Novel approaches for addressing adverse lifestyles in patients with Cardiovascular Disease and their families

Webinar Chair:
Professor Donna Fitzsimons RGN, BSc, PhD, FESC
Queens University Belfast
Issues for discussion

• How to optimise self-management in lifestyle change including telehealth strategies...

• New strategies to overcome old obstacles in cardiovascular prevention: How can the family help?
What are adverse lifestyles anyway?

- Lack of exercise & sedentary behaviour
- Processed foods & high fat diet
- Smoking, passive smoking & electronic cigarettes
- High stress jobs & home life
- Unchecked risk factors – hypertension, hyperlipidaemia
- Social deprivation – poor housing & access to healthcare
A Perfect Storm

Heightened CVD Risk

- Adverse Lifestyle
- Aging Population
- Rising Co-Morbidity
- Lack of Adherence To Preventive Strategies
Issues with current prevention programmes

Referral rates low

Uptake poor

Drop Out High

Secondary Prevention Targets Not Met

Prof Fitzsimon
What’s behind the lack of adherence?

• Personal resistance to change
• Poor motivation
• Inadequate understanding of risk
• Prevention programmes may be unattractive – time, location, components, length
• Poor infrastructure & lack of investment in prevention
How to optimise self-management in lifestyle change (including telehealth strategies)

Dan Gaita
• Male, 57 y, hypertension, dyslipidemia
• History: father died at 45 y (MI)
• Smoker 20-30 cigarettes/day
• No time for exercise (enjoying sport TV channels..)
• Multinational company (extra-program, stress)
• No CVD history

• Weight 102 kg, Height 173 cm
• BMI 34.2 kg/m² (abdominal obesity)
• BP 165/90 mmHg, HR 65 beat/min
- HbA1c 8.1%
- Fasting glucose 7.8 mmol/L (139 mg/dL)
- Creatinine 150 mmol/L (1.33 mg/dL)
- Total Cholesterol 6.3 mmol/L (243 mg/dL)
- Triglyceride 2.3 mmol/L (210 mg/dL)
- HDL cholesterol 0.9 mmol/L (35 mg/dL)
- LDL cholesterol 4.4 mmol/L (172 mg/dL)
Question 1

His CV risk is high?

1. Yes
2. No
3. I don’t know
Assessment of Total CV Risk
Systematic Coronary Risk Evaluation (SCORE)
European: 10 year risk for fatal CVD

Very High risk:
>10%/ a history of CVD/ DM/ CKD

High risk:
5%-10%/ a very high level of chol/BP/ DM/ CKD

Moderate risk: 1%-5%

Low risk: ≤1%
Question 1

His CV risk is Very high!

1. Yes
2. No
3. I don’t know
CVD risk continuum

Risk factors

Healthy individuals

Large population at risk

High risk individuals

CVD
Diabetes mellitus
Chronic kidney disease
Clinical dichotomy

LIFESTYLE
Healthy individuals

Population prevention

Risk factors

DRUGS
CVD
Diabetes mellitus
Chronic kidney disease

Clinical prevention

Population prevention

<1%

≥5%
Clinical dichotomy

LIFESTYLE
Healthy individuals

Population prevention

<1%

Risk factors

≥5%

Clinical prevention

DRUGS
CVD
Diabetes mellitus
Chronic kidney disease

Population prevention

Clinical prevention
Question 2

Lifestyle changes?

1. Nutrition
2. Physical activity
3. Smoking cessation
4. Stress management
5. CVD risk factors control
1. Why?

The only way to keep healthy is to eat what you don’t want, to drink what you don’t like and to do what you would rather not do.

Mark Twain

2. Self-management...
CHD Mortality in All Finland and in North Karelia, Men Aged 35-64

Per 100,000

- Start of the North Karelia Project
- Extension of the Project nationally

North Karelia

All Finland

- 85%
- 80%

Year: 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06
CHD deaths prevented or postponed by treatments and risk factor changes, in the US 1980–2000.

- Risk factors worse: +17%
  - Obesity (increase): +7%
  - Diabetes (increase): +10%
- Risk factors better: −61%
  - Population BP fall: −20%
  - Smoking: −12%
  - Cholesterol (diet): −24%
  - Physical activity: −5%
- Treatments: −47%
  - AMI treatments: −10%
  - Secondary prevention: −11%
  - Heart failure: −9%
  - Angina: CABG and PCI: −5%
  - Hypertension therapies: −7%
  - Statins (primary prevention): −5%
  - Unexplained: −9%

341,745 fewer deaths in 2000
Prevention = Civilization

Euro Heart Index 2016

Inclination of trend lines for SDR/100 000*) of ischaemic heart disease 1998 - 2014 or available years therein
*) logarithmic values. Source: WHO HfA, July 2016
WHO Targets and WHF Goal

