GXT and CVD; initial results

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**Table** Inclusion criteria for the current study

**Question**: Should we drop the last exclusion given our focus is on all cause mortality?

| Exclusion criteria | Number of participants |
| --- | --- |
| CARDIA participants enrolled at Year 0 exam | 5,114 |
| Completed at least one graded exercise test | 5,079 |
| Not using beta blockers during graded exercise test | 5,062 |
| Alive and CVD free at Year 20 exam | 4,805 |

**Table** Participant characteristics at the Year 0 Exam.

| **Characteristic** | **Overall** | **Black Females** | **Black Males** | **White Females** | **White Males** | **p-value1** |
| --- | --- | --- | --- | --- | --- | --- |
| No. of participants | 4,781 | 1,387 | 1,040 | 1,268 | 1,086 |  |
| Testing center |  |  |  |  |  | <0.001 |
| Birmingham | 22 | 24 | 25 | 19 | 22 |  |
| Chicago | 22 | 22 | 21 | 22 | 24 |  |
| Minnesota | 28 | 21 | 26 | 31 | 32 |  |
| Oakland | 28 | 33 | 28 | 28 | 22 |  |
| Age | 24.8 (3.7) | 24.3 (3.8) | 24.0 (3.7) | 25.4 (3.4) | 25.3 (3.4) | <0.001 |
| GXT duration, seconds | 581 (183) | 428 (124) | 666 (153) | 550 (144) | 729 (147) | <0.001 |
| Education at year 20 |  |  |  |  |  | <0.001 |
| Associate's or more | 33 | 20 | 18 | 48 | 46 |  |
| Highschool/GED or less | 67 | 80 | 82 | 52 | 54 |  |
| Difficulty paying for basics |  |  |  |  |  | <0.001 |
| Not very hard | 66 | 62 | 61 | 68 | 74 |  |
| Somewhat hard | 34 | 38 | 39 | 32 | 26 |  |
| Marital status |  |  |  |  |  | <0.001 |
| Married or co-habitating | 22 | 19 | 18 | 28 | 22 |  |
| Other | 78 | 81 | 82 | 72 | 78 |  |
| Body mass index, kg/m2 | 24.4 (4.9) | 25.7 (6.4) | 24.5 (4.2) | 23.1 (4.3) | 24.3 (3.5) | <0.001 |
| Self-reported physical activity |  |  |  |  |  | <0.001 |
| Meeting guidelines | 59 | 37 | 73 | 58 | 73 |  |
| Not meeting guidelines | 41 | 63 | 27 | 42 | 27 |  |
| Self-reported health |  |  |  |  |  | <0.001 |
| Excellent or good | 90 | 85 | 89 | 94 | 94 |  |
| Fair or poor | 9.9 | 15 | 11 | 6.0 | 6.0 |  |
| Alcohol use |  |  |  |  |  | <0.001 |
| Does not drink alcohol | 14 | 21 | 15 | 9.4 | 8.0 |  |
| Drinks alcohol | 86 | 79 | 85 | 91 | 92 |  |
| Smoking status |  |  |  |  |  | <0.001 |
| Current | 30 | 31 | 36 | 27 | 25 |  |
| Former | 13 | 8.4 | 9.1 | 20 | 16 |  |
| Never smoked | 57 | 60 | 55 | 53 | 59 |  |
| *1Kruskal-Wallis rank sum test; Pearson's Chi-squared test* | | | | | | |

