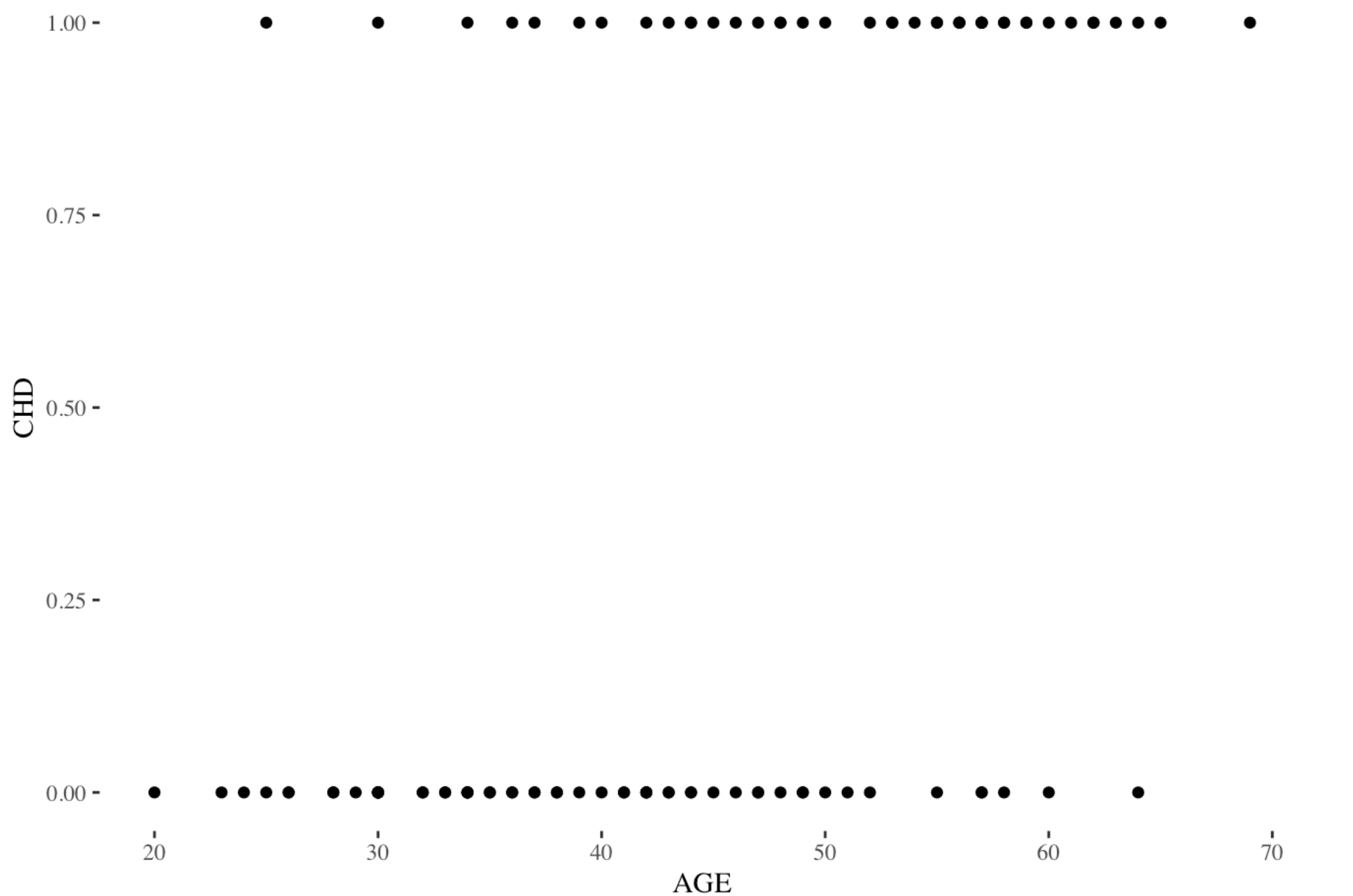


PlotLogisticData

Richard Careaga

5/14/2019



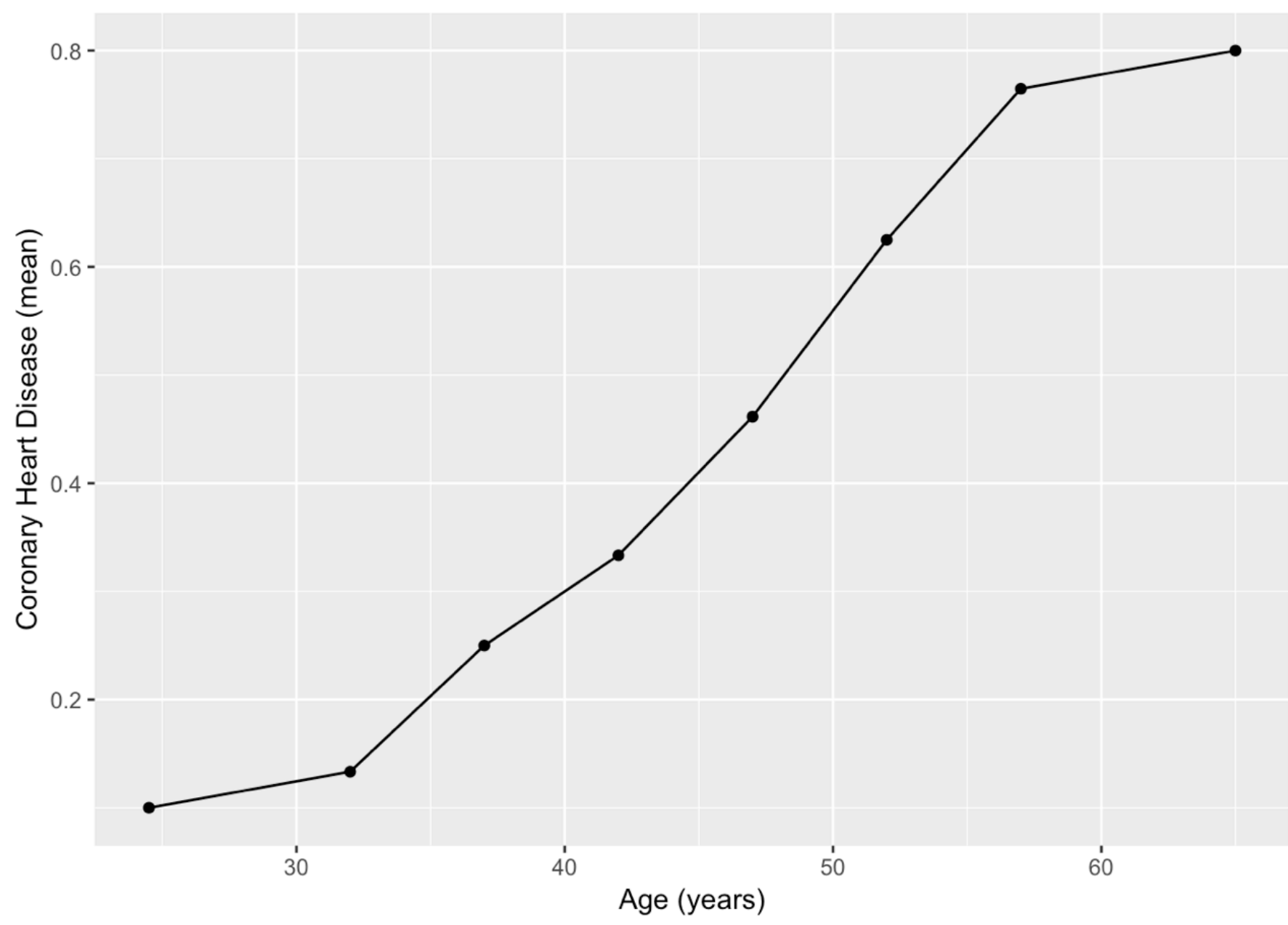
CHD vs. Age

Data from Table 1.1. Replicate binned summary from Table 1.2

AgeGroup	n	Absent	Present	Mean
20-29	10	9	1	0.1
30-34	15	13	2	0.133
35-39	12	9	3	0.25
40-44	15	10	5	0.333
45-49	13	7	6	0.462

