Ten-year change in sedentary behavior and cardiorespiratory fitness are independently associated with clustered...
Is sitting the new smoking?
Ten-year change in sedentary behavior and cardiorespiratory fitness are independently associated with clustered cardio-metabolic risk

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CONCLUSION
- A combination of decreasing sedentary behavior (SB) and increasing cardiorespiratory fitness (CRF) is most beneficial towards cardio-metabolic health, not moderate and vigorous physical activity (MVPA)
- Associations between CRF and cardio-metabolic risk were mediated through changes in waist circumference
- From a public health perspective, lifestyle interventions need to focus on lowering SB & increasing CRF

INTRODUCTION
- A growing proportion of adults is inactive
- Sedentary behavior (SB) is highly prevalent, even in those who are sufficiently active
- Cardiorespiratory fitness (CRF) is a strong predictor for cardio-metabolic health
  - Accumulating evidence has suggested that these three exposures (SB, MVPA & CRF) contribute independently to unhealthier cardio-metabolic risk profiles.
- Central adiposity and nutritional intake negatively influence cardio-metabolic health
  - Important candidate to examine as potential mediator

AIM
- Examine the independent associations between change in sedentary behavior, MVPA and CRF and concurrent change in clustered cardio-metabolic risk over a ten-year follow up
  - Whether any independent associations were mediated by change in central adiposity or nutritional intake
  - Whether change in exposures interact with each other

METHODS & MATERIALS
- SB and MVPA were self-reported (FPACQ)
- CRF was determined by means of a maximal exercise test
- Cardio-metabolic Risk Score (CMRS): Standardized values (by sex and age) for waist circumference, fasting glucose, HDL-cholesterol, triglycerides, blood pressure were summed and divided by five
- CMRS_no_adj: CMRS without waist circumference and divided by four
- Statistical analyses:
  - Multiple linear regression with standardized regression coefficients
  - Mediation analysis by the product of coefficients (a*b) method by MacKinnon
  - Interaction effects between change in exposures

RESULTS

MULTIPLE LINEAR REGRESSION

Model = adjusted for age, follow-up time, sex, original study population, baseline and changes in healthy eating, smoking, education level; changes and baseline of all three exposures

Table 1. Standardized regression coefficients (β) of sedentary behavior, moderate-and-vigorous physical activity and cardiorespiratory fitness for cardio-metabolic markers

<table>
<thead>
<tr>
<th>Change in SB</th>
<th>Change in MVPA</th>
<th>Change in CRF</th>
</tr>
</thead>
<tbody>
<tr>
<td>β</td>
<td>β</td>
<td>β</td>
</tr>
<tr>
<td>CMRS_no_adj</td>
<td>0.12**</td>
<td>-0.08</td>
</tr>
<tr>
<td>CMRS_circle</td>
<td>0.12**</td>
<td>-0.20</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td>0.04</td>
<td>0.00</td>
</tr>
<tr>
<td>Fasting Glucose</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>HDL-cholesterol</td>
<td>-0.09</td>
<td>0.15**</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>0.12**</td>
<td>-0.04</td>
</tr>
<tr>
<td>Diastolic Blood Pressure</td>
<td>0.08</td>
<td>-0.08</td>
</tr>
<tr>
<td>Systolic Blood Pressure</td>
<td>0.05</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001

Figure 2. Estimated marginal means (SE) for change in CMRS in six groups of participants, defined by their change in CRF (decrease (62%) and no decrease (38%) over time) and change in sedentary behavior (decrease (37%), increase between 0-4 h/week (24%) and increase by > 4 h/week (39%)

INTERACTION ANALYSIS

REFERENCES