0.001
Incidence rates: Control: 7.2 (95% CI 6.1-8.5), Intervention: 4.5 (95% CI 3.8-5.5)

Hazard ratio=0.614 (95% CI 0.477-0.789), p<0.001
Adjusted hazard ratio=0.591 (95% CI 0.461-0.758), p<0.001
Log-rank test: $p=0.0312$
Incidence rates: Control: 7.0 (95% CI 5.5-8.9), Intervention: 4.9 (95% CI 3.8-6.3)

Hazard ratio=0.685 (95% CI 0.485-0.966), $p=0.031$
Adjusted hazard ratio=0.667 (95% CI 0.476-0.935), $p=0.019$

DPS follow-up 2009 after intervention
DPS 2009. Men

Log-rank test: p=0.0075
Incidence rates: Control: 8.0 (95% CI 6.0-10.7), Intervention: 4.6 (95% CI 3.3-6.3)
Hazard ratio=0.562 (95% CI 0.367-0.861), p=0.008
Adjusted hazard ratio=0.530 (95% CI 0.351-0.800), p=0.003

Cumulative incidence

Follow-up time, years


Log-rank test: p=0.0054
Incidence rates: Control: 6.9 (95% CI 5.6-8.4), Intervention: 4.5 (95% CI 3.6-5.7)
Hazard ratio=0.646 (95% CI 0.473-0.881), p=0.006
Adjusted hazard ratio=0.631 (95% CI 0.463-0.860), p=0.004

Cumulative incidence

Follow-up time, years
# Success achieving the goals at year 3, (%) - DPS

<table>
<thead>
<tr>
<th>Goals</th>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss, 5%, at year 3</td>
<td>39</td>
<td>19</td>
</tr>
<tr>
<td>Dietary Fat &lt;30E%</td>
<td>35</td>
<td>15</td>
</tr>
<tr>
<td>Safa, &lt; 10E%</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Dietary fibre 15g/1000kcal</td>
<td>38</td>
<td>24</td>
</tr>
<tr>
<td>Exercise, 4 h/wk</td>
<td>76</td>
<td>59</td>
</tr>
</tbody>
</table>
Diabetes incidence in the DPS study
Original treatment groups; follow-up until the end of year 2009

Hazard ratio (95% CI)

Incidence rate per 100 p-y (95% CI)

Success score at year 3

Incidence rate, per 100 person-years
Hazard ratio (multivariate adjusted)
DPS: proportion (%) of persons achieving predefined intervention goals

<table>
<thead>
<tr>
<th>Number of goals</th>
<th>3-year follow up</th>
<th>First post-intervention follow up*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Intervention</td>
</tr>
<tr>
<td>0</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>1</td>
<td>31</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>4–5</td>
<td>14</td>
<td>6</td>
</tr>
</tbody>
</table>

*p-value

*p Excluding patients with diabetes during intervention period

Weight change (kg) from baseline

### Yearly Weight Change

<table>
<thead>
<tr>
<th>Year</th>
<th>Control</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>-1</td>
<td>-0.9</td>
</tr>
<tr>
<td>2</td>
<td>-0.9</td>
<td>-0.9</td>
</tr>
<tr>
<td>3</td>
<td>-0.9</td>
<td>-0.9</td>
</tr>
<tr>
<td>4</td>
<td>-0.3</td>
<td>-1</td>
</tr>
<tr>
<td>5</td>
<td>-1</td>
<td>-4.5</td>
</tr>
<tr>
<td>6</td>
<td>-3.8</td>
<td>-3.5</td>
</tr>
<tr>
<td>7</td>
<td>-3.1</td>
<td>-3</td>
</tr>
<tr>
<td>8</td>
<td>-3</td>
<td>-2.5</td>
</tr>
<tr>
<td>9</td>
<td>-3.1</td>
<td>-2</td>
</tr>
<tr>
<td>10</td>
<td>-3.5</td>
<td>-1.5</td>
</tr>
<tr>
<td>11</td>
<td>-4</td>
<td>-1</td>
</tr>
<tr>
<td>12</td>
<td>-4.5</td>
<td>-0.5</td>
</tr>
<tr>
<td>13</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Sample Size

<table>
<thead>
<tr>
<th>Year</th>
<th>Control</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>508</td>
<td>473</td>
</tr>
<tr>
<td>1</td>
<td>437</td>
<td>371</td>
</tr>
<tr>
<td>2</td>
<td>205</td>
<td>48</td>
</tr>
</tbody>
</table>

