The need for immediate dietary change to limit and then prevent the rising epidemic of non-communicable disease

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Major risk factors for non-communicable diseases: smoking; diet; physical inactivity

1. Classic understanding of major factors by the 1970s: smoking, saturated and polyunsaturated fats, and salt.

2. Fibre-rich vegetable and fruit intake limits high blood pressure, cardiovascular disease and cancers; obesity emerges as an amplifier of public health problems.

3. Trans fatty acids increasingly used in food processing: amplifies cardiovascular disease and obesity and diabetes. Protective effects of N-3 fatty acids become clearer.

4. Simplifying the dietary challenge.
ATHEROSCLEROSIS
STROKE
HYPERTENSION
CHRONIC LUNG DISEASE

DIETARY CHANGE

FAT
Salt
Saturated Fats

N-3/N-6 PUFA S

Blood Cholesterol

SMOKING

PHYSICAL INACTIVITY

OBESITY
DIABETES

HYPERTENSION

THROMBOSIS

CANCERS

STROKE
COR. HEART DIS.

ATHEROSCLEROSIS

CHRONIC LUNG DISEASE
DIETARY CHANGE

- TOTAL FAT: Refined Carbs
- Saturated Fats
- Trans fat
- N-3/N-6 PUFAS
- Salt

FIBRE-RICH VEG & FRUIT

HIGH ENERGY DENSITY DIET

OBESITY

PHYSICAL INACTIVITY

STROKE

COR. HEART DIS.

DIABETES

DIETARY CHANGE

HYPERTENSION

CANCERS

ATHERO历程SOSIS

BLOOD CHOLESTEROL

THROMBOSIS
DIETARY CHANGE

- TOTAL FAT
  - Refined Carbs
- FIBRE-RICH VEG & FRUIT
- Salt
- Trans fat
- N-3/N-6 PUFAS
- Saturated Fats

PHYSICAL INACTIVITY

- THE DIETARY CHALLENGE FOR NCD PREVENTION
- SMOKING
Changes in CHD Risk Factors in Finland Men & Women aged 30 - 59

Vartiainen et al., Int. J. Epid. 1994, 23: 495.
Comparing the observed male mortality rates from CHD in N.E. Finland with those predicted from changes in the risk factors.

Vartiainen et al. 1994.

Smoking
Blood pressure
Cholesterol
All three risks

National Mortality rate now down 90% by 2010

Vartiainen et al. 1994.
The importance of reduced saturated fat intake in inducing the fall in cardiovascular mortality in Finland

CHANGING DIETARY PATTERNS IN SCANDINAVIA 1965 - 1990

Vegetables (kg/hd/wk)
- Denmark
- Finland

Fat (kg/hd/wk)
- Denmark
- Finland

Fish (kg/hd/wk)
- Denmark
- Finland

Milk (l/hd/wk)
- Denmark
- Finland

Nat. Public Health Inst., Helsinki, Finland.
Explaining the decrease in cardiovascular mortality in Ireland 1985-2000

Dietary fat and weight gain: additional effects of high sugar intakes on Caribbean overweight/obesity: recognised WHO factors increasing dietary energy density

Obesity epidemic is inevitable unless policies to reduce intakes substantially from fat & sugar with spontaneous increases in activity are introduced now.

Adapted from Bray & Popkin, AJCN 1998; 68: 1157-1173 with data from FAO 2005, CFNI and recent national surveys.
Central obesity and insulin resistance: South Asian susceptibility: also affects Mexico, probably Middle East and other regions


A comparison of the impact of BMI on Diabetes in Asians and Caucasians

Diabetes prevention on a national scale in Finland

- Incidence of DM
  - Normal GT: 2.0% men, 1.2% women
  - Impaired FG: 13.5% men, 7.4% women
  - Impaired GT: 16.1% men, 11.3% women

- Incidence DM in obese without diabetes:
  - 2.5-4.9% weight loss: 28% less diabetes
  - >5% weight loss: 69% less diabetes
  - But
  - >2.5% weight gain: 10% more diabetes

Saaristo et al. One year follow-up of the Finnish National Diabetes Prevention Program (FIN-D2D). Diabetes Care 2010;33: 2146-2151
Decrease in obesity rates in 25 and 65 year olds + general population induced by different government policies

