



Determining Risk Thresholds for Initiating Statins for Primary Prevention of Cardiovascular Disease: A Benefit-harm Balance Modeling Study

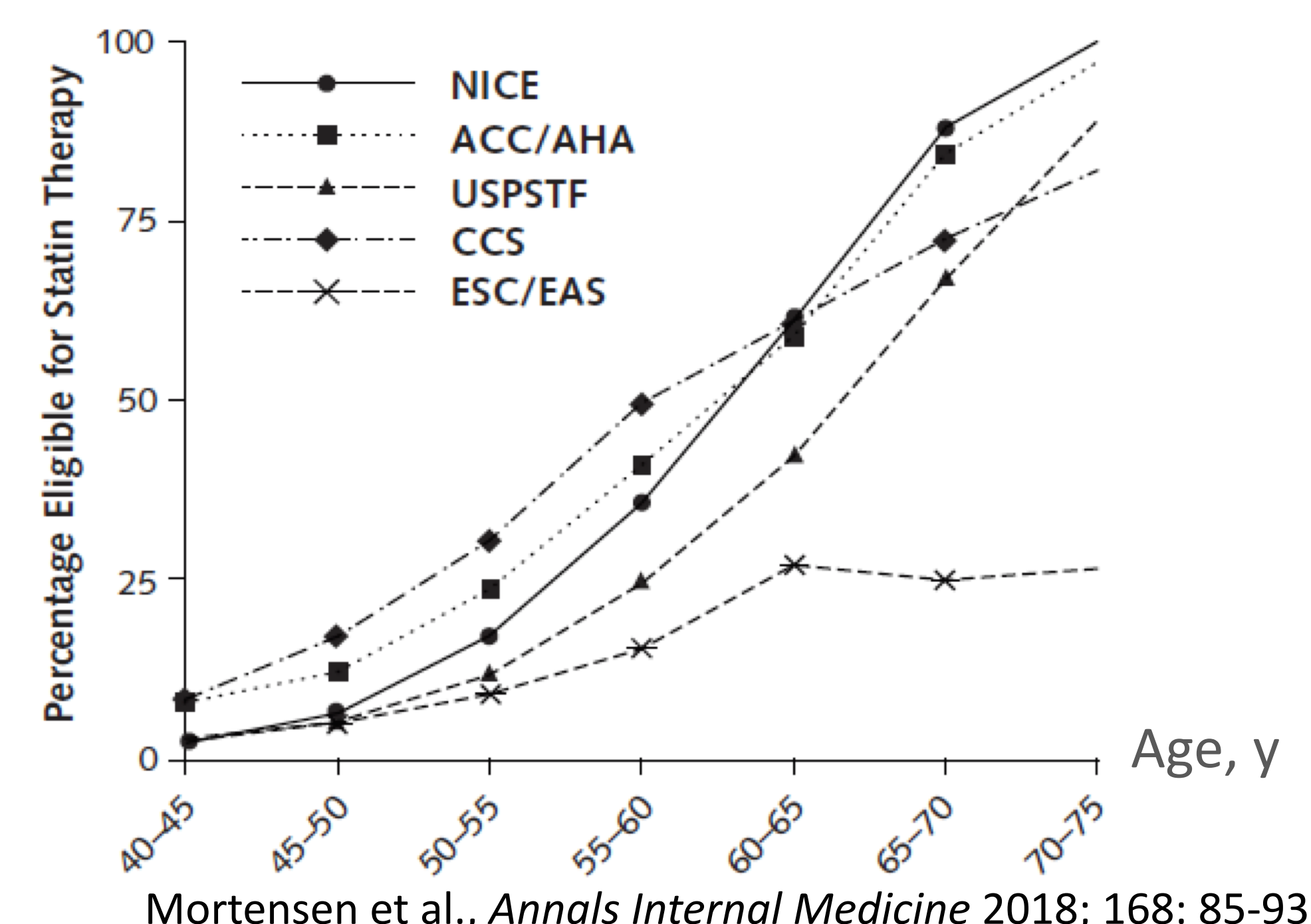
Henock G. Yebyo; Hélène E. Aschmann; Milo A. Puhan
University of Zurich, Zurich, Switzerland

Background

Most guidelines use predicted risk for cardiovascular disease (CVD) as a basis for initiating statin use for primary prevention of CVD. However, how harms were considered and weighed against benefits is often unclear.