25by25 GLOBAL TARGET
A 25% RELATIVE REDUCTION IN OVERALL MORTALITY FROM CARDIOVASCULAR DISEASE, CANCER, DIABETES OR CHRONIC RESPIRATORY DISEASES

WHF GOAL
A 25% REDUCTION IN PREMATURE MORTALITY FROM CARDIOVASCULAR DISEASE BY 2025

HARMFUL USE OF ALCOHOL
10% REDUCTION

PHYSICAL INACTIVITY
10% REDUCTION

SALT/SODIUM INTAKE
30% REDUCTION

TOBACCO USE
30% REDUCTION

RAISED BLOOD PRESSURE
25% REDUCTION

DIABETES/OBESITY
0% INCREASE

50% OF ELIGIBLE PEOPLE RECEIVING DRUG THERAPY AND COUNSELLING TO PREVENT HEART ATTACK AND STROKE

80% AVAILABILITY OF ESSENTIAL MEDICINES AND BASIC TECHNOLOGIES TO TREAT CVD AND OTHER NCDS

2025
TOPICS


2. Self-management

“It is easier to fight for one’s principles than to live up to them.” — Alfred Adler
Self-Management

...AND THE REAL

1954
Burger King
2.8 oz
202 calories
2004
4.3 oz
310 calories

1955
McDonald's
2.4 oz
210 calories
7 oz
610 calories

1900
Hershey's
2 oz
297 calories
7 oz
1,000 calories

1916
Coca-Cola
6.5 fluid oz
79 calories
16 fluid oz
194 calories

1950s
Movie popcorn
3 cups
174 calories
21 cups (buttered)
1,700 calories
Self-management = 'the successful outcome of the person and all appropriate individuals and services working together to support him or her to deal with the very real implications of living the rest of their life with one or more long-term conditions'.

... education has been associated with improved: knowledge, coping, adherence, self-efficacy, symptom management, enhanced quality of life, reduction in healthcare utilisation.

Access to healthy option
Self-management & the adoption of a healthy lifestyle, such as through diet, physical activity, and other health-related behaviours (e.g., smoking cessation), are essential for the management of chronic diseases. Thus, tele-rehabilitation could further widen participation to more patients and provide monitoring and greater individualized behavioural support, but large-scale randomized trials are needed. 

https://www.cardio.org/EAPC
"I have never in my life learned anything from any man who agreed with me." - Dudley Field Malone


2. Self-management

Telehealth TOPICS
What is Telehealth?

The way to permit doctors to examine and treat patients remotely, in real time, using online streaming video technology & interactive tools.
What is Telehealth? (1)

**Patients**

- Timely access to locally unavailable services
- Reduces the burden and cost of transportation for care
- Increases patient engagement and self-management

**Health Professionals**

- Access to consultative services
- Supports team based, collaborative care delivery models
- Helps mitigate workforce shortages
What is Telehealth? (2)

Hospital Systems

- Facilitates appropriate transfers, keeps patients local when appropriate
- Decreases readmissions through remote patient monitoring tools

Communities

- Increased broadband deployment
- Enhances community hospital viability and supports workforce
Telehealth Scope of Services (1)

Telemedicine: Live (Audio-Video) Interaction

- Scheduled and unscheduled
- Specialty consults, Primary Care, Employee
- Ancillary health and wellness services
Telehealth Scope of Services (2)

Remote Patient Monitoring

Chronic disease management
- Hospitals - at risk population, cost avoidance/reduction
  - Clinics - ACOs, Private practice, hospital owned
    - Telemetry monitoring

Post Acute monitoring

Store & Forward & Diagnostic Tests Interpretation

Cardiology!

www.escardio.org/EAPC
Remote Patient Monitoring (RPM)

Home health services using telecommunications to enhance the delivery of home health care including:

- Daily Health Sessions
- Personalized Interventions
  - Targeted Education
  - Health Coach
- Behavior Modification
- Patient Empowerment

www.escardio.org/EAPC
Home-health
UNELE NUMERE au nevoie DE TOATĂ GRIJA TA

#ȘtiuCâtAm
Bine ati venit
Program reabilitare cardiaca

username: patient; password: patient

Plan terapeutic
Plan nutritional
Cum sa eviti atacul de cord

Sesiune recuperare
Incalzire
Miscati brate in fata si in spate
Faceti rotatii de trunchi cu bratele deschise
Repetati pentru 20 de secunde.

Exercitii
Mergeti pentru 30 de minute, mentinand pulsul la o valoare correcta.

Stare: Deconectat
Valoare: Va rog asteptati !!!

00:00
Start  Stop

S. Busnatu’s courtesy
- personalized **physical activity** sessions, 4 per week
- nutritional indications
- real time **medical therapy titration**
- BP/HR/O₂/ECG monitoring
- ECG -1- channel monitoring *(planned for the Beta version)*
Mean BMI - men

Mean BMI

>28
27 to 28
26 to 27
25 to 26
<25
no data
Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health.

