Epidemiology of cardiovascular diseases
Mortality among men and women

Note: no data available for Andorra.
Source: WHO Mortality Database.
Countries where cancer mortality is higher than CVD mortality
DALY

- DALY per 100 000 people:
  - http://data.euro.who.int/healthatlas/DiseaseBurdenDALY/atlas.html

- Age-standardized DALY:
  - http://data.euro.who.int/healthatlas/DiseaseBurdenSDRDALY/atlas.html
Estimated DALY per 1000 population for all cardiovascular diseases
Concept of prevention of cardiovascular diseases

- Cardiovascular diseases should be imagined as a spectrum, where given diseases are risk factors of another disease.
- This way is hypertension a disease and a risk factor of AMI as well.
- Lifestyle change is not only part of prevention but should be an organic part of the therapy too.
Comprehensive approach to hypertension control

• Focused clinical interventions for those at high risk
• Lifestyle advice
• Population-based strategies
Stages of CVD Intervention

- Primordial – Before risk factors develop
- Primary – Treatment of risk factors
- Secondary – After a CVD event occurs
Primordial prevention

- In 1978, Strasser introduced the concept of primordial prevention. Once a risk factor has developed, it can be difficult to reduce the risk it contributes to overall health.

- “Medications and lifestyle interventions cannot reduce CVD event rates to levels seen in those who maintain optimal risk factor profiles (ideal cardiovascular health) into middle and older ages.”

- Primordial prevention focuses on populations.

- The goal is to prevent the appearance of risk factors in a given population.
Significance of primordial prevention

Risk Factors worse: +17%
- Obesity (increase) +7%
- Diabetes (increase) +10%

Risk Factors better: -65%
- 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 & PTCA -5%
- Hypertension therapies -7%
- Statins (primary prevention) -5%

341,745 fewer deaths in 2000
Goal of complex strategy
50% „rule” of hypertension

- 50% of the sick are diagnosed
  - 50% of the diagnosed are treated
    - 50% of the treated population is treated correctly
- 1/8 of the sick are treated correctly
- Possible reasons:
  - Low rate of visits in population
  - Poor adherence to screening and diagnostic protocol
  - Poor adherence to treatment protocol
  - Not optimal compliance of patients
Blood pressure measurement
## Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Blood Pressure, mm Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>SBP 90-119 and 60-79</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>SBP 120-139 or DBP 80-89</td>
</tr>
<tr>
<td>Stage 1 HTN</td>
<td>SBP 140-159 or DBP 90-99</td>
</tr>
<tr>
<td>Stage 2 HTN</td>
<td>SBP $\geq$160 or DBP $\geq$100</td>
</tr>
</tbody>
</table>

DBP = diastolic blood pressure; SBP = systolic blood pressure
Common mistakes

- Cuff size and application
- Arm position
- Differences in arm size
- Rest period prior to measurement
- Inflation/deflation method
- Concentration of the measurer
- Digit bias (tendency to record a zero as the last digit)
- Lack of repeated measures
- Time between repeated measures
- Lack of calibration/maintenance of measurement devices
- Body position
- Muscle tension
- Quality of stethoscope
- Level of training of measurer
Cuff size

**USING THE RIGHT CUFF**

To find out if you’re using the right-size cuff, compare the length of the bladder inside the cuff with the circumference of the patient’s arm. (You can feel the bladder inside the cuff.) If the bladder is at least 80% of the circumference of his arm, your reading should be accurate.
Confirm Elevated Blood Pressure

- A standardized blood pressure measurement process is important for correctly classifying blood pressure.
- Elevated blood pressure readings should be confirmed.
- Self-monitoring of blood pressure should be encouraged in patients with elevated blood pressure.
Diagnosing hypertension

• When considering a diagnosis of hypertension, measure blood pressure in both arms.

• If the difference in readings between arms is more than 20 mmHg, repeat the measurements.