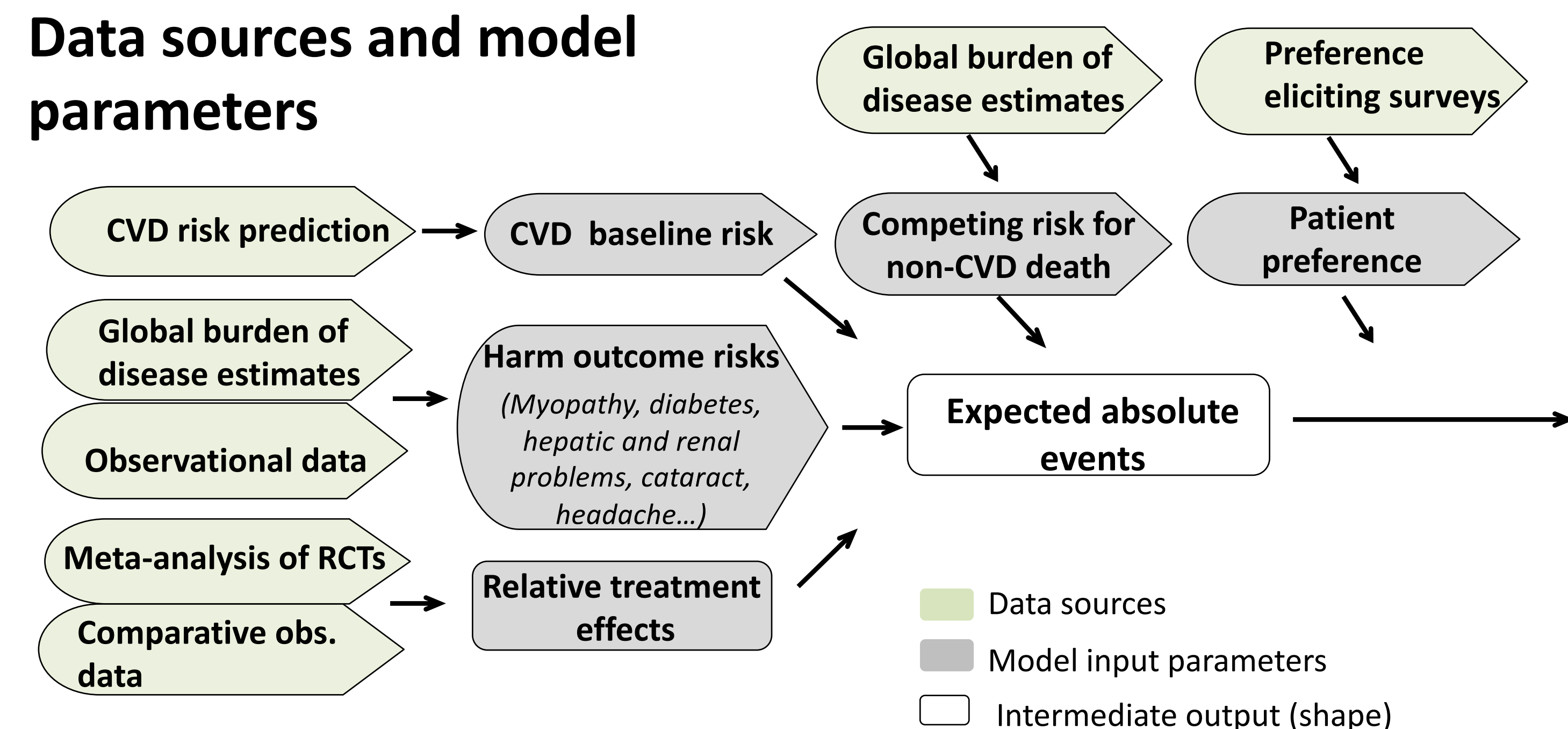
Objective

To identify the expected 10-year CVD risk threshold above which low- or moderate-dose statins provide *net* benefit.

