Figure 1: Prevalence and predictive power of "poor" self-rated health up to 16 years prior to death, by age group (smoothed exponential trendline)

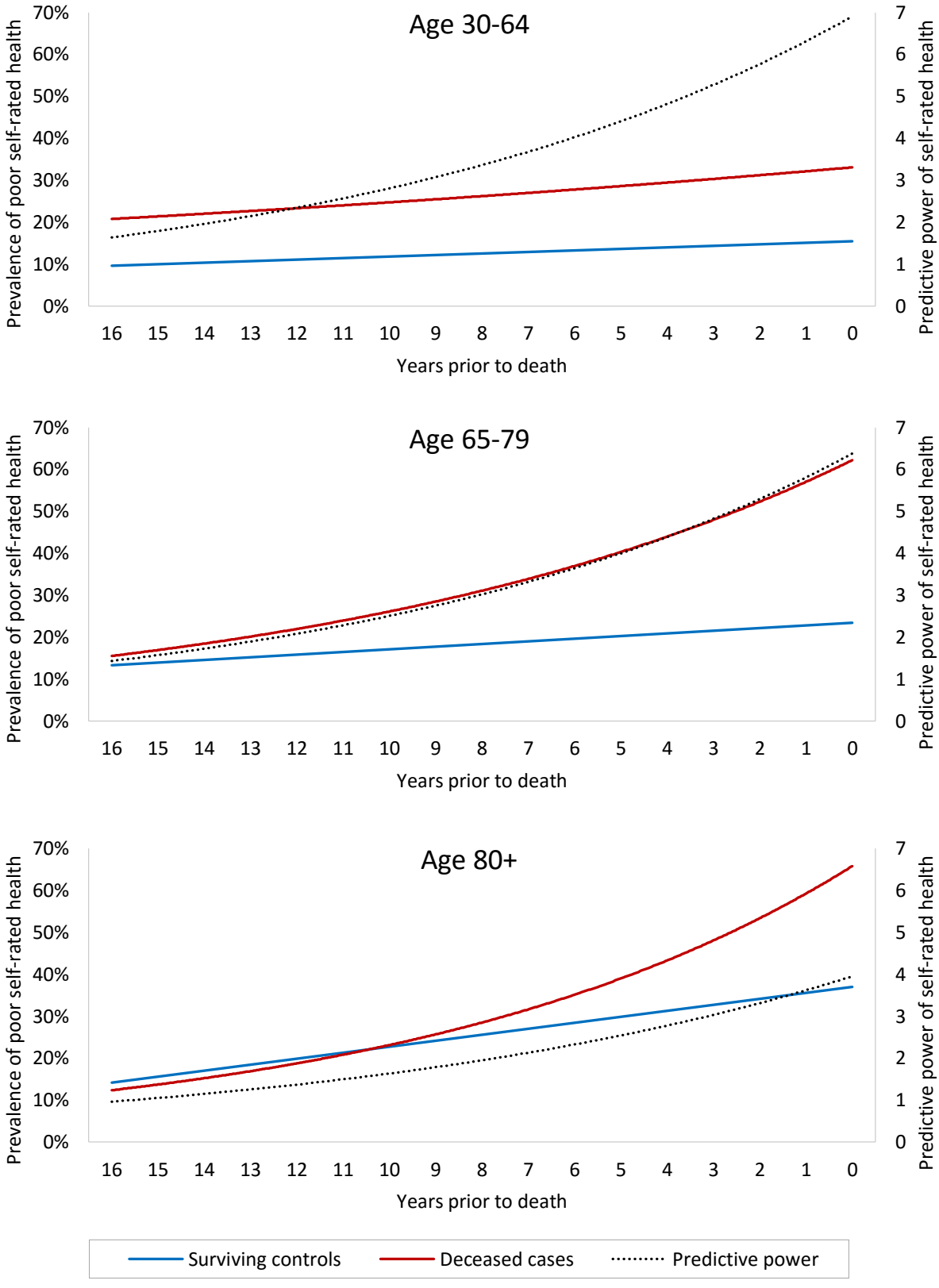
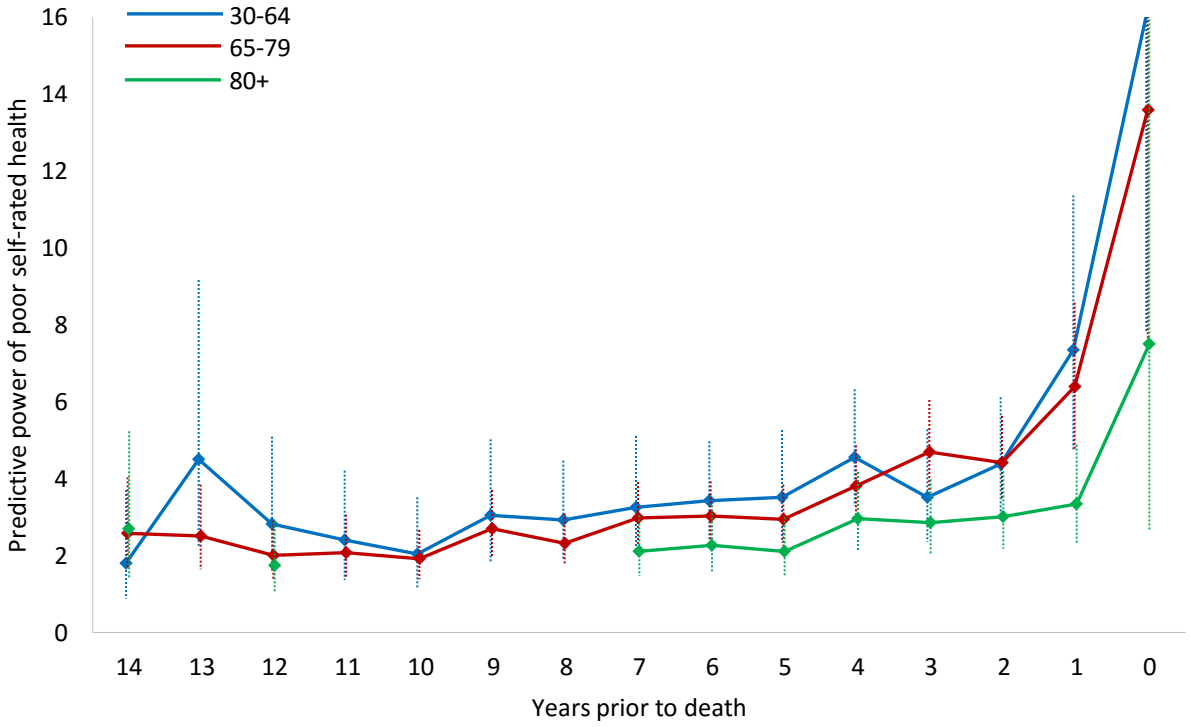


