Online Appendix

Mammograms and Mortality: How Has the Evidence Evolved?

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Replication of Published Results

The last column of the second panel of Table A.1 replicates published results in Miller et al. (2014), which considers evidence up to the 2005 calendar year, as opposed to 20 years after enrollment. The results are qualitatively similar.

Table A.1: Excess Breast Cancer Mortality and All-Cause Mortality Rates in Intervention 20 Years After Enrollment Versus Up to 2005 Calendar Year in the Canadian National Breast Screening Study

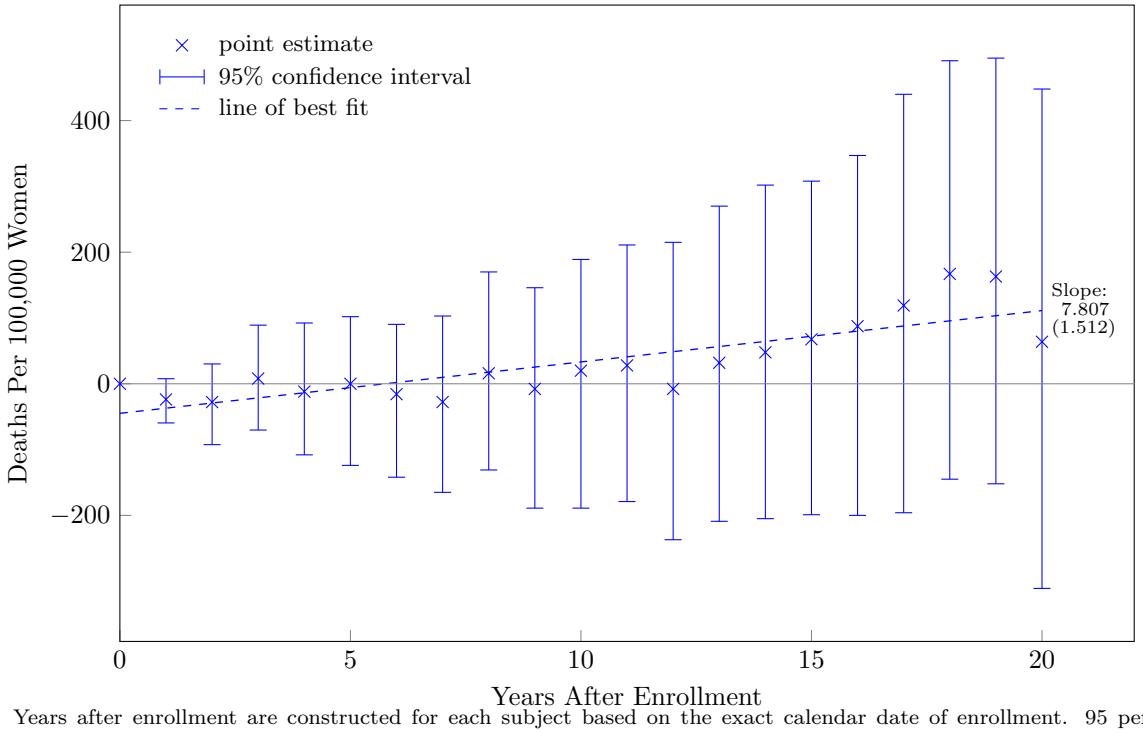
	(1) Intervention	(2) Control	(1) – (2) Intervention - Control	(1)/(2) Relative Risk
		20 Years After Enrollment		
Breast Cancer Deaths (per 100,000)	904	924	-20 (65)	0.98 (0.07)
All-Cause Deaths (per 100,000)	7,969	7,880	89 (175)	1.01 (0.02)
		Up to 2005 Calendar Year		
Breast Cancer Deaths (per 100,000)	1,113	1,124	-12 (71)	0.99 (0.06)
All-Cause Deaths (per 100,000)	10,660	10,439	221 (195)	1.02 (0.02)
N	44,925	44,910		

Note. Years after enrollment are constructed for each subject based on the exact calendar date of enrollment. Standard errors in parentheses are calculated as the standard deviation of the point estimates obtained in 200 bootstrap samples. Subjects aged 40-59 at enrollment are included. Some differences between statistics might not appear internally consistent because of rounding.