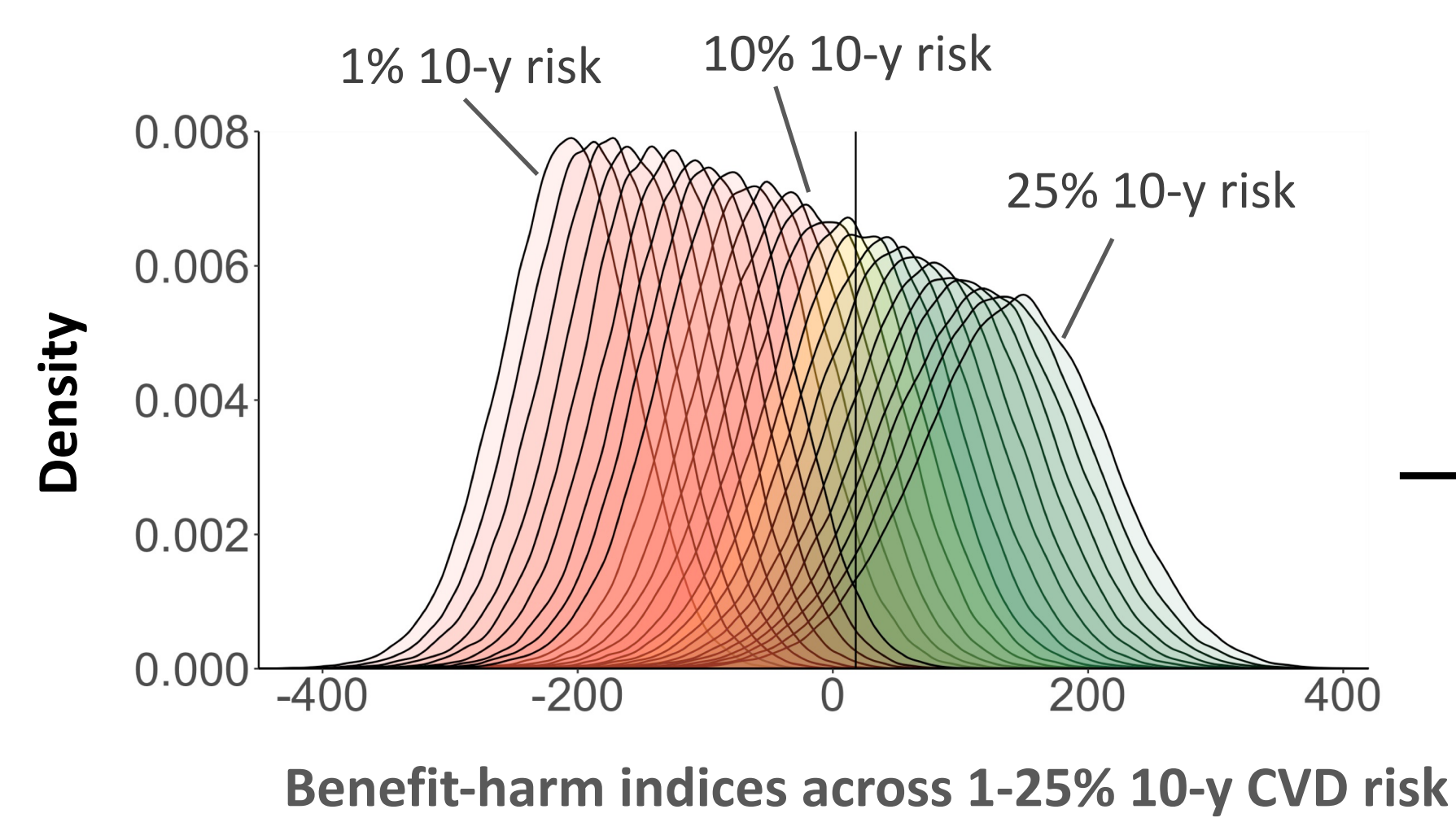


Methods

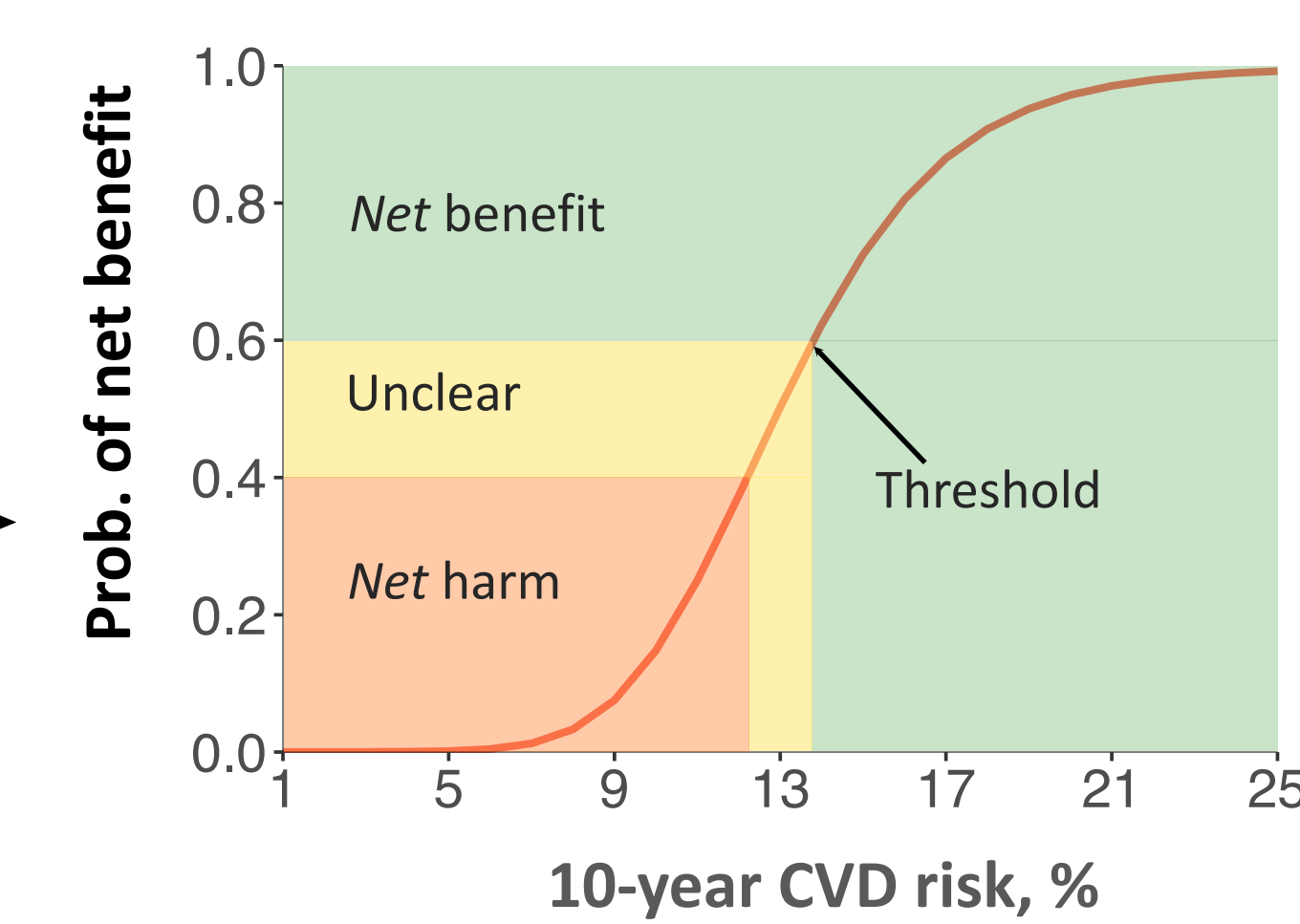
Data sources and model parameters



Benefit-harm balance index



CVD risk threshold

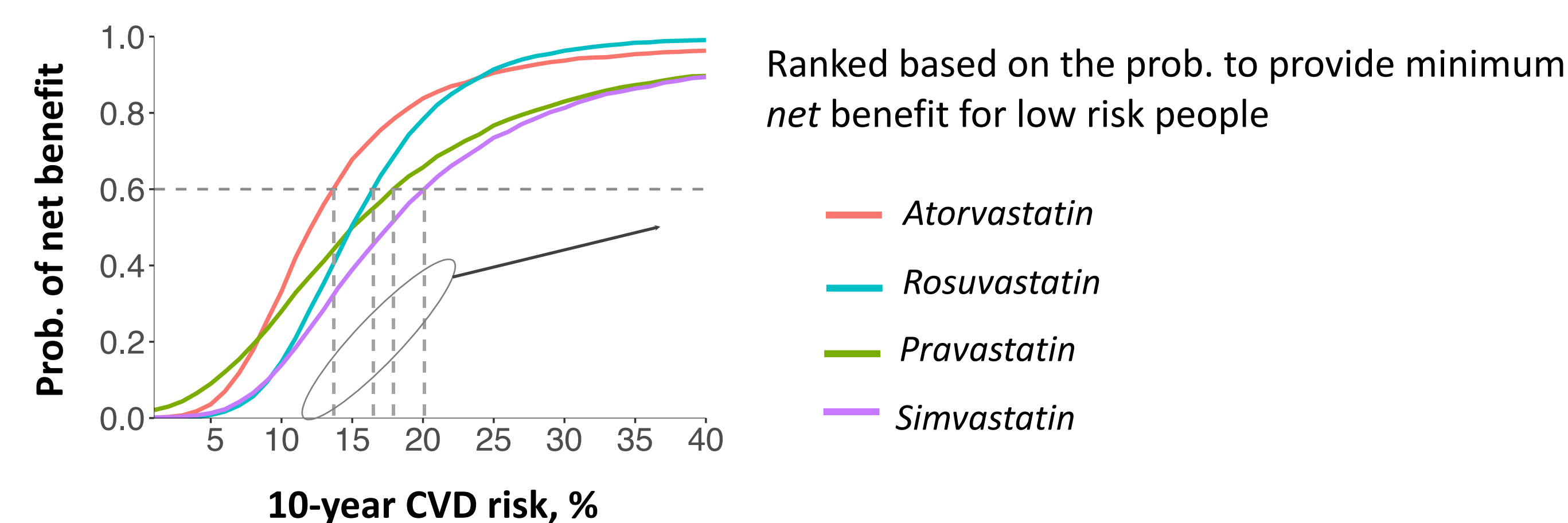


Results

(a) Probabilities at which statins would be more likely to provide *net* benefit

Age, y	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
70-75	0.4	0.6	1	1.5	2.5	3.5	5.1	7	9.4	12	16	20	24	29	34	38	43	48	53	57	62	65	69	72	76
65-69	0.1	0.2	0.4	0.6	1.2	2.1	3.4	5	7.6	11	15	20	25	31	37	43	49	55	61	66	71	75	79	82	85
60-64	0	0	0.1	0.2	0.4	1	2.1	3.6	6.1	9.8	15	21	28	35	44	51	58	65	72	77	81	85	88	91	93
