

Laboratory for Quantitative Medicine  
**Technical Report #5**  
July 29, 2009

# **Validation: Size+Nodes+Prognostic Factors Equation**

This report presents results demonstrating the  
validity and accuracy of the  
Size+Nodes+PrognosticFactors equation.

L. Leon Chen, Devon M. Bush, Matthew E. Nolan, James S. Michaelson,  
PhD<sup>1,2,3</sup>

Departments of Pathology<sup>1</sup> and Surgery<sup>2</sup>, Massachusetts General Hospital and the Department  
of Pathology<sup>3</sup>, Harvard Medical School, Boston, Massachusetts

Correspondence to James S. Michaelson Ph.D., Division of Surgical Oncology, Cox Building  
Room 626, Massachusetts General Hospital, 100 Blossom Street, Boston, Massachusetts, 02114  
TEL 617 501 0590 FAX 617 724 3895  
Email: [michaelj@helix.mgh.harvard.edu](mailto:michaelj@helix.mgh.harvard.edu)

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## **I. Introduction**

This report summarizes all verification and validation studies that have been performed on the Size+Nodes+PrognosticFactors equation, for breast cancer. The data is grouped and permuted in multiple ways, demonstrating the accuracy of the Size+Nodes+PrognosticFactors equation. Because the Size+Nodes+ PrognosticFactors equation adds additional layers of information to the Size+Nodes and SizeOnly equations, we should expect that accuracy should be improved over using either the Size+Nodes equation or SizeOnly equation alone. Indeed, this is shown through all the various measures of accuracy. However, it must be noted that in certain instances, the uncertainty becomes very large. This is due to the decreasing numbers of people that can be included as increasing numbers of prognostic factors are added to the equation.

The parameter of Qs (refer to Technical Report #2: Equation Parameters) was derived using the SEER dataset. Section III verifies that this derived value indeed provides accurate results over a wide range of data stratification strategies. Section IV then validates this in an entirely separate dataset, using the Partners Healthcare Breast Cancer Database.

Sections V and VI apply the Size+Nodes+ PrognosticFactors equation to data from breast cancer cases diagnosed after 1987. A second, different, value of Qs (refer to Technical Report #2: Equation Parameters) was used for this process. Section V verifies that this second derived value indeed provides accurate results over a wide range of data stratification strategies for post-1987 cases. Section VI then validates this approach for post-1987 data in an entirely separate dataset, using the Partners Healthcare Breast Cancer Database.

## **II. Datasets**

### *SEER Dataset (Breast Cancer)*

Breast cancer data was extracted from the US Surveillance, Epidemiology, and End Results (SEER) dataset, which is provided by the National Cancer Institute. It consists of 17 regional registries across the US, with data from 1973 to 2004. An extensive effort was made to clean the data, for example by considering only first malignant primary tumors. Also, analysis is restricted to patients with 1-50 mm tumors and 0-7 positive lymph nodes. These patients total 362,491.

### *Partners Healthcare Breast Cancer Database*

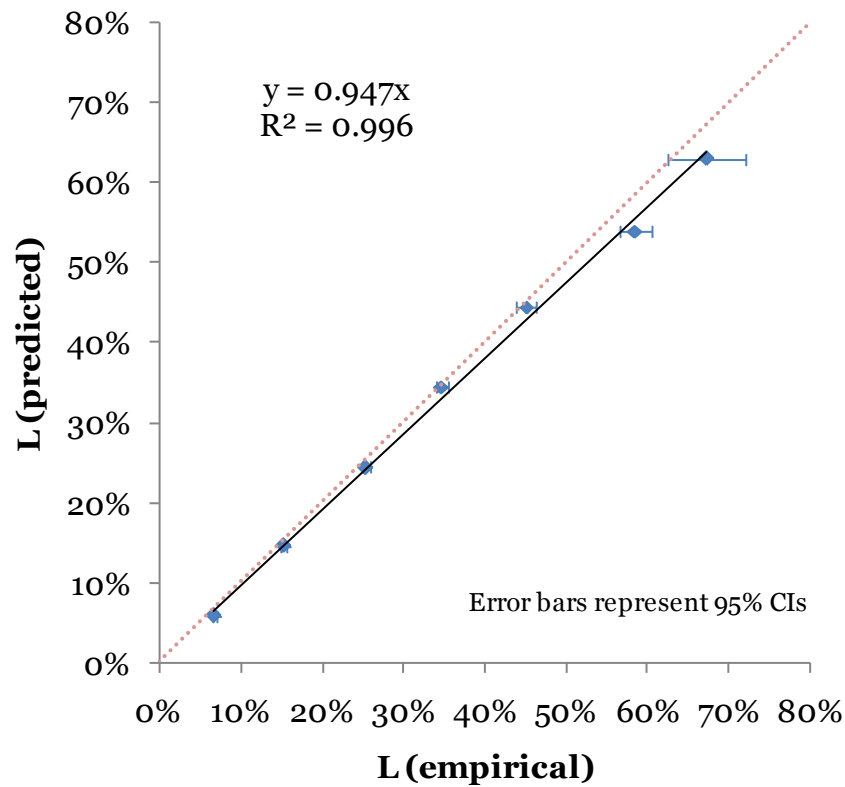
This database consists of 24,771 breast cancer patients diagnosed at the Massachusetts General Hospital or the Brigham and Women's hospital between 1968 and 2007. Analysis is restricted to patients with 1-50 mm tumors and 0-7 positive lymph nodes, a subset with 7,907 patients.

### III. Verification on the SEER dataset

Grouped by 10% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-10%	115510	6.79%	(0.16%)	5.83%	(0.01%)	-0.97%
10.1-20%	115037	15.36%	(0.17%)	14.62%	(0.01%)	-0.74%
20.1-30%	69718	25.38%	(0.25%)	24.43%	(0.01%)	-0.95%
30.1-40%	35917	34.74%	(0.40%)	34.45%	(0.02%)	-0.30%
40.1-50%	18125	45.14%	(0.61%)	44.44%	(0.02%)	-0.70%
50.1-60%	7008	58.54%	(1.00%)	53.97%	(0.03%)	-4.58%
60.1-70%	1094	67.30%	(2.42%)	63.03%	(0.07%)	-4.28%
<i>Mean (std. dev.)</i>						-1.79% (1.82%)
<i>Mean weighted by N (std. dev.)</i>						-0.89% (0.81%)
<i>Root Mean Square (std. dev.)</i>						2.46% (3.05%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.17% (1.34%)

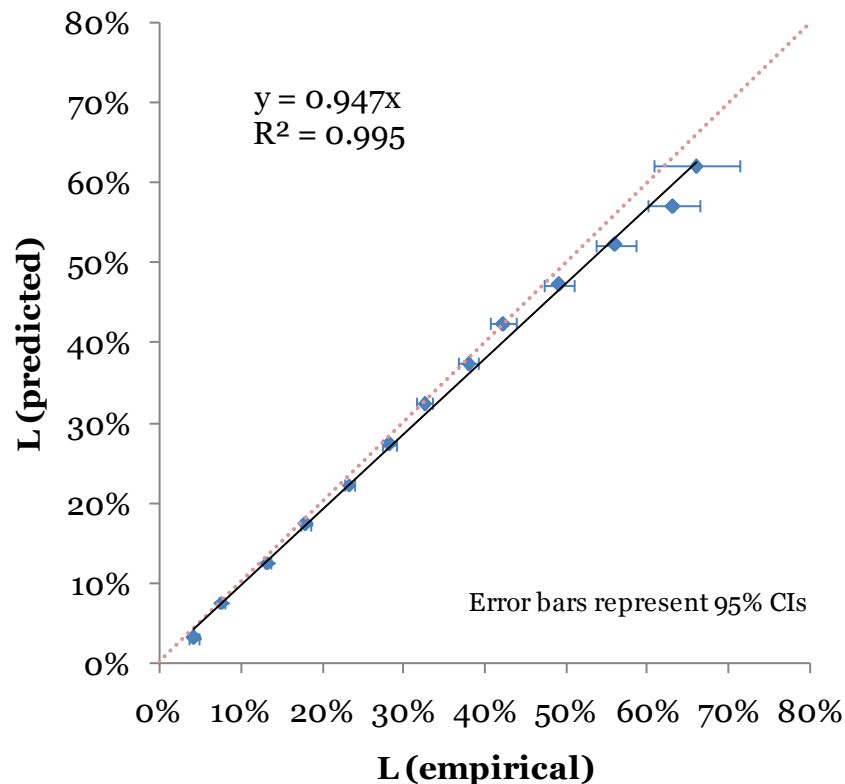
<sup>†</sup>70.1-80% and 80.1+% groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



Grouped by 5% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-5%	44314	4.31%	(0.29%)	3.12%	(0.01%)	-1.19%
5.1-10%	71196	7.76%	(0.20%)	7.51%	(0.01%)	-0.24%
10.1-15%	65292	13.38%	(0.22%)	12.50%	(0.01%)	-0.88%
15.1-20%	49745	18.00%	(0.28%)	17.40%	(0.01%)	-0.60%
20.1-25%	40239	23.29%	(0.32%)	22.27%	(0.01%)	-1.02%
25.1-30%	29479	28.32%	(0.41%)	27.38%	(0.01%)	-0.94%
30.1-35%	21292	32.65%	(0.50%)	32.41%	(0.01%)	-0.25%
35.1-40%	14625	38.00%	(0.65%)	37.41%	(0.01%)	-0.58%
40.1-45%	10626	42.34%	(0.79%)	42.38%	(0.01%)	0.03%
45.1-50%	7499	49.14%	(0.97%)	47.36%	(0.02%)	-1.78%
50.1-55%	4543	56.04%	(1.25%)	52.26%	(0.02%)	-3.78%
55.1-60%	2465	63.17%	(1.65%)	57.11%	(0.03%)	-6.07%
60.1-65%	886	66.01%	(2.69%)	62.10%	(0.05%)	-3.91%
<i>Mean (std. dev.)</i>						-1.63% (1.82%)
<i>Mean weighted by N (std. dev.)</i>						-0.80% (0.67%)
<i>Root Mean Square (std. dev.)</i>						2.39% (3.28%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.02% (1.19%)

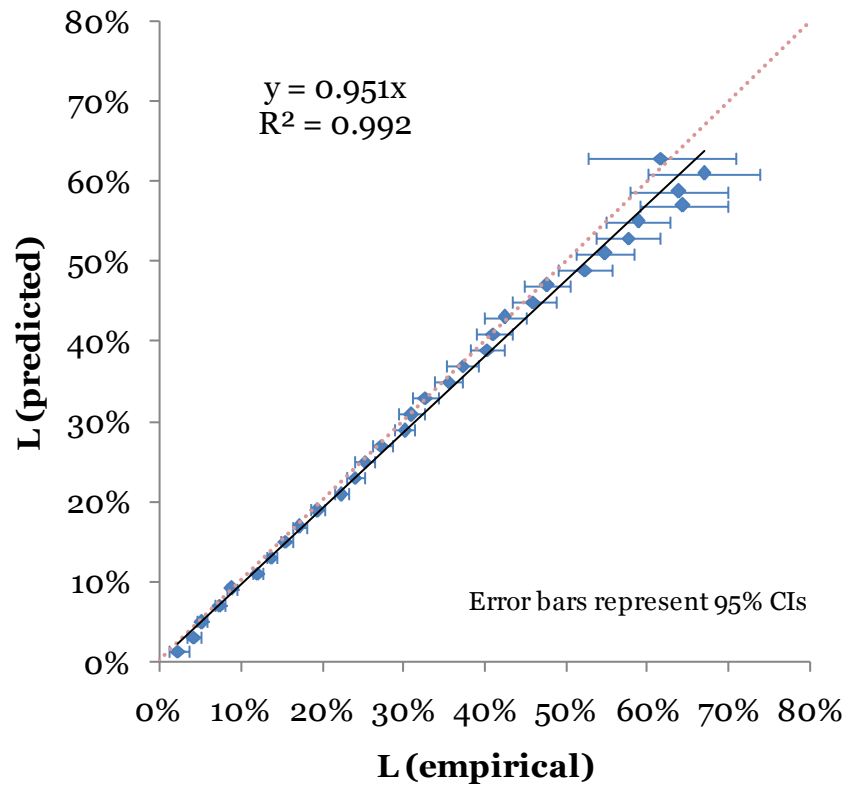
<sup>†</sup>65.1-70%, 70.1-75%, 75.1-80%, 80.1-85%, 85.1+% groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