**Table** Participant characteristics at the Year 20 Exam.

| **Characteristic** | **Overall** | **Black Females** | **Black Males** | **White Females** | **White Males** | **p-value1** |
| --- | --- | --- | --- | --- | --- | --- |
| No. of participants | 4,631 | 1,322 | 1,006 | 1,238 | 1,065 |  |
| Testing center |  |  |  |  |  | <0.001 |
| Birmingham | 22 | 23 | 25 | 19 | 22 |  |
| Chicago | 22 | 22 | 21 | 22 | 24 |  |
| Minnesota | 28 | 22 | 26 | 32 | 32 |  |
| Oakland | 28 | 33 | 28 | 27 | 22 |  |
| Age | 44.8 (3.7) | 44.3 (3.8) | 44.0 (3.7) | 45.5 (3.4) | 45.4 (3.4) | <0.001 |
| GXT duration, seconds | 433 (160) | 299 (111) | 461 (130) | 429 (141) | 555 (135) | <0.001 |
| Education at year 20 |  |  |  |  |  | <0.001 |
| Associate's or more | 64 | 53 | 44 | 77 | 73 |  |
| Highschool/GED or less | 36 | 47 | 56 | 23 | 27 |  |
| Difficulty paying for basics |  |  |  |  |  | <0.001 |
| Not very hard | 76 | 64 | 72 | 81 | 85 |  |
| Somewhat hard | 24 | 36 | 28 | 19 | 15 |  |
| Marital status |  |  |  |  |  | <0.001 |
| Married or co-habitating | 56 | 40 | 50 | 67 | 67 |  |
| Other | 44 | 60 | 50 | 33 | 33 |  |
| Body mass index, kg/m2 | 29 (7) | 32 (8) | 29 (6) | 27 (7) | 28 (5) | <0.001 |
| Self-reported physical activity |  |  |  |  |  | <0.001 |
| Meeting guidelines | 48 | 29 | 55 | 48 | 61 |  |
| Not meeting guidelines | 52 | 71 | 45 | 52 | 39 |  |
| Self-reported health |  |  |  |  |  | <0.001 |
| Excellent or good | 90 | 83 | 87 | 94 | 94 |  |
| Fair or poor | 10 | 17 | 13 | 6.0 | 6.3 |  |
| Alcohol use |  |  |  |  |  | <0.001 |
| Does not drink alcohol | 21 | 30 | 26 | 14 | 14 |  |
| Drinks alcohol | 79 | 70 | 74 | 86 | 86 |  |
| Smoking status |  |  |  |  |  | <0.001 |
| Current | 19 | 23 | 29 | 13 | 16 |  |
| Former | 19 | 12 | 11 | 28 | 21 |  |
| Never smoked | 62 | 64 | 60 | 58 | 64 |  |
| *1Kruskal-Wallis rank sum test; Pearson's Chi-squared test* | | | | | | |

**Table**: Hazard ratio (95%) for all-cause mortality among CARDIA participants in the current analysis.

|  | **Hazard ratio (95% CI)** | | | **P-value for interaction** | |
| --- | --- | --- | --- | --- | --- |
| **Characteristic** | **Model 1** | **Model 2** | **Model 3** | **Race** | **Sex** |
| *GXT duration, Y0* | | | | | |
| ≥ 12 minutes | 1 (ref) | 1 (ref) | 1 (ref) | .03 | .39 |
| ≥ 8 to < 12 minutes | 1.60 (1.08, 2.38) | 1.50 (1.01, 2.23) | 1.47 (0.98, 2.19) | .03 | .39 |
| < 8 minutes | 2.70 (1.63, 4.48) | 2.57 (1.54, 4.30) | 2.43 (1.43, 4.12) | .03 | .39 |
| *20-year % reduction in GXT duration* | | | | | |
| < 25% decline | 1 (ref) | 1 (ref) | 1 (ref) | .07 | .74 |
| ≥ 25% to < 35% decline | 1.28 (0.88, 1.87) | 1.26 (0.84, 1.89) | 1.20 (0.81, 1.77) | .07 | .74 |
| ≥ 35% decline | 1.51 (0.93, 2.45) | 1.55 (0.83, 2.88) | 1.41 (0.82, 2.42) | .07 | .74 |

# Reproducibility

Reproducibility receipt

## [1] "2021-11-12 13:41:53 EST"

## Local: master D:/CARDIA - GXT and CVD  
## Remote: master @ origin (https://github.com/bcjaeger/CARDIA---GXT-and-CVD.git)  
## Head: [453e828] 2021-09-23: Initial commit