55-59	0	0	0	0	0.1	0.4	1.1	2.6	5.3	9.9	17	25	34	44	54	62	70	77	83	87	90	93	95	96	97
50-54	0	0	0	0	0.1	0.3	1	2.7	6.2	12	22	32	43	55	65	73	81	86	90	93	95	97	98	98	99
45-49	0	0	0	0	0.1	0.3	1.1	3	7.7	15	27	39	52	65	75	82	88	91	94	96	97	98	99	99	100
40-44	0	0	0	0	0	0.3	1.2	3.5	9.2	19	33	47	59	72	81	87	91	94	96	98	99	99	99	100	100

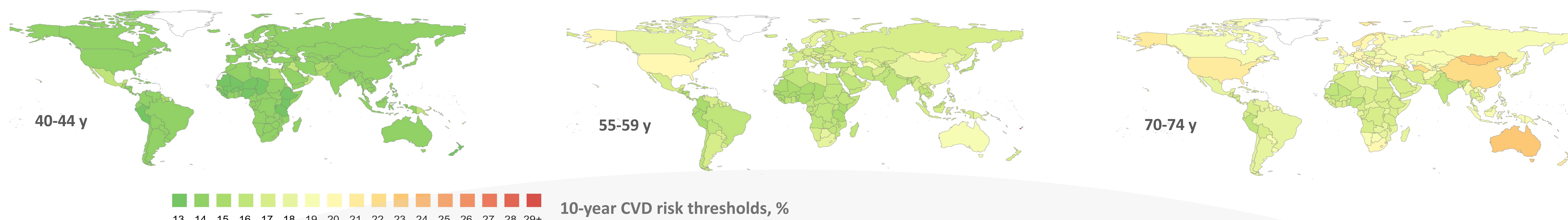
(b) Benefit-harm balance of specific statins



Statins would be more likely to provide *net* benefit at higher 10-year CVD risk thresholds than currently reflected in guidelines issued by cardiovascular societies but lower thresholds than recommended by general practice and public health guidelines.

CVD risk thresholds for providing *net* benefit vary considerably by age, statin type, and populations.

(c) Risk thresholds across populations



References

- Nortensen MB, Nordestgaard BG. Comparison of five major guidelines for statin use in primary prevention in a contemporary general population. *Ann Intern Med*, 2018; 168: 85–92.
- Yebyo HG, Aschmann HE, Puhan MA. Finding the balance between benefits and harms when using statins for primary prevention of CVD: A modeling study. *Ann Intern Med*, 2019;170:1–10