• If the difference in readings between arms remains more than 20 mmHg on the second measurement, measure subsequent blood pressures in the arm with the higher reading.

• If blood pressure measured in the clinic is 140/90 mmHg or higher:
  • Take a second measurement during the consultation.
  • If the second measurement is substantially different from the first, take a third measurement.
  • Record the lower of the last two measurements as the clinic blood pressure.
Home Blood Pressure Measurement

• When using HBPM to confirm a diagnosis of hypertension, ensure that:
  • for each blood pressure recording, two consecutive measurements are taken, at least 1 minute apart and with the person seated and
  • blood pressure is recorded twice daily, ideally in the morning and evening and
  • blood pressure recording continues for at least 4 days, ideally for 7 days.
  • Discard the measurements taken on the first day and use the average value of all the remaining measurements to confirm a diagnosis of hypertension.

• Hypertension threshold: 135/85
Indication of 24 hour ABPM

- Suspected white-coat hypertension (including in pregnancy)
- Suspected masked hypertension (untreated subject with normal clinic BP and elevated ABP)
- Suspected nocturnal hypertension or no night time reduction in BP (dipping)
- Hypertension despite appropriate treatment
- Patients with a high risk of future cardiovascular events (even if clinic BP is normal)
- Suspected episodic hypertension.
- Titration therapy
- Sleep apnoe
Interpreting results

- 24 hour average $<115/75$ mmHg (hypertension threshold $130/80$ mmHg)
- Day time (awake) $<120/80$ mmHg (hypertension threshold $135/85$ mmHg)
- Night time (asleep) $<105/65$ mmHg (hypertension threshold $120/75$ mmHg).
Complete Initial Assessment: Accurately Stage and Complete Risk Assessment Recommendations

• It is important to accurately stage newly confirmed hypertension and assess risk for cardiovascular disease and other target organ damage.
• A complete review of all medications (prescription and over-the-counter) is very important.
<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Signs/Symptoms</th>
<th>Options for Further Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic kidney disease</td>
<td>Variable, may be absent</td>
<td>Estimated GFR, urinalysis</td>
</tr>
<tr>
<td>Renalvascular hypertension</td>
<td>Unexplained hypertension in younger women, abdominal bruit</td>
<td>Consult with specialist</td>
</tr>
<tr>
<td>Sleep apnea</td>
<td>Excessive daytime sleepiness, obesity, snoring</td>
<td>History, sleep study</td>
</tr>
<tr>
<td>Primary aldosteronism</td>
<td>Unprovoked hypokalemia</td>
<td>Plasma renin/aldosterone ratio 24-hour urine aldosterone</td>
</tr>
<tr>
<td>Drug-induced (prescription, over-the-counter, supplements or illicit drugs)</td>
<td>Variable history</td>
<td>Medication review, urine toxin screen</td>
</tr>
<tr>
<td>Aortic coarctation</td>
<td>Unequal blood pressure in right and left arms, delayed or absent femoral pulses</td>
<td>Aortic imaging, consult local experts for preferred test</td>
</tr>
<tr>
<td>Cushing syndrome</td>
<td>Hyperglycemia, truncal obesity</td>
<td>Dexamethasone suppression test, 24-hour urine free cortisol</td>
</tr>
<tr>
<td>Pheochromocytoma</td>
<td>Paroxysmal symptoms</td>
<td>24-hour urine metanephrines and plasma-free metanephrines</td>
</tr>
<tr>
<td>Thyroid/parathyroid disease</td>
<td>Variable, hypercalcemia</td>
<td>TSH, serum PTH</td>
</tr>
</tbody>
</table>
Risk assessment of patients

European Guidelines on CVD prevention
Indications of risk assessment

• Patients with established atherosclerotic CVD.

