

## Supplementary Online Content

Vazir A, Claggett B, Cheng S, et al. Association of resting heart rate and temporal changes in heart rate with outcomes in participants of the Atherosclerosis Risk in Communities study. *JAMA Cardiol*. Published online January 24, 2018. doi:10.1001/jamacardio.2017.4974

**eTable 1.** Characteristics of Participants at Visit 1 Categorized by Change in Heart Rate Between Visit 1 and 2

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This supplementary material has been provided by the authors to give readers additional information about their work.

**eTable 1. Characteristics of Participants at Visit 1 Categorized by Change in Heart Rate (HR) Between Visit 1 and 2**

Categories compared using ANOVA. Participants with a greater than 10-beat increase in HR were more likely at visit 1 to have a lower HR, be on a beta-blocker, less likely to be current drinkers, and more likely to be African-American.

|                                  | >10 drop<br>n=1775 | 5-10 drop<br>n=2498 | <5 change<br>n=6528 | 5-10 rise<br>n=1992 | >10 rise<br>n=1413 | P value          |
|----------------------------------|--------------------|---------------------|---------------------|---------------------|--------------------|------------------|
| Age                              | 54 ± 6             | 54 ± 6              | 54 ± 6              | 54 ± 6              | 54 ± 6             | 0.344            |
| Male                             | 783 (44%)          | 1044 (42%)          | 2950 (45%)          | 907 (46%)           | 653 (46%)          | 0.024            |
| Black                            | <b>399 (23%)</b>   | <b>510 (20%)</b>    | <b>1470 (23%)</b>   | <b>594 (30%)</b>    | <b>531 (38%)</b>   | <b>&lt;0.001</b> |
| BMI                              | 28 ± 5             | 28 ± 5              | 27 ± 5              | 27 ± 5              | 28 ± 6             | <0.001           |
| DM                               | 233 (13%)          | 241 (10%)           | 612 (9%)            | 235 (12%)           | 229 (16%)          | <0.001           |
| Hypertension                     | 669 (38%)          | 814 (33%)           | 1960 (30%)          | 704 (36%)           | 605 (43%)          | <0.001           |
| Current smoker                   | 429 (24%)          | 630 (25%)           | 1539 (24%)          | 502 (25%)           | 387 (27%)          | 0.202            |
| Current drinkers                 | <b>1022 (58%)</b>  | <b>1473 (59%)</b>   | <b>3778 (58%)</b>   | <b>1099 (55%)</b>   | <b>706 (50%)</b>   | <b>&lt;0.001</b> |
| Systolic BP                      | 124 ± 19           | 120 ± 18            | 120 ± 18            | 121 ± 18            | 123 ± 20           | <0.001           |
| Diastolic BP                     | 76 ± 11            | 73 ± 11             | 73 ± 11             | 73 ± 11             | 75 ± 12            | <0.001           |
| Heart Rate                       | <b>76 ± 11</b>     | <b>69 ± 9</b>       | <b>65 ± 9</b>       | <b>63 ± 9</b>       | <b>62 ± 9</b>      | <b>&lt;0.001</b> |
| Creatinine                       | 1.1 ± 0.3          | 1.1 ± 0.3           | 1.1 ± 0.3           | 1.1 ± 0.2           | 1.1 ± 0.5          | <0.001           |
| AF                               | 3 (0.2%)           | 0 (0.0%)            | 2 (0.0%)            | 0 (0.0%)            | 2 (0.1%)           | 0.0362           |
| Physical activity at work        | 2.6 ± 0.7          | 2.6 ± 0.7           | 2.6 ± 0.7           | 2.7 ± 0.7           | 2.7 ± 0.7          | 0.008            |
| Sport during leisure activity    | 2.4 ± 0.8          | 2.4 ± 0.8           | 2.5 ± 0.8           | 2.5 ± 0.8           | 2.4 ± 0.8          | <0.001           |
| physical activity during leisure | 2.3 ± 0.6          | 2.4 ± 0.6           | 2.4 ± 0.6           | 2.4 ± 0.6           | 2.3 ± 0.6          | <0.001           |
| Betablocker                      | <b>163 (9%)</b>    | <b>217 (9%)</b>     | <b>640 (10%)</b>    | <b>225 (11%)</b>    | <b>255 (18%)</b>   | <b>&lt;0.001</b> |

**eTable 2. Characteristics of Participants at Visit 2 Categorized by Change in Heart Rate (HR) Between Visit 2 and 3.**

Categories compared using ANOVA. Participants with a greater than 10-beat increase in HR were more likely at visit 2 to have a lower heart rate and to be on a beta-blocker.