Grouped by 2% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-2%	8435	2.41%	(0.58%)	1.28%	(0.01%)	-1.12%
3-4%	22785	4.28%	(0.42%)	3.04%	(0.00%)	-1.24%
5-6%	27397	5.27%	(0.31%)	4.97%	(0.00%)	-0.29%
7-8%	29112	7.56%	(0.31%)	7.02%	(0.00%)	-0.54%
9-10%	27781	9.00%	(0.32%)	9.08%	(0.00%)	0.09%
11-12%	25274	12.13%	(0.36%)	11.03%	(0.00%)	-1.10%
13-14%	28441	13.78%	(0.33%)	13.01%	(0.00%)	-0.77%
15-16%	21946	15.66%	(0.41%)	14.96%	(0.00%)	-0.70%
17-18%	19884	17.18%	(0.44%)	16.89%	(0.00%)	-0.29%
19-20%	19492	19.45%	(0.43%)	18.92%	(0.00%)	-0.53%
21-22%	18656	22.37%	(0.45%)	20.93%	(0.00%)	-1.43%
23-24%	14830	24.08%	(0.56%)	22.95%	(0.00%)	-1.14%
25-26%	13544	25.28%	(0.59%)	24.98%	(0.01%)	-0.30%
27-28%	11202	27.42%	(0.66%)	26.95%	(0.01%)	-0.47%
29-30%	11486	30.18%	(0.63%)	28.91%	(0.01%)	-1.27%
31-32%	8839	30.98%	(0.77%)	30.91%	(0.01%)	-0.07%
33-34%	8486	32.76%	(0.79%)	32.99%	(0.01%)	0.24%
35-36%	7048	35.55%	(0.88%)	34.93%	(0.01%)	-0.62%
37-38%	6103	37.31%	(1.02%)	36.98%	(0.01%)	-0.33%
39-40%	5441	40.37%	(1.07%)	38.99%	(0.01%)	-1.38%
41-42%	4688	41.12%	(1.16%)	40.93%	(0.01%)	-0.19%
43-44%	3935	42.45%	(1.29%)	43.03%	(0.01%)	0.58%
45-46%	3726	46.00%	(1.40%)	44.95%	(0.01%)	-1.05%
47-48%	3151	47.66%	(1.44%)	47.05%	(0.01%)	-0.62%
49-50%	2625	52.38%	(1.71%)	48.95%	(0.01%)	-3.42%
51-52%	2191	54.80%	(1.83%)	51.02%	(0.01%)	-3.78%
53-54%	1661	57.65%	(2.03%)	52.97%	(0.01%)	-4.68%
55-56%	1456	58.83%	(2.06%)	55.00%	(0.01%)	-3.83%
57-58%	919	64.39%	(2.77%)	57.02%	(0.02%)	-7.37%
59-60%	781	63.89%	(3.03%)	58.84%	(0.02%)	-5.05%
61-62%	492	66.97%	(3.52%)	61.02%	(0.03%)	-5.95%
63-64%	261	61.73%	(4.60%)	62.90%	(0.04%)	1.17%
<i>Mean (std. dev.)</i>						-1.48% (2.00%)
<i>Mean weighted by N (std. dev.)</i>						-0.74% (0.75%)
<i>Root Mean Square (std. dev.)</i>						2.47% (3.51%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.05% (1.34%)

<sup>†</sup>65-66%, 67-68% ... 87-88%, 89-90% not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



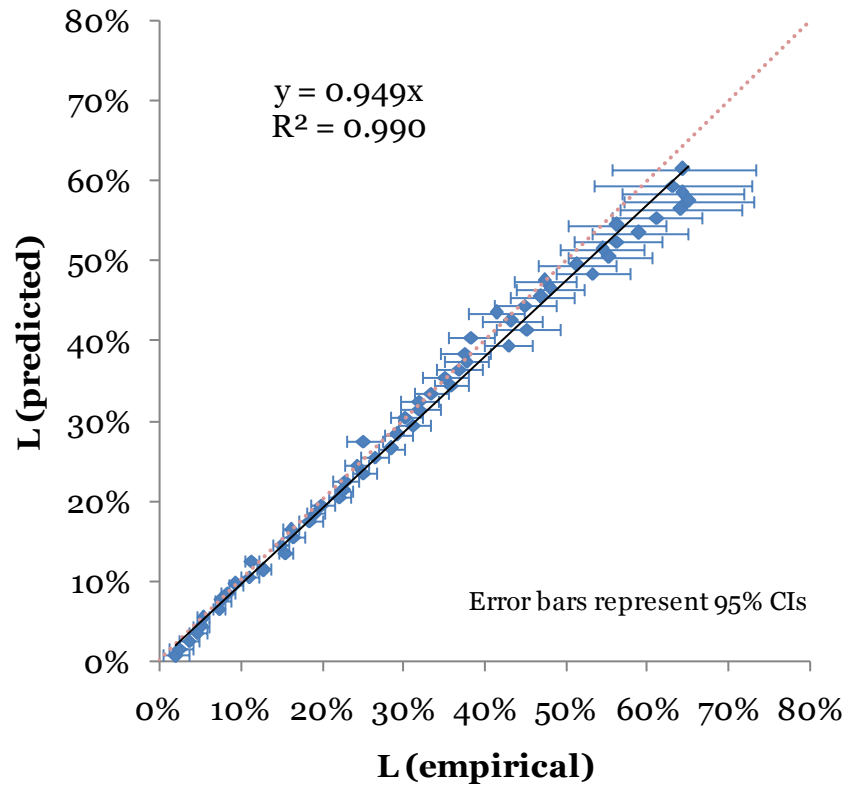
Grouped by 1% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1	2640	2.05%	(0.79%)	0.70%	(0.00%)	-1.35%
2	5795	2.58%	(0.75%)	1.55%	(0.00%)	-1.03%
3	10372	3.69%	(0.62%)	2.53%	(0.00%)	-1.16%
4	12413	4.65%	(0.56%)	3.48%	(0.00%)	-1.17%
5	13094	5.19%	(0.51%)	4.43%	(0.00%)	-0.76%
6	14303	5.38%	(0.38%)	5.47%	(0.00%)	0.09%
7	15980	7.36%	(0.41%)	6.55%	(0.00%)	-0.81%
8	13132	7.81%	(0.48%)	7.59%	(0.00%)	-0.22%
9	13023	8.45%	(0.47%)	8.50%	(0.00%)	0.05%
10	14758	9.45%	(0.44%)	9.59%	(0.00%)	0.14%
11	11230	11.02%	(0.56%)	10.50%	(0.00%)	-0.52%
12	14044	12.89%	(0.47%)	11.45%	(0.00%)	-1.43%
13	14388	11.39%	(0.47%)	12.53%	(0.00%)	1.14%
14	14053	15.59%	(0.45%)	13.50%	(0.00%)	-2.09%
15	11577	14.97%	(0.52%)	14.47%	(0.00%)	-0.50%
16	10369	16.57%	(0.66%)	15.51%	(0.00%)	-1.06%
17	11128	16.16%	(0.55%)	16.42%	(0.00%)	0.26%
18	8756	18.59%	(0.70%)	17.50%	(0.00%)	-1.09%
19	11007	19.18%	(0.54%)	18.46%	(0.00%)	-0.72%
20	8485	20.01%	(0.73%)	19.52%	(0.00%)	-0.49%
21	8837	22.18%	(0.74%)	20.48%	(0.00%)	-1.70%
22	9819	22.69%	(0.57%)	21.34%	(0.00%)	-1.35%
23	7799	22.91%	(0.77%)	22.49%	(0.00%)	-0.42%
24	7031	25.21%	(0.80%)	23.45%	(0.00%)	-1.76%
25	6753	24.27%	(0.79%)	24.46%	(0.00%)	0.19%
26	6791	26.48%	(0.90%)	25.50%	(0.00%)	-0.99%
27	6472	28.56%	(0.83%)	26.54%	(0.00%)	-2.02%
28	4730	25.22%	(1.07%)	27.51%	(0.00%)	2.29%
29	5975	29.39%	(0.82%)	28.36%	(0.00%)	-1.03%
30	5511	31.29%	(1.01%)	29.50%	(0.00%)	-1.79%
31	4948	30.31%	(0.98%)	30.47%	(0.00%)	0.16%
32	3891	32.03%	(1.26%)	31.47%	(0.00%)	-0.55%
33	4021	31.99%	(1.15%)	32.47%	(0.00%)	0.48%
34	4465	33.44%	(1.09%)	33.47%	(0.00%)	0.03%
35	3967	35.90%	(1.12%)	34.49%	(0.00%)	-1.41%
36	3081	35.13%	(1.40%)	35.50%	(0.01%)	0.37%
37	2964	36.84%	(1.48%)	36.47%	(0.01%)	-0.37%
38	3139	37.76%	(1.41%)	37.45%	(0.01%)	-0.31%
39	2607	37.60%	(1.52%)	38.45%	(0.01%)	0.86%
40	2834	42.92%	(1.49%)	39.48%	(0.01%)	-3.44%
41	2552	38.36%	(1.45%)	40.47%	(0.01%)	2.11%
42	2136	45.32%	(1.95%)	41.49%	(0.01%)	-3.83%
43	1939	43.36%	(1.83%)	42.52%	(0.01%)	-0.84%
44	1996	41.47%	(1.78%)	43.52%	(0.01%)	2.06%
45	2003	45.03%	(1.95%)	44.47%	(0.01%)	-0.56%
46	1723	47.02%	(2.00%)	45.51%	(0.01%)	-1.51%
47	1544	48.05%	(2.13%)	46.54%	(0.01%)	-1.51%
48	1607	47.35%	(1.96%)	47.53%	(0.01%)	0.18%
49	1410	53.22%	(2.33%)	48.48%	(0.01%)	-4.74%
50	1215	51.31%	(2.48%)	49.50%	(0.01%)	-1.81%
51	1080	55.37%	(2.58%)	50.52%	(0.01%)	-4.85%
52	1111	54.43%	(2.60%)	51.51%	(0.01%)	-2.93%



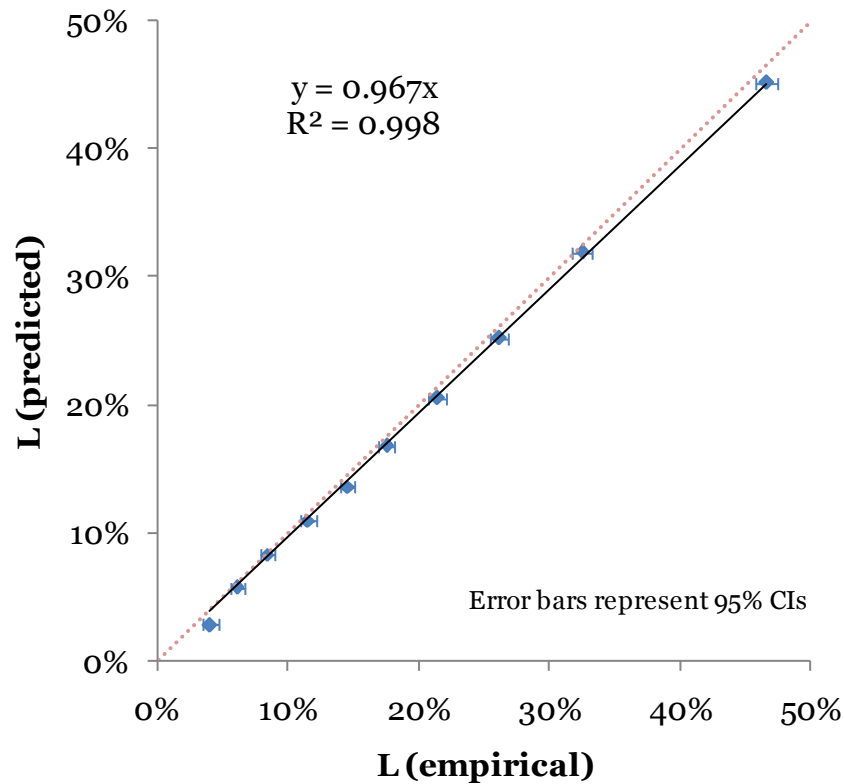
53	851	56.34%	(2.75%)	52.47%	(0.01%)	-3.87%
54	810	59.06%	(3.00%)	53.49%	(0.01%)	-5.57%
55	691	56.23%	(3.02%)	54.50%	(0.01%)	-1.73%
56	765	61.15%	(2.81%)	55.45%	(0.01%)	-5.70%
57	452	64.06%	(3.80%)	56.50%	(0.01%)	-7.56%
58	467	65.04%	(4.06%)	57.52%	(0.01%)	-7.52%
59	496	64.26%	(3.80%)	58.49%	(0.01%)	-5.78%
60	285	63.14%	(4.93%)	59.45%	(0.02%)	-3.69%
62	260	64.39%	(4.49%)	61.49%	(0.02%)	-2.90%
<i>Mean (std. dev.)</i>						-1.44% (2.11%)
<i>Mean weighted by N (std. dev.)</i>						-0.72% (1.18%)
<i>Root Mean Square (std. dev.)</i>						2.54% (3.52%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.38% (1.93%)

†61%, 63%, 64% ... 87%, 88% groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