JL-03
People at risk of type 2 diabetes – How to find them?
The aims:

• To develop a **simple, inexpensive and reliable** way to identify the people at high risk of type 2 diabetes in the general population

• To develop a method for screening for the risk of type 2 diabetes which **does not require** blood drawing or other measurements that need medical equipment or trained personnel
FINnish Diabetes Risk SCore

FINDRISC

Score range 0-26 p

Lindström & Tuomilehto
Diabetes Care 2003; 26: 725-731

TYPE 2 DIABETES RISK ASSESSMENT FORM

Circle the right alternative and add up your points.

1. Age
   0 p. Under 45 years
   2 p. 45–54 years
   3 p. 55–64 years
   4 p. Over 64 years

2. Body mass index (See reverse of form)
   0 p. Lower than 25 kg/m²
   1 p. 25–30 kg/m²
   3 p. Higher than 30 kg/m²

3. Waist circumference measured below the ribs (usually at the level of the navel)
   MEN
   0 p. Less than 94 cm
   3 p. 94–102 cm
   4 p. More than 102 cm
   WOMEN
   0 p. Less than 80 cm
   3 p. 80–88 cm
   4 p. More than 88 cm

4. Do you usually have daily at least 30 minutes of physical activity at work and/or during leisure time (including normal daily activity)?
   0 p. Yes
   2 p. No

5. How often do you eat vegetables, fruit or berries?
   0 p. Every day
   1 p. Not every day

6. Have you ever taken antihypertensive medication regularly?
   0 p. No
   2 p. Yes

7. Have you ever been found to have high blood glucose (e.g., in a health examination, during an illness, during pregnancy)?
   0 p. No
   5 p. Yes

8. Have any of the members of your immediate family or other relatives been diagnosed with diabetes (type 1 or type 2)?
   0 p. No
   3 p. Yes: grandparent, aunt, uncle or first cousin (but no own parent, brother, sister or child)
   5 p. Yes: parent, brother, sister or own child

Total Risk Score

Low: estimated 1 in 100 will develop disease
Slightly elevated: estimated 1 in 25 will develop disease
Moderate: estimated 1 in 6 will develop disease
High: estimated 1 in 3 will develop disease
Very high: estimated 1 in 2 will develop disease

Please turn over
Diabetes incidence during 10-year follow up by baseline FINDRISC value
Prevalence of abnormal glucose tolerance by FINDRISC value – cross sectional analysis among 45-74-year old men and women (Finrisk-2002 survey; N=2966)

Unrecognized type 2 diabetes

IGT, IFG or unrecognized T2DM

The risk increment per 1 score point increase in FINDRISC for the incidence of acute CHD and stroke event, and total mortality among 25-64-year old men and women (n=17 725)

<table>
<thead>
<tr>
<th></th>
<th>CHD incidence</th>
<th>Stroke incidence</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Men</strong></td>
<td>1.18 (1.17-1.22)</td>
<td>1.23 (1.19-1.27)</td>
<td>1.16 (1.14-1.19)</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td>1.21 (1.20-1.27)</td>
<td>1.16 (1.12-1.20)</td>
<td>1.18 (1.15-1.21)</td>
</tr>
</tbody>
</table>

Performance of FINDRISC in identifying unrecognized T2DM among 45-74-year old men and women (Finrisk-02, n=2966)

<table>
<thead>
<tr>
<th>Cutoff value</th>
<th>Sensitivity</th>
<th>PPV</th>
<th>NPV</th>
<th>% of study sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>66%</td>
<td>22%</td>
<td>94%</td>
<td>35%</td>
</tr>
<tr>
<td>Women</td>
<td>70%</td>
<td>11%</td>
<td>96%</td>
<td>41%</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>45%</td>
<td>25%</td>
<td>92%</td>
<td>21%</td>
</tr>
<tr>
<td>Women</td>
<td>55%</td>
<td>14%</td>
<td>96%</td>
<td>27%</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>30%</td>
<td>30%</td>
<td>91%</td>
<td>12%</td>
</tr>
<tr>
<td>Women</td>
<td>38%</td>
<td>16%</td>
<td>95%</td>
<td>16%</td>
</tr>
</tbody>
</table>
FINnish Diabetes Risk Score

