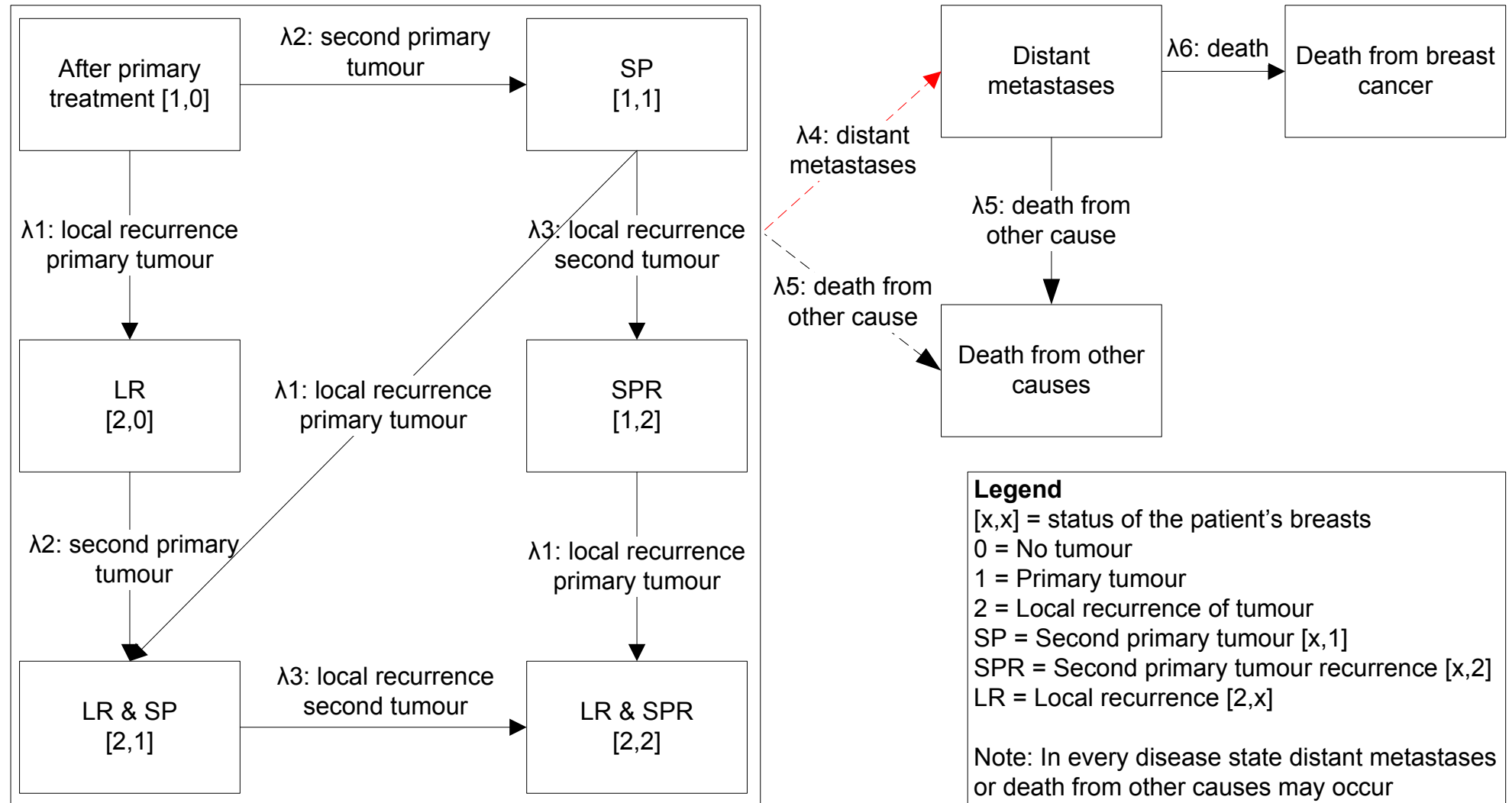


Optimization of breast cancer follow-up

additional slides for SMDM poster presentation

State transition diagram



Model input

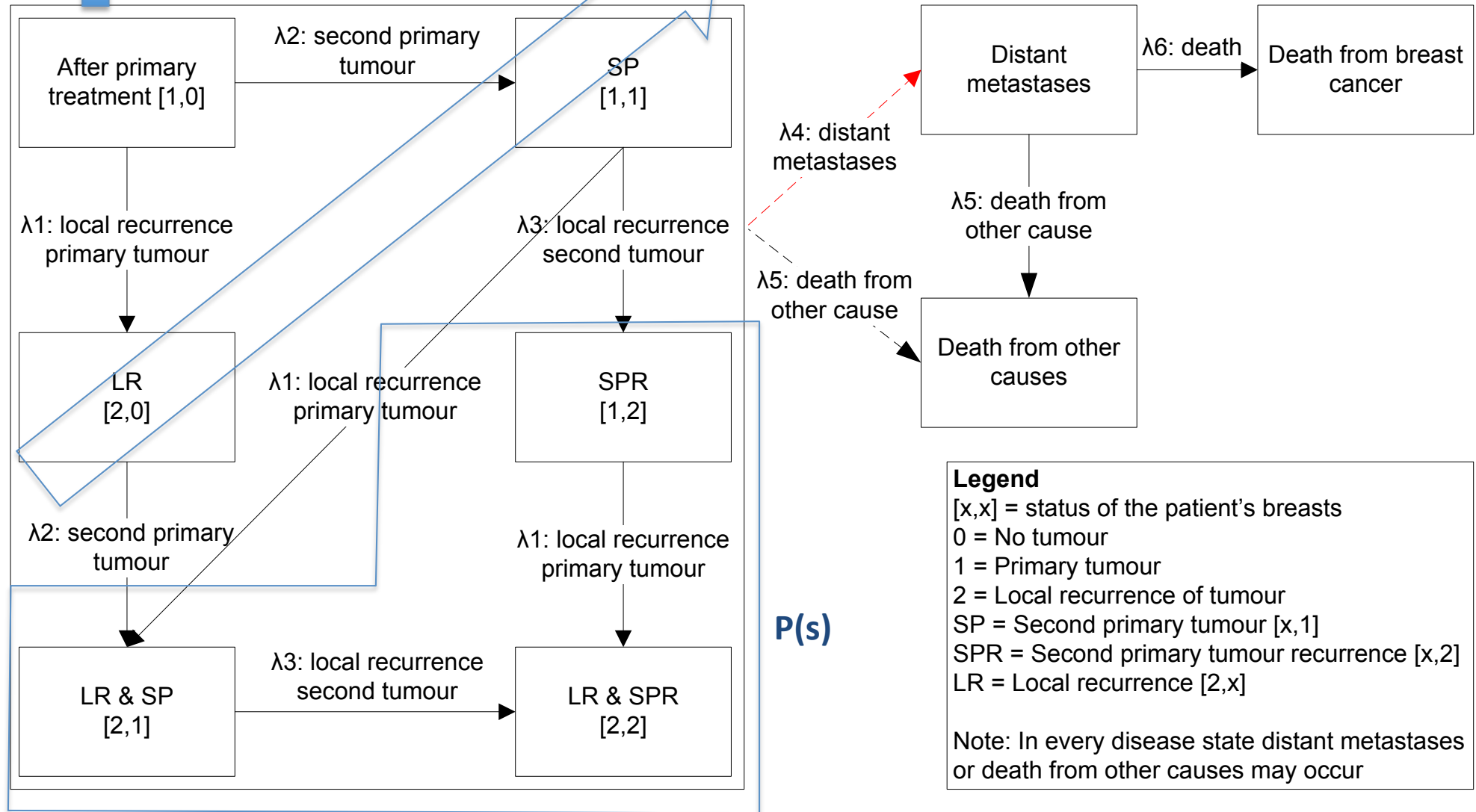
- λ_1 = baseline risk based on IBTR!
- λ_2 = constant risk at additional 0,6% / year
- $\lambda_3 = \lambda_1$ assuming tumor size 1-2cm and no lymph node involvement
- λ_4 : Metastasizing risk obtained from Adjuvant!