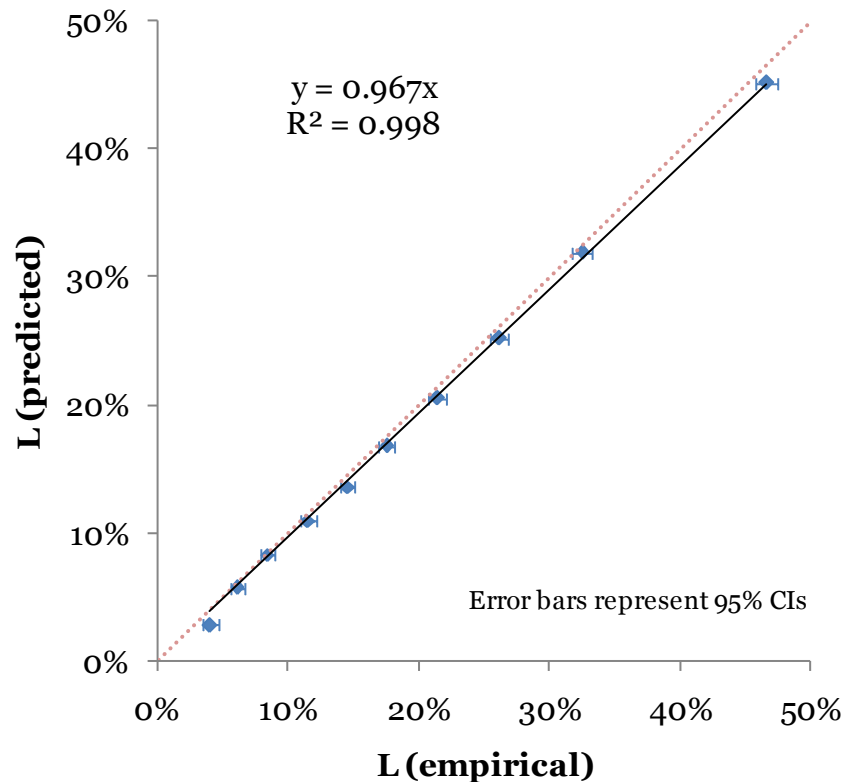
Grouped by 10% predicted lethality percentiles using the Size+Nodes+PrognosticFactors equation

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-4.3%	36424	3.98%	(0.32%)	2.79%	(0.01%)	-1.19%
4.4-6.9%	36081	6.07%	(0.28%)	5.68%	(0.00%)	-0.39%
7.0-9.7%	36473	8.34%	(0.27%)	8.28%	(0.00%)	-0.06%
9.8-12.3%	36036	11.50%	(0.30%)	10.95%	(0.00%)	-0.55%
12.4-15.0%	36245	14.52%	(0.29%)	13.60%	(0.00%)	-0.92%
15.1-18.5%	36356	17.49%	(0.32%)	16.77%	(0.01%)	-0.72%
18.6-22.6%	36130	21.37%	(0.33%)	20.50%	(0.01%)	-0.87%
22.7-28.0%	36577	26.13%	(0.35%)	25.22%	(0.01%)	-0.91%
28.1-36.4%	35920	32.45%	(0.39%)	31.91%	(0.01%)	-0.54%
36.5+%	36249	46.61%	(0.43%)	45.20%	(0.04%)	-1.40%
Mean (std. dev.)						-0.76% (0.39%)
Mean weighted by N (std. dev.)						-0.76% (0.39%)
Root Mean Square (std. dev.)						0.84% (0.78%)
Root Mean Square weighted by N (std. dev.)						0.84% (0.78%)



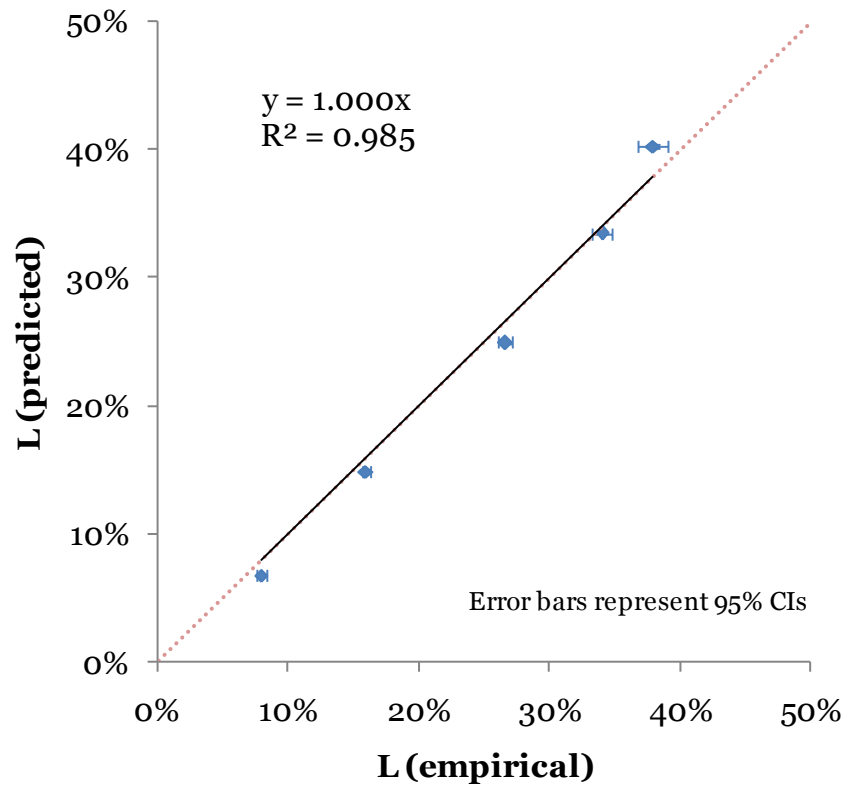
Grouped by 5% predicted lethality percentiles using the Size+Nodes+PrognosticFactors equation

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-2.9%	18125	3.05%	(0.44%)	1.93%	(0.01%)	-1.12%
3.0-4.3%	18299	4.63%	(0.43%)	3.65%	(0.00%)	-0.98%
4.4-5.7%	18276	4.92%	(0.37%)	5.02%	(0.00%)	0.10%
5.8-6.9%	17805	7.04%	(0.40%)	6.35%	(0.00%)	-0.68%
7.0-8.3%	18122	7.97%	(0.39%)	7.61%	(0.00%)	-0.37%
8.4-9.7%	18351	8.70%	(0.38%)	8.95%	(0.00%)	0.25%
9.8-11.0%	17895	10.79%	(0.43%)	10.27%	(0.00%)	-0.52%
11.1-12.3%	18141	12.20%	(0.42%)	11.62%	(0.00%)	-0.57%
12.4-13.4%	18109	14.58%	(0.40%)	12.96%	(0.00%)	-1.62%
13.5-15.0%	18136	14.40%	(0.43%)	14.23%	(0.00%)	-0.17%
15.1-16.6%	18209	16.36%	(0.46%)	15.87%	(0.00%)	-0.49%
16.7-18.5%	18147	18.50%	(0.44%)	17.67%	(0.00%)	-0.82%
18.6-20.5%	18011	20.59%	(0.49%)	19.53%	(0.00%)	-1.06%
20.6-22.6%	18119	22.16%	(0.46%)	21.47%	(0.00%)	-0.69%
22.7-25.1%	18127	24.63%	(0.49%)	23.80%	(0.01%)	-0.83%
25.2-28.0%	18450	27.61%	(0.50%)	26.61%	(0.01%)	-0.99%
28.1-31.7%	17799	30.44%	(0.55%)	29.82%	(0.01%)	-0.63%
31.8-36.4%	18121	34.38%	(0.55%)	33.97%	(0.01%)	-0.40%
36.5-43.8%	18126	40.22%	(0.59%)	39.82%	(0.02%)	-0.40%
43.9+%	18123	53.17%	(0.62%)	50.59%	(0.04%)	-2.57%
Mean (std. dev.)						-0.73% (0.61%)
Mean weighted by N (std. dev.)						-0.73% (0.61%)
Root Mean Square (std. dev.)						0.94% (1.22%)
Root Mean Square weighted by N (std. dev.)						0.94% (1.22%)



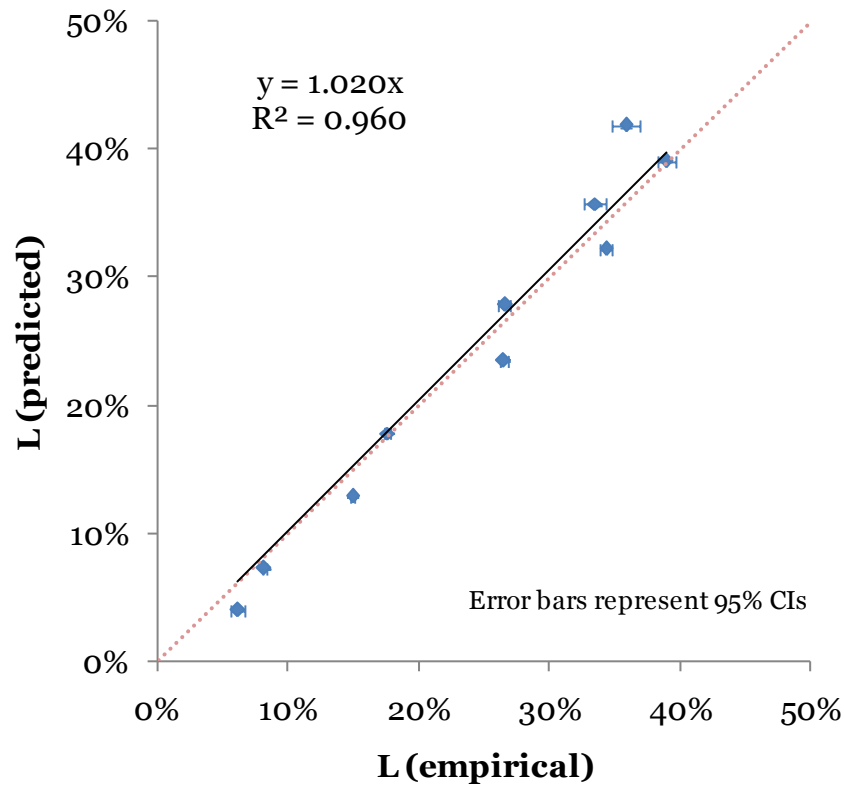
Grouped by 10 mm tumor size bins

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	79542	7.89%	(0.19%)	6.73%	(0.02%)	-1.16%
11-20 mm	153328	15.92%	(0.16%)	14.84%	(0.02%)	-1.08%
21-30 mm	81722	26.57%	(0.24%)	24.93%	(0.04%)	-1.64%
31-40 mm	32763	34.02%	(0.39%)	33.48%	(0.06%)	-0.54%
41-50 mm	15136	37.88%	(0.58%)	40.24%	(0.09%)	2.36%
<i>Mean (std. dev.)</i>						-0.41% (1.60%)
<i>Mean weighted by N (std. dev.)</i>						-1.03% (1.14%)
<i>Root Mean Square (std. dev.)</i>						1.49% (1.44%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.45% (1.48%)



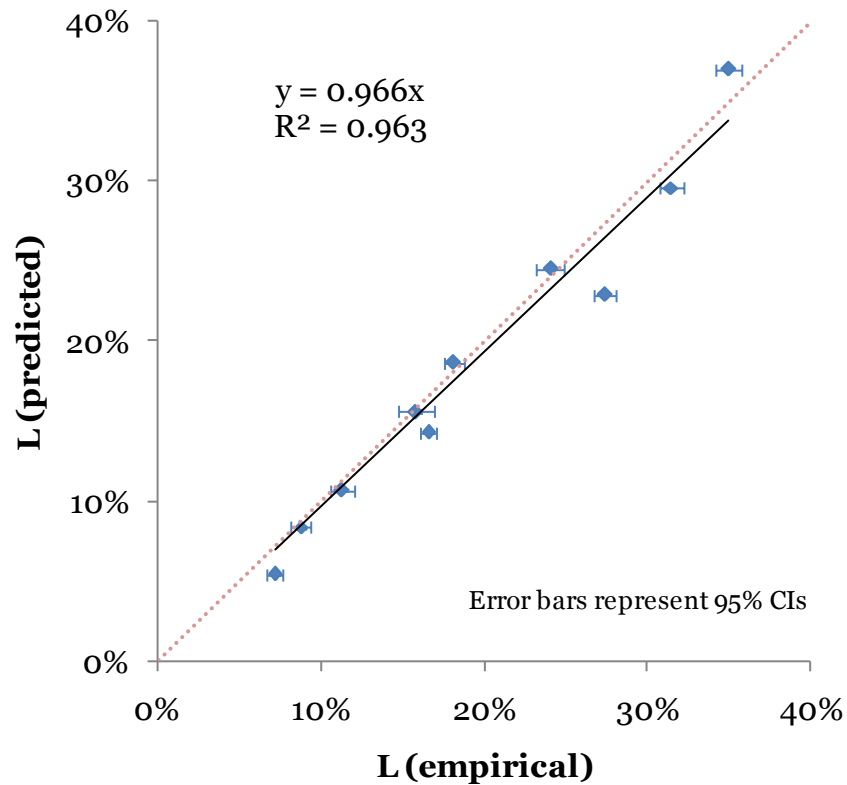
# Grouped by 5 mm tumor size bins

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-5 mm	12919	6.08%	(0.49%)	3.94%	(0.04%)	-2.14%
6-10 mm	66623	8.15%	(0.21%)	7.27%	(0.02%)	-0.88%
11-15 mm	91912	14.89%	(0.20%)	12.86%	(0.02%)	-2.03%
16-20 mm	61416	17.56%	(0.29%)	17.80%	(0.03%)	0.24%
21-25 mm	54761	26.43%	(0.29%)	23.49%	(0.04%)	-2.95%
26-30 mm	26961	26.54%	(0.46%)	27.86%	(0.06%)	1.32%
31-35 mm	21281	34.31%	(0.45%)	32.25%	(0.07%)	-2.06%
36-40 mm	11482	33.44%	(0.77%)	35.74%	(0.10%)	2.31%
41-45 mm	8985	38.90%	(0.70%)	39.10%	(0.12%)	0.20%
46-50 mm	6151	35.81%	(1.04%)	41.91%	(0.15%)	6.10%
Mean (std. dev.)						0.01% (2.72%)
Mean weighted by N (std. dev.)						-1.00% (2.21%)
Root Mean Square (std. dev.)						2.58% (3.33%)
Root Mean Square weighted by N (std. dev.)						2.32% (3.09%)