FindRisc

n=509
Score range 1-24 p

Median score among the DPS participants: 13 men:12, women:14

Lindström et al., Diabetes Care 2003; 26: 725-731
DPS: Diabetes in the Control group by baseline FINDRISC value

Incidence rate per 100 person-years
DPS: Diabetes in the Intervention vs. Control group by baseline FINDRISC value

Incidence rate per 100 person-years

Hazard ratio

p for interaction=0.043
Programme for the Prevention of Type 2 Diabetes in Finland 2003-2010

Three strategies:

• Population strategy
• High risk strategy
• Early diagnosis and treatment strategy

**FINDRISC in the Finnish Diabetes Association website:**
(A) cumulative and (B) monthly numbers
12/2005-10/2008
www.diabetes.fi

**Objective:** 100 000 screened during 2003-2007

**Actual:** 250 000 in the Internet; 100 000-200 000 in primary care in the D2D project. Printed FINDRISC forms: 1.5 million
200,000-250,000 screened for risk of type 2 diabetes during FIN-D2D

Diagnostics, interventions and follow-up in primary care

High risk cohort for evaluation
n=10,149

- OGTT n=8,353
- Follow-up data n=5,523
- One-year follow-up data n=3,880

Evaluation, follow-up

Moderate risk cohort n=9,898
# D2D: High risk and intermediate risk cohorts

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number, n:</td>
<td>10 2666</td>
<td>9 898</td>
</tr>
<tr>
<td>Age, yrs:</td>
<td>54.0</td>
<td>49.8</td>
</tr>
<tr>
<td>Men, %:</td>
<td>33.4</td>
<td>40.4</td>
</tr>
<tr>
<td>BMI, kg/m²:</td>
<td>31.7</td>
<td>-</td>
</tr>
<tr>
<td>BMI &gt;30 kg/m², %:</td>
<td>59.6</td>
<td>-</td>
</tr>
<tr>
<td>Waist, cm:</td>
<td>102.9</td>
<td>-</td>
</tr>
<tr>
<td>FINDRISC points, mean</td>
<td>17.2</td>
<td>10.3</td>
</tr>
</tbody>
</table>

- **High risk, if:** FINDRISC score $\geq 15$
- GDM
- History of CVD
- History of IFG tai IGT

- **Intermediate risk, if:** FINDRISC score 7-14
# Changes in risk factors in high-risk individuals during the 1st year of intervention

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th></th>
<th>Women</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline, mean</td>
<td>Absolute change</td>
<td>Baseline, mean</td>
<td>Absolute change</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>96,5</td>
<td>-1,02</td>
<td>84,1</td>
<td>-0,88</td>
</tr>
<tr>
<td>Waist (cm)</td>
<td>107,8</td>
<td>-1,06</td>
<td>99,8</td>
<td>-0,98</td>
</tr>
<tr>
<td>BP syst (mmHg)</td>
<td>142,2</td>
<td>-0,75</td>
<td>138,9</td>
<td>-1,67</td>
</tr>
<tr>
<td>BP diast (mmHg)</td>
<td>88,1</td>
<td>-1,30</td>
<td>85,5</td>
<td>-1,33</td>
</tr>
<tr>
<td>Cholesterol (mmol/l)</td>
<td>5,1</td>
<td>-0,26</td>
<td>5,2</td>
<td>-0,12</td>
</tr>
</tbody>
</table>
Type 2 diabetes risk reduction in 1-year follow-up according to weight loss in the FIN-D2D

Incidence of diabetes (%)

- Lost >5%: -69%
- Lost 2.5-4.9%: -29%
- Stable weight: Ref
- Gained >2.5%: +10%

Weight change

Diabetes Care 2010; 33: 2146-2151
Preliminary results of FIN-D2D

• Implementation of diabetes prevention successful
• Over 10% of the Finnish population screened for type 2 diabetes. FINDRISC very popular
• New models of diabetes prevention documented and disseminated
• Impact of media. Good media coverage
• Burden of obesity and diabetes on the Finnish political agenda (Health promotion Programme of the Finnish government)
• Awareness of obesity and type 2 diabetes now high in FINLAND. Highest in the FIN-D2D areas
• Preliminary results of T2D prevention encouraging
Disease Prevention:

It is better to be healthy than ill or dead.

Geoffrey Rose