A crude population measure of obesity is the body mass index (BMI), a person’s weight (in kilograms) divided by the square of his or her height (in m). A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight.

Overweight and obesity are major risk factors for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer.

Obesity raises the risk of morbidity from hypertension, dyslipidemia, type 2 diabetes mellitus (diabetes), coronary heart disease (CHD), stroke, gallbladder disease, osteoarthritis, sleep apnea and respiratory problems, and some cancers. Obesity is also associated with increased risk of all-cause and CVD mortality.
### Obesity & CV Risk

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Change</th>
<th>Change in CHD risk, %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Obesity, men</strong></td>
<td>+ 1%</td>
<td>+ 3.6</td>
</tr>
<tr>
<td></td>
<td>+ 1 BMI unit</td>
<td>+ 15.8</td>
</tr>
<tr>
<td></td>
<td>+ 1 kg</td>
<td>+ 5.4</td>
</tr>
<tr>
<td><strong>Obesity, women</strong></td>
<td>+ 1%</td>
<td>+ 3.3</td>
</tr>
<tr>
<td></td>
<td>+ 1 BMI unit</td>
<td>+ 14.3</td>
</tr>
<tr>
<td></td>
<td>+ 1 kg</td>
<td>+ 5.2</td>
</tr>
</tbody>
</table>

11 Studies, > 30,000 W, > 13,000 M

After adjusted for other risk factors, such as hypertension, dyslipidemia, diabetes, or smoking

Weight gain? Looks the same...

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Change</th>
<th>Change in CHD risk, %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight gain, men</strong></td>
<td>+ 1%</td>
<td>+ 2.1</td>
</tr>
<tr>
<td></td>
<td>+ 1 BMI unit</td>
<td>+ 9.1</td>
</tr>
<tr>
<td></td>
<td>+ 1 kg</td>
<td>+ 3.1</td>
</tr>
<tr>
<td><strong>Weight gain, women</strong></td>
<td>+ 1%</td>
<td>+ 2.9</td>
</tr>
<tr>
<td></td>
<td>+ 1 BMI unit</td>
<td>+ 15.6</td>
</tr>
<tr>
<td></td>
<td>+ 1 kg</td>
<td>+ 5.7</td>
</tr>
</tbody>
</table>

11 Studies, > 30,000 W, > 13,000 M

After adjusted for other risk factors, such as hypertension, dyslipidemia, diabetes, or smoking

The metabolic burden of sleep loss

Sebastian M Schmid*, Manfred Hallschmid*, Bernd Schultes*
# Integrated Care Model for MetS

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Goals</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer leaders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community health department workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community organizations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthcare system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician assistants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse practitioners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ancillary health professionals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device companies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Community Health Goals
- Create opportunities to screen families
- Increase awareness through community engagement strategies
- Promote healthy behaviors

## Healthcare System Goals
- Form an integrated network of care (general practitioners and specialists)
- Gather more data/evidence for MetS care; Share with real-time data
- Provide robust and focused health promotion training to clinicians
- Insurers to cover those at-risk

## Industry Goals
- Focus on ectopic fat
- Provide evidence-based therapy
- Provide alternative methods of measuring obesity

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Sperling L et al. J Am Coll Cardiol. 2015; 66(9):1050-67

www.escardio.org/EAPC
Total CV Risk

INTERHEART

Odds Ratio (99% CI)

Smoking | Diabetes | Hypertension | ApoB/ApoA1 | 1+2+3 | 1+2+3+4 | Overweight | Psychosoc fact | All

2.9 | 2.4 | 1.9 | 3.3 | 13.0 | 42.3 | 68.5 | 182.9 | 333.7

www.escardio.org/EAPC
Adherence?

Antiaggregant
- 22% RRR of stroke
- 20% RRR of coronary events


Statin
- 43% RRR of total mortality
- 52% RRR of non fatal MI
- 47% RRR of coronary mortality
- 47% RRR of stroke


ACEI
- 26% RRR of cardiovascular death
- 20% RRR of AMI
- 31% RRR of stroke

Reducing Premature Cardiovascular Morbidity and Mortality in People With Atherosclerotic Vascular Disease

Treatment cascade for patients with known cardiovascular disease

- Patients
  - Patients with cardiovascular events
    - Patients accessing health care
      - Interventions prescribed by health care professionals
        - Patient adherence
          - Cardiovascular events

- Estimated efficacy: 75%
- 70%
- 80%
- 50%
- Real effectiveness: 21%
Safety & Legal aspects
Conclusions

1. Tailor

2. Prioritize (stratify risk)

3. Interdisciplinary
10 year Mortality by BMI groups

- Attenuated with older age
- U shaped relationship
- No impact of BMI at >75y

Percentage mortality (log scale) by BMI groups:
- 85-89
- 80-84
- 75-79
- 70-74
- 65-69
- 60-64
- 55-59
- 50-54
- 45-49
- 40-44
- 35-39
- 30-34
- 25-29
- 20-24