• Asymptomatic individuals who are at increased risk of CVD because of:
  • multiple risk factors resulting in raised total CVD risk
  • (≥ 5% 10 year risk of CVD death)
  • Diabetes type 2 and type 1 with microalbuminuria
  • Markedly increased single risk factors especially if associated with end organ damage

• Close relatives of subjects with premature atherosclerotic CVD or of those who are at particularly high risk.
Systematic Coronary Risk Evaluation
The SCORE system

• The SCORE system is based on big prospective European studies and predicts all kinds of fatal atherosclerotic endpoints for a period of 10 years.

• Following risk factors are included:
  • gender
  • Age
  • smoking
  • systolic blood pressure
  • total cholesterol or total cholesterol/HDL-C ratio.
European Risk SCORE Charts

- Low risk chart in Belgium, France, Greece, Italy, Luxembourg, Spain, Switzerland and Portugal
- High risk chart in other countries of Europe

Charité, CVK, Lipidambulanz
Figure 1

10 year risk of fatal CVD in **high risk** regions of Europe by gender, age, systolic blood pressure, total cholesterol and smoking status.

### Women

<table>
<thead>
<tr>
<th>Age</th>
<th>Non-smoker</th>
<th>Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>14 16 19 22 26</td>
<td>14 16 19 22 26</td>
</tr>
<tr>
<td>55</td>
<td>12 15 18</td>
<td>12 15 18</td>
</tr>
<tr>
<td>50</td>
<td>10 12 15</td>
<td>10 12 15</td>
</tr>
</tbody>
</table>

### Men

<table>
<thead>
<tr>
<th>Age</th>
<th>Non-smoker</th>
<th>Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>25 30 34 47</td>
<td>25 30 34 47</td>
</tr>
<tr>
<td>55</td>
<td>23 27 31</td>
<td>23 27 31</td>
</tr>
<tr>
<td>50</td>
<td>21 25 29</td>
<td>21 25 29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Systolic blood pressure</th>
<th>Cholesterol mmol</th>
</tr>
</thead>
<tbody>
<tr>
<td>180 160 140 120</td>
<td>150 200 250 300 mg/dl</td>
</tr>
</tbody>
</table>

**SCORE**

- 15% and over
- 10% - 14%
- 5% - 9%
- 3% - 4%
- 2%
- 1%
- < 1%

10-year risk of fatal CVD in populations at high CVD risk.
### Low Risk SCORE

**Figure 2**

10-year risk of fatal CVD in low risk regions of Europe by gender, age, systolic blood pressure, total cholesterol and smoking status.

<table>
<thead>
<tr>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td><strong>Systolic Blood Pressure</strong></td>
<td><strong>Systolic Blood Pressure</strong></td>
</tr>
<tr>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td><strong>Cholesterol (mmol)</strong></td>
<td><strong>Cholesterol (mmol)</strong></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

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### Framingham Risk Score

**Framingham Risk Score to predict 10 year ABSOLUTE RISK of CHD EVENT**

This risk assessment only applies to assessment for PRIMARY PREVENTION of CHD, in people who do not have evidence of established vascular disease. Patients who already have evidence of vascular disease usually have a >20% risk of further events of over 10 years, and require vigorous SECONDARY PREVENTION. People with a Family History of premature vascular disease are at higher risk than predicted; Southern Europeans and some Asians may have a lower risk in relation to standard risk factors.

**STEP 1:** Add scores by sex for Age, Total Cholesterol, HDL-Cholesterol, BP, Diabetes and Smoking. (If HDL unknown, assume 1.1 in Males, 1.4 in Females)

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-34</td>
<td>-1</td>
<td>-9</td>
</tr>
<tr>
<td>35-39</td>
<td>-3</td>
<td>-2</td>
</tr>
<tr>
<td>40-44</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>45-49</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>50-54</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>55-59</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>60-64</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>65-69</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>70-74</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

**STEP 2:** Use total score to determine Predicted 10 year Absolute Risk of CHD Event (Coronary Death, Myocardial Infarction, Angina) by sex

