Supplementary Table 1. Estimated ERSPC model parameters*

Onset is modeled by a hazard function (5 parameters)†

Age in years	Hazard
0	0.0000
30	0.0000
50	0.0005
70	0.0170
100	0.0503

Durations in preclinical states are modeled by Weibull distributions (13 parameters)

	Mean	Shape
T1G6M0	2.70868	0.90514
T1G7M0	6.49444	0.90514
T1G8M0	21.6563	0.90514
T2G6M0	4.00188	3.84944
T2G7M0	7.40624	3.84944
T2G8M0	11.1226	3.84944
T3G6M0	3.53881	1.04132
T3G7M0	18.9094	1.04132
T3G8M0	23.3957	1.04132

TxGxM1 = mean(TxGxM1) × 0.0101638

Correlation between the duration of preclinical states in an individual (1 parameter)

Correlation	0.866907

Yearly hazard of metastasis in different preclinical states (9 parameters)

T1G6M0	0.0003
T1G7M0	0.0016
T1G8M0	0.0213
T2G6M0	0.0045
T2G7M0	0.0119
T2G8M0	0.0473
T3G6M0	0.0017
T3G7M0	0.0067
T3G8M0	0.1046

Transition probability (12 parameters)

From	To	Probability
T1G6Mx	T1G7Mx	0.27
	T2G6Mx	0.71
	Clinical	0.02
T1G7Mx	T1G8Mx	0.19
	T2G7Mx	0.78
	Clinical	0.03
T1G8Mx	T2G8Mx	0.00
	Clinical	1.00
T2G6Mx	T2G7Mx	0.24
	T3G6Mx	0.62
	Clinical	0.15
T2G7Mx	T2G8Mx	0.63
	T3G7Mx	0.00
	Clinical	0.36
T2G8Mx	T3G8Mx	0.00
	Clinical	1.00
T3G6Mx	T3G7Mx	0.00
	Clinical	1.00
T3G7Mx	T3G8Mx	0.00
	Clinical	1.00
T3G8Mx	Clinical	1.00

Yearly hazard of additional clinical diagnosis in different preclinical states (4 parameters)‡

T1GxM0	0.056
T2GxM0	0.001
T3GxM0	0.056
T1GxM1	0.801
T2GxM1	0.014
T3GxM1	0.810

Sensitivity (4 parameters)

T1GxM0	0.936
T2GxM0	0.941
T3GxM0	1.000
T1GxM1	0.962
T2GxM1	0.965
T3GxM1	1.000

*T1, T2, T3 are the three clinical T stages: T1(impalpable), T2 (palpable, confined to the prostate), and T3+ (palpable, with extensions beyond the prostatic capsule), G6 is Gleason score (G) less than 7, G7 is Gleason score of 7, G8 Gleason score more than 7, M0 is the local-regional stage and M1 is the distant stage. Tx, Gx, and Mx imply all clinical T stages, all Gleason scores, and all metastatic stages, respectively.

†Time of tumor onset is generated from a piece-wise linear hazard function.

‡These parameters model a higher incidence in the control arm of the ERSPC trial compared to the population in 1991 (the baseline). The difference in clinical diagnosis between these two populations can for instance be attributed to contamination (screening in the control arm) or to changes in clinical practice leading to earlier diagnosis, eg, to the use of PSA testing for symptomatic disease in a clinical setting.

Supplementary Table 2. Observed data in ERSPC–Rotterdam*

Baseline

Age group, y	n	Incidence per 1000 man-years †
45–49	11	0.02
50–54	58	0.14
55–59	131	0.36
60–64	387	1.19
65–69	734	2.59
70–74	950	4.50
75–79	969	6.57
80–84	668	7.98
>85	431	8.52

Clinical T stage and metastatic stage distribution, % (n = 1610)‡

	T1	T2	T3	Total
M0	12.92	47.45	17.76	78.14
M1	1.06	11.30	9.50	21.86
Total	13.98	58.76	27.27	100.00

Control arm§

Age group, y	n	Incidence per 1000 man-years
55–59	29	1.61
60–64	135	3.35
65–69	192	5.13
70–74	247	7.95
>75	146	9.85

Clinical T stage, metastatic stage, and Gleason score distribution, % (n = 472)

		G < 7	G = 7	G > 7	Total
M0	T1	29.87	7.84	4.45	42.16
	T2	15.47	10.59	3.81	29.87
	T3	4.24	9.32	7.20	20.76
	Subtotal	49.58	27.75	15.47	92.80
M1	T1	0.00	0.00	0.00	0.00
	T2	0.21	0.85	1.69	2.75
	T3	0.00	1.27	3.18	4.45
	Subtotal	0.21	2.12	4.87	7.20
	Total	49.79	29.87	20.34	100.00

Screen arm§

Detection rate per 1000 men screened by round of screening

	Round 1		Round 2		Round 3	
Age group, y	n	rate	n	rate	n	rate
55–59	176	27.64	20	20.77	0	0.00
60–64	239	44.81	171	35.14	38	26.44
65–69	366	76.81	189	49.74	83	32.35
70–74	287	86.73	170	59.30	74	37.85

Clinical T stage, metastatic stage, and Gleason score distribution, % (n = 1815)

Round 1		G < 7	G = 7	G > 7	Total
M0	T1	28.23	6.61	1.04	35.88
	T2	29.84	12.75	3.59	46.18
	T3	6.89	7.84	2.64	17.37
	Subtotal	64.97	27.20	7.27	99.43
M1	T1	0.00	0.00	0.00	0.00
	T2	0.00	0.00	0.00	0.00
	T3	0.00	0.09	0.47	0.57