Wolfram Doehner’s courtesy
Conclusions

1. Tailor

2. Prioritize (stratify risk)

3. Interdisciplinary
BMI and resting heart rate

<table>
<thead>
<tr>
<th>Heart rate (bpm)</th>
<th>Non-Smoker</th>
<th>Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1 1 2 3</td>
<td>3 3 4 7</td>
</tr>
<tr>
<td>90</td>
<td>1 1 1 2</td>
<td>3 3 4 7</td>
</tr>
<tr>
<td>80</td>
<td>1 1 1 2</td>
<td>2 2 3 4</td>
</tr>
<tr>
<td>70</td>
<td>2 2 2 3</td>
<td>1 1 1 2</td>
</tr>
<tr>
<td>60</td>
<td>0 0 0 0</td>
<td>1 1 1 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Body mass index</th>
<th>Non-Smoker</th>
<th>Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>23 28 33 38</td>
<td>33 38</td>
</tr>
<tr>
<td>28</td>
<td>28 33 38</td>
<td>38</td>
</tr>
</tbody>
</table>

Cooney M T et al. Eur Heart J 2010;eurheartj.ehq164
Early intervention

• Unhealthy diets begin to influence CV markers early in life - dyslipidemia, high blood pressure, impaired glucose tolerance, as well as obesity and metabolic syndrome may become rooted as early as 3 to 5 years of age, increasing the risk of development of atherosclerosis in adolescence and early adulthood.

• Education (Knowledge) can include such topics as how the body and heart work, healthy food habits, physical activity, and emotional habits to avoid addictions.

• The optimal period of time to motivate behavior in favor of health is between the age of 3 to 5 years - evolving evidence that our behavior as adults has its roots in the environment that we live in from age 3 to 5 years.

Assessment of the Risk for Diabetes

**FINDRISC**

Finnish Diabetes Risk Score (FINDRISC) to address 10-year risk of type 2 DM (T2DM) in adults

**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
   - 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 min 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 anti-hypertensive 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**

- The risk of developing type 2 diabetes within 10 years is
  - Lower than 7: Low: estimated one in 100 will develop disease
  - 7-11: Slightly elevated: estimated one in 25 will develop disease
  - 12-14: Moderate: estimated one in 6 will develop disease
  - 15-20: High: estimated one in three will develop disease
  - Higher than 20: Very High: estimated one in two will develop disease
Conclusions

1. Tailor

2. Prioritize (stratify risk)

3. Interdisciplinary
Interdisciplinary team

Secondary prevention in the clinical management of patients with CVD. EJPC 2012

www.escardio.org/EAPC
Health Determinants

**BEHAVIORS**
- NO SMOKING
- OPTIMAL NUTRITION
- DAILY EXERCISE
- ADIPOSIETY (BMI < 25)

**FACTORS**
- Cholesterolemia
- Glycemia
- Blood pressure

Minimum 5!

American Heart Association

www.escardio.org/EAPC
Early to bed,
Early to rise,
Work like hell
RESPECT GUIDELINES!!
New strategies to overcome old obstacles in cardiovascular prevention
How can the family help?

Dr Catriona Jennings
The Issues

• Contribution of unhealthy lifestyles – smoking, poor diet and sedentarism - to non communicable disease burden e.g. CVD, risk factors like obesity, hypertension and diabetes
• Increasingly dependent aged population left with increased health care needs
• Increasing inequalities worldwide

How do we manage these problems?
Some approaches which have been shown to work
Nurse led care well documented

Effect of a nurse-coordinated prevention programme on cardiovascular risk after an acute coronary syndrome: main results of the RESPONSE randomised trial

ORIGINAL ARTICLE

Harald Jostad,1 Clemens von Bögelen,2 Marco W. Almos,3 Anno Lien,4 Jan Melle van Danzij,5 Wouter Harisma,6 Dirk J. A. Lok,7 Hans J. A. Koenig,8 Keijian de Vries,9 Paul C. A. R. de Milliano,10 Adriaan J. M. Willem,11 Wim J. M. Schellekens12 Reiner1, Jan G. P. Janssen1, Ron J. G. Peters1, Jennifer Jones1, Serena Termaat1, and David Wood2

1Cardiology Department, Eindhoven University Hospital, Eindhoven, The Netherlands; 2Cardiology Department, Food and Drug Administration, Rockville, Maryland, USA; 3Department of Medicine, Universit"atsspital Zürich, Zürich, Switzerland; 4Department of Cardiology, Maastricht University Medical Center, Maastricht, The Netherlands; 5Department of Cardiology, University Hospital Maastricht, Maastricht, The Netherlands; 6Department of Cardiology, University Hospital Leiden, Leiden, The Netherlands; 7Department of Cardiology, Erasmus Medical Center, Rotterdam, The Netherlands; 8Department of Cardiology, University Hospital Antwerp, Antwerp, Belgium; 9Department of Cardiology, The Netherlands Cancer Institute, Amsterdam, The Netherlands; 10Department of Cardiology, Leiden University Medical Center, Leiden, The Netherlands; 11Department of Cardiology, University Hospital Zurich, Zurich, Switzerland; 12Department of Cardiology, University Hospital Maastricht, Maastricht, The Netherlands.
### TABLE 1 Nurse Case Management Trials—Summary of Findings