- Work-site
- Fiscal
- Drs.
- Self-Reg
- Schools
- Mass media
- Drs.+
- Dietitian
- Food Advt.
- Reg.
- Food Labelling

65 years
General Population
25 years

OECD Obesity and the Economics of Prevention. Fit not Fat. 2010
Major initiatives in France are reversing the obesity epidemic in children

- 64 Regions
- Children aged 7-9 yrs.
- IOTF cut-off points

Prevalences
- 2000: 18.1%
  O/W 3.8% Obese
- 2007: 15.5%
  O/W 2.8% Obese

1. Total control of food and drink in schools
2. Ban on any marketing to children
3. Marketing of foods high in fat, sugar and salt banned unless taxed & marketed with a health warning.

Data presented by the French Ministry of Health at the International Congress of Nutrition Bangkok, October 2009
The keys to success in the food business and in obesity and chronic disease (NCDs) prevention

- Marketing
- Price
- Availability
Doubling shelf space increases sales by 40%
Manipulating children's behaviour: evidence from the UK government's systematic analysis

Food industry promotions:
- Can confuse nutritional knowledge, e.g. if fruit is included in product
- Change children's food preferences
- Change purchasing behaviour
- Influence choice and consumption by brand
- Alter balance of food categories eaten

Consumer purchases with traffic light food labelling of nutrients as proposed by UK's Food Standards Agency.

Healthy (GREEN), reasonable (AMBER), or unhealthy (RED)

Wheel of Health (WoH)

JS Ham and Pineapple Pizzeria 356g all 5 GREEN on WoH

42% 55%

JS Ham & Pineapple Thin & Crispy Pizza 335g
1 red, 2 amber, 2 green


'Be Good to Yourself' Chocolate sponge puddings
4 Green 1 amber

42% 89%

'Taste the Difference' Melting Middle Chocolate puddings
4 red, 1 amber
Cost-effectiveness of policies

Federal / National Parliament

Educ

Ag/Food

Trade

Business

Health

Regional

Local Council

Local Council

Local Council

Schools

Work place

Community centres

Hospitals

Military/Police

GENERAL POPULATION

IMPACT

COSTS

Maximum

Minimum

Minimum

Maximum
## Cost-effective population based interventions for combating obesity and diabetes: concepts applicable to all NCDs

<table>
<thead>
<tr>
<th>Certainty of effectiveness</th>
<th>Potential Population Impact</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quite high</td>
<td>Local price incentive</td>
<td>Trade restrictions; tariffs</td>
<td>Sugared beverage tax</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Financial incentives for physical activity; exercise referral</td>
<td>Food labelling; workplace rules</td>
<td>Agricultural framework</td>
<td></td>
</tr>
<tr>
<td>Quite low</td>
<td>Purely information-based campaigns</td>
<td>Work place rules and regulations</td>
<td>Subsidised public transport</td>
<td></td>
</tr>
</tbody>
</table>

Academy of Medical Sciences & Royal Society of Edinburgh, March 2011
Conclusions: 1

1. Dietary changes are fundamental to the rapid prevention and proper management of NCDs
2. Specific dietary factors affect different diseases: several interact.
3. Key nutrients are:
   a) Salt
   b) Saturated fats: need to aim for major changes <5% Energy
   c) Polyunsaturated fat type crucial: n-3 in preference to n-6
   d) Trans fats - an unnecessary, toxic dietary ingredient - consider legal measures to ban in food products
   e) Vegetables and fruit intake: Finland, Chile & many countries show value of readily availability at no extra costs in all catering/school settings
   f) Total fat and added sugars inducing an energy density diet - critical when general population inactive: take multiple actions to reduce sugary drinks including fruit juices & increase dietary fibre rich foods
Conclusions: 2

1. **Socio-economic factors** drive the NCD epidemic: driven by tobacco & food sales high in fat, sugar, salt
2. **Marketing, cost, and availability** of foods, tobacco plus poor urban planning crucial in determining population behaviour
3. **Health education**: useful scene setter but does not work on its own
4. **Need multiple government cost effective initiatives** to change food supply, fast food, tobacco & alcohol sales; environment changes to induce physical activity
5. **Rapid changes** in both 1ry and 2ry prevention of NCDs within 1 year if dietary change occurs
6. **Focus non-medical**; Treasury support crucial. Ministry of Health needs to lead!
7. **90% reduction in NCDs possible** if government action coordinated