<table>
<thead>
<tr>
<th>Total Score</th>
<th>&lt;2</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>&gt;17</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 year Risk, Male</td>
<td>&lt;2%</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>7%</td>
<td>8%</td>
<td>10%</td>
<td>13%</td>
<td>16%</td>
<td>20%</td>
<td>25%</td>
<td>33%</td>
<td>45%</td>
<td>53%</td>
<td>63%</td>
<td>73%</td>
<td>83%</td>
<td>93%</td>
</tr>
<tr>
<td>10 year Risk, Female</td>
<td>&lt;1%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
<td>8%</td>
<td>10%</td>
<td>11%</td>
<td>13%</td>
<td>18%</td>
<td>20%</td>
<td>24%</td>
<td>27%</td>
<td></td>
</tr>
</tbody>
</table>

**STEP 3:** Compare Predicted 10 year Absolute Risk with “Average” and “Ideal” 10 year Risks, to give Relative Risks

<table>
<thead>
<tr>
<th>Age</th>
<th>30-34</th>
<th>35-39</th>
<th>40-44</th>
<th>45-49</th>
<th>50-54</th>
<th>55-59</th>
<th>60-64</th>
<th>65-69</th>
<th>70-74</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Ideal” Male</td>
<td>3%</td>
<td>5%</td>
<td>7%</td>
<td>11%</td>
<td>14%</td>
<td>16%</td>
<td>21%</td>
<td>23%</td>
<td>30%</td>
</tr>
<tr>
<td>“Ideal” Female</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
<td>2%</td>
<td>5%</td>
<td>6%</td>
<td>6%</td>
<td>12%</td>
<td>12%</td>
<td>13%</td>
</tr>
</tbody>
</table>

People with an absolute risk of >20% should be considered for treatment: with a Statin to achieve a Total Cholesterol <6 and/or LDL cholesterol <3.3 with anti-hypertensives to achieve a BP ≤160/90 (ideally ≤140/80).

Qualifiers

- Risk may be higher than indicated in the chart in:
  - Sedentary or obese subjects, esp. those with central obesity
  - Individuals with a strong family hx of premature CVD
  - The socially deprived
  - Those with low HDL-C or high triglycerides
  - Asymptomatic subjects with evidence of pre-clinical atherosclerosis:
    - e.c. reduced ankle-brachial index or on imaging such as carotid ultrasonography or CT scanning.

Charité, CVK, Lipidambulanzt
Ankle-brachial index

- The ankle-brachial index test is a quick, noninvasive way to check your risk of peripheral artery disease (PAD).
- Indication:
  - Over 50 years of age
  - Current or former smoker
  - Diabetes
  - High blood pressure
  - High cholesterol, LDL, low HDL
How to calculate ankle-brachial index

**Right arm:**
- Systolic pressure: 180 mm Hg

**Left arm:**
- Systolic pressure: 100 mm Hg

**Right ankle:**
- Systolic pressure
  - Posterior tibial (PT): 68 mm Hg
  - Dorsalis pedis (DP): 64 mm Hg

**Left ankle:**
- Systolic pressure
  - Posterior tibial (PT): 736 mm Hg
  - Dorsalis pedis (DP): 732 mm Hg

**Right ABI equals ratio of:**
- Higher of the right ankle pressure (PT or DP)
- Higher arm pressure (right or left arm)

**Left ABI equals ratio of:**
- Higher of the left ankle pressure (PT or DP)
- Higher arm pressure (right or left arm)

*The lower of these numbers is the patient’s overall ankle-brachial index. Overall ankle-brachial index = 0.57*
Results

• Your ankle-brachial index may show you have:

• **No blockage (1.0 to 1.4).** An ankle-brachial index number in this range suggests that you probably don't have peripheral artery disease.

• **Blockage (0.9 or less).** An ankle-brachial index number less than 1.0 indicates narrowing of the arteries in your leg.

