Kinra, S; Andersen, E; Ben-Shlomo, Y; Bowen, L; Lyngdoh, T; Prabhakaran, D; Reddy, KS; Ramakrishnan, L; Bharathi, A; Vaz, M; +4 more... Kurpad, A; Smith, GD; Ebrahim, S; Indian Migration Study Group; (2011) Association Between Urban Life-Years and Cardiometabolic Risk: The Indian Migration Study. American journal of epidemiology, 174 (2). pp. 154-64. ISSN 0002-9262 DOI: https://doi.org/10.1093/aje/kwr053

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Web Figure 1: Recruitment flow chart for the Indian Migration Study 2005-2007.

15,596 subjects (workers/spouses) identified & contacted

13,695 subjects completed assessment of eligibility.

7,594 subjects were eligible.

7,102 agreed in principle to participate with their sibling.

3,537 workers or spouses (and 3530 siblings) participated by the end of field work.

(3,525 sib-pairs; unpaired - 12 workers, 5 siblings)

7,067 individuals (worker, spouse or sibling) participated:

38 Urban-rural migrant workers & their sibs
519 Rural workers & their sibs
4,223 Rural-urban migrant workers & their sibs
2,287 Urban workers & their sibs

1901 subjects did not complete assessments.

6101 were not eligible. Did not have a rural sib or were not randomly chosen for the urban non-migrant sample.

492 did not want to participate.

3565 had not participated by the end of field-work.

4,223 (rural-urban migrant workers & their sibs) included in present analyses:

(2,108 sib-pairs; unpaired – 4 workers, 3 siblings)

7,102 agreed in principle to participate with their sibling.
### Web Table 1: Subject (factory worker or spouse) characteristics by responder status

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Responders</th>
<th>Non-responders</th>
<th>No consent</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>3537</td>
<td>3565</td>
<td>492</td>
</tr>
<tr>
<td>Male, N (%)</td>
<td>1,800 (50.9)</td>
<td>2,057 (57.7)</td>
<td>279 (56.7)</td>
</tr>
<tr>
<td>Age, mean (SD)</td>
<td>41.7 (9.2)</td>
<td>41.9 (9.6)</td>
<td>46.2 (7.9)</td>
</tr>
<tr>
<td>Hindu religion, N (%)</td>
<td>3,243 (91.7)</td>
<td>3,345 (93.8)</td>
<td>446 (90.7)</td>
</tr>
<tr>
<td>Married, N (%)</td>
<td>3,436 (97.1)</td>
<td>3,439 (96.5)</td>
<td>478 (97.1)</td>
</tr>
<tr>
<td>Self reported high blood pressure, heart disease or stroke, N (%)</td>
<td>684 (19.3)</td>
<td>526 (14.8)</td>
<td>104 (21.1)</td>
</tr>
<tr>
<td>Currently smoke/chew tobacco, N (%)</td>
<td>646 (18.3)</td>
<td>723 (20.3)</td>
<td>80 (16.3)</td>
</tr>
<tr>
<td>Distance in hours from factory to place of origin, Mean (SD) (Q1; Q3)</td>
<td>6.5 (7.0) (2; 9)</td>
<td>6.8 (8.0) (1; 9)</td>
<td>8.2 (9.6) (2; 12)</td>
</tr>
<tr>
<td>Migrant, N (%)</td>
<td>2,112 (59.7)</td>
<td>2,165 (60.7)</td>
<td>372 (75.6)</td>
</tr>
</tbody>
</table>
### Web table 2: Levels of cardio-metabolic risk factors by percentage of life spent in an urban area