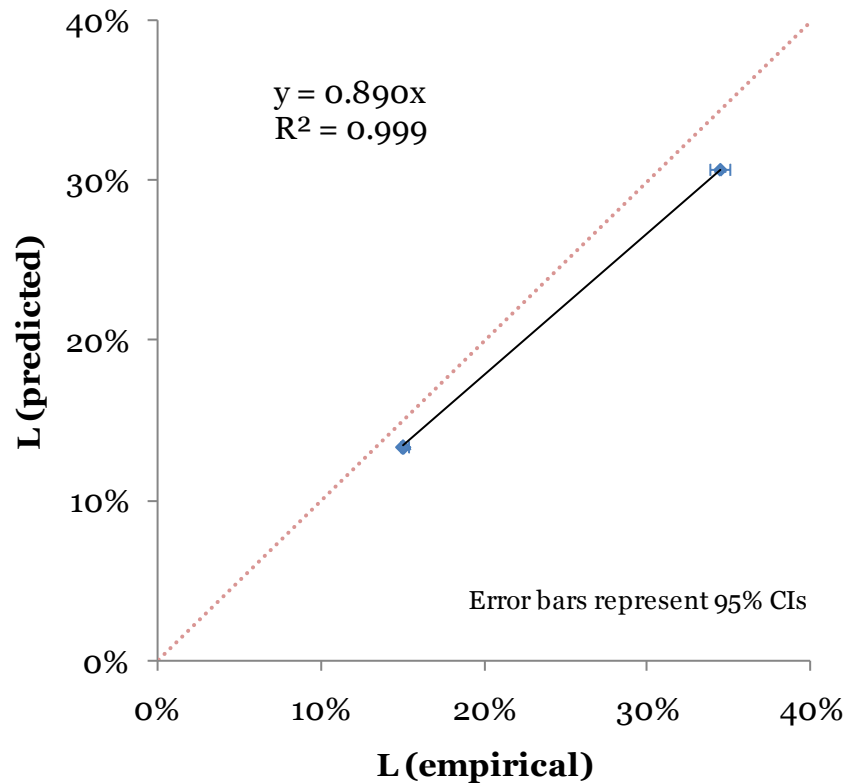
# Grouped by 10% tumor size percentiles

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-8 mm	44510	7.16%	(0.25%)	5.42%	(0.02%)	-1.74%
9-10 mm	35032	8.76%	(0.30%)	8.39%	(0.03%)	-0.37%
11-13 mm	36804	11.29%	(0.39%)	10.69%	(0.03%)	-0.59%
14-15 mm	55108	16.59%	(0.24%)	14.31%	(0.03%)	-2.28%
16-17 mm	16894	15.81%	(0.58%)	15.58%	(0.06%)	-0.24%
18-20 mm	44522	18.15%	(0.33%)	18.64%	(0.04%)	0.49%
21-23 mm	30854	27.40%	(0.35%)	22.89%	(0.05%)	-4.50%
24-27 mm	29468	24.07%	(0.44%)	24.50%	(0.06%)	0.44%
28-33 mm	33673	31.44%	(0.37%)	29.60%	(0.06%)	-1.84%
34-50 mm	35626	34.96%	(0.41%)	37.00%	(0.06%)	2.05%
Mean (std. dev.)						-0.86% (1.82%)
Mean weighted by N (std. dev.)						-0.92% (1.85%)
Root Mean Square (std. dev.)						1.92% (2.48%)
Root Mean Square weighted by N (std. dev.)						1.98% (2.30%)



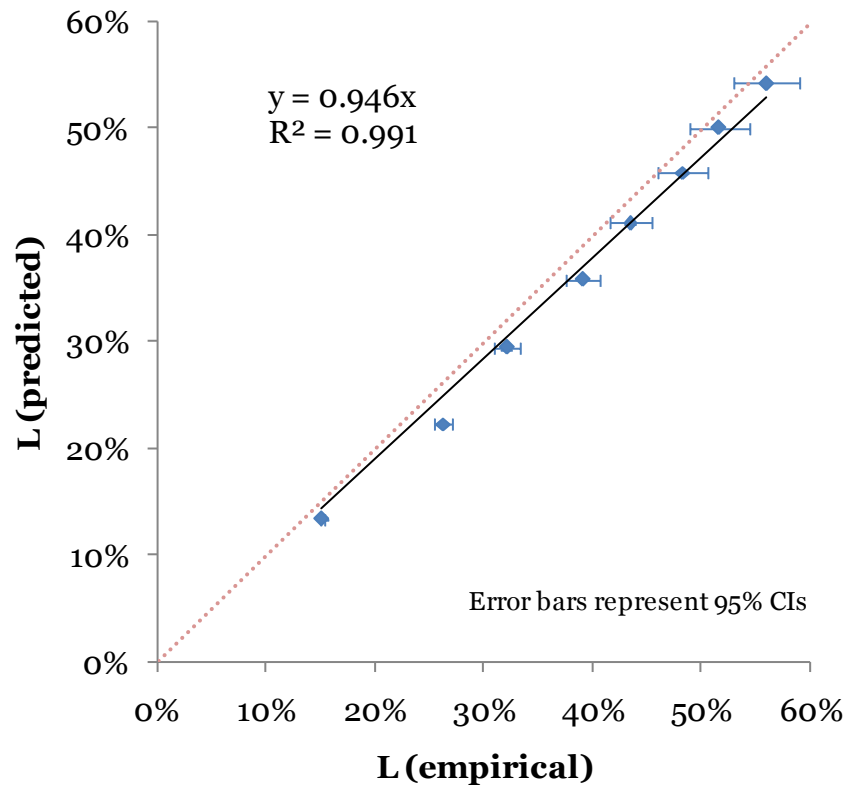
## Grouped by lymph nodes positivity status

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Negative	263544	15.09%	(0.12%)	13.34%	(0.02%)	-1.75%
Positive	98947	34.42%	(0.29%)	30.70%	(0.04%)	-3.72%
<i>Mean (std. dev.)</i>						-2.74% (1.39%)
<i>Mean weighted by N (std. dev.)</i>						-2.29% (0.36%)
<i>Root Mean Square (std. dev.)</i>						2.91% (2.76%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.30% (1.29%)



# Grouped by number of positive lymph nodes

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0	263544	15.09%	(0.12%)	13.34%	(0.02%)	-1.75%
1	44002	26.21%	(0.42%)	22.32%	(0.04%)	-3.89%
2	21367	32.06%	(0.59%)	29.46%	(0.06%)	-2.60%
3	12319	39.05%	(0.80%)	35.86%	(0.07%)	-3.19%
4	7934	43.40%	(0.98%)	41.17%	(0.08%)	-2.23%
5	5699	48.28%	(1.17%)	45.90%	(0.09%)	-2.39%
6	4296	51.63%	(1.38%)	50.11%	(0.09%)	-1.51%
7	3330	55.99%	(1.53%)	54.25%	(0.10%)	-1.74%
<i>Mean (std. dev.)</i>						-2.41% (0.81%)
<i>Mean weighted by N (std. dev.)</i>						-2.13% (3.47%)
<i>Root Mean Square (std. dev.)</i>						2.53% (2.09%)
<i>Root Mean Square weighted by N (std. dev.)</i>						3.88% (6.01%)

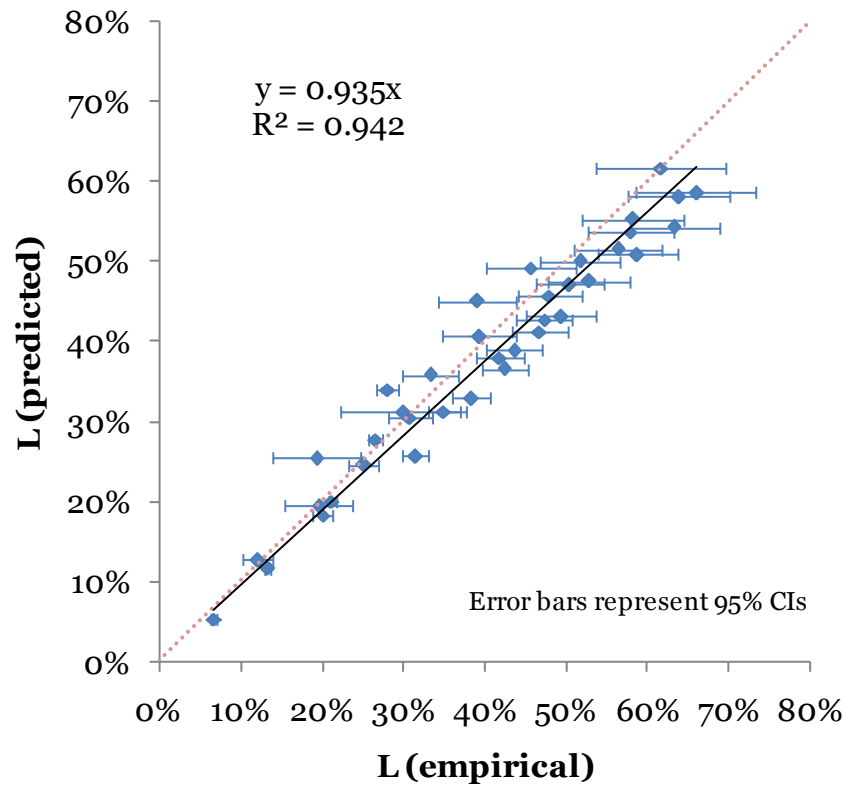




# Permutations of 10 mm tumor size bins and number of positive lymph nodes

Group <sup>†</sup> Size	Nodes	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	0	70435	6.77%	(0.19%)	5.30%	(0.01%)	-1.48%
11-20 mm	0	115491	13.33%	(0.17%)	11.61%	(0.01%)	-1.72%
21-30 mm	0	51410	21.24%	(0.27%)	19.98%	(0.03%)	-1.26%
31-40 mm	0	18375	26.62%	(0.45%)	27.74%	(0.05%)	1.12%
41-50 mm	0	7833	28.03%	(0.69%)	33.95%	(0.10%)	5.92%
1-10 mm	1	5482	12.14%	(0.95%)	12.67%	(0.03%)	0.53%
11-20 mm	1	19148	20.12%	(0.63%)	18.28%	(0.03%)	-1.84%
21-30 mm	1	12198	31.52%	(0.82%)	25.69%	(0.05%)	-5.84%
31-40 mm	1	4997	38.34%	(1.15%)	32.91%	(0.10%)	-5.42%
41-50 mm	1	2177	43.63%	(1.80%)	38.88%	(0.18%)	-4.74%
1-10 mm	2	1806	19.64%	(2.09%)	19.41%	(0.05%)	-0.23%
11-20 mm	2	8321	25.12%	(0.97%)	24.62%	(0.04%)	-0.50%
21-30 mm	2	6651	35.02%	(1.04%)	31.23%	(0.06%)	-3.79%
31-40 mm	2	3096	41.88%	(1.49%)	37.94%	(0.11%)	-3.94%
41-50 mm	2	1493	49.39%	(2.20%)	43.15%	(0.19%)	-6.24%
1-10 mm	3	740	19.39%	(2.72%)	25.41%	(0.08%)	6.02%
11-20 mm	3	4188	30.86%	(1.40%)	30.50%	(0.06%)	-0.35%
21-30 mm	3	4143	42.47%	(1.41%)	36.51%	(0.07%)	-5.96%
31-40 mm	3	2157	47.38%	(1.77%)	42.71%	(0.12%)	-4.66%
41-50 mm	3	1091	52.85%	(2.55%)	47.54%	(0.21%)	-5.31%
1-10 mm	4	453	30.01%	(3.91%)	31.14%	(0.10%)	1.12%
11-20 mm	4	2464	33.37%	(1.76%)	35.76%	(0.07%)	2.39%
21-30 mm	4	2668	46.79%	(1.73%)	41.22%	(0.08%)	-5.57%
31-40 mm	4	1501	50.48%	(2.15%)	47.13%	(0.14%)	-3.35%
41-50 mm	4	848	56.40%	(2.76%)	51.54%	(0.22%)	-4.86%
11-20 mm	5	1623	39.39%	(2.30%)	40.63%	(0.08%)	1.24%
21-30 mm	5	2034	48.02%	(1.96%)	45.69%	(0.08%)	-2.33%
31-40 mm	5	1082	58.78%	(2.48%)	50.88%	(0.15%)	-7.90%
41-50 mm	5	675	58.22%	(3.16%)	55.30%	(0.22%)	-2.91%
11-20 mm	6	1210	39.12%	(2.48%)	45.08%	(0.08%)	5.95%
21-30 mm	6	1487	51.78%	(2.50%)	50.01%	(0.10%)	-1.77%
31-40 mm	6	850	63.31%	(2.81%)	54.29%	(0.15%)	-9.01%
41-50 mm	6	541	66.03%	(3.76%)	58.60%	(0.22%)	-7.44%
11-20 mm	7	883	45.66%	(2.79%)	49.20%	(0.09%)	3.54%
21-30 mm	7	1131	57.92%	(2.65%)	53.69%	(0.11%)	-4.23%
31-40 mm	7	705	63.84%	(3.22%)	58.12%	(0.17%)	-5.72%
41-50 mm	7	478	61.68%	(4.09%)	61.70%	(0.22%)	0.03%
Mean (std. dev.)							-2.18% (3.86%)
Mean weighted by N (std. dev.)							-1.59% (4.09%)
Root Mean Square (std. dev.)							4.39% (4.44%)
Root Mean Square weighted by N (std. dev.)							4.33% (8.36%)