Separate Trends for Women in Their 40s and 50s

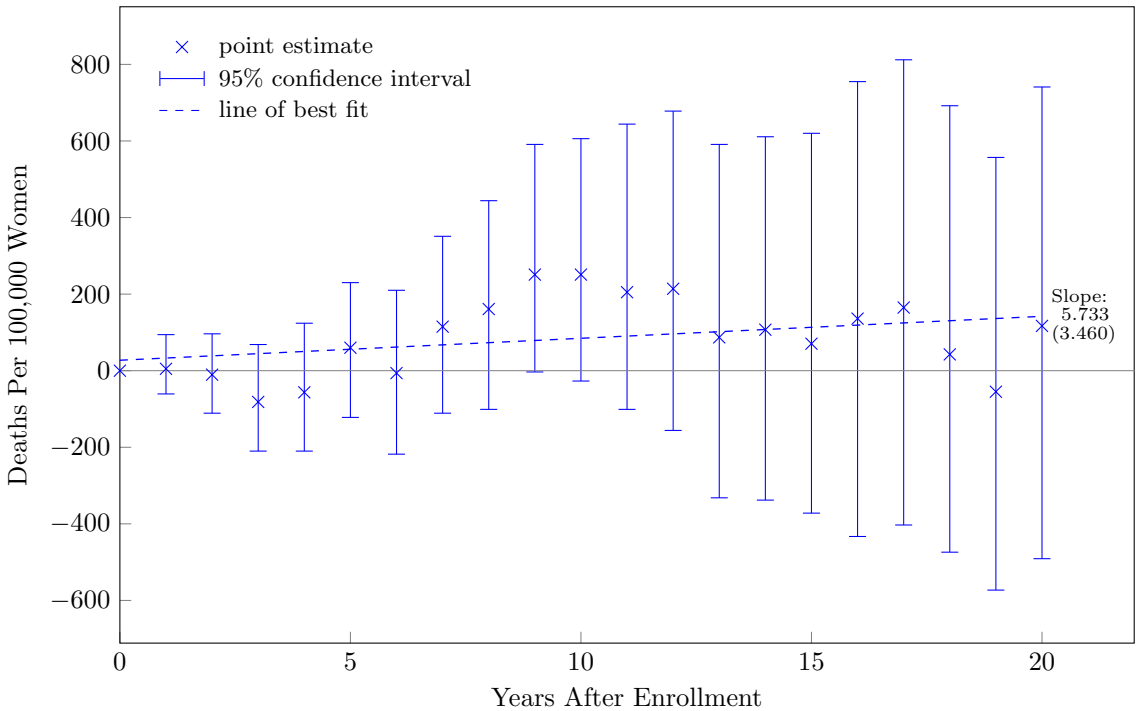
Figures A.1 and A.2 present separate trends for women in their 40s and 50s at enrollment. Despite losses in statistical power that result from dividing the sample, the magnitude of the time trend is similar within each age group. With each additional year of follow-up, mammography assignment yields 8 additional excess deaths per 100,000 women aged 40-49 and 6 additional excess deaths per 100,000 women aged 50-59.

Figure A.1: Trend in Excess All-Cause Mortality Rate in Intervention for Women Aged 40-49 at Enrollment in the Canadian National Breast Screening Study



Note. Years after enrollment are constructed for each subject based on the exact calendar date of enrollment. 95 percent confidence intervals in each year after enrollment are obtained from the same 200 bootstrap samples. The standard error on the slope of the line of best fit is calculated from a panel regression, block bootstrapped by year after enrollment, which takes into account that the point estimates and the line of best fit are estimated. Subjects aged 40-49 at enrollment are included.