<table>
<thead>
<tr>
<th>Nursing Intervention</th>
<th>Significant Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimize management of dyslipidemia</td>
<td>Improved measures of dyslipidemia</td>
</tr>
<tr>
<td>CVD risk reduction: lifestyle (diet and exercise)</td>
<td>10-year CVD risk reduction</td>
</tr>
<tr>
<td>Hypertension (5 E program: Education, Engagement, Environment, Evidence, Evaluation)</td>
<td>Blood pressure, BMI, and weight reduction</td>
</tr>
<tr>
<td>Diabetes and hypertension</td>
<td>Blood pressure and diabetes improved</td>
</tr>
<tr>
<td>Smoking cessation (education, counseling, and follow-up)</td>
<td>Significant &quot;quit&quot; rate</td>
</tr>
<tr>
<td>CVD risk with medication counseling and management</td>
<td>Less CAD progression; all CVD risk factors lowered; decreased Framingham score</td>
</tr>
<tr>
<td>CVD risk management cost evaluation</td>
<td>Cost effective</td>
</tr>
</tbody>
</table>

Data from Berra et al. (16).

BMI = body mass index; CAD = coronary artery disease; CVD = cardiovascular disease.

Multidisciplinary Cardiovascular Prevention and Rehabilitation: RCTs since 2010

All-cause mortality

Gijs J van Halewijn Erasmus Rotterdam and Imperial College London

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Intervention</th>
<th>Control</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events</td>
<td>Total</td>
<td>Events</td>
<td>Total</td>
</tr>
<tr>
<td>Astengo 2010</td>
<td>1</td>
<td>33</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>Brotons 2011</td>
<td>36</td>
<td>481</td>
<td>26</td>
<td>442</td>
</tr>
<tr>
<td>Carrington 2013</td>
<td>27</td>
<td>306</td>
<td>15</td>
<td>296</td>
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<tr>
<td>Cohen 2014</td>
<td>7</td>
<td>251</td>
<td>7</td>
<td>251</td>
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<td>Haglin 2011</td>
<td>15</td>
<td>36</td>
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<td>Hawkes 2013</td>
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<tr>
<td>He 2012</td>
<td>0</td>
<td>132</td>
<td>1</td>
<td>118</td>
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<tr>
<td>Janssen 2014</td>
<td>0</td>
<td>112</td>
<td>1</td>
<td>98</td>
</tr>
<tr>
<td>Jorstad 2013</td>
<td>3</td>
<td>366</td>
<td>10</td>
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<tr>
<td>Krebs 2013</td>
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<td>14</td>
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<td>15</td>
</tr>
<tr>
<td>Kubilius 2012</td>
<td>1</td>
<td>70</td>
<td>2</td>
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<tr>
<td>Moreno-Palanco 2011</td>
<td>5</td>
<td>118</td>
<td>20</td>
<td>121</td>
</tr>
<tr>
<td>Mosca 2010</td>
<td>1</td>
<td>132</td>
<td>4</td>
<td>134</td>
</tr>
<tr>
<td>Pinto 2011</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>66</td>
</tr>
<tr>
<td>Reid 2012 Online program</td>
<td>0</td>
<td>115</td>
<td>2</td>
<td>108</td>
</tr>
<tr>
<td>Reid 2012 Phone counselling</td>
<td>0</td>
<td>69</td>
<td>0</td>
<td>72</td>
</tr>
<tr>
<td>Saffi 2014</td>
<td>1</td>
<td>38</td>
<td>3</td>
<td>36</td>
</tr>
<tr>
<td>Stewart 2015</td>
<td>24</td>
<td>301</td>
<td>23</td>
<td>310</td>
</tr>
<tr>
<td>West 2012</td>
<td>245</td>
<td>899</td>
<td>243</td>
<td>905</td>
</tr>
</tbody>
</table>

Subtotal (95% CI)

| Total events | 371 | 364 |

Heterogeneity: Chi² = 24.01, df = 17 (P = 0.12); I² = 29%
Test for overall effect: Z = 0.20 (P = 0.84)
### Additional analyses