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Adjusted Mean in Groups of Percent Urban Life</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>% Body Fat (%)</strong>*###</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Urban life-years</td>
<td>21.72 [21.43, 22.01]</td>
<td>29.49 [29.00, 29.98]</td>
<td></td>
</tr>
<tr>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>25.63 [25.09, 26.16]</td>
<td>31.96 [31.35, 32.56]</td>
<td></td>
</tr>
<tr>
<td>More than 62.5% urban life</td>
<td>25.67 [25.12, 26.22]</td>
<td>32.46 [31.68, 33.25]</td>
<td></td>
</tr>
<tr>
<td><strong>Systolic BP (mmHg)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Urban life-years</td>
<td>123.14 [122.24, 124.05]</td>
<td>120.14 [118.69, 121.59]</td>
<td></td>
</tr>
<tr>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>124.76 [122.52, 126.99]</td>
<td>119.18 [116.94, 121.42]</td>
<td></td>
</tr>
<tr>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>124.44 [122.55, 126.33]</td>
<td>119.28 [117.11, 121.45]</td>
<td></td>
</tr>
<tr>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>124.36 [122.69, 126.02]</td>
<td>119.57 [117.76, 121.38]</td>
<td></td>
</tr>
<tr>
<td>More than 62.5% urban life</td>
<td>126.32 [124.62, 128.01]</td>
<td>119.16 [116.82, 121.50]</td>
<td></td>
</tr>
<tr>
<td><strong>Diastolic BP (mmHg)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Urban life-years</td>
<td>77.09 [76.48, 77.69]</td>
<td>76.90 [76.00, 77.79]</td>
<td></td>
</tr>
<tr>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>78.73 [77.23, 80.23]</td>
<td>77.42 [76.04, 78.79]</td>
<td></td>
</tr>
<tr>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>78.72 [77.45, 79.99]</td>
<td>77.01 [75.67, 78.35]</td>
<td></td>
</tr>
<tr>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>78.98 [77.86, 80.09]</td>
<td>76.77 [75.65, 77.88]</td>
<td></td>
</tr>
<tr>
<td>More than 62.5% urban life</td>
<td>79.84 [78.70, 80.98]</td>
<td>77.54 [76.10, 78.98]</td>
<td></td>
</tr>
<tr>
<td><strong>Body mass index (kg/m²)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Urban life-years</td>
<td>22.03 [21.85, 22.22]</td>
<td>22.98 [22.61, 23.34]</td>
<td></td>
</tr>
<tr>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>22.98 [22.52, 23.44]</td>
<td>23.70 [23.14, 24.27]</td>
<td></td>
</tr>
<tr>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>23.42 [23.04, 23.81]</td>
<td>25.11 [24.57, 25.66]</td>
<td></td>
</tr>
<tr>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>23.73 [23.39, 24.07]</td>
<td>25.32 [24.86, 25.78]</td>
<td></td>
</tr>
<tr>
<td>More than 62.5% urban life</td>
<td>23.96 [23.61, 24.31]</td>
<td>25.39 [24.79, 25.98]</td>
<td></td>
</tr>
<tr>
<td><strong>Waist circumference (cm)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Urban life-years</td>
<td>81.77 [81.25, 82.29]</td>
<td>76.19 [75.32, 77.07]</td>
<td></td>
</tr>
<tr>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>84.51 [83.22, 85.80]</td>
<td>78.59 [77.23, 79.94]</td>
<td></td>
</tr>
<tr>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>85.21 [84.12, 86.31]</td>
<td>80.06 [78.74, 81.37]</td>
<td></td>
</tr>
<tr>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>87.19 [86.23, 88.15]</td>
<td>80.23 [79.14, 81.32]</td>
<td></td>
</tr>
<tr>
<td>More than 62.5% urban life</td>
<td>87.15 [86.17, 88.13]</td>
<td>80.92 [79.51, 82.33]</td>
<td></td>
</tr>
<tr>
<td><strong>Total cholesterol (mmol/L)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Urban life-years</td>
<td>4.58 [4.52, 4.65]</td>
<td>4.77 [4.67, 4.87]</td>
<td></td>
</tr>
<tr>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>4.59 [4.43, 4.74]</td>
<td>4.81 [4.65, 4.96]</td>
<td></td>
</tr>
<tr>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>4.73 [4.60, 4.87]</td>
<td>4.74 [4.59, 4.90]</td>
<td></td>
</tr>
<tr>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>4.77 [4.65, 4.89]</td>
<td>4.79 [4.66, 4.92]</td>
<td></td>
</tr>
<tr>
<td>More than 62.5% urban life</td>
<td>4.66 [4.54, 4.78]</td>
<td>4.77 [4.60, 4.94]</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Adjusted means in groups of percent urban life for men and women. All models include a random effect of sib-pairs. Non-migrants are in zero urban life years group. The models are adjusted for age group, factory and socio-economic group. * ~ p<0.05, ** ~ p<0.01, *** ~ p<0.001 for the test for trend in percent urban life in men and # ~ p<0.05, ## ~ p<0.01, ### ~ p<0.001 for the test for trend in percent urban life in women. a) Geometric mean.
### Web Table 2 (contd.): Levels of cardio-metabolic risk factors by percentage of life spent in an urban area