Figure 1 shows that the prevalence of poor health among survivors rises gradually over time as a function of increasing age, which is expected. Poor health among deceased cases begins higher, and rises faster as death approaches. The widening gap in poor health reports between deceased cases and matched surviving controls suggests an increasing predictive power of poor health for mortality over time, which is indeed the case, shown by the black dotted line. Although the trajectories of poor health get higher with age, its predictive power for mortality declines.

In order to directly compare predictive power across the age groups, Figure 2 displays the predictive power trajectories for each of the three age groups, showing the raw data points on which the smoothed exponential trendlines from Figure 1 were calculated. Each data point represents a relative risk ratio for reporting "poor" health in each year prior to death, calculated from a fully-adjusted GEE model. Only statistically significant point estimates are included, so only the last 14 (not 16) years prior to death are shown, and some point estimates are missing for the highest (80+) age group.

Figure 2: Predictive power of poor self-rated health by age group in the last 14 years prior to death: relative risk of reporting "poor" health for deceased cases versus surviving controls, fully-adjusted GEE models (raw data points with 95% CI)



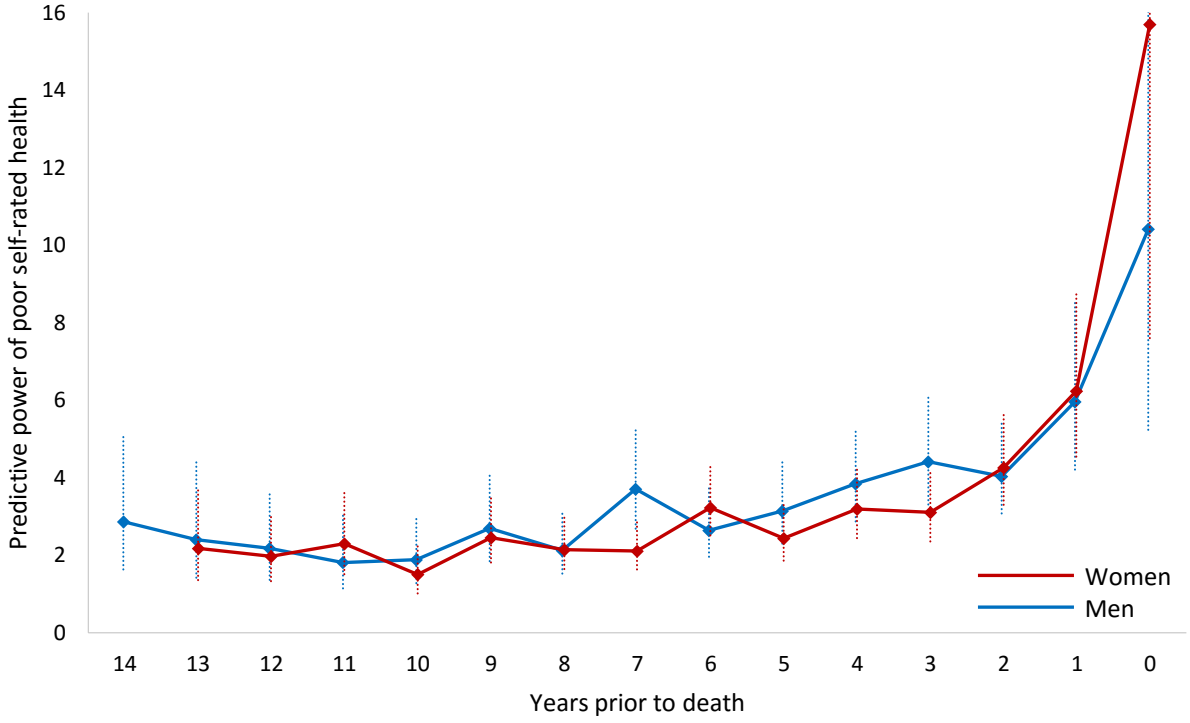
The trajectories of predictive power in the last 14 years prior to death in Figure 2 show more clearly the gradient in predictive power by age. As hypothesized, we see increased predictive power among the younger age groups (30-64 and 65-79), and diminished predictive power

among the oldest group (80+). The predictive power estimates for the younger two age groups are not statistically distinguishable (falling within each other's 95% confidence interval), whereas predictive power is significantly lower for the oldest 80+ age group within 7 years proximity to death.

*The moderating effect of **sex** for predictive power*

Figure 3 reports the predictive power trajectories for women (red) and men (blue). Data points represent predictive power estimates for the relative risk of reporting "poor" health in each year prior to death, calculated from a fully-adjusted GEE model. Only statistically significant point estimates are included.

Figure 3: Predictive power of poor self-rated health by sex in the last 14 years prior to death: relative risk of reporting "poor" health for deceased cases versus surviving controls, fully-adjusted GEE models (raw data points with 95% CI)



Both sexes show statistically significant predictive power for mortality at all observations up to 14 years prior to death, and increasing predictive power as death approaches. Figure 3 offers no solution to the gender paradox; the trajectories of the predictive power of self-rated health by sex are statistically indistinguishable. However, it is possible that age and sex interact differently to affect the predictive power of self-rated health. Therefore, Figure 4 shows the predictive power trajectory by age group for each sex.