• **Rigid arteries (more than 1.4).** If your ankle-brachial index number is higher than 1.4, this may mean that your arteries are rigid and don't compress when the blood pressure cuff is inflated. Ultrasound may be needed.
European Treatment Guidelines
## European Risk Score and LDL-C

<table>
<thead>
<tr>
<th>Total CV risk (SCORE) %</th>
<th>LDL-C levels</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 70 mg/dL</td>
<td>70 to &lt; 100 mg/dL</td>
<td>100 to &lt; 155 mg/dL</td>
<td>155 to &lt; 190 mg/dL</td>
<td>≥ 190 mg/dL</td>
</tr>
<tr>
<td>&lt; 1</td>
<td>Lifestyle advice</td>
<td>Lifestyle advice</td>
<td>Lifestyle advice</td>
<td>Lifestyle advice</td>
<td>Lifestyle advice, consider drug if uncontrolled</td>
</tr>
<tr>
<td>Classa/Leverb</td>
<td>I/C</td>
<td>I/C</td>
<td>I/C</td>
<td>I/C</td>
<td>Ila/A</td>
</tr>
<tr>
<td>≥ 1 to &lt; 5</td>
<td>Lifestyle advice</td>
<td>Lifestyle advice</td>
<td>Lifestyle advice, consider drug if uncontrolled</td>
<td>Lifestyle advice, consider drug if uncontrolled</td>
<td>Lifestyle advice, consider drug if uncontrolled</td>
</tr>
<tr>
<td>Classa/Leverb</td>
<td>I/C</td>
<td>I/C</td>
<td>Ila/A</td>
<td>Ila/A</td>
<td>I/A</td>
</tr>
<tr>
<td>≥ 5 to &lt; 10, or high-risk</td>
<td>Lifestyle advice</td>
<td>Lifestyle advice, consider drug if uncontrolled</td>
<td>Lifestyle advice and drug treatment for most</td>
<td>Lifestyle advice and drug treatment</td>
<td>Lifestyle advice and drug treatment</td>
</tr>
<tr>
<td>Classa/Leverb</td>
<td>Ila/A</td>
<td>Ila/A</td>
<td>Ila/A</td>
<td>I/A</td>
<td>I/A</td>
</tr>
<tr>
<td>≥ 10 or very high-risk</td>
<td>Lifestyle advice, consider drug</td>
<td>Lifestyle advice and concomitant drug treatment</td>
<td>Lifestyle advice and concomitant drug treatment</td>
<td>Lifestyle advice and concomitant drug treatment</td>
<td>Lifestyle advice and concomitant drug treatment</td>
</tr>
<tr>
<td>Classa/Leverb</td>
<td>Ila/A</td>
<td>Ila/A</td>
<td>I/A</td>
<td>I/A</td>
<td>I/A</td>
</tr>
</tbody>
</table>
### Effectiveness of Lifestyle modification

<table>
<thead>
<tr>
<th>Modification</th>
<th>Recommendation</th>
<th>Approximate Reduction (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity</td>
<td>Engage in regular aerobic physical activity (e.g., brisk walking) ≥30 min/day, most days</td>
<td>4-9</td>
</tr>
<tr>
<td>DASH eating plan</td>
<td>Consume diet rich in fruits, vegetables, and low-fat (reduced saturated and total fat) dairy products</td>
<td>8-14</td>
</tr>
<tr>
<td>Dietary sodium restriction</td>
<td>Reduce dietary sodium intake to max of 100 mmol/day (2.4 g sodium or 6 g sodium chloride)</td>
<td>2-8</td>
</tr>
<tr>
<td>Moderate alcohol</td>
<td>Limit daily consumption to max of 1 drink for women or 2 drinks for men</td>
<td>2-4</td>
</tr>
<tr>
<td>weight loss</td>
<td>Maintain normal body weight (BMI 18.5-24.9 kg/m²)</td>
<td>5-20 per 10-kg weight loss</td>
</tr>
<tr>
<td>Stress reduction</td>
<td>Practice a stress-reduction modality such as TM</td>
<td>5</td>
</tr>
<tr>
<td>Tobacco cessation</td>
<td>Incorporate cessation modality of choice</td>
<td>2-4 (after 1 wk of cessation)</td>
</tr>
</tbody>
</table>