Distant metastasis (λ_4)

- Metastasis due primary tumor
 - P (p, no): $p(\text{metastasis} \mid \text{no LR/SP})$
 - P (p, yes): $p(\text{metastasis} \mid \text{LR/SP})$
- Metastasis due LR / SP
 - P (s)
- Less intensive follow-up schemes
 - Increased metastasis risk
 - Penalty: 2.6% extra/year

$P(p | \text{no LR, no SP})$

$P(p | \text{LR, SP})$



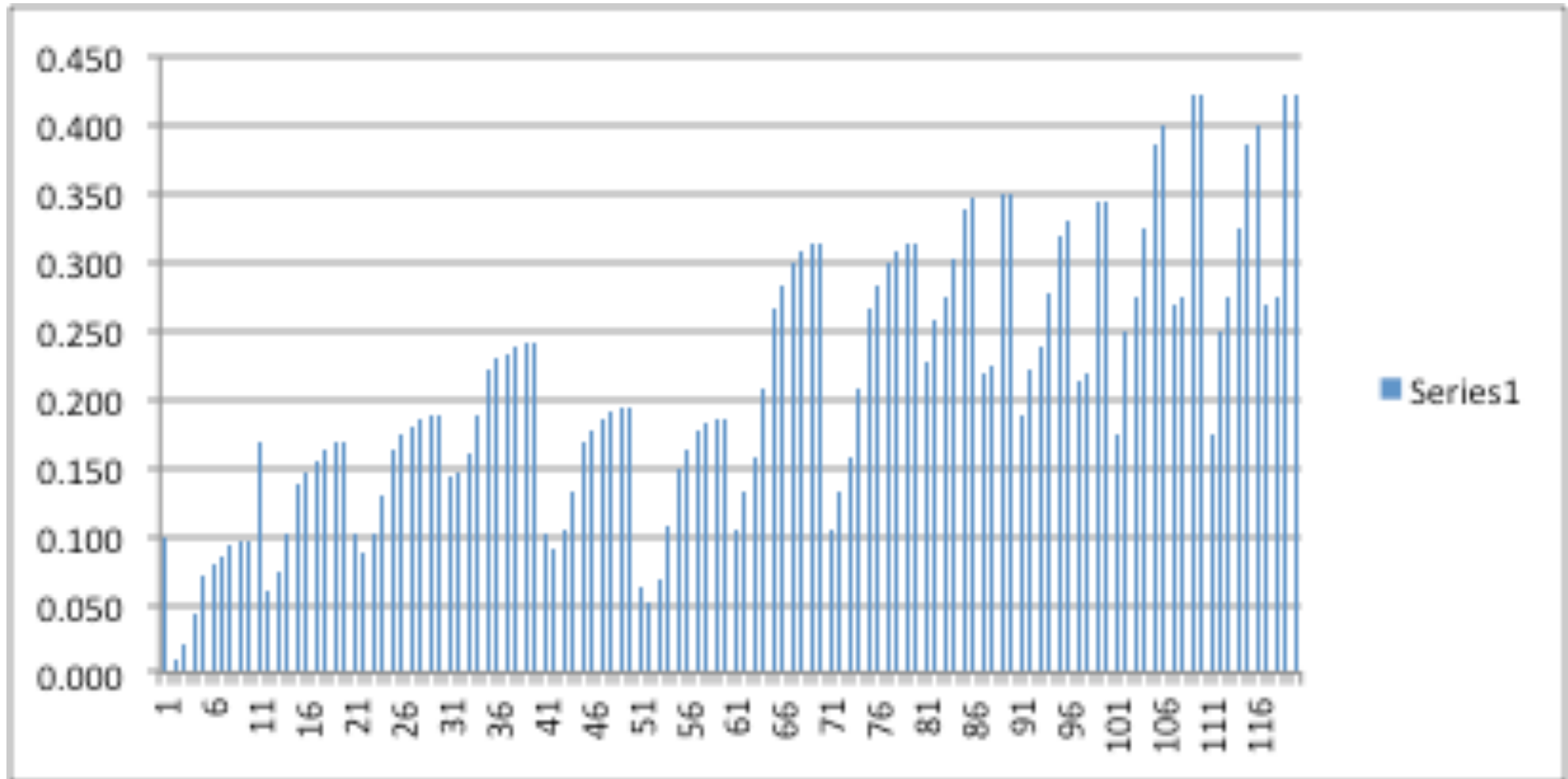
$P(s)$

Calculated $\lambda_1, \lambda_2, \lambda_3$

	A	B	C	D	E	F	G	H	I	J	K	L
1	Age Group	Lymph Nodes	Tumor Size		Adjuvant Tot.Risk	IBTR! Local Risk	Sec. Prim. Risk	Metastates Risk		P(p,no)	P(p,yes)	P(s)
2	0	1	1		0.220	0.121	0.006	0.099		0.072	0.136	0.080
3	1	1	1		0.130	0.121	0.006	0.009		0.003	0.005	0.003
4	2	1	1		0.130	0.109	0.006	0.021		0.012	0.023	0.013
5	3	1	1		0.130	0.086	0.005	0.044		0.032	0.060	0.035
6	4	1	1		0.130	0.058	0.005	0.072		0.057	0.108	0.063
7	5	1	1		0.130	0.051	0.006	0.079		0.064	0.122	0.072
8	6	1	1		0.130	0.044	0.006	0.086		0.071	0.154	0.079