Figure 4: Predictive power of poor self-rated health by sex and age group in the last 14 years prior to death: relative risk of reporting "poor" health for deceased cases versus surviving controls, fully-adjusted GEE models (point estimates with 95% CI high/low lines)

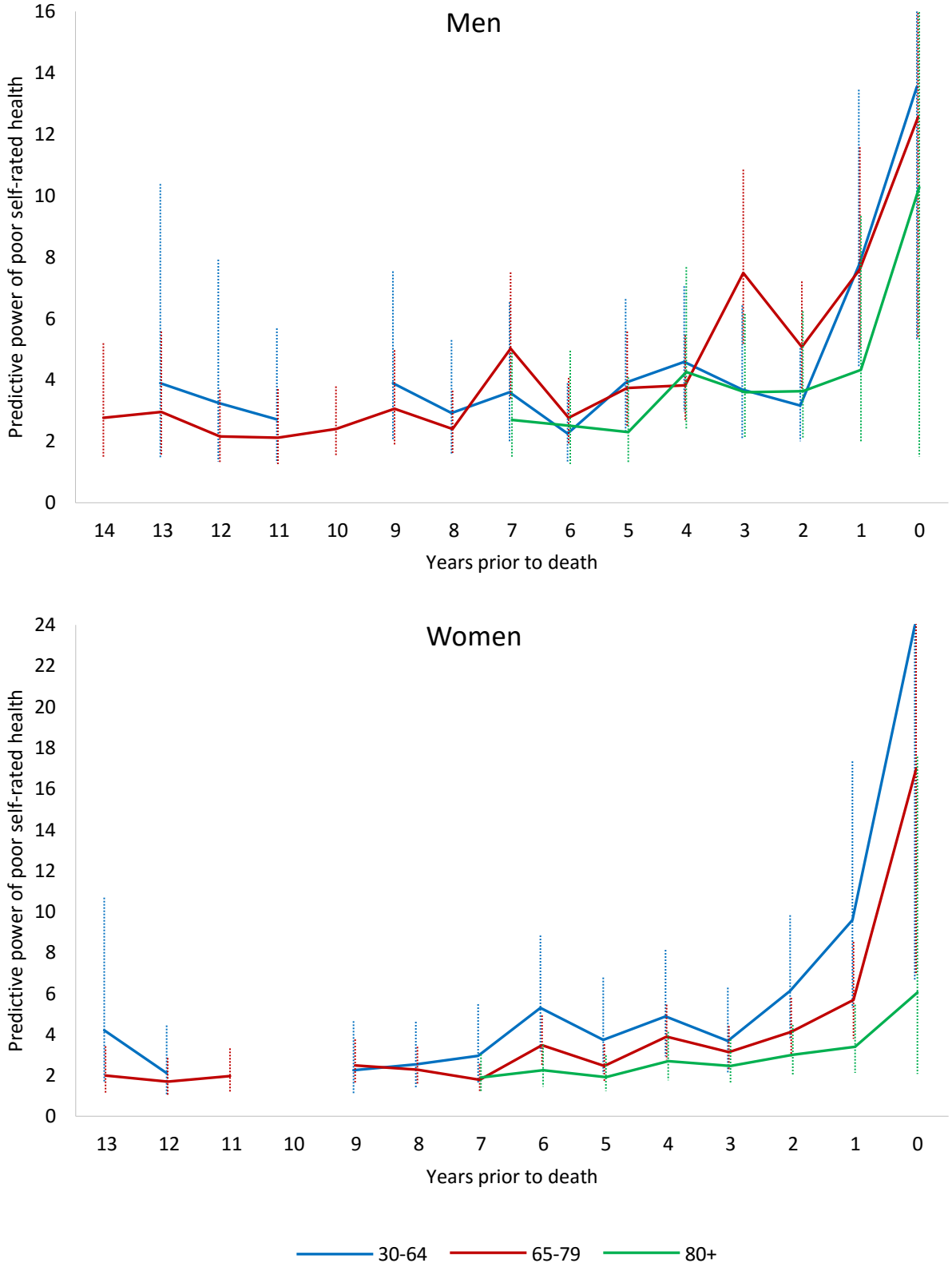


Figure 4 shows that there is no discernable gradient in the trajectories of predictive power by age group among men. Except for a few anomalous observations, men's predictive power trajectories for all ages fall within each other's confidence intervals. Women's predictive power trajectories, on the other hand, show a consistently ordered gradient according to the initial hypothesis: reduced predictive power with increasing age. Among women, the youngest (30-64) age group is distinguishable from the middle group (65-79) at about half the observations. The oldest (80+) age group is distinguishable from both younger age groups (30-64 and 65-79) at most observations for which complete data are available.

*The moderating effect of **education** for predictive power*

Figure 5 reports the population prevalence of poor self-rated health among deceased cases and surviving controls for respondents of each level of education. Among both deceased cases and surviving controls, the health gradient by education in Figure 5 is in the expected direction, with increasing education associated with lower rates of poor health. The ratio in poor health between deceased cases and surviving controls forms the basis for predictive power. However, the ratios in Figure 5 are simple descriptive proportions. Figure 6, on the other hand, reports the relative risk ratio point estimates for reporting "poor" health between deceased cases and surviving controls for each education group up to 14 years prior to death, calculated from fully-adjusted GEE models controlling for sociodemographic, health behaviours, and diagnosed diseases.

Figure 5: Prevalence of poor self-rated health by level of education, deceased cases and surviving controls