**More than 5 risk factors addressed**

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Intervention</th>
<th>Control</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Cohen 2014</td>
<td>7</td>
<td>251</td>
<td>9.9%</td>
</tr>
<tr>
<td>He 2012</td>
<td>0</td>
<td>132</td>
<td>2.2%</td>
</tr>
<tr>
<td>Jorstad 2013</td>
<td>3</td>
<td>366</td>
<td>14.5%</td>
</tr>
<tr>
<td>Krebs 2013</td>
<td>2</td>
<td>14</td>
<td>0.7%</td>
</tr>
<tr>
<td>Kubilius 2012</td>
<td>1</td>
<td>70</td>
<td>2.8%</td>
</tr>
<tr>
<td>Moreno-Palanco 2011</td>
<td>5</td>
<td>118</td>
<td>27.9%</td>
</tr>
<tr>
<td>Mosca 2010</td>
<td>1</td>
<td>132</td>
<td>5.6%</td>
</tr>
<tr>
<td>Saffi 2014</td>
<td>1</td>
<td>38</td>
<td>4.4%</td>
</tr>
<tr>
<td>Stewart 2015</td>
<td>24</td>
<td>301</td>
<td>32.0%</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>1422</strong></td>
<td><strong>1404</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

**Total events** 44

Heterogeneity: $\chi^2 = 12.56$, $df = 8$ ($P = 0.13$); $I^2 = 36$

Test for overall effect: $Z = 2.40$ ($P = 0.02$)

---

Gijs J van Halewijn Erasmus Rotterdam and Imperial College London

www.escardio.org/EAPC
Multidisciplinary Cardiovascular Prevention and Rehabilitation: RCTs since 2010

Additional analyses

Prescription of medicines versus monitoring of medicines

1.1.4 Prescription of medicines in intervention group

<table>
<thead>
<tr>
<th>Study</th>
<th>Patients</th>
<th>Events</th>
<th>Total</th>
<th>Medicines</th>
<th>95% CI</th>
<th>Test for overall effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jorstad 2013</td>
<td>3</td>
<td>366</td>
<td>10</td>
<td>349</td>
<td>33.6%</td>
<td>0.29 [0.08, 1.03]</td>
</tr>
<tr>
<td>Krebs 2013</td>
<td>2</td>
<td>14</td>
<td>0</td>
<td>15</td>
<td>1.6%</td>
<td>5.33 [0.28, 102.26]</td>
</tr>
<tr>
<td>Moreno-Palanco 2011</td>
<td>5</td>
<td>118</td>
<td>20</td>
<td>121</td>
<td>64.8%</td>
<td>0.26 [0.10, 0.66]</td>
</tr>
</tbody>
</table>

Subtotal (95% CI): 498 | 485 | 100.0% | 0.35 [0.18, 0.69] |

Total events: 10 | 30

Heterogeneity: Chi² = 3.77, df = 2 (P = 0.15); I² = 47%
Test for overall effect: Z = 3.04 (P = 0.002)

1.1.5 Monitoring of medicines in intervention group

<table>
<thead>
<tr>
<th>Study</th>
<th>Patients</th>
<th>Events</th>
<th>Total</th>
<th>Medicines</th>
<th>95% CI</th>
<th>Test for overall effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brotons 2011</td>
<td>36</td>
<td>481</td>
<td>26</td>
<td>442</td>
<td>62.7%</td>
<td>1.27 [0.78, 2.07]</td>
</tr>
<tr>
<td>Cohen 2014</td>
<td>7</td>
<td>251</td>
<td>7</td>
<td>251</td>
<td>16.2%</td>
<td>1.00 [0.36, 2.81]</td>
</tr>
<tr>
<td>Hawkes 2013</td>
<td>2</td>
<td>215</td>
<td>0</td>
<td>215</td>
<td>1.1%</td>
<td>5.83 [0.28, 120.84]</td>
</tr>
<tr>
<td>He 2012</td>
<td>0</td>
<td>132</td>
<td>1</td>
<td>118</td>
<td>3.7%</td>
<td>0.30 [0.01, 7.25]</td>
</tr>
<tr>
<td>Mosca 2010</td>
<td>1</td>
<td>132</td>
<td>4</td>
<td>134</td>
<td>9.2%</td>
<td>0.25 [0.03, 2.24]</td>
</tr>
<tr>
<td>Saffi 2014</td>
<td>1</td>
<td>38</td>
<td>3</td>
<td>36</td>
<td>7.1%</td>
<td>0.32 [0.03, 2.90]</td>
</tr>
</tbody>
</table>

Subtotal (95% CI): 1249 | 1232 | 100.0% | 1.08 [0.72, 1.62] |

Total events: 47 | 41

Heterogeneity: Chi² = 5.15, df = 5 (P = 0.40); I² = 3%
Test for overall effect: Z = 0.37 (P = 0.71)
These models are seen as a standard and included in guidelines.
Smoking cessation

Nurses

Monitoring management of blood pressure, cholesterol, and glucose

Prescription and adherence with cardio-protective medications

In the image:
- Nurses
- Dietitians
- Dietetic change
- Physical activity specialists

Increasing physical activity in daily life

www.escardio.org/EAPC
Influences on health behaviour
The influence of spouses on each other
Is there any evidence for couples concordance?