|                         | >10 drop<br>n=1334 | 5-10 drop<br>n=1860 | <5 change<br>n=5942 | 5-10 rise<br>n=2015 | >10 rise<br>n=1365 | P value |
|-------------------------|--------------------|---------------------|---------------------|---------------------|--------------------|---------|
| <b>Age</b>              | 57 ± 6             | 57 ± 6              | 57 ± 6              | 57 ± 6              | 57 ± 6             | 0.384   |
| <b>Male</b>             | 602(45%)           | 877(47%)            | 2646(45%)           | 869(43%)            | 577(42%)           | 0.044   |
| <b>Blacks</b>           | 422 (32%)          | 461 (25%)           | 1226 (21%)          | 391 (20%)           | 280 (21%)          | <0.001  |
| <b>DM</b>               | 259 (19%)          | 264 (14%)           | 741 (13%)           | 262 (13%)           | 222 (16%)          | <0.001  |
| <b>Hypertension</b>     | 563 (43%)          | 633 (34%)           | 1875 (32%)          | 668 (33%)           | 545 (40%)          | <0.001  |
| <b>BMI</b>              | 29 ± 6             | 28 ± 5              | 28 ± 5              | 28 ± 5              | 28 ± 5             | <0.001  |
| <b>Current smokers</b>  | 253 (19%)          | 380 (20%)           | 1186 (20%)          | 444 (22%)           | 314 (23%)          | 0.002   |
| <b>Current drinkers</b> | 671 (50%)          | 1044 (56%)          | 3507 (59%)          | 1215 (60%)          | 767 (56%)          | <0.001  |
| <b>Creatinine</b>       | 1.17 ± 0.39        | 1.17 ± 0.42         | 1.15 ± 0.34         | 1.14 ± 0.28         | 1.14 ± 0.35        | 0.032   |
| <b>Systolic BP</b>      | 124 ± 20           | 121 ± 18            | 120 ± 18            | 120 ± 18            | 123 ± 19           | <0.001  |
| <b>Diastolic BP</b>     | 74 ± 11            | 72 ± 10             | 72 ± 10             | 71 ± 10             | 73 ± 10            | <0.001  |
| <b>HR</b>               | 76 ± 10            | 69 ± 9              | 64 ± 9              | 62 ± 9              | 62 ± 9             | <0.001  |
| <b>AF</b>               | 14 (1.1%)          | 4 (0.2%)            | 13 (0.2%)           | 3 (0.1%)            | 10 (0.7%)          | <0.001  |
| <b>Betablocker</b>      | 104 (8%)           | 153 (8%)            | 552 (9%)            | 233 (12%)           | 208 (15%)          | <0.001  |

**eTable 3. Characteristics of Participants at Visit 3 Categorized by Change in Heart Rate (HR) Between Visit 3 and 4.**

Categories compared using ANOVA. Participants with a greater than 10-beat increase in HR were more likely at visit 3 to be diabetic and to have a lower HR and be on a beta-blocker.

|                  | >10 drop<br>n=1984 | 5-10 drop<br>n=2395 | <5 change<br>n=4793 | 5-10 rise<br>n=1135 | >10 rise<br>n=760 | P value |
|------------------|--------------------|---------------------|---------------------|---------------------|-------------------|---------|
| Age              | 59.90 ± 5.68       | 59.81 ± 5.67        | 59.93 ± 5.65        | 59.48 ± 5.59        | 60.21 ± 5.77      | 0.059   |
| Male             | 845(43%)           | 1038 (43%)          | 2146 (45%)          | 501 (44%)           | 374(49%)          | 0.025   |
| Black            | 344 (17.3%)        | 396 (16.5%)         | 983 (20.5%)         | 349 (30.7%)         | 260 (34.2%)       | <0.001  |
| BMI              | 28.40 ± 5.66       | 28.21 ± 5.33        | 28.36 ± 5.32        | 29.01 ± 5.63        | 29.25 ± 5.69      | <0.001  |
| DM               | 307 (15.5%)        | 261 (10.9%)         | 619 (13.0%)         | 196 (17.3%)         | 169 (22.3%)       | <0.001  |
| Hypertension     | 838 (42.3%)        | 846 (35.6%)         | 1756 (36.8%)        | 504 (44.6%)         | 397 (52.4%)       | <0.001  |
| Current Smokers  | 297 (15.0%)        | 347 (14.5%)         | 778 (16.3%)         | 236 (20.8%)         | 153 (20.2%)       | <0.001  |
| Current drinkers | 1133 (57.2%)       | 1342 (56.2%)        | 2562 (53.5%)        | 557 (49.1%)         | 327 (43.1%)       | <0.001  |
| Systolic BP      | 125.14 ± 18.52     | 123.61 ± 18.38      | 122.85 ± 17.94      | 124.97 ± 18.74      | 127.59 ± 20.59    | <0.001  |
| Diastolic BP     | 73.26 ± 10.66      | 71.66 ± 9.97        | 71.02 ± 10.02       | 71.87 ± 10.25       | 72.22 ± 11.59     | <0.001  |
| Heart rate       | 73.32 ± 9.66       | 66.47 ± 8.47        | 62.87 ± 8.80        | 61.99 ± 9.31        | 61.33 ± 9.57      | <0.001  |
| AF               | 19 (1.0%)          | 3 (0.1%)            | 11 (0.2%)           | 3 (0.3%)            | 11 (1.4%)         | <0.001  |
| Betablocker      | 163 (8.2%)         | 214 (8.9%)          | 517 (10.8%)         | 126 (11.1%)         | 127 (16.7%)       | <0.001  |

**eTable 4. Beta-Blocker Use and Effect on Relationship Between Heart Rate Covariates and All-Cause Mortality**

|                       | Use of Beta-blocker       | No beta-blocker use       | P for interaction |
|-----------------------|---------------------------|---------------------------|-------------------|
| Temporal change in HR | 1.04 (0.99-1.13); p=0.106 | 1.15 (1.12-1.18); p<0.001 | P<0.01            |
| Time-updated HR       | 1.07 (1.02-1.12); p<0.01  | 1.17 (1.14-1.19); p<0.001 | P<0.01            |
| Baseline HR           | 1.03 (0.98-1.09); p=0.170 | 1.07 (1.05-1.09); p<0.001 | P=0.206           |