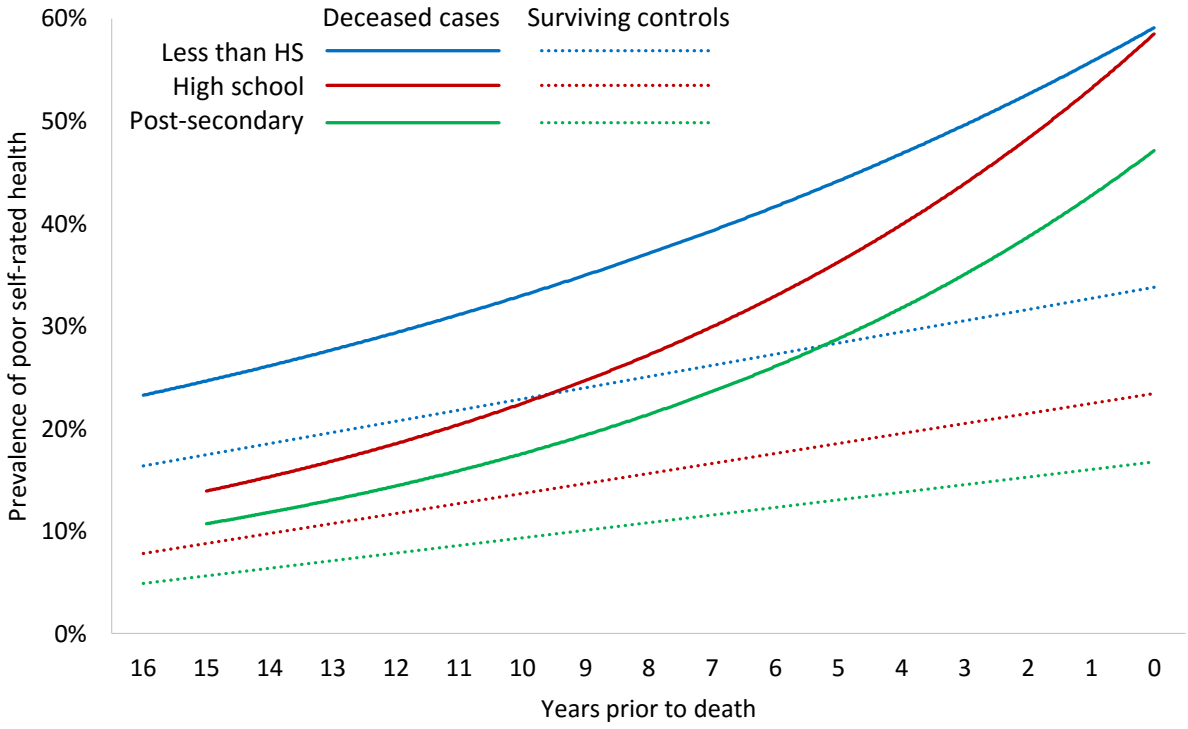
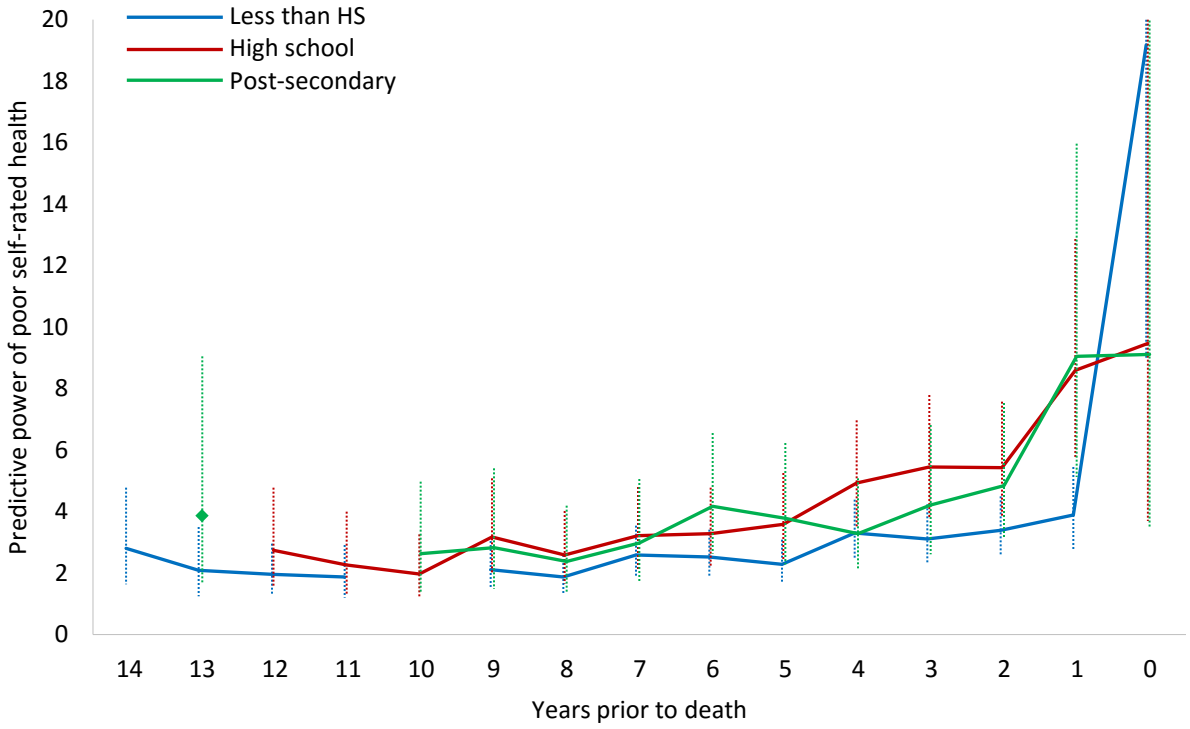


Figure 6: Predictive power of poor self-rated health by education in the last 14 years prior to death: relative risk of reporting "poor" health for deceased cases versus surviving controls, fully-adjusted GEE models (raw data points with 95% CI)



The results in Figure 6 fail to show any discernable gradient in predictive power according to education level. Not only are the predictive power trajectories by education level statistically indistinguishable from each other, the trajectory for respondents with the highest level of education (post-secondary) is lower than that of high-school educated respondents at many observations. Like with age group, we tested sex differences in predictive power by educational group (not shown), and found that neither sex showed the hypothesized gradient in predictive power by education level.