9	7	1	1		0.130	0.037	0.006	0.093		0.078	0.148	0.087
10	8	1	1		0.130	0.033	0.006	0.097		0.083	0.156	0.092
11	9	1	1		0.130	0.033	0.006	0.097		0.083	0.156	0.092
12	10	1	2		0.320	0.151	0.006	0.169		0.126	0.239	0.140
13	1	1	2		0.210	0.131	0.006	0.059		0.044	0.083	0.049
14	2	1	2		0.210	0.137	0.006	0.073		0.056	0.107	0.063
15	3	1	2		0.210	0.107	0.005	0.103		0.083	0.157	0.092
16	4	1	2		0.210	0.073	0.005	0.137		0.118	0.223	0.131
17	5	1	2		0.210	0.064	0.006	0.146		0.128	0.243	0.142
18	6	1	2		0.210	0.055	0.006	0.155		0.136	0.260	0.153
19	7	1	2		0.210	0.047	0.006	0.163		0.148	0.280	0.164
20	8	1	2		0.210	0.042	0.006	0.168		0.154	0.291	0.171
21	9	1	2		0.210	0.042	0.006	0.168		0.154	0.291	0.171
22	10	1	3		0.250	0.148	0.006	0.102		0.155	0.294	0.173
23	1	1	3		0.236	0.148	0.006	0.088		0.088	0.129	0.076
24	2	1	3		0.236	0.134	0.006	0.102		0.081	0.153	0.090
25	3	1	3		0.236	0.105	0.005	0.131		0.108	0.205	0.120
26	4	1	3		0.236	0.071	0.005	0.164		0.144	0.273	0.160

