Using this model to get initial results

UPDATES: FIXED immortal time bias, CHECKED performance of models and settled on LINEAR for PA VOLUME \*AND\* INTENSITY (coheres reasonably well with previous results really despite their approach…) - Based on AIC/BIC

**Table 1: Overview of PA Volume Results for White British Ancestry**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Genetic Risk** | **Physical Activity Risk (Lower Risk = MORE Physical Activity)** | | | |
| *20th Percentile* | *40th Percentile* | *60th Percentile* | *80th Percentile* |
| *20th Percentile* | 1 (Reference) | 1.12 (95% CI: 1.08-1.16) | 1.22 (95% CI: 1.14-1.30) | 1.33 (95% CI: 1.21-1.46) |
| *40th Percentile* | 1.26 (95% CI: 1.22-1.30) | 1.41 (95% CI: 1.34-1.48) | 1.53 (95% CI: 1.42-1.65) | 1.68 (95% CI: 1.52-1.85) |
| *60th Percentile* | 1.54 (95% CI: 1.45-1.63) | 1.72 (95% CI: 1.60-1.84) | 1.87 (95% CI: 1.71-2.04) | 2.05 (95% CI: 1.83-2.29) |
| *80th Percentile* | 1.95 (95% CI: 1.77-2.13) | 2.17 (95% CI: 1.97-2.40) | 2.37 (95% CI: 2.11-2.65) | 2.59 (95% CI: 2.27-2.95) |

As opposed to my results that failed to correct for immortal time bias, the relationship between physical activity volume and incident CAD is extremely strong in these results. A person at the 80th percentile of physical activity and the 20th percentile of genetic risk faces a 33% greater hazard of incident CAD than their counterpart at the 20th percentile of physical activity. The increased hazard from a lack of physical activity becomes greater at higher genetic risk groups relative to the reference group. While genetic risk still appears to exhibit a stronger association with incident CAD than physical activity volume, PA volume increases hazard by 1/3 to ½ has much as genetic risk does - a much closer association than in the original results. While PA volume and genetic risk each have important independent associations with incident CAD hazard, their combined association is even more powerful. At the 80th percentile of risk for PA volume and genetic risk, an individual is at a 159% greater risk of incident CAD than an individual in the 20th percentile of risk in both categories.

REPEATING PROCESS FOR PA INTENSITY

\*ALSO\* CONCLUDED THAT LINEAR WAS BEST - But ALSO did NOT see interaction effects across distribution… SO modeling MVPA CONTROLLING for PA (again - surprisingly close to previous results…)

PA VOLUME - becomes insignificant when % MVPA enters the model…

**Table 2: Overview of PA Intensity (% MVPA) Results for White British Ancestry**

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| **Genetic Risk** | **% MVPA Risk (Lower Risk = MORE Physical Activity)** | | | |
| *20th Percentile* | *40th Percentile* | *60th Percentile* | *80th Percentile* |
| *20th Percentile* | 1 (Reference) | 1.15 (95% CI: 1.09-1.20) | 1.29 (95% CI: 1.18-1.41) | 1.48 (95% CI: 1.29-1.69) |
| *40th Percentile* | 1.26 (95% CI: 1.22-1.30) | 1.45 (95% CI: 1.37-1.53) | 1.63 (95% CI: 1.48-1.79) | 1.86 (95% CI: 1.62-2.14) |
| *60th Percentile* | 1.54 (95% CI: 1.45-1.63) | 1.77 (95% CI: 1.64-1.91) | 1.99 (95% CI: 1.79-2.21) | 2.27 (95% CI: 1.96-2.63) |
| *80th Percentile* | 1.95 (95% CI: 1.77-2.13) | 2.24 (95% CI: 2.01-2.48) | 2.52 (95% CI: 2.21-2.86) | 2.88 (95% CI: 2.44-3.39) |

In this analysis, PA volume from earlier is kept in the regression as a control variable and the percent of total physical activity from moderate to vigorous physical activity (% MVPA) is treated as the primary physical activity exposure. The results align well with the previous analysis but demonstrate that physical activity intensity has an even stronger association with incident CAD than does physical activity volume alone. Specifically, an individual at the 80th percentile of % MVPA risk and 20th percentile of genetic risk has a 48% greater hazard of incident CAD than an individual at the 20th percentile of % MVPA risk. The combined impact of high genetic predisposition to CAD and little % MVPA is especially troubling, as an individual at the 80th percentile of both of these categories faces a 188% greater hazard of incident CAD than an individual at the 20th percentile.

I next try to produce a visual representation of the results from Table 1 below. I will surely use a very similar figure in the actual paper, although I’d like to improve how these figures look stacked.

**Figure 1: Forest Plot of Genetic and Overall PA and Risk of Incident CAD**

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| --- |
| ***20th Percentile of PA vs 40th Percentile of PA***  Chart, box and whisker chart  Description automatically generated |
| ***20th Percentile of PA vs 60th Percentile of PA***  Chart, box and whisker chart  Description automatically generated |
| ***20th Percentile of PA vs 80th Percentile of PA***  Chart, box and whisker chart  Description automatically generated |