## R version 4.1.1 (2021-08-10)  
## Platform: x86\_64-w64-mingw32/x64 (64-bit)  
## Running under: Windows 10 x64 (build 19043)  
##   
## Matrix products: default  
##   
## locale:  
## [1] LC\_COLLATE=English\_U.S. Virgin Islands.1252   
## [2] LC\_CTYPE=English\_U.S. Virgin Islands.1252   
## [3] LC\_MONETARY=English\_U.S. Virgin Islands.1252  
## [4] LC\_NUMERIC=C   
## [5] LC\_TIME=English\_U.S. Virgin Islands.1252   
##   
## attached base packages:  
## [1] stats graphics grDevices utils datasets methods base   
##   
## other attached packages:  
## [1] gtsummary\_1.5.0 table.glue\_0.0.2 mitml\_0.4-3 survminer\_0.4.9   
## [5] ggpubr\_0.4.0 cmprsk\_2.2-10 survival\_3.2-11 recipes\_0.1.17   
## [9] miceRanger\_1.5.0 lme4\_1.1-27.1 Matrix\_1.3-4 haven\_2.4.3   
## [13] tidylog\_1.0.2 forcats\_0.5.1 stringr\_1.4.0 dplyr\_1.0.7   
## [17] purrr\_0.3.4 readr\_2.0.2 tidyr\_1.1.4 tibble\_3.1.5   
## [21] ggplot2\_3.3.5 tidyverse\_1.3.1 flextable\_0.6.9 tarchetypes\_0.3.2  
## [25] targets\_0.8.1 dotenv\_1.0.3 conflicted\_1.0.4   
##   
## loaded via a namespace (and not attached):  
## [1] readxl\_1.3.1 uuid\_1.0-2 backports\_1.3.0 corrplot\_0.90   
## [5] systemfonts\_1.0.3 igraph\_1.2.7 splines\_4.1.1 listenv\_0.8.0   
## [9] digest\_0.6.28 foreach\_1.5.1 htmltools\_0.5.2 fansi\_0.5.0   
## [13] memoise\_2.0.0 magrittr\_2.0.1 tzdb\_0.2.0 openxlsx\_4.2.4   
## [17] globals\_0.14.0 modelr\_0.1.8 gower\_0.2.2 officer\_0.4.0   
## [21] colorspace\_2.0-2 rvest\_1.0.2 pan\_1.6 xfun\_0.27   
## [25] callr\_3.7.0 crayon\_1.4.1 jsonlite\_1.7.2 officedown\_0.2.2   
## [29] Exact\_3.0 zoo\_1.8-9 iterators\_1.0.13 glue\_1.4.2   
## [33] rvg\_0.2.5 gtable\_0.3.0 ipred\_0.9-12 car\_3.0-11   
## [37] future.apply\_1.8.1 jomo\_2.7-2 abind\_1.4-5 scales\_1.1.1   
## [41] mvtnorm\_1.1-3 DBI\_1.1.1 rstatix\_0.7.0 Rcpp\_1.0.7   
## [45] xtable\_1.8-4 foreign\_0.8-81 proxy\_0.4-26 km.ci\_0.5-2   
## [49] clisymbols\_1.2.0 lava\_1.6.10 prodlim\_2019.11.13 httr\_1.4.2   
## [53] FNN\_1.1.3 ellipsis\_0.3.2 pkgconfig\_2.0.3 nnet\_7.3-16   
## [57] dbplyr\_2.1.1 utf8\_1.2.2 tidyselect\_1.1.1 rlang\_0.4.12   
## [61] munsell\_0.5.0 cellranger\_1.1.0 tools\_4.1.1 cachem\_1.0.6   
## [65] cli\_3.0.1 generics\_0.1.1 ranger\_0.13.1 broom\_0.7.9   
## [69] evaluate\_0.14 fastmap\_1.1.0 yaml\_2.2.1 processx\_3.5.2   
## [73] knitr\_1.36 fs\_1.5.0 zip\_2.2.0 survMisc\_0.5.5   
## [77] rootSolve\_1.8.2.3 future\_1.22.1 nlme\_3.1-152 xml2\_1.3.2   
## [81] compiler\_4.1.1 rstudioapi\_0.13 curl\_4.3.2 e1071\_1.7-9   
## [85] ggsignif\_0.6.3 gt\_0.3.1 reprex\_2.0.1 broom.helpers\_1.4.0  
## [89] DescTools\_0.99.43 stringi\_1.7.5 ps\_1.6.0 gdtools\_0.2.3   
## [93] lattice\_0.20-44 nloptr\_1.2.2.2 KMsurv\_0.1-5 vctrs\_0.3.8   
## [97] pillar\_1.6.4 lifecycle\_1.0.1 data.table\_1.14.2 lmom\_2.8   
## [101] R6\_2.5.1 gridExtra\_2.3 rio\_0.5.27 parallelly\_1.28.1   
## [105] gld\_2.6.2 codetools\_0.2-18 boot\_1.3-28 MASS\_7.3-54   
## [109] assertthat\_0.2.1 withr\_2.4.2 expm\_0.999-6 parallel\_4.1.1   
## [113] hms\_1.1.1 grid\_4.1.1 rpart\_4.1-15 timeDate\_3043.102   
## [117] class\_7.3-19 minqa\_1.2.4 rmarkdown\_2.11 carData\_3.0-4   
## [121] git2r\_0.28.0 lubridate\_1.8.0 base64enc\_0.1-3