50-54	8	3	5	0.625
55-59	17	4	13	0.765
60-70	10	2	8	0.8

Replicate line graph used in place of scattergraph



ICU data from exercises

Logistic equation of vital status (STA) on AGE at discharge

The conditional mean of Y (SNA) given x (AGE) is

$$E(Y|X)$$

which is conventionally expressed as

$$\pi(x)$$

The form of the logistic model of $\pi(x)$ is

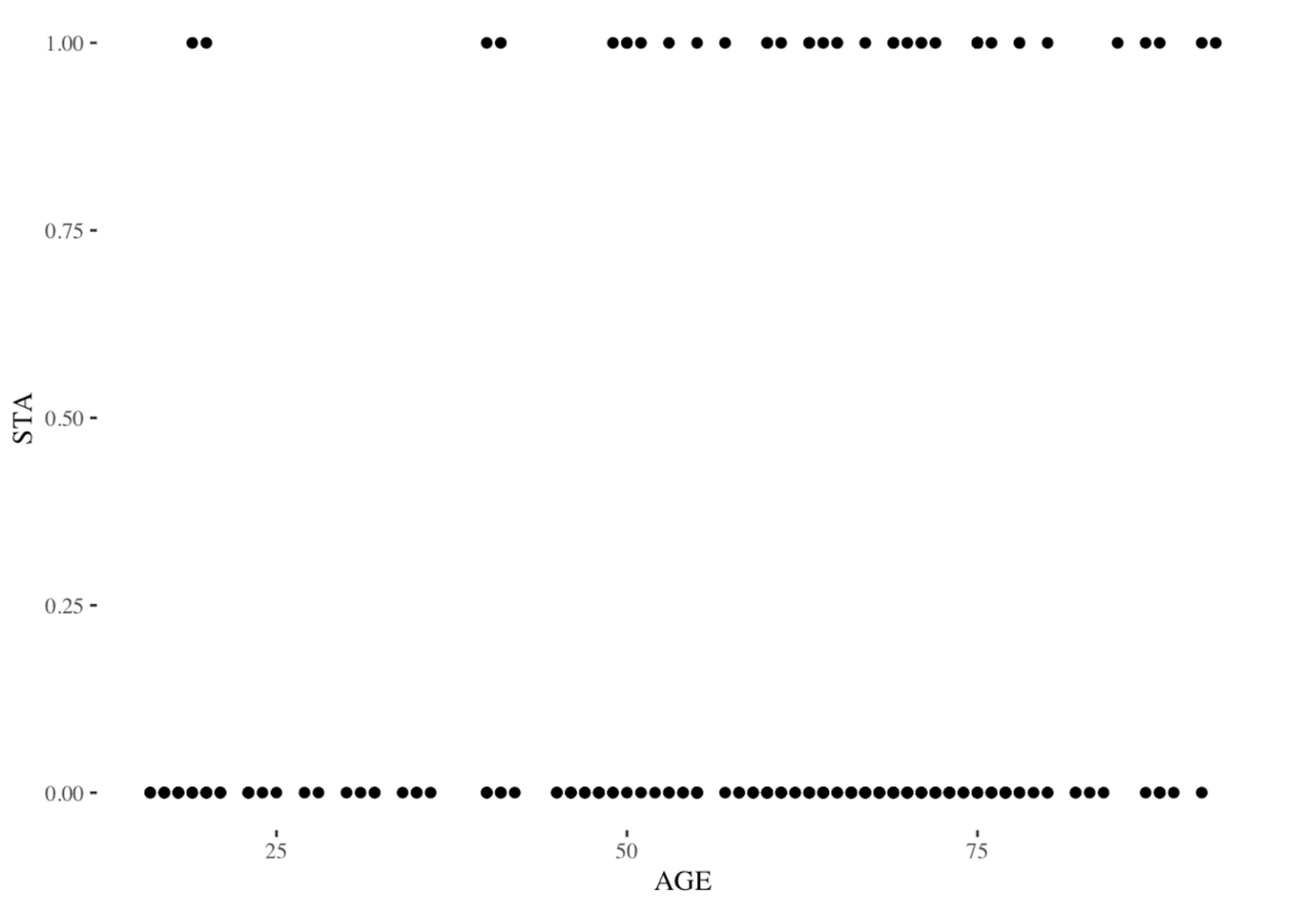
$$\pi(x) = \frac{e^{\beta_0 + \beta_1 x}}{1 + e^{\beta_0 + \beta_1 x}}$$

The *logit tranformation* is defined as

$$g(x) = \ln\left[\frac{\pi(x)}{1 - \pi(x)}\right] = \beta_0 + \beta_1 x$$

Because the outcome, Y , is binary, rather than continous, we choose logistic regression, rather than linear regression.