	Subtotal	0.00	0.09	0.47	0.57
Total		64.97	27.29	7.74	100.00
Round 2		G < 7	G = 7	G > 7	Total
M0	T1	52.00	9.09	0.73	61.82
	T2	24.73	7.64	1.82	34.18
	T3	2.00	1.27	0.36	3.64
	Subtotal	78.73	18.00	2.91	99.64
M1	T1	0.00	0.00	0.00	0.00
	T2	0.18	0.00	0.18	0.36
	T3	0.00	0.00	0.00	0.00
	Subtotal	0.18	0.00	0.18	0.36
Total		78.91	18.00	3.09	100.00
Round 3		G < 7	G = 7	G > 7	Total
M0	T1	56.41	7.18	0.00	63.59
	T2	27.69	4.62	2.56	34.87
	T3	0.51	0.00	1.03	1.54
	Subtotal	84.62	11.79	3.59	100.00
M1	T1	0.00	0.00	0.00	0.00
	T2	0.00	0.00	0.00	0.00
	T3	0.00	0.00	0.00	0.00
	Subtotal	0.00	0.00	0.00	0.00
Total		84.62	11.79	3.59	100.00

Incidence of interval cancers per 1000 man-years by time since last screening

Time (t) since last screening, y	n	Incidence
0 ≤ t < 1	8	0.50
1 ≤ t < 2	7	0.48
2 ≤ t < 3	12	0.84
3 ≤ t < 4	18	1.46
t ≥ 4	52	4.21

*T1, T2, T3 are the three clinical T stages: T1(impalpable), T2 (palpable, confined to the prostate), and T3+ (palpable, with extensions beyond the prostatic capsule), G < 7 is Gleason score (G) less than 7, G = 7 is Gleason score of 7, G > 7 Gleason score more than 7 , M0 is the local or regional stage and M1 is the distant stage. For clinical T stage, metastatic stage, and Gleason score distribution, only completed cases (cases for which the clinical T stage, Gleason score and metastatic stage are known) are shown.

†Data from the Netherlands Cancer Registry for 1991.

‡Data from the Rotterdam Cancer Registry for 1992 and 1993.

§ For the screen arm, data for cases diagnosed up to December 31, 2006, are presented. For the control arm, data for cases diagnosed up to July 4, 2004, are presented. Data for the control arm were collected from the Rotterdam cancer registry. Because there is a delay of 1–2 years in the reporting of tumors, the cutoff date for the control arm is different from that of the screen arm.

Supplementary Table 3. Observed incidence and stage distribution in the US population*

Year	Age group (years)						
	50–54	55–59	60–64	65–69	70–74	75–79	80–84
Observed incidence per 1000 man-years							
1985	0.27	0.94	2.26	4.48	6.81	9.15	11.09
1986	0.32	0.93	2.34	4.79	7.09	9.47	11.60
1987	0.37	1.16	2.61	5.29	8.25	10.90	12.14
1988	0.37	1.11	2.81	5.43	8.86	10.91	12.81
1989	0.36	1.21	3.16	6.15	9.19	11.58	12.82
1990	0.49	1.42	3.66	7.24	10.76	13.39	14.79
1991	0.70	1.93	4.93	9.36	14.47	16.78	17.47
1992	0.90	2.57	6.04	11.31	15.80	18.14	17.75
1993	0.95	2.71	5.97	10.66	13.92	14.45	13.99
1994	0.99	2.60	5.54	9.33	12.16	11.76	10.65
1995	1.04	2.85	5.39	8.71	11.14	10.55	9.65
1996	1.19	2.85	5.78	8.34	10.65	10.44	9.00
1997	1.27	3.04	5.72	9.00	10.80	10.47	9.38
1998	1.27	3.15	5.49	8.69	10.36	10.79	9.16
1999	1.40	3.29	6.28	9.41	11.37	10.96	9.12
2000	1.39	3.55	6.17	9.35	10.75	10.70	9.25
Observed percentage of distant disease							
1985	18.85	18.84	17.51	19.00	19.41	21.04	24.34
1986	18.75	19.86	16.78	15.77	19.89	20.04	23.93
1987	21.30	15.71	14.31	14.86	15.50	17.48	22.33
1988	23.84	15.29	14.83	14.87	15.20	17.56	21.11
1989	15.88	15.41	13.79	14.12	13.51	17.41	22.55
1990	11.59	13.39	12.10	11.44	12.28	14.94	19.45
1991	7.62	8.01	8.45	8.36	9.44	11.71	19.17
1992	5.69	6.47	6.23	5.78	7.12	9.53	12.99
1993	4.52	5.36	5.98	5.30	6.04	8.92	14.49
1994	2.27	4.81	4.53	5.38	5.27	8.26	13.70
1995	4.01	3.62	5.13	4.66	6.22	8.31	12.95
1996	4.18	3.82	3.69	3.71	5.29	7.49	13.18
1997	3.65	2.91	3.35	4.13	4.87	6.39	11.52
1998	2.33	3.30	3.70	3.31	4.75	6.62	11.31
1999	3.16	2.62	2.67	3.65	3.99	5.21	9.59
2000	2.00	2.58	2.14	3.23	3.84	5.60	8.89

*Data from the National Cancer Institute's Surveillance, Epidemiology, and End Results database. The data are based on nine catchment areas of the United States: San Francisco–Oakland, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, and Atlanta.