*DASH: Dietary Approaches to Stop Hypertension; max: maximum; SBP: systolic blood pressure; TM: Transcendental Meditation.*

*Source: References 4, 10, 13, 16.*
Lifestyle profiles of countries

- http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/country-work
Dietary Approaches for Stopping Hypertension (DASH-diet)

- Lowered blood pressure well, especially in those with high blood pressure
- Effects seen in 2 weeks
- Worked best if sodium also restricted
DASH and DASH sodium trial

• Dietary Approaches to Stop Hypertension (DASH) Trial
  • Compared the effects of three diets – typical American diet, fruits and vegetable diet, and a diet rich in fruits and vegetables and low fat dairy, and reduced in saturated fat, total fat, and cholesterol
  • Combination diet (DASH) produced the largest blood pressure reduction after 8 weeks – average ↓ of 5.5 / 3.0 mm Hg
    • Participants with hypertension experienced an average blood pressure ↓ of 11.4 / 5.5 mm Hg

• DASH Sodium Trial
  • DASH diet and a low level of sodium (below 2.3g) ↓ SBP by 7.1 mg Hg
Characteristics of DASH diet

- Daily amount of 400g vegetable (3 servings vegetable, 2 serving fruit
  - Potato, rice not included
- Whole-grain products, brown rice
- Daily two table spoons of seeds and nuts
- Weekly twice fish consumption
- Poultry meat instead of red meat
- 500ml of milk or equal amount a dairy products
- Unsaturated fat consumption
Sodium restriction

• Sodium affects blood pressure by changing blood volume
• Absorbed sodium remains in the extracellular compartments.
• Globally, 8.5 million deaths could be averted over 10 years from 2006 to 2015 through a 15% reduction in sodium intake
• Average blood pressure was reduced by 22.7/9.1 mm Hg in patients with resistant hypertension (no effect with more than three different type of HTN medication) when switched from a high to low sodium diet
• In most individuals blood pressure is reduced within days to weeks of reducing sodium intake
Problem with sodium restriction

• Approximately 75% of our sodium intake comes from processed foods (e.g. bread, cheese, cold cuts)
• Producers should be involved too.
Potassium supplementation

- potassium supplementation lowers the blood pressure significantly in hypertensive patients and insignificantly in normotensive patients.
- The magnitude of change has been illustrated in systematic reviews that included meta-analyses of both randomized trials and cohort studies.
- In a meta-analysis of 16 randomized trials in hypertensive patients, increased potassium intake significantly reduced systolic blood pressure by a mean of 5.3/3.1 mmHg. By contrast, the reduction in blood pressure was small (0.1/0.6 mmHg) and not statistically significant in three trials in normotensive subjects.
- When a subgroup analysis was performed according to achieved potassium intake, patients with an increase to 3.5-4.7 mg/day had the largest reduction in blood pressure (7.2/4.1 mmHg).
Obesity and overweight in the world

- 1.6 billion people are overweight
- 400 million people are obese
- World map:
Childhood overweight and obesity

- Childhood obesity is one of the most serious public health challenges of the 21st century.
- The problem is global and is steadily affecting many low- and middle-income countries, particularly in urban settings. The prevalence has increased at an alarming rate.
- Globally, in 2013 the number of overweight children under the age of five, is estimated to be over 42 million. Close to 31 million of these are living in developing countries.
- Overweight and obese children are likely to stay obese into adulthood and more likely to develop noncommunicable diseases like diabetes and cardiovascular diseases at a younger age.
Measuring and classifying weight