Scatterplot

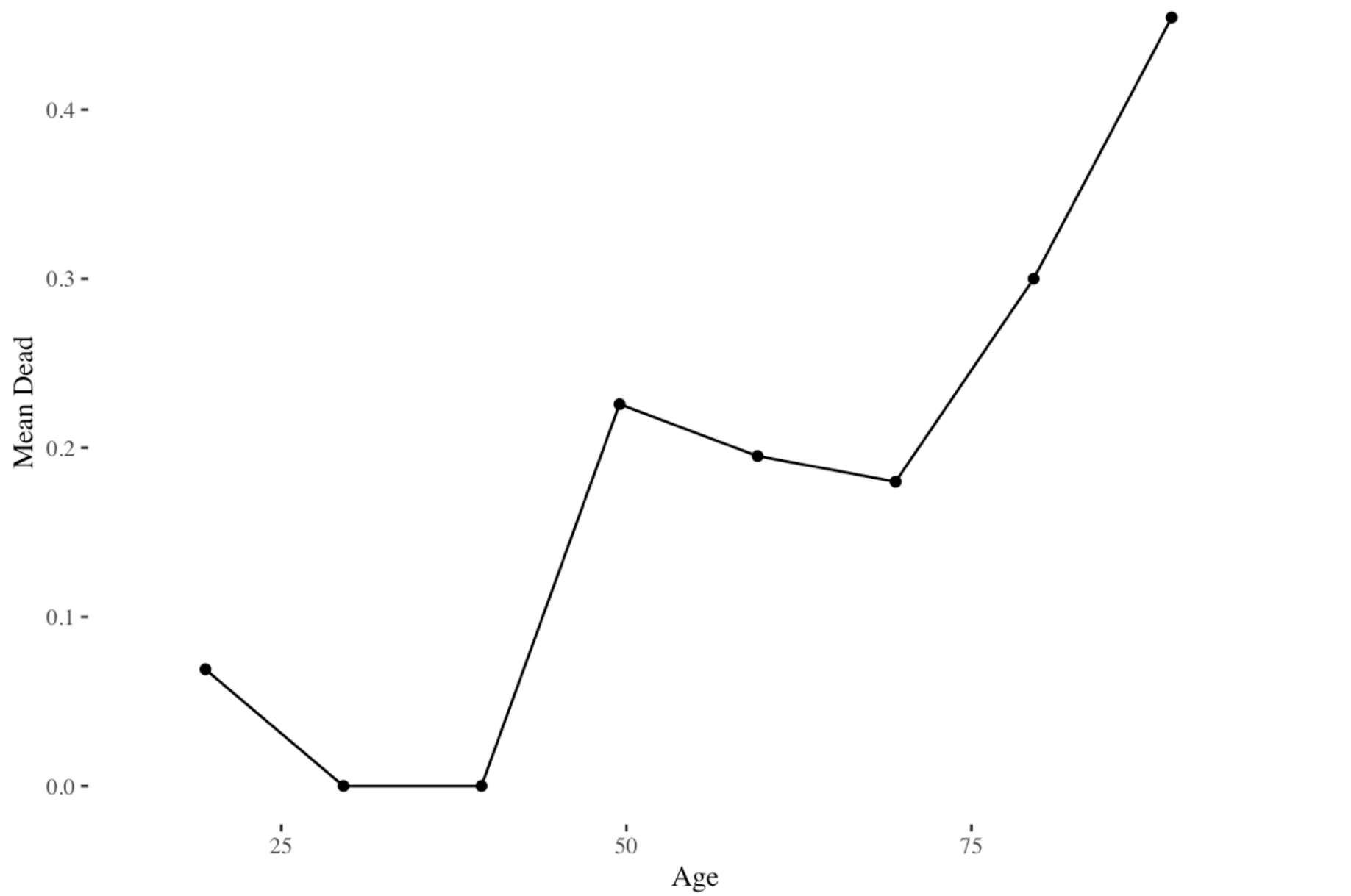


Scatterplot and cohort table

AgeGroup	n	Died	Lived	Mean
15-24	29	2	2	0.069
25-34	5	0	0	0

	35-44	3	0	0	0
	55-64	31	7	7	0.226
	65-74	41	8	8	0.195
	75-84	80	18	18	0.225
	85-94	11	5	5	0.455

Replicate line graph used in place of scatterplot



Likelihood and log likelihood

$$l\beta = \prod_{i=1}^n \pi(x)^{y_i} [1 - \pi(x)]^{1-y_i}, n = 200$$

$$L(\beta) = ln[l(\beta)] = \prod_{i=1}^n y, ln[\pi(x_i)], ln[1 - \pi(x_i)]$$

Likelihood estimates

To find β that maximizes $L(\beta)$, we cannot differentiate the sum of squared deviation functions with respect to β because they are not linear.