Meta-Analysis

Spousal Concordance for Major Coronary Risk Factors: A Systematic Review and Meta-Analysis

Augusto Di Castelnuovo*, Gianni Quacquaruccio*, Maria Benedetta Donati, Giovanni de Gaetano, and Licia Iacoviello

Initially submitted January 22, 2008; accepted for publication July 14, 2008.

Spousal pairs permit assessment of determinants of diseases related to environment, because they share the same lifestyle and environment. The authors reviewed spouses’ concordance for the major coronary risk factors. A search of the MEDLINE, PubMed, and EMBASE databases was performed. Seventy-one papers were selected for a total of 207 cohorts of pairs and 424,613 correlations in more than 100,000 couples. The most strongly correlated within-pairs factors were smoking and body mass index, with overall correlations of 0.23 (95% confidence interval: 0.12, 0.36) and 0.15 (95% confidence interval: 0.05, 0.25), respectively. Statistically significant positive correlations were also found for diastolic blood pressure, triglycerides, total and low density lipoprotein cholesterol, weight, and the waist/hip ratio. The overall odds ratios for concordance in hypertension, smoking, diabetes, and obesity were all statistically significant, ranging from 1.16 to 3.25. Assortative mating influenced concordance for blood pressure, smoking, glucose, low density lipoprotein cholesterol, weight, body mass index, and waist circumference. This systematic review shows a statistically significant positive spousal concordance for the majority of main coronary risk factors. However, the strength of the concordance was markedly different among factors and appeared to be quite modest for all of them. Interventions to reduce cardiovascular risk factors should be addressed jointly to both members of a marital couple.
Dynamics for couples concordance

- Non-random mating
  - Selection of a mate on the basis of a particular phenotype
  - Social homogamy
- Convergence of behaviours over relationship duration
- Social control – illness as an opportunity for healthy change

645 couples (one with incident CHD mostly male patients): lifestyle Profiles at baseline

<table>
<thead>
<tr>
<th></th>
<th>Patients %</th>
<th>Partners %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of smoking*</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>Ever smoked</td>
<td>70</td>
<td>50</td>
</tr>
<tr>
<td>Fruit and vegetables ≥ 400g/day*</td>
<td>50</td>
<td>52</td>
</tr>
<tr>
<td>Saturated fat &lt; 10% total energy*</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Moderate intensity physical activity ≥ 30 minutes 5+ times/week*</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Median steps per day**</td>
<td>5948</td>
<td>7074</td>
</tr>
</tbody>
</table>

* Prior to the cardiac event of the patient
** At baseline assessment

Observational study from EUROACTION RCT
Concordance for smoking habit in 645 couples at the time of the cardiac event

<table>
<thead>
<tr>
<th>Partner</th>
<th>Patient</th>
<th>Current</th>
<th>Ex</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>E</td>
<td>O</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>69</td>
<td>39.2</td>
<td>1.76</td>
<td>26</td>
<td>38.9</td>
</tr>
<tr>
<td>Ex</td>
<td>41</td>
<td>52.0</td>
<td>0.79</td>
<td>62</td>
<td>52.6</td>
</tr>
<tr>
<td>Never</td>
<td>23</td>
<td>41.9</td>
<td>0.55</td>
<td>44</td>
<td>41.5</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>132</td>
<td>380</td>
<td>645</td>
<td></td>
</tr>
</tbody>
</table>

O = observed   E = expected

P = 0.0001
Concordance for diet at baseline in EUROACTION couples

Fruit and vegetables
\[ r = 0.67 \]

Saturated fat
\[ r = 0.43 \]
Correlation at baseline between patients and partners for kcals of moderate intensity physical activity

Pearson correlation coefficient $r=0.25$, $p<0.0001$ (n=605)
Other data worldwide

- **Smoking**
  - British Family Heart Study – primary prevention – smoking (Pyke 1996)

- **Saturated fat consumption**
  - Chinese couples Taiwan –0.41
  - Hawaiian couples – 0.43

- **Fruit and vegetable consumption**
  - Scottish couples - 0.45 fruit 0.66 vegetables

- **Physical Activity**
  - Canadian parents of junior school children – LTPA 0.24
  - Portuguese parents – 0.21

Involving the spouse to enhance nurse-led multidisciplinary approaches: The EUROACTION family centred programme

- Why? To facilitate lifestyle change by optimising social support from family
- Premise – there is concordance for lifestyle and therefore lifestyle change may be more successful if the whole family is on board

A nurse led multidisciplinary family centred programme for coronary patients and their families
# Cardiovascular Prevention and rehabilitation programme

## Identification and recruitment

## Multi-disciplinary initial assessment

### 16 week Preventive Cardiology Programme

- Empowering families to change their lifestyle: smoking, diet and physical activity
- Blood pressure, blood cholesterol and blood glucose management
- Compliance with cardio-protective medication
- One to one and group approach
- Supervised hospital and home exercise programme
- Health promotion workshop programme