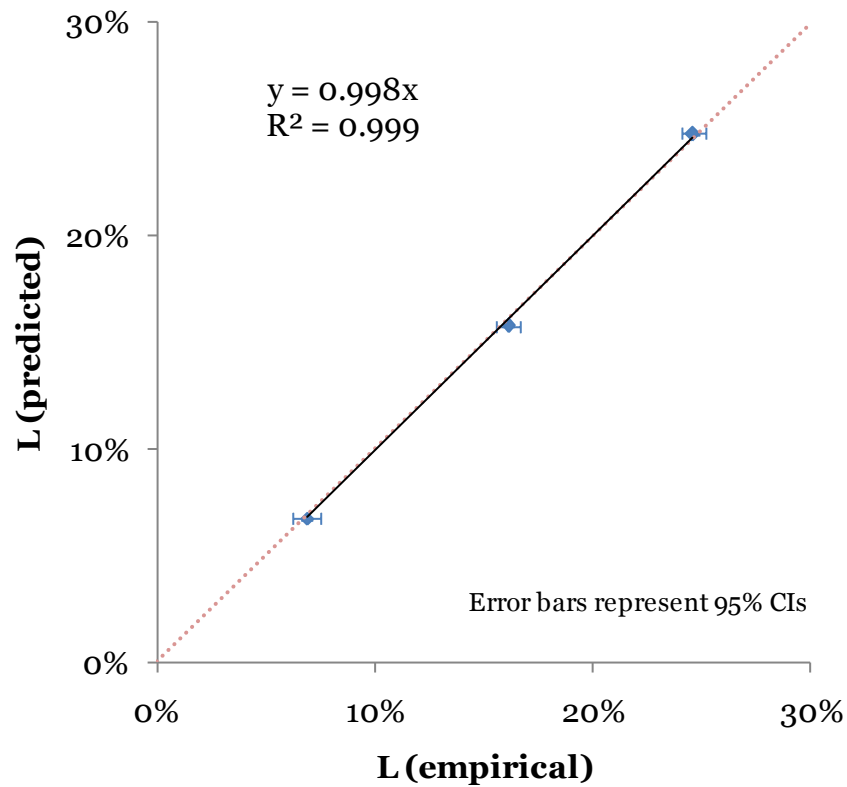
<sup>†</sup>for the combinations of 1-10 mm with 5, 6, and 7 positive nodes, the groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



## Grouped by tumor grade

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
grade 1	51159	6.84%	(0.27%)	6.74%	(0.03%)	-0.11%
grade 2	114415	16.10%	(0.27%)	15.77%	(0.03%)	-0.33%
grade 3	95092	24.61%	(0.27%)	24.79%	(0.04%)	0.19%
<i>Mean (std. dev.)</i>						-0.08% (0.26%)
<i>Mean weighted by N (std. dev.)</i>						-0.10% (0.32%)
<i>Root Mean Square (std. dev.)</i>						0.23% (0.22%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.28% (0.31%)

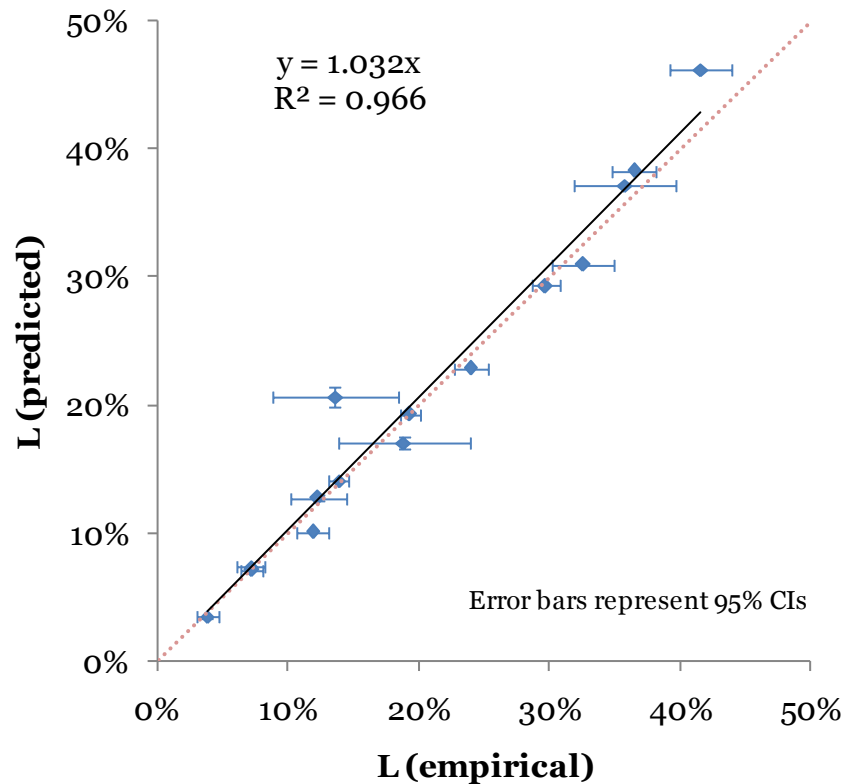
<sup>†</sup>grade 4 also exists in the dataset, but is not included in the calculation of the mean or displayed on graph; grade 4 no longer exists



## Permutations of 10 mm tumor size bins and tumor grade

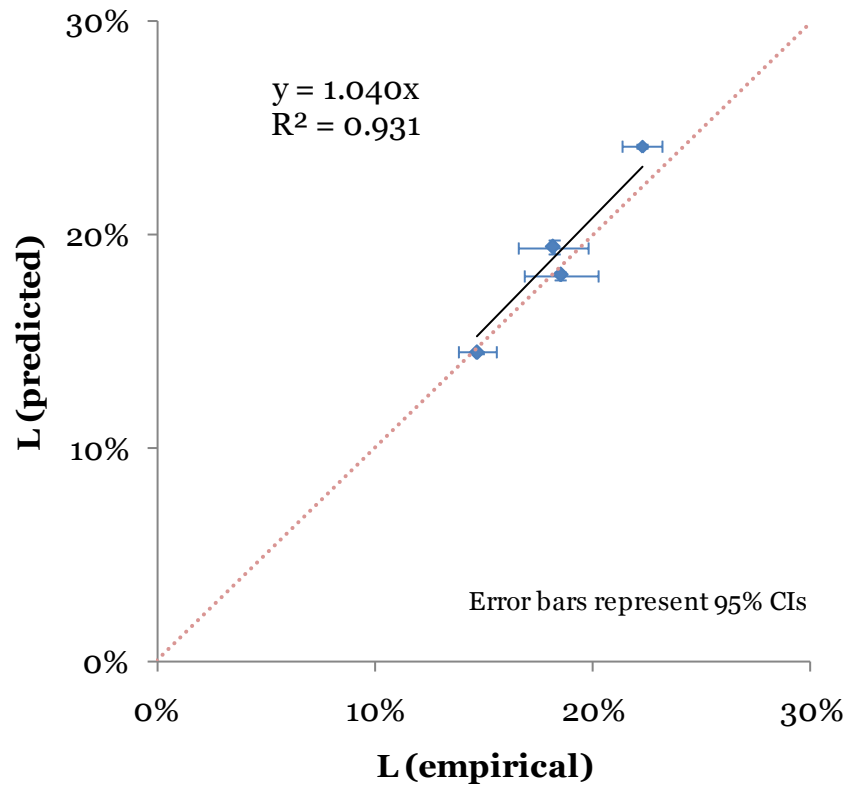
Group <sup>†</sup> Size	Grade	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	1	21723	3.76%	(0.43%)	3.42%	(0.03%)	-0.33%
11-20 mm	1	21760	7.11%	(0.56%)	7.37%	(0.04%)	0.27%
21-30 mm	1	5458	12.24%	(1.09%)	12.71%	(0.11%)	0.47%
31-40 mm	1	1476	18.85%	(2.57%)	17.03%	(0.25%)	-1.81%
41-50 mm	1	742	13.56%	(2.43%)	20.60%	(0.38%)	7.04%
1-10 mm	2	28311	7.14%	(0.43%)	7.13%	(0.03%)	-0.01%
11-20 mm	2	53374	13.84%	(0.38%)	14.07%	(0.03%)	0.23%
21-30 mm	2	22384	23.90%	(0.66%)	22.83%	(0.06%)	-1.07%
31-40 mm	2	7137	32.51%	(1.21%)	30.98%	(0.12%)	-1.53%
41-50 mm	2	3209	35.73%	(1.95%)	37.12%	(0.18%)	1.39%
1-10 mm	3	12257	11.84%	(0.65%)	10.06%	(0.06%)	-1.79%
11-20 mm	3	38346	19.26%	(0.40%)	19.23%	(0.04%)	-0.03%
21-30 mm	3	27620	29.66%	(0.53%)	29.31%	(0.06%)	-0.35%
31-40 mm	3	11622	36.44%	(0.83%)	38.29%	(0.09%)	1.85%
41-50 mm	3	5247	41.54%	(1.19%)	46.20%	(0.13%)	4.66%
<i>Mean (std. dev.)</i>							0.60% (2.42%)
<i>Mean weighted by N (std. dev.)</i>							-0.01% (0.79%)
<i>Root Mean Square (std. dev.)</i>							2.41% (3.64%)
<i>Root Mean Square weighted by N (std. dev.)</i>							0.76% (0.87%)

<sup>†</sup>grade 4 also exists in the dataset, but is not included in the calculation of the mean or displayed on graph; grade 4 no longer exists



Grouped by estrogen and progesterone receptor status

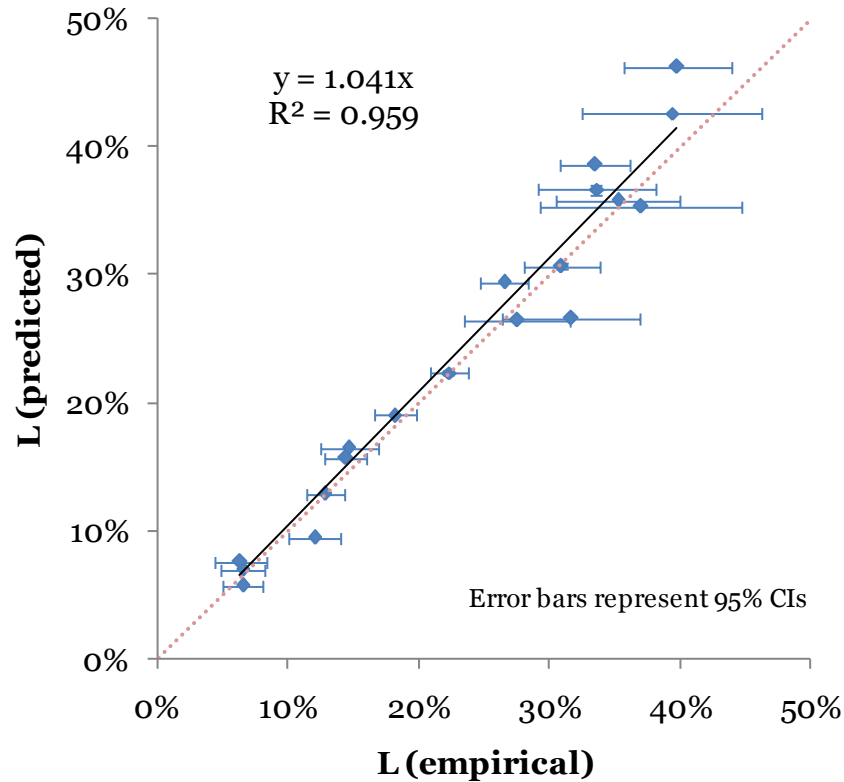
Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
ER+/PR+	151742	14.68%	(0.43%)	14.49%	(0.03%)	-0.19%
ER+/PR-	28880	18.51%	(0.87%)	18.10%	(0.08%)	-0.41%
ER-/PR+	5519	18.16%	(0.81%)	19.44%	(0.17%)	1.27%
ER-/PR-	44672	22.25%	(0.48%)	24.17%	(0.06%)	1.92%
<i>Mean (std. dev.)</i>						0.65% (1.13%)
<i>Mean weighted by N (std. dev.)</i>						0.23% (0.88%)
<i>Root Mean Square (std. dev.)</i>						1.17% (1.30%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.79% (1.03%)