Figure A.2: Trend in Excess All-Cause Mortality Rate in Intervention for Women Aged 50-59 at Enrollment in the Canadian National Breast Screening Study

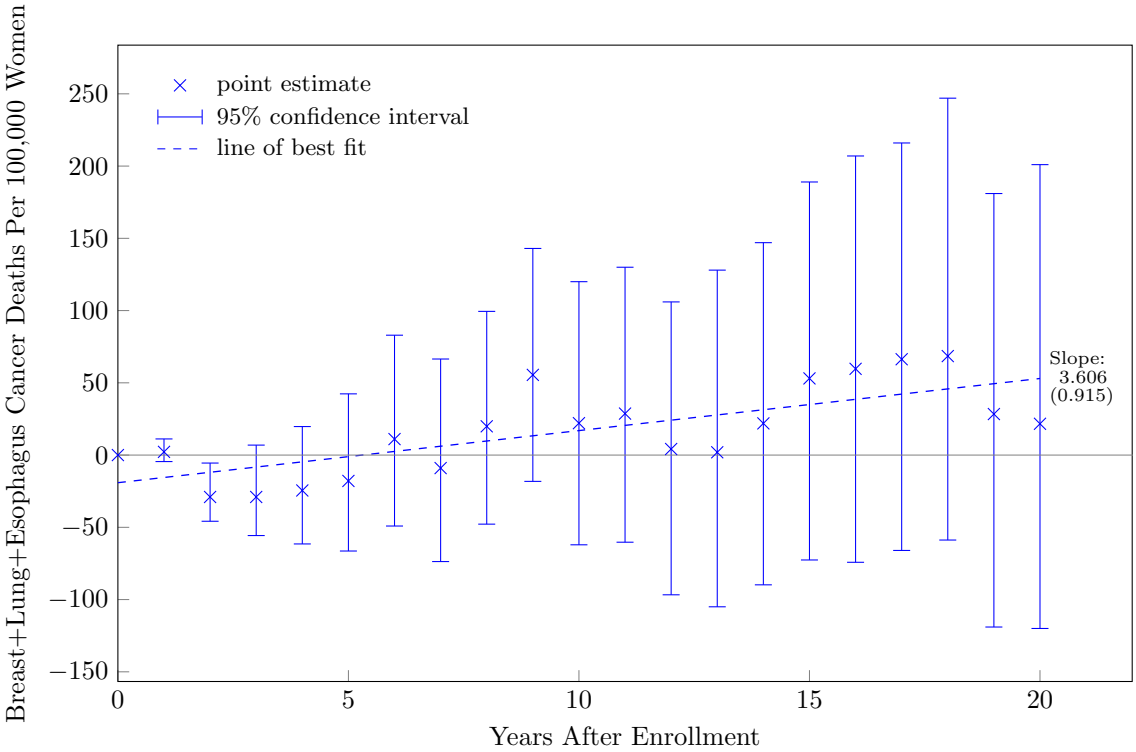


Note. Years after enrollment are constructed for each subject based on the exact calendar date of enrollment. 95 percent confidence intervals in each year after enrollment are obtained from the same 200 bootstrap samples. The standard error on the slope of the line of best fit is calculated from a panel regression, block bootstrapped by year after enrollment, which takes into account that the point estimates and the line of best fit are estimated. Subjects aged 50-59 at enrollment are included.

Trend in Mortality from Breast, Lung, and Esophageal Cancer Combined

Figure A.3 shows that there is a positive, statistically significant trend in excess deaths due to breast, lung, and esophageal cancers combined: with each additional year of follow-up after enrollment, there are an additional 3.6 excess deaths per 100,000 women in intervention relative to control, which explains almost half of the trend in all-cause mortality depicted in Figure 3.

Figure A.3: Trend in Excess Mortality Rate from Breast, Lung, and Esophageal Cancers Combined in Intervention in the Canadian National Breast Screening Study



Note. Years after enrollment are constructed for each subject based on the exact calendar date of enrollment. 95 percent confidence intervals in each year after enrollment are obtained from the same 200 bootstrap samples. Lung cancer mortality is defined using ICD-9 code 162 for subjects who died before 2000 and using ICD-10 codes C33-34 for subjects who died from 2000 onward. Esophageal cancer mortality is defined using ICD-9 code 150 for subjects who died before 2000 and using ICD-10 code C15 for subjects who died from 2000 onward. The standard error on the slope of the line of best fit, in parentheses, is calculated from a panel regression, block bootstrapped by year after enrollment, which takes into account that the point estimates and the line of best fit are estimated. Subjects aged 40-59 at enrollment are included.

References

Miller, A. B., C. Wall, C. J. Baines, P. Sun, T. To, and S. A. Narod (2014). Twenty five year follow-up for breast cancer incidence and mortality of the Canadian National Breast Screening Study: Randomised screening trial. *British Medical Journal 348*.