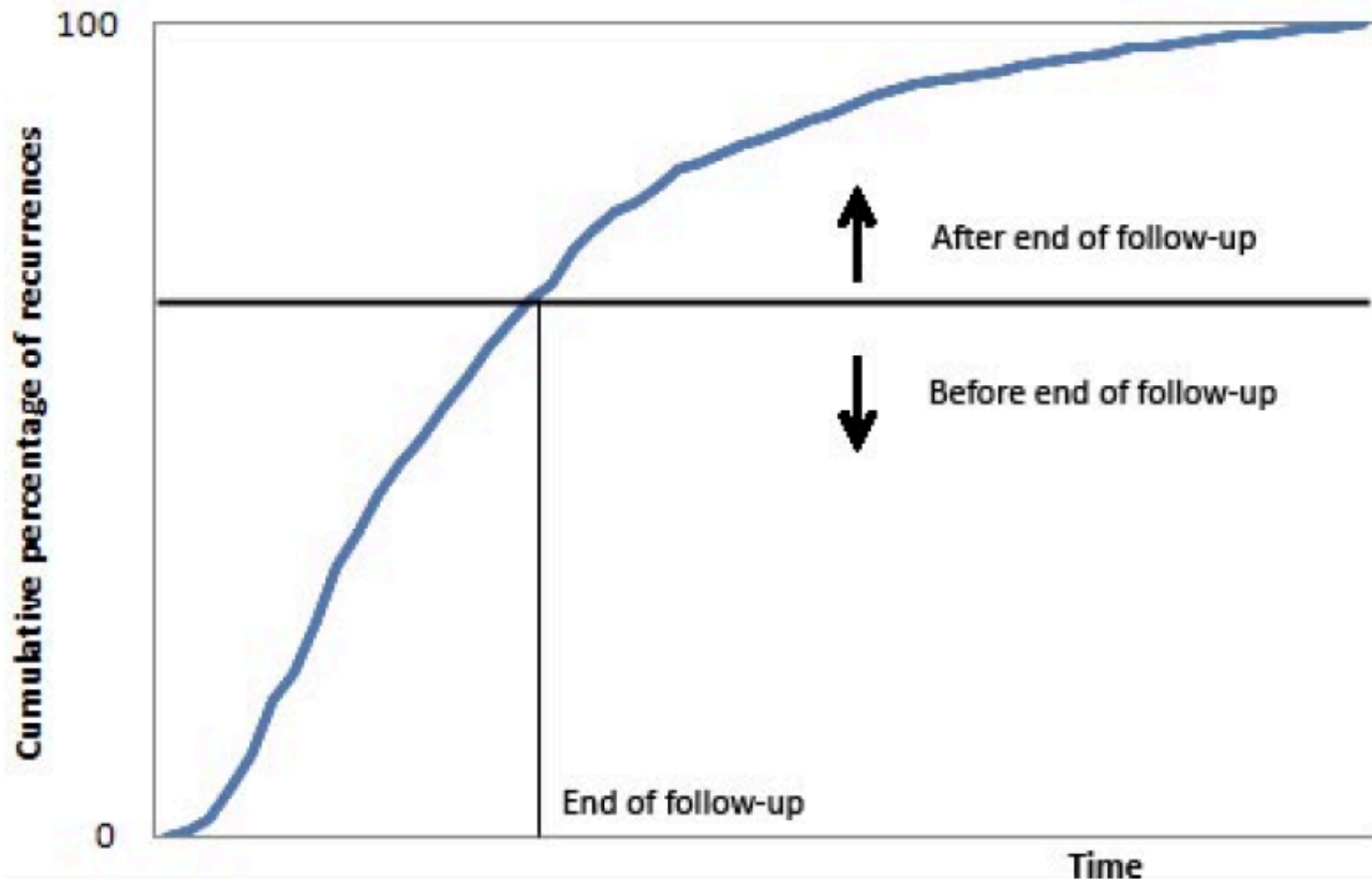
Calculated risk of metastasis

(120 groups based on age, lymph node involvement and tumor size)



Time of occurrence

- Detection depends on the intensity and length of follow-up
- Time of occurrence is modeled through inverse transform sampling
- Obtained from Engel et al, 2003



Effect of follow-up

- NP 20 minutes, surgeon 10 minutes
- NP and surgeon visits assumed equivalent
- NP telephone not effective
- Assumptions:
 - Transition probabilities obtained from clinical trial data in which follow-up was embedded. So, the risk rates are “detection rates” rather than “occurrence rates”
 - However, these sources variable considerably. Assumption is that data came from high intensity follow-up schedules
 - Only penalty for less intensive follow-up: 2,6% extra metastasis risk
 - Once detected: adjuvant therapy and improved QALY (is part of source data)

Penalty risk metastasis

- The average detection time of .25 year is average for current data. When follow-up is performed yearly, the average detection time will be .5 year. This allows the tumor to grow for an additional 91 days. This would allow the tumor to double in volume at maximum growth rate (but it would not double the diameter of the tumor). As Engel et al. (2003) mentions: “A 10-mm tumour can double in volume in 4 months (120 days) making a 12.6-mm diameter tumour. In this time, further metastases may be initiated in 2.6% of these concerned (1%/mm)”. Therefore, if a scenario only has follow-up once per year, we add 0,026 to P(s).