# Permutations of 10 mm tumor size bins and estrogen/progesterone receptor status

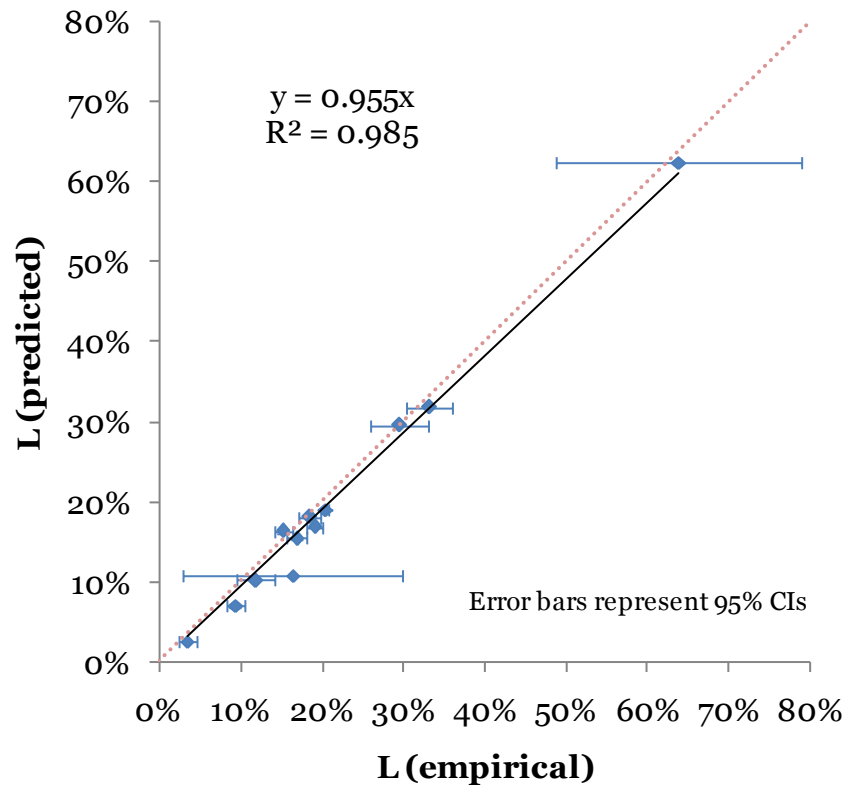
Group <sup>†</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Size	ER/PR						
1-10 mm	ER+/PR+	40037	6.48%	(0.75%)	5.73%	(0.03%)	-0.75%
11-20 mm	ER+/PR+	69671	12.79%	(0.72%)	12.86%	(0.03%)	0.07%
21-30 mm	ER+/PR+	28800	22.27%	(0.75%)	22.33%	(0.06%)	0.06%
31-40 mm	ER+/PR+	9105	30.89%	(1.50%)	30.62%	(0.12%)	-0.27%
41-50 mm	ER+/PR+	4129	33.59%	(2.31%)	36.66%	(0.19%)	3.07%
1-10 mm	ER+/PR-	7515	6.48%	(0.87%)	6.94%	(0.07%)	0.46%
11-20 mm	ER+/PR-	12295	14.32%	(0.81%)	15.69%	(0.08%)	1.36%
21-30 mm	ER+/PR-	5864	31.65%	(2.68%)	26.63%	(0.14%)	-5.02%
31-40 mm	ER+/PR-	2208	35.22%	(2.40%)	35.83%	(0.24%)	0.61%
41-50 mm	ER+/PR-	998	39.33%	(3.50%)	42.62%	(0.37%)	3.29%
1-10 mm	ER-/PR+	1196	6.29%	(1.03%)	7.60%	(0.18%)	1.31%
11-20 mm	ER-/PR+	2378	14.62%	(1.11%)	16.45%	(0.18%)	1.83%
21-30 mm	ER-/PR+	1250	27.53%	(2.07%)	26.43%	(0.28%)	-1.10%
31-40 mm	ER-/PR+	486	36.97%	(3.91%)	35.36%	(0.47%)	-1.61%
1-10 mm	ER-/PR-	7058	11.98%	(1.00%)	9.41%	(0.08%)	-2.58%
11-20 mm	ER-/PR-	17516	18.12%	(0.81%)	19.00%	(0.06%)	0.88%
21-30 mm	ER-/PR-	12393	26.50%	(0.95%)	29.43%	(0.09%)	2.93%
31-40 mm	ER-/PR-	5283	33.44%	(1.33%)	38.62%	(0.14%)	5.18%
41-50 mm	ER-/PR-	2422	39.72%	(2.11%)	46.27%	(0.21%)	6.55%
Mean (std. dev.)							0.86% (2.68%)
Mean weighted by N (std. dev.)							0.27% (1.37%)
Root Mean Square (std. dev.)							2.74% (3.42%)
Root Mean Square weighted by N (std. dev.)							1.36% (1.63%)

<sup>†</sup> the group that is the combination of 41-50 mm with ER-/PR+ is not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



## Grouped by histological type

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Ductal	264692	20.51%	(0.13%)	18.96%	(0.02%)	-1.56%
Lobular	25117	19.13%	(0.49%)	16.84%	(0.07%)	-2.29%
Intraductal+ LCIS	23449	16.90%	(0.64%)	15.44%	(0.07%)	-1.45%
Mucinous	9374	9.39%	(0.56%)	7.00%	(0.06%)	-2.39%
Medullary	5675	15.21%	(0.57%)	16.33%	(0.12%)	1.12%
Tubular	4992	3.46%	(0.55%)	2.50%	(0.06%)	-0.96%
Comedo	4184	18.48%	(0.72%)	18.07%	(0.18%)	-0.41%
Scirrhous	1577	33.26%	(1.42%)	31.79%	(0.35%)	-1.48%
Inflammatory	147	63.85%	(7.74%)	62.45%	(1.41%)	-1.40%
Paget's disease	1266	29.51%	(1.83%)	29.61%	(0.44%)	0.10%
Papillary	1991	11.92%	(1.16%)	10.18%	(0.18%)	-1.75%
Cribriform	722	16.41%	(6.88%)	10.74%	(0.32%)	-5.67%
<i>Mean (std. dev.)</i>						-1.51% (1.65%)
<i>Mean weighted by N (std. dev.)</i>						-1.56% (4.10%)
<i>Root Mean Square (std. dev.)</i>						2.18% (2.97%)
<i>Root Mean Square weighted by N (std. dev.)</i>						4.23% (7.75%)



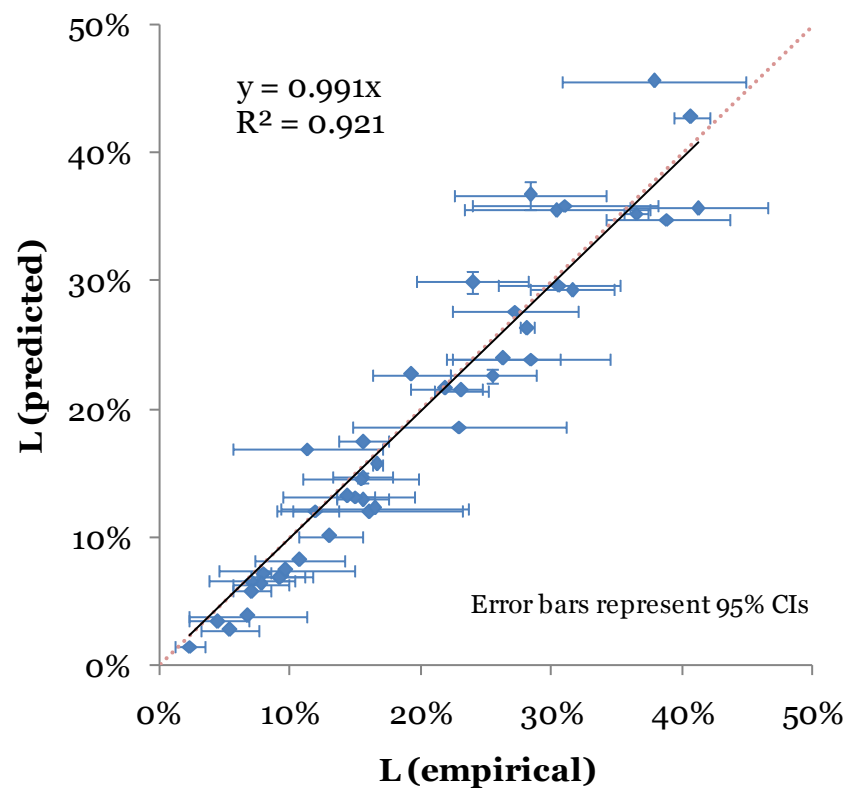
# Permutations of 10 mm tumor size bins and histological type

Group <sup>†</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Size	Histology						
1-10 mm	Ductal	58516	8.00%	(0.22%)	7.19%	(0.02%)	-0.81%
11-20 mm	Ductal	113454	16.58%	(0.19%)	15.68%	(0.02%)	-0.89%
21-30 mm	Ductal	59315	28.12%	(0.29%)	26.35%	(0.04%)	-1.78%
31-40 mm	Ductal	23290	36.46%	(0.47%)	35.28%	(0.06%)	-1.18%
41-50 mm	Ductal	10117	40.67%	(0.71%)	42.81%	(0.10%)	2.14%
1-10 mm	Lobular	4680	9.21%	(0.93%)	6.83%	(0.08%)	-2.38%
11-20 mm	Lobular	10500	14.98%	(0.73%)	13.12%	(0.07%)	-1.87%
21-30 mm	Lobular	5936	23.05%	(1.03%)	21.49%	(0.12%)	-1.55%
31-40 mm	Lobular	2496	31.54%	(1.63%)	29.31%	(0.20%)	-2.23%
41-50 mm	Lobular	1505	38.86%	(2.41%)	34.82%	(0.27%)	-4.04%
1-10 mm	Intraductal +LCIS	5086	7.75%	(1.10%)	6.35%	(0.08%)	-1.40%
11-20 mm	Intraductal +LCIS	10713	15.51%	(1.00%)	12.92%	(0.08%)	-2.59%
21-30 mm	Intraductal +LCIS	5085	21.89%	(1.40%)	21.64%	(0.14%)	-0.25%
31-40 mm	Intraductal +LCIS	1662	30.55%	(2.37%)	29.63%	(0.26%)	-0.91%
41-50 mm	Intraductal +LCIS	903	30.33%	(3.63%)	35.54%	(0.39%)	5.21%
1-10 mm	Mucinous	2335	5.32%	(1.10%)	2.72%	(0.05%)	-2.59%
11-20 mm	Mucinous	4091	7.06%	(0.75%)	5.74%	(0.06%)	-1.32%
21-30 mm	Mucinous	1876	13.02%	(1.26%)	10.09%	(0.13%)	-2.94%
31-40 mm	Mucinous	752	15.38%	(2.27%)	14.50%	(0.28%)	-0.88%
41-50 mm	Mucinous	320	22.95%	(4.18%)	18.56%	(0.48%)	-4.40%
1-10 mm	Medullary	354	7.00%	(1.68%)	6.55%	(0.25%)	-0.45%
11-20 mm	Medullary	2085	11.92%	(0.89%)	12.05%	(0.15%)	0.13%
21-30 mm	Medullary	1952	15.60%	(0.97%)	17.44%	(0.17%)	1.84%
31-40 mm	Medullary	877	19.24%	(1.52%)	22.71%	(0.24%)	3.47%
41-50 mm	Medullary	407	27.22%	(2.45%)	27.61%	(0.39%)	0.39%
1-10 mm	Tubular	3127	2.26%	(0.61%)	1.43%	(0.05%)	-0.82%
11-20 mm	Tubular	1536	4.49%	(1.15%)	3.41%	(0.12%)	-1.08%
21-30 mm	Tubular	236	9.67%	(2.63%)	7.43%	(0.48%)	-2.24%
1-10 mm	Comedo	897	9.34%	(1.22%)	6.94%	(0.18%)	-2.40%
11-20 mm	Comedo	1549	15.50%	(1.15%)	14.63%	(0.19%)	-0.87%
21-30 mm	Comedo	987	25.47%	(1.66%)	22.64%	(0.28%)	-2.83%
31-40 mm	Comedo	470	23.95%	(2.18%)	29.92%	(0.42%)	5.97%
41-50 mm	Comedo	281	28.35%	(2.98%)	36.73%	(0.56%)	8.37%
1-10 mm	Scirrhou	164	16.43%	(3.65%)	12.22%	(0.32%)	-4.21%
11-20 mm	Scirrhou	584	26.27%	(2.25%)	23.93%	(0.32%)	-2.34%
21-30 mm	Scirrhou	468	41.18%	(2.68%)	35.69%	(0.38%)	-5.48%
31-40 mm	Scirrhou	246	37.81%	(3.58%)	45.66%	(0.55%)	7.85%
1-10 mm	Paget's disease	236	16.03%	(3.61%)	11.98%	(0.48%)	-4.05%
11-20 mm	Paget's disease	456	28.38%	(3.07%)	23.89%	(0.45%)	-4.49%
21-30 mm	Paget's disease	328	30.97%	(3.61%)	35.88%	(0.55%)	4.91%
1-10 mm	Papillary	423	6.69%	(2.27%)	3.79%	(0.16%)	-2.91%
11-20 mm	Papillary	773	10.67%	(1.76%)	8.18%	(0.21%)	-2.49%
21-30 mm	Papillary	466	14.40%	(2.58%)	13.20%	(0.32%)	-1.20%