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Adjusted Mean in Groups of Percent Urban Life</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 Urban life-years</td>
<td>2.78 [2.72, 2.83]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>2.79 [2.65, 2.93]</td>
</tr>
<tr>
<td>LDL-cholesterol</td>
<td></td>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>2.91 [2.80, 3.03]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>2.89 [2.78, 2.99]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 62.5% urban life</td>
<td>2.86 [2.76, 2.96]</td>
</tr>
<tr>
<td>HDL-cholesterol</td>
<td></td>
<td>0 Urban life-years</td>
<td>1.14 [1.13, 1.16]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>1.14 [1.10, 1.17]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>1.17 [1.14, 1.20]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>1.15 [1.13, 1.18]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 62.5% urban life</td>
<td>1.14 [1.11, 1.16]</td>
</tr>
<tr>
<td>Triglycerides</td>
<td></td>
<td>0 Urban life-years</td>
<td>1.31 [1.27, 1.34]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>1.34 [1.26, 1.43]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>1.32 [1.26, 1.40]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>1.43 [1.36, 1.49]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 62.5% urban life</td>
<td>1.34 [1.27, 1.40]</td>
</tr>
<tr>
<td>HOMA score</td>
<td></td>
<td>0 Urban life-years</td>
<td>1.01 [0.96, 1.07]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>1.13 [1.00, 1.28]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>1.01 [0.90, 1.12]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>1.27 [1.15, 1.39]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 62.5% urban life</td>
<td>1.32 [1.20, 1.46]</td>
</tr>
<tr>
<td>Fasting glucose</td>
<td></td>
<td>0 Urban life-years</td>
<td>4.98 [4.95, 5.02]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>4.98 [4.90, 5.07]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>5.10 [5.03, 5.17]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 62.5% urban life</td>
<td>5.07 [5.00, 5.14]</td>
</tr>
<tr>
<td>Fasting insulin</td>
<td></td>
<td>0 Urban life-years</td>
<td>4.66 [4.43, 4.89]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 &lt; Urban Life ≤ 35%</td>
<td>5.14 [4.56, 5.79]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35% &lt; Urban Life ≤ 50%</td>
<td>4.59 [4.15, 5.08]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% &lt; Urban Life ≤ 62.5%</td>
<td>5.66 [5.18, 6.19]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 62.5% urban life</td>
<td>6.00 [5.49, 6.57]</td>
</tr>
</tbody>
</table>

Notes: Adjusted means in groups of percent urban life for men and women. Non-migrants are in zero urban life years group. All models include a random effect of sib-pairs. The models are adjusted for age group, factory and socio-economic group. * ~ p<0.05, ** ~ p<0.01, *** ~ p<0.001 for the test for trend in percent urban life in men and # ~ p<0.05, ## ~ p<0.01, ### ~ p<0.001 for the test for trend in percent urban life in women. a) Geometric mean.
Web table 3: Effect modification of the association between urban life years and % body fat, systolic blood pressure (SBP) and fasting insulin by selected participant characteristics: Men

<table>
<thead>
<tr>
<th>Effect modifier</th>
<th>% Body fat. Effect of urban life-years first 10 years, per 10 years. (95% CI)</th>
<th>% Body fat. Effect of urban life-years after 10 years, per 10 years. (95% CI)</th>
<th>SBP Effect of urban life-years per 10 years (95% CI)</th>
<th>Insulin Effect of urban life-years per 10 years (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age 45</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &lt; 45</td>
<td>2.89 [0.69, 5.09]</td>
<td>0.62 [-0.14, 1.37]</td>
<td>1.37 [-0.55, 3.29]</td>
<td>0.88 [0.63, 1.23]</td>
</tr>
<tr>
<td>Age ≥ 45</td>
<td>0.09 [-3.96, 4.13]</td>
<td>-0.02 [-0.48, 0.44]</td>
<td>1.44 [0.07, 2.81]</td>
<td>0.84 [0.57, 1.23]</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not married</td>
<td>-0.12 [-5.77, 5.54]</td>
<td>-0.06 [-1.35, 1.24]</td>
<td>1.03 [-2.45, 4.51]</td>
<td>1.12 [0.93, 1.35]</td>
</tr>
<tr>
<td>Currently married</td>
<td>2.90 [0.93, 4.88]</td>
<td>0.12 [-0.27, 0.52]</td>
<td>1.45 [0.30, 2.61]</td>
<td>1.07 [1.01, 1.14]</td>
</tr>
<tr>
<td><strong>Household type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear family or single</td>
<td>2.33 [-0.01, 4.67]</td>
<td>0.16 [-0.26, 0.58]</td>
<td>1.35 [0.10, 2.61]</td>
<td>1.08 [1.01, 1.15]</td>
</tr>
<tr>
<td>Extended family</td>
<td>3.40 [0.29, 6.50]</td>
<td>-0.11 [-0.73, 0.51]</td>
<td>1.57 [-0.09, 3.23]</td>
<td>1.06 [0.97, 1.15]</td>
</tr>
<tr>
<td><strong>Socio-economic position</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low/ Middle</td>
<td>12.17 [6.10, 18.25]</td>
<td>-0.50 [-1.54, 0.53]</td>
<td>2.21 [-0.96, 5.38]</td>
<td>1.01 [0.86, 1.20]</td>
</tr>
<tr>
<td>High</td>
<td>1.36 [-0.57, 3.30]</td>
<td>0.14 [-0.25, 0.54]</td>
<td>1.37 [0.21, 2.53]</td>
<td>1.08 [1.01, 1.14]</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual / Housework</td>
<td>3.52 [-0.60, 7.65]</td>
<td>-0.04 [-0.89, 0.82]</td>
<td>1.72 [-0.59, 4.02]</td>
<td>1.08 [0.96, 1.22]</td>
</tr>
<tr>
<td>Skilled manual</td>
<td>2.12 [-0.75, 4.98]</td>
<td>0.16 [-0.32, 0.64]</td>
<td>1.79 [0.33, 3.24]</td>
<td>1.09 [1.01, 1.18]</td>
</tr>
<tr>
<td>Non-manual</td>
<td>2.68 [-0.51, 5.86]</td>
<td>0.04 [-0.52, 0.61]</td>
<td>0.93 [-0.62, 2.48]</td>
<td>1.04 [0.96, 1.13]</td>
</tr>
</tbody>
</table>