The evidence for the moderating effect of education for predictive power fails to support the hypothesis of increasing predictive power for mortality with increasing education gradient. Neither did disaggregating the education gradients by sex show that the hypothesis held for men or women. The analysis now turns to a second operationalization of SES, to examine the effect of sex-specific ***income*** tertile on the predictive power of self-rated health.

*The moderating effect of **income** for predictive power*

Figure 7 reports the population-average prevalence of poor self-rated health among deceased cases and surviving controls according to sex-specific income tertile up to 16 years prior to death. Like with education, the gradient in poor self-rated health is in the expected direction, among both deceased cases and surviving controls: the lowest-income respondents report the worst health, and the highest-income respondents the best. Figure 7 shows unadjusted mean

differences, whereas Figure 8 reports the relative risk of reporting poor health calculated from multivariate GEE models controlling for sociodemographic, health behaviours, and diagnosed diseases.

Figure 7: Prevalence of self-rated poor health by sex-specific income tertile in the last 16 years prior to death, deceased cases and surviving controls (exponential regression trendline.)

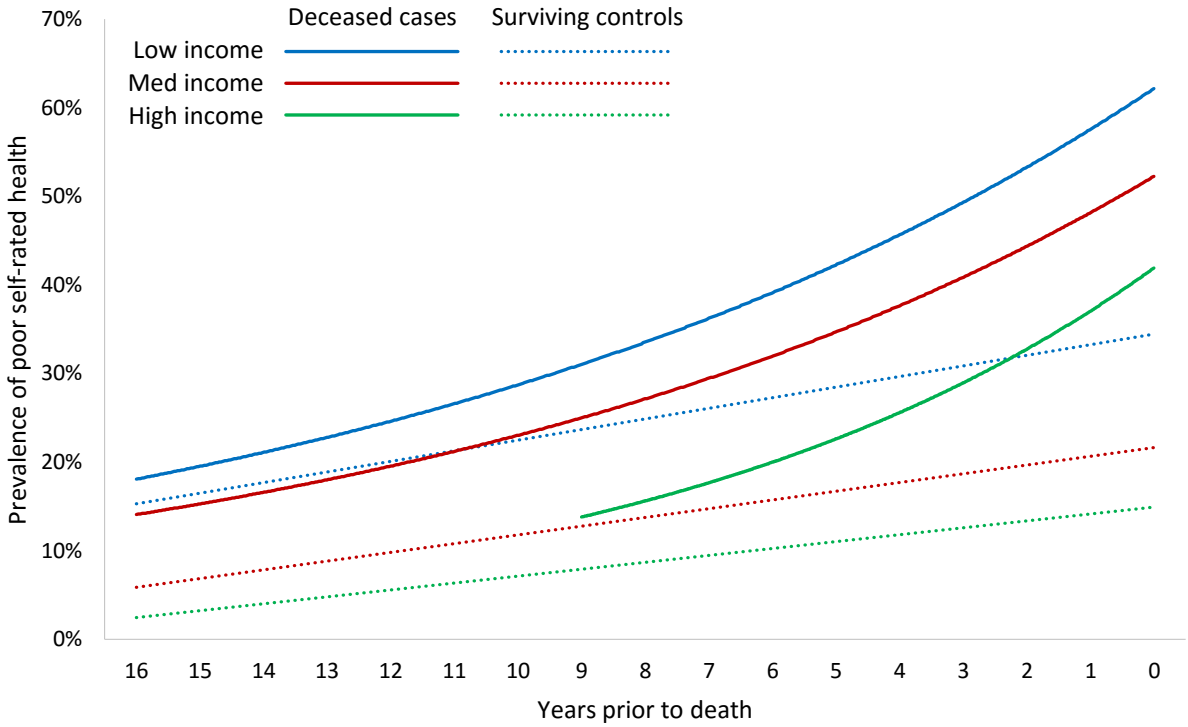
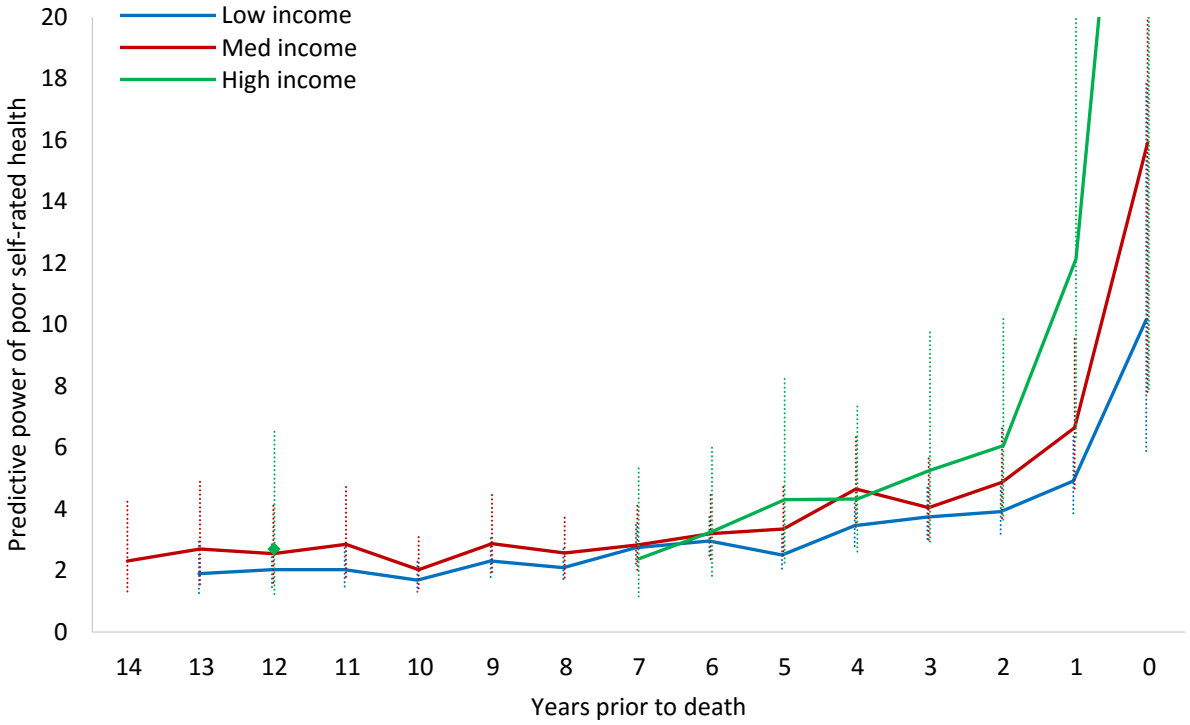


Figure 8: Predictive power of poor self-rated health by sex-specific income tertile in the last 14 years prior to death: relative risk of reporting "poor" health for deceased cases versus surviving controls, fully-adjusted GEE models (raw data points with 95% CI)



Unlike with education (in Figure 6), income shows a more consistent positive gradient in predictive power in Figure 8, particularly in the last 3 years prior to death. However, only the highest and lowest income tertiles are statistically distinguishable from each other at most observations. Like with age and education before, we decomposed the income tertiles by sex (not shown), and find that neither sex is contributing disproportionately to the apparent income gradient in predictive power.

Discussion

Self-rated health predicts mortality in Canada up to 14 years prior to death among all ages, sexes, and socioeconomic classes, and the predictive power of self-rated health increases exponentially with proximity to death.

When undifferentiated by sex, there appears to be a declining gradient in the predictive power of self-rated health in Canada by increasing age group (Figure 2). However, the predictive power trajectories among the younger two age groups (30-64; 65-79) are not statistically distinguishable. The hypothesis for a clear age gradient could be more adequately supported by a replication using a larger sample to more conclusively distinguish the trajectories between younger age groups. The evidence in this study shows that the larger decline in predictive power