31-40 mm	Papillary	203	11.24%	(2.92%)	16.88%	(0.46%)	5.64%
			<i>Mean (std. dev.)</i>		-0.59% (3.30%)		
			<i>Mean weighted by N (std. dev.)</i>		-1.08% (3.00%)		
			<i>Root Mean Square (std. dev.)</i>		3.32% (3.93%)		
			<i>Root Mean Square weighted by N (std. dev.)</i>		3.16% (6.12%)		

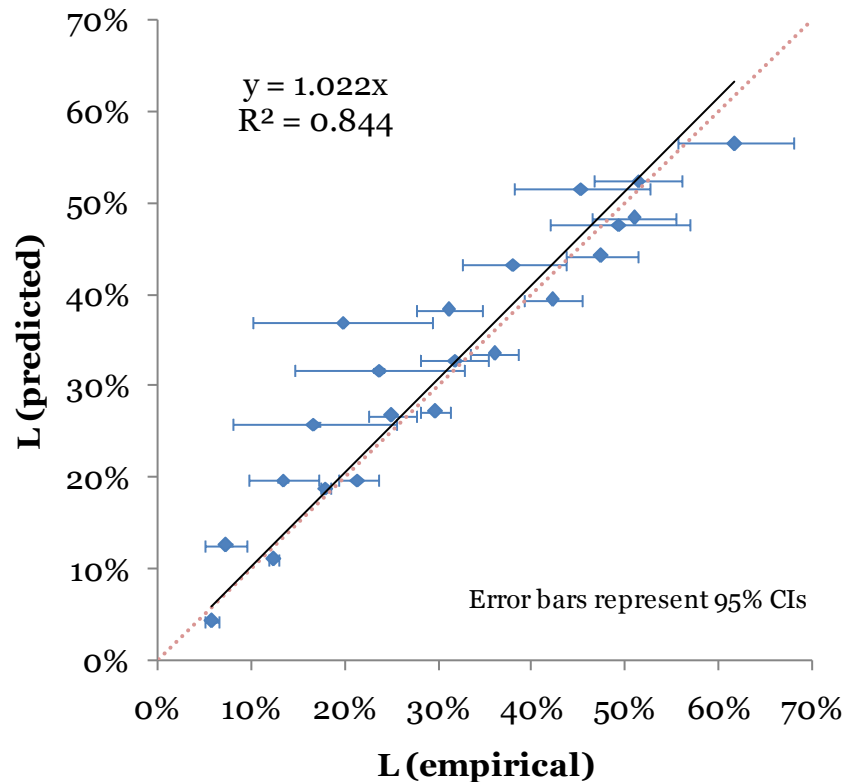
†all other permutation groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group; in addition, grade 4, though it exists in the dataset, is omitted because it no longer exists



# Permutations of number of positive lymph nodes and tumor grade

Group <sup>†</sup> Nodes	Grade	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0	1	42097	5.73%	(0.35%)	4.27%	(0.01%)	-1.46%
1	1	5250	7.28%	(1.18%)	12.56%	(0.04%)	5.29%
2	1	1881	13.40%	(1.94%)	19.66%	(0.07%)	6.27%
3	1	820	16.75%	(4.52%)	25.80%	(0.10%)	9.06%
4	1	489	23.68%	(4.66%)	31.66%	(0.13%)	7.98%
5	1	287	19.80%	(4.93%)	36.91%	(0.17%)	17.10%
0	2	81001	12.35%	(0.29%)	10.99%	(0.02%)	-1.36%
1	2	15734	21.41%	(1.08%)	19.70%	(0.05%)	-1.72%
2	2	7283	25.07%	(1.30%)	26.71%	(0.07%)	1.64%
3	2	3968	31.79%	(1.84%)	32.75%	(0.09%)	0.96%
4	2	2464	31.13%	(1.80%)	38.31%	(0.11%)	7.18%
5	2	1716	38.08%	(2.82%)	43.28%	(0.12%)	5.20%
6	2	1312	49.45%	(3.86%)	47.62%	(0.13%)	-1.84%
7	2	937	45.35%	(3.72%)	51.53%	(0.14%)	6.18%
0	3	60908	17.96%	(0.30%)	18.80%	(0.04%)	0.84%
1	3	14082	29.67%	(0.86%)	27.18%	(0.07%)	-2.48%
2	3	7297	36.01%	(1.27%)	33.48%	(0.10%)	-2.53%
3	3	4490	42.23%	(1.59%)	39.46%	(0.12%)	-2.77%
4	3	2995	47.46%	(1.98%)	44.24%	(0.13%)	-3.22%
5	3	2234	51.00%	(2.27%)	48.34%	(0.14%)	-2.66%
6	3	1691	51.42%	(2.38%)	52.43%	(0.15%)	1.01%
7	3	1395	61.82%	(3.17%)	56.52%	(0.16%)	-5.31%
Mean (std. dev.)							1.97% (5.43%)
Mean weighted by N (std. dev.)							-0.51% (2.73%)
Root Mean Square (std. dev.)							5.66% (7.91%)
Root Mean Square weighted by N (std. dev.)							2.72% (4.35%)

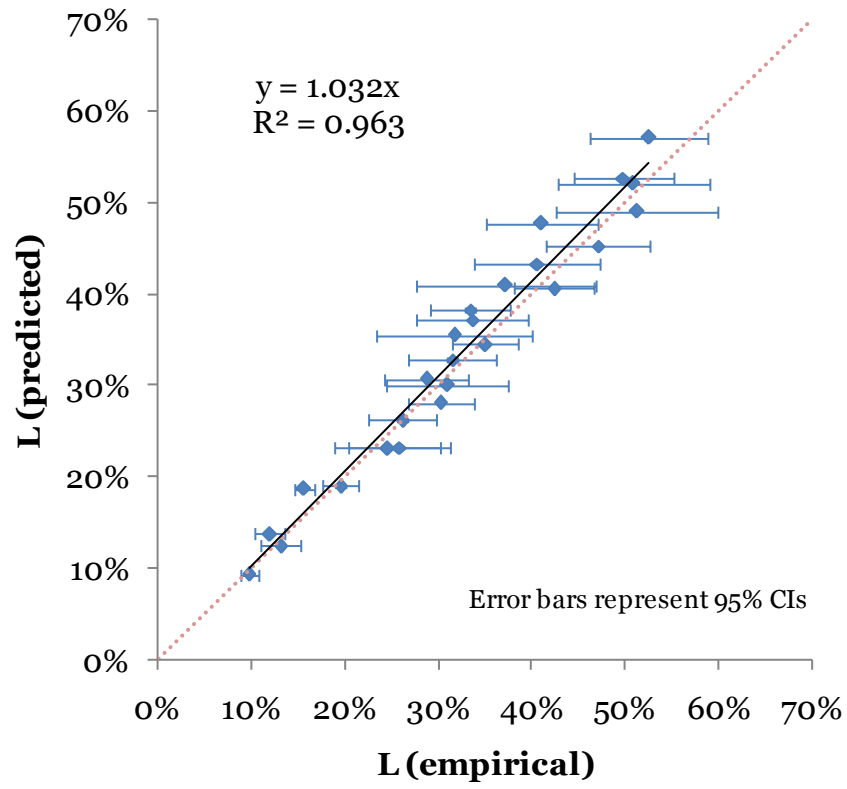
<sup>†</sup> the combinations of grade 1 with 6 and 7 positive lymph nodes are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group; in addition, grade 4, though it exists in the dataset, is omitted because it no longer exists



# Permutations of number of positive lymph nodes and estrogen/progesterone receptor status

Group <sup>†</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Nodes	ER/PR status						
0	ER+/PR+	106881	9.74%	(0.51%)	9.23%	(0.02%)	-0.50%
1	ER+/PR+	20980	19.56%	(1.00%)	18.96%	(0.05%)	-0.60%
2	ER+/PR+	9637	26.18%	(1.81%)	26.19%	(0.07%)	0.01%
3	ER+/PR+	5446	31.56%	(2.42%)	32.77%	(0.08%)	1.21%
4	ER+/PR+	3369	33.45%	(2.18%)	38.22%	(0.10%)	4.76%
5	ER+/PR+	2369	40.57%	(3.47%)	43.25%	(0.11%)	2.67%
6	ER+/PR+	1742	41.08%	(3.05%)	47.67%	(0.13%)	6.59%
7	ER+/PR+	1318	50.92%	(4.15%)	52.10%	(0.14%)	1.18%
0	ER+/PR-	20228	13.15%	(1.07%)	12.43%	(0.06%)	-0.72%
1	ER+/PR-	3994	24.56%	(2.84%)	23.11%	(0.14%)	-1.45%
2	ER+/PR-	1817	28.79%	(2.28%)	30.68%	(0.19%)	1.89%
3	ER+/PR-	1040	33.66%	(3.04%)	37.16%	(0.25%)	3.50%
0	ER-/PR+	3754	11.97%	(0.86%)	13.74%	(0.14%)	1.77%
1	ER-/PR+	749	25.92%	(2.79%)	23.20%	(0.31%)	-2.72%
2	ER-/PR+	406	30.97%	(3.34%)	30.01%	(0.40%)	-0.97%
3	ER-/PR+	207	31.74%	(4.22%)	35.49%	(0.56%)	3.75%
4	ER-/PR+	146	37.27%	(4.87%)	40.95%	(0.57%)	3.68%
0	ER-/PR-	30538	15.62%	(0.53%)	18.69%	(0.06%)	3.07%
1	ER-/PR-	6119	30.28%	(1.82%)	28.07%	(0.12%)	-2.21%
2	ER-/PR-	2959	35.07%	(1.83%)	34.49%	(0.16%)	-0.58%
3	ER-/PR-	1781	42.41%	(2.15%)	40.60%	(0.20%)	-1.81%
4	ER-/PR-	1195	47.14%	(2.82%)	45.20%	(0.22%)	-1.93%
5	ER-/PR-	843	51.27%	(4.46%)	49.08%	(0.25%)	-2.19%
6	ER-/PR-	703	49.87%	(2.73%)	52.65%	(0.24%)	2.78%
7	ER-/PR-	534	52.53%	(3.24%)	57.16%	(0.27%)	4.64%
Mean (std. dev.)							1.03% (2.61%)
Mean weighted by N (std. dev.)							0.19% (2.52%)
Root Mean Square (std. dev.)							2.76% (3.13%)
Root Mean Square weighted by N (std. dev.)							2.47% (4.66%)

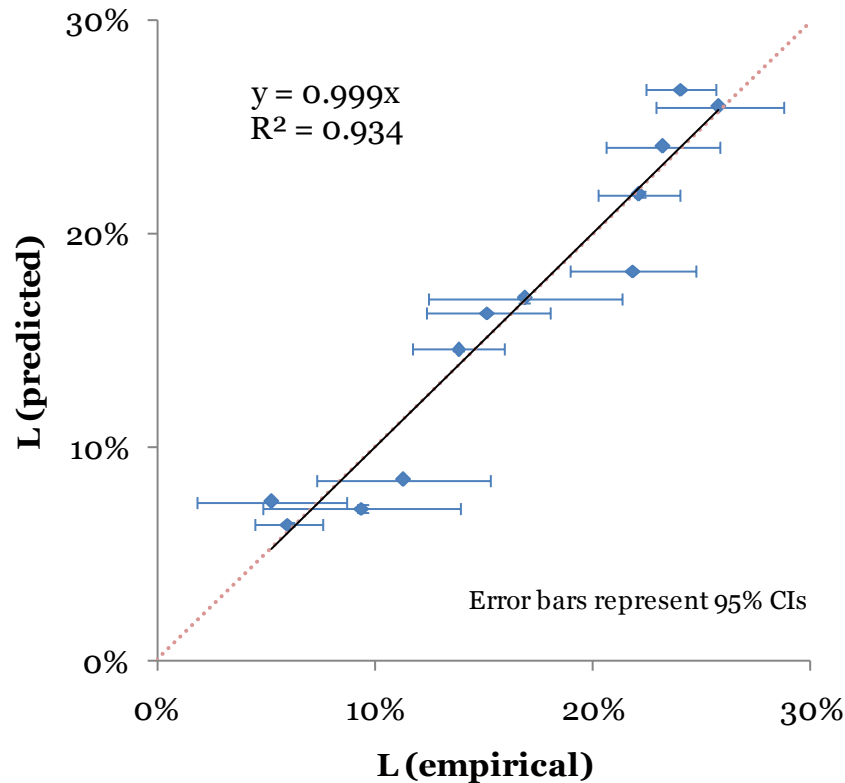
<sup>†</sup> the groups that are the combinations of 4,5,6,7 positive nodes with ER+/PR-, and 5,6,7 positive nodes with ER-/PR+ are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



# Permutations of tumor grade and estrogen/progesterone receptor status

Group <sup>†</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Grade	ER/PR status						
1	ER+/PR+	33359	5.97%	(0.79%)	6.38%	(0.04%)	0.41%
2	ER+/PR+	67774	13.81%	(1.06%)	14.59%	(0.04%)	0.78%
3	ER+/PR+	32077	22.11%	(0.95%)	21.84%	(0.07%)	-0.27%
1	ER+/PR-	5260	9.38%	(2.32%)	7.13%	(0.10%)	-2.25%
2	ER+/PR-	11461	16.86%	(2.25%)	17.00%	(0.10%)	0.13%
3	ER+/PR-	8407	25.80%	(1.49%)	25.98%	(0.14%)	0.18%
1	ER-/PR+	526	5.23%	(1.77%)	7.43%	(0.34%)	2.21%
2	ER-/PR+	1635	15.17%	(1.46%)	16.28%	(0.26%)	1.12%
3	ER-/PR+	2488	23.19%	(1.35%)	24.11%	(0.26%)	0.92%
1	ER-/PR-	1354	11.29%	(2.05%)	8.47%	(0.22%)	-2.82%
2	ER-/PR-	8242	21.83%	(1.48%)	18.26%	(0.13%)	-3.57%
3	ER-/PR-	29434	24.02%	(0.84%)	26.78%	(0.08%)	2.77%
Mean (std. dev.)							-0.03% (1.94%)
Mean weighted by N (std. dev.)							0.51% (1.78%)
Root Mean Square (std. dev.)							1.86% (2.05%)
Root Mean Square weighted by N (std. dev.)							1.78% (2.64%)

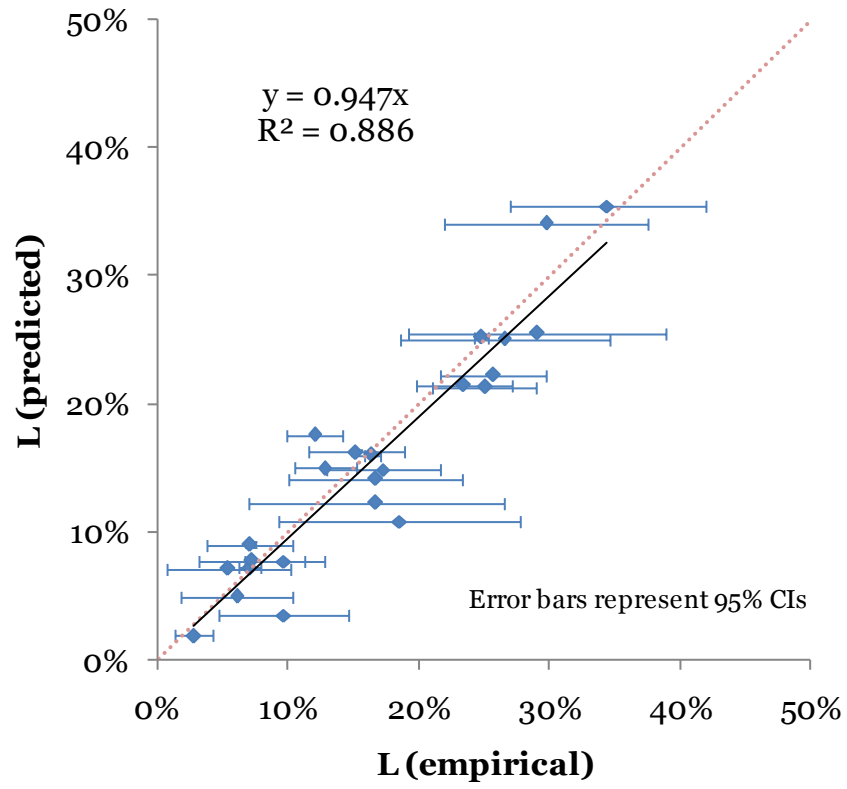
<sup>†</sup> grade 4 also exists in the dataset, but is not included in the calculation of the mean or displayed on graph; grade 4 no longer exists



# Permutations of tumor grade and histological type

Group <sup>†</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Grade	Histology						
1	Ductal	34245	7.00%	(0.41%)	7.14%	(0.04%)	0.14%
2	Ductal	88468	16.36%	(0.30%)	16.00%	(0.04%)	-0.36%
3	Ductal	78797	24.75%	(0.30%)	25.21%	(0.05%)	0.46%
1	Lobular	3158	7.05%	(1.69%)	9.00%	(0.15%)	1.95%
2	Lobular	6633	15.17%	(1.87%)	16.21%	(0.13%)	1.04%
3	Lobular	2361	25.65%	(2.10%)	22.23%	(0.26%)	-3.43%
1	Intraductal +LCIS	4024	7.18%	(2.05%)	7.72%	(0.12%)	0.54%
2	Intraductal +LCIS	10590	12.79%	(1.19%)	14.96%	(0.10%)	2.17%
3	Intraductal +LCIS	4681	23.43%	(1.86%)	21.48%	(0.18%)	-1.95%
1	Mucinous	2812	9.60%	(2.56%)	3.46%	(0.07%)	-6.14%
2	Mucinous	1859	9.67%	(1.58%)	7.65%	(0.16%)	-2.02%
3	Mucinous	337	16.69%	(4.97%)	12.25%	(0.51%)	-4.44%
2	Medullary	205	16.65%	(3.38%)	14.15%	(0.73%)	-2.50%
3	Medullary	1768	11.99%	(1.11%)	17.56%	(0.23%)	5.57%
1	Tubular	3354	2.72%	(0.73%)	1.84%	(0.06%)	-0.88%
1	Comedo	116	5.35%	(2.41%)	7.09%	(0.63%)	1.74%
2	Comedo	766	17.22%	(2.23%)	14.85%	(0.39%)	-2.37%
3	Comedo	1175	25.02%	(2.02%)	21.30%	(0.36%)	-3.72%
2	Scirrhou	199	28.99%	(5.03%)	25.50%	(0.91%)	-3.49%
3	Scirrhou	237	34.43%	(3.82%)	35.43%	(0.92%)	1.00%
2	Paget's disease	274	26.53%	(4.09%)	25.05%	(0.85%)	-1.48%
3	Paget's disease	506	29.70%	(3.95%)	34.10%	(0.70%)	4.39%
1	Papillary	436	6.05%	(2.17%)	4.90%	(0.22%)	-1.15%
2	Papillary	445	18.50%	(4.73%)	10.80%	(0.40%)	-7.70%
Mean (std. dev.)							-0.94% (3.11%)
Mean weighted by N (std. dev.)							-0.02% (1.21%)
Root Mean Square (std. dev.)							3.18% (3.81%)
Root Mean Square weighted by N (std. dev.)							1.18% (1.78%)

<sup>†</sup>the groups of grade 1 and medullary, grade 2 and tubular, grade 3 and tubular, grade 1 and scirrhou, grade 1 and Paget's disease, grade 3 and papillary are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group; in addition, grade 4, though it exists in the dataset, is omitted because it no longer exists

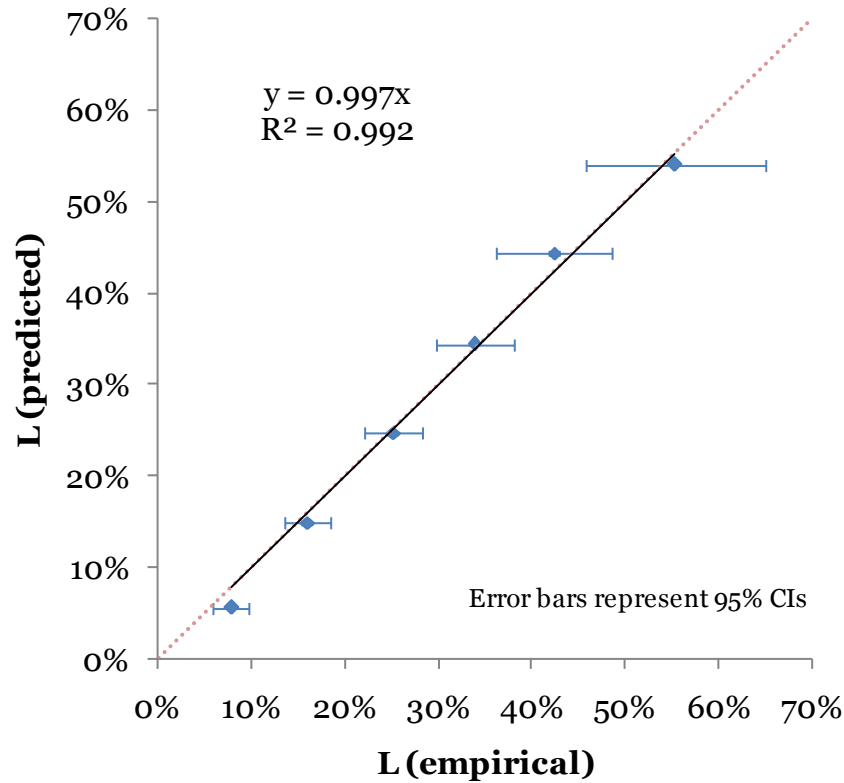


#### IV. Validation on the Partners dataset

Grouped by 10% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)	L predicted (SEM)	Difference (pred – emp)
0-10%	2785	7.87% (0.98%)	5.62% (0.05%)	-2.25%
11-20%	2102	16.00% (1.29%)	14.89% (0.06%)	-1.11%
21-30%	1414	25.19% (1.60%)	24.67% (0.07%)	-0.53%
31-40%	930	33.91% (2.14%)	34.43% (0.09%)	0.53%
41-50%	438	42.43% (3.18%)	44.38% (0.13%)	1.95%
51-60%	205	55.34% (4.91%)	54.07% (0.19%)	-1.28%
<i>Mean (std. dev.)</i>				-0.45% (1.49%)
<i>Mean weighted by N (std. dev.)</i>				-1.05% (2.01%)
<i>Root Mean Square (std. dev.)</i>				1.43% (1.40%)
<i>Root Mean Square weighted by N (std. dev.)</i>				2.12% (3.01%)

<sup>†</sup>61-70%, 71-80%, 81-87% not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group

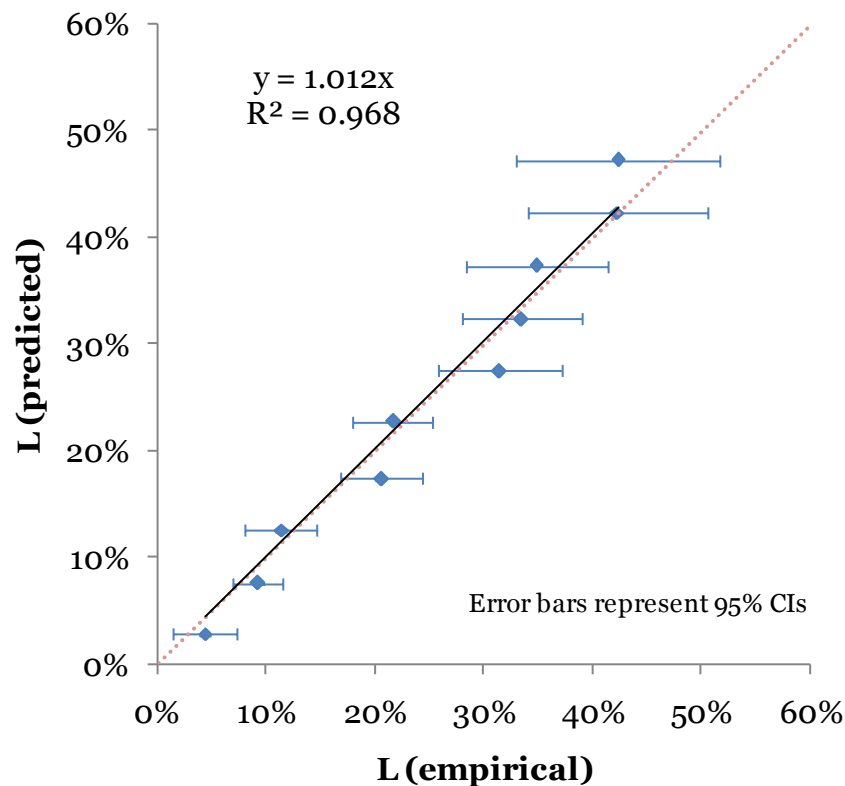




Grouped by 5% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)	L predicted (SEM)	Difference (pred – emp)
0-5%	1139	4.31% (1.51%)	2.82% (0.04%)	-1.49%
6-10%	1646	9.19% (1.16%)	7.56% (0.03%)	-1.63%
11-15%	1088	11.33% (1.69%)	12.58% (0.05%)	1.25%
16-20%	1014	20.53% (1.91%)	17.37% (0.04%)	-3.16%
21-25%	849	21.61% (1.88%)	22.79% (0.05%)	1.18%
26-30%	565	31.40% (2.90%)	27.49% (0.06%)	-3.92%
31-35%	544	33.42% (2.82%)	32.35% (0.06%)	-1.07%
36-40%	386	34.81% (3.32%)	37.36% (0.08%)	2.55%
41-45%	257	42.23% (4.19%)	42.34% (0.09%)	0.12%
46-50%	181	42.29% (4.75%)	47.26% (0.09%)	4.97%
Mean (std. dev.)				-0.12% (2.70%)
Mean weighted by N (std. dev.)				-0.80% (2.24%)
Root Mean Square (std. dev.)				2.56% (2.83%)
Root Mean Square weighted by N (std. dev.)				2.27% (2.41%)