* ~ p<0.05, ** ~ p<0.01, *** ~ p<0.001 for the test of no effect modification
Web table 3 (contd.):  **Effect modification of the association between urban life years and % body fat, systolic blood pressure (SBP) and fasting insulin by selected participant characteristics: Women**

<table>
<thead>
<tr>
<th>Effect modifier</th>
<th>% Body fat. Effect of urban life-years first 10 years, per 10 years. (95% CI)</th>
<th>% Body fat. Effect of urban life-years after 10 years, per 10 years. (95% CI)</th>
<th>SBP Effect of urban life-years per 10 years (95% CI)</th>
<th>Insulin Effect of urban life-years first 10 years per 10 years (95% CI)</th>
<th>Insulin Effect of urban life-years after 10 years per 10 years (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 45</td>
<td>Age &lt; 45: 4.26 [-2.05, 6.47] 0.22 [-0.69, 1.13] 0.12 [-2.10, 2.33] 1.28 [0.89, 1.84] 0.95 [0.82, 1.10]</td>
<td>Age ≥ 45: -2.70 [-8.08, 2.69] 0.51 [-0.30, 1.31] 1.41 [-0.63, 3.45] 2.05 [0.85, 4.90] 0.90 [0.78, 1.10]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Not married: 4.41 [-1.79, 10.61] -1.26 [-2.96, 0.43] 0.47 [-1.94, 2.87] 4.53 [1.72, 11.96] 0.85 [0.65, 1.11]</td>
<td>Currently married: 3.45 [1.29, 5.61] 0.38 [-0.23, 0.99] 0.84 [-0.66, 2.35] 1.19 [0.84, 1.68] 0.93 [0.85, 1.03]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household type</td>
<td>Nuclear family or single: 1.85 [-0.39, 4.08] 0.31 [-0.32, 0.94] 0.96 [-0.56, 2.48] 1.43 [0.98, 2.06] 0.92 [0.83, 1.02]</td>
<td>Extended family: 7.61 [4.04, 11.17] -0.40 [-1.36, 0.56] 0.32 [-1.39, 2.03] 1.21 [0.68, 2.17] 0.95 [0.82, 1.12]</td>
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<td>Socio-economic position</td>
<td>Low/ Middle: 5.20 [-1.70, 12.09] -2.94 [-5.55, -0.33] -1.16 [-5.21, 2.89] 1.94 [0.65, 5.84] 1.03 [0.68, 1.56]</td>
<td>High: 3.14 [1.01, 5.27] 0.25 [-0.34, 0.83] 0.81 [-0.69, 2.31] 1.27 [0.89, 1.80] 0.92 [0.84, 1.01]</td>
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<td>Occupation</td>
<td>Manual / Housework: 3.71 [1.60, 5.81] 0.07 [-0.54, 0.68] 0.99 [-0.53, 2.51] 1.41 [1.00, 2.00] 0.93 [0.84, 1.02]</td>
<td>Skilled manual: 0.45 [-10.68, 11.59] 1.86 [-0.32, 4.04] -1.59 [-4.24, 1.05] 1.66 [0.27, 10.42] 1.10 [0.76, 1.58]</td>
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<td>Non-manual: 1.68 [-6.34, 9.70] 0.24 [-1.29, 1.77] 0.88 [-1.18, 2.94] 0.80 [0.23, 2.78] 0.92 [0.73, 1.16]</td>
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</tbody>
</table>

* ~ p<0.05, ** ~ p<0.01, *** ~ p<0.001 for the test of no effect modification