### 16 week assessment at end of programme

### One year follow-up
EUROACTION: Non-smoking spouses help smoking coronary patients to quit

<table>
<thead>
<tr>
<th>Patients</th>
<th>Current smokers Baseline n</th>
<th>16 weeks %</th>
<th>n</th>
<th>Current smokers Baseline n</th>
<th>One year %</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient only smoked</td>
<td>75</td>
<td>76</td>
<td>57</td>
<td>72</td>
<td>74</td>
<td>53</td>
</tr>
<tr>
<td>Both smoked</td>
<td>34</td>
<td>56</td>
<td>19</td>
<td>0.06</td>
<td>33</td>
<td>58</td>
</tr>
</tbody>
</table>

Reported smoking cessation was validated with breath CO ≤ 6ppm
A closer look at the dynamics: smoking cessation

- **Israeli smokers post myocardial infarction and their wives (Vilchinsky 2011)**
  - Smoking cessation improved in patients who perceived that their wives were ‘actively engaging’ with their problem
  - Buffering (denial, minimising problem) and over protecting by wives was NOT useful

- **Health compromised smokers and spouses (Rohrbaugh 2012)**
  - Famcom study - Training couples to use personal pronoun in addressing smoking cessation together: ‘we talk’ improved smoking cessation

Vilchinsky 2011 Health Psychology 4;411-419

Rohrbaugh 2012 Fam Proc 51;107-121
EUROACTION CORONARY COUPLES: Dietary and physical activity habits at 1 year (8 months after end of programme)

<table>
<thead>
<tr>
<th></th>
<th>Patients %</th>
<th>Partners %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit and vegetables ≥ 400g/day</td>
<td>78</td>
<td>71</td>
</tr>
<tr>
<td>Saturated fat &lt; 10% total energy (sub-sample)</td>
<td>57</td>
<td>60</td>
</tr>
<tr>
<td>≥ 30 minutes moderate intensity physical activity 5+ times/week</td>
<td>59</td>
<td>48</td>
</tr>
</tbody>
</table>
Concordance for dietary change in EUROACTION couples (BL to 1 year)

Fruit and vegetables

Saturated fat

www.escardio.org/EAPC
Concordance for 7 Day Activity Recall

![Graph showing quintiles of patients with reduced KCALS expended per day.]

- Reduced
- KCALs Expended/ Day
- Increased

<table>
<thead>
<tr>
<th>Quintiles of Patients</th>
<th>Change (95% CI) in Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-4.0</td>
</tr>
<tr>
<td>2</td>
<td>-2.0</td>
</tr>
<tr>
<td>3</td>
<td>0.0</td>
</tr>
<tr>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>5</td>
<td>4.0</td>
</tr>
</tbody>
</table>
A closer look at the dynamics: diet

- Men with a premature myocardial infarction and their wives (Russel 1994 – case control study)
  - Saturated fat intake in patients and wives at one year was less than in comparison group
  - Effect in wives reduced over time but not in patients

- Women participating in a low fat diet study (Shattuck 1992)
  - Women’s low fat diets had a reduction effect on their partners’ diets at one year


Shattuck 1992 Am J Pub Health 82; 1244-50
A closer look at the dynamics: physical activity

- **Men post cardiac event and their wives (Macken 2000)**
  - Three quarters of wives were concordant with husbands re exercise at one year (most were exercising together)

- **Men post myocardial infarction and their wives (Dracup 1987)**
  - Men who were counselled re lifestyle and risk factors with their wives exercised more and sustained levels in long term better than those counselled alone
  - Wives counselled with husbands exercised more during the short term


Dracup 1984 Patient Educ Couns 6;169-77
MRFITT: spin-of effect of prevention intervention for men on their wives

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Usual care</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking %</td>
<td>25</td>
<td>31</td>
<td>Not significant</td>
</tr>
<tr>
<td>weight</td>
<td>67</td>
<td>69</td>
<td>Not significant</td>
</tr>
<tr>
<td>Food record rating*</td>
<td>13</td>
<td>17</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Dietary knowledge score**</td>
<td>30</td>
<td>27</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>LDL-C <em>(mg/dl)</em></td>
<td>127</td>
<td>142</td>
<td>p&lt;0.01</td>
</tr>
</tbody>
</table>

Some determinants of good spousal support when health is a concern

• ‘Spinoff effect’ or passive adoption of the other’s habits
• Demonstrating an active engagement in a problem
• Sharing problems (not buffering or over-protecting)
• Involving the spouse in the health education intervention
Implications for research and clinical practice

• Concordance for lifestyles and concordance for change in couples exists and is an important factor in considering behaviour change theory
• Dynamics of change can and should inform the structure and management of prevention and rehabilitation programmes
• Further research – qualitative in depth investigation of couples dynamics to inform programme content
• Large RCT required to demonstrate effectiveness of a couples approach to CVD prevention
Nagging doesn’t work!