<table>
<thead>
<tr>
<th>BMI (kg/m²)</th>
<th>Obesity Class</th>
<th>Disease Risk* Relative to Normal Weight and Waist Circumference</th>
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<tr>
<td>Underweight</td>
<td>&lt; 18.5</td>
<td>Men 102 cm (40 in) or less</td>
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<td>Women 88 cm (35 in) or less</td>
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<td>Men &gt; 102 cm (40 in)</td>
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<td>Women &gt; 88 cm (35 in)</td>
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Adverse effects of overweight and obesity

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<th>WRR</th>
<th>PAR</th>
<th>%</th>
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Hx=surgery
Weight loss

- Calorie restriction: The centerpiece of dietary therapy for weight loss in overweight patients is a low-calorie diet (800 to 1,500 kcal/day). This should be reached gradually and maintained until ideal weight is gained. Another possibility is to decrease daily intake by 600 kcal.
- Gradually increase physical activity to weekly 300 minutes of moderate activity or 150 minutes of high-intensity training.
- Ideal weight loss: less than 0.5kg/week
Therapeutic indications

• Drugs
  • Your body mass index (BMI) is 30 or greater
  • Your BMI is greater than 27, and you also have medical complications of obesity, such as diabetes, high blood pressure or sleep apnea

• Surgery
  • You have extreme obesity (BMI of 40 or higher)
  • Your BMI is 35 to 39.9, and you also have a serious weight-related health problem, such as diabetes or high blood pressure
  • You're committed to making the lifestyle changes that are necessary for surgery to work
Orlistat

• Its primary function is preventing the absorption of fats from the human diet by acting as a lipase inhibitor, thereby reducing caloric intake.
• Effectiveness is definite but modest
Lorcaserin

- 5-HT2C receptor agonist
- The activation of 5-HT2C receptors in the hypothalamus is supposed to activate proopiomelanocortin (POMC) production and consequently promote weight loss through satiety.
Surgical treatment

• Gastric bypass surgery
• Laparoscopic adjustable gastric binding
• Biliopancreatic diversion with duodenal switch
• Gastric sleeve
Physical activity recommendations

• Recommendation according to age:
  • 5-17
  • 18-64
  • 65+
Children and youth aged 5–17 should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily.

Amounts of physical activity greater than 60 minutes provide additional health benefits.

Most of the daily physical activity should be aerobic. Vigorous-intensity activities should be incorporated, including those that strengthen muscle and bone, at least 3 times per week.
• Adults aged 18–64 should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity.

• Aerobic activity should be performed in bouts of at least 10 minutes duration.

• For additional health benefits, adults should increase their moderate-intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate- and vigorous-intensity activity.

• Muscle-strengthening activities should be done involving major muscle groups on 2 or more days a week.
65+

• 1. Adults aged 65 years and above should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity.

• 2. Aerobic activity should be performed in bouts of at least 10 minutes duration.

• 3. For additional health benefits, adults aged 65 years and above should increase their moderate-intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate- and vigorous-intensity activity.

• 4. Adults of this age group, with poor mobility, should perform physical activity to enhance balance and prevent falls on 3 or more days per week.

• 5. Muscle-strengthening activities should be done involving major muscle groups, on 2 or more days a week.

• 6. When adults of this age group cannot do the recommended amounts of physical activity due to health conditions, they should be as physically active as their abilities and conditions allow.
Source

- http://apps.who.int/iris/bitstream/10665/44399/1/9789241599979_eng.pdf
Cardiovascular diseases and diabetes
International statistics

• Diabetes profile: http://www.who.int/diabetes/country-profiles/en/
Causes of the diabetes pandemic

- Aging societies
- Unhealthy nutrition
- Overweight and obesity
- Sedentary lifestyle
Screening for diabetes

- Testing to assess risk for future diabetes in asymptomatic people should be considered in adults of any age who are overweight or obese (BMI ≥25 kg/m² or ≥23 kg/m² in Asian Americans) and who have one or more additional risk factors for diabetes.

- For all patients, testing should begin at age 45 years.

- If tests are normal, repeat testing carried out at a minimum of 3-year intervals is reasonable.

- To test for prediabetes, fasting plasma glucose, 2-h plasma glucose after 75-g oral glucose tolerance test, and A1C are equally appropriate.

- In patients with prediabetes, identify and, if appropriate, treat other cardiovascular disease risk factors.

- Testing to detect prediabetes should be considered in children and adolescents who are overweight or obese and who have two or more additional risk factors for diabetes.
Blood pressure goals in hypertension

- Goal: 130/80
- When proteinuria is present: 125/75
Diabetes care

• Guidelines of the European Society of Cardiology 2016
• When CV risk factors present, HbA1 below 7%
• BUT: initial stage: HbA1c below 6.5%
• Metformin should be used first (if there are are no CI or there is no impairment in renal function.
• Diabetes + CV: SGLT2 (sodium-glucose co-transporter-2)-inhibitor should be adminissted to decrease mortality
• 40+ age: statins
Chemoprevention of cardiovascular diseases

• Aspirin for virtually all with established CVD, and in persons at< 10% SCORE risk once blood pressure has been controlled.
• Beta-blockers after myocardial infarction and, in carefully titrated doses, in those with heart failure.
• ACE-inhibitors in those with left ventricular dysfunction and in diabetic subjects with hypertension or nephropathy.
• Anti-coagulants in those at increased risk of thrombo-embolic events, particularly atrial fibrillation.
• Thrombocyte aggregation inhibitors to decrease AMI, stroke: Aspirin+ticagrelol or prasugrellel for 12 weeks, after that long-ter Aspirin treatment
Lipid levels

• Very high CV risk: LDL-C < 1.8 mmol/l, or at least 50% decrease compared to baseline if LDL-C is between 1.8-3.5 mmol/l

• High CV risk: LDL-C < 2.6 mmol/l, or at least 50% decrease compared to baseline if LDL-C is between 2.6-5.1 mmol/l

• In all other cases: LDL-C < 3.0 mmol/l
Scandinavian Simvastatin Survival Study

- The present trial was designed to evaluate the effect of cholesterol lowering with simvastatin on mortality and morbidity in patients with coronary heart disease (CHD).
- 4444 patients with angina pectoris or previous myocardial infarction and serum cholesterol 5.5-8.0 mmol/L on a lipid-lowering diet were randomised to double-blind treatment with simvastatin or placebo.
- Over the 5.4 years median follow-up period, simvastatin produced mean changes in total cholesterol, low-density-lipoprotein cholesterol, and high-density-lipoprotein cholesterol of -25%, -35%, and +8%, respectively, with few adverse effects. 256 patients (12%) in the placebo group died, compared with 182 (8%) in the simvastatin group. The relative risk of death in the simvastatin group was 0.70 (95% CI 0.58-0.85, p=0.0003). The 6-year probabilities of survival in the placebo and simvastatin groups were 87.6% and 91.3%, respectively.
- There were 189 coronary deaths in the placebo group and 111 in the simvastatin group (relative risk 0.58, 95% CI 0.46-0.73), while noncardiovascular causes accounted for 49 and 46 deaths, respectively. 622 patients (28%) in the placebo group and 431 (19%) in the simvastatin group had one or more major coronary events. The relative risk was 0.66 (95% CI 0.59-0.75, p<0.00001), and the respective probabilities of escaping such events were 70.5% and 79.6%. This risk was also significantly reduced in subgroups consisting of women and patients of both sexes aged 60 or more.
- This study shows that long-term treatment with simvastatin is safe and improves survival in CHD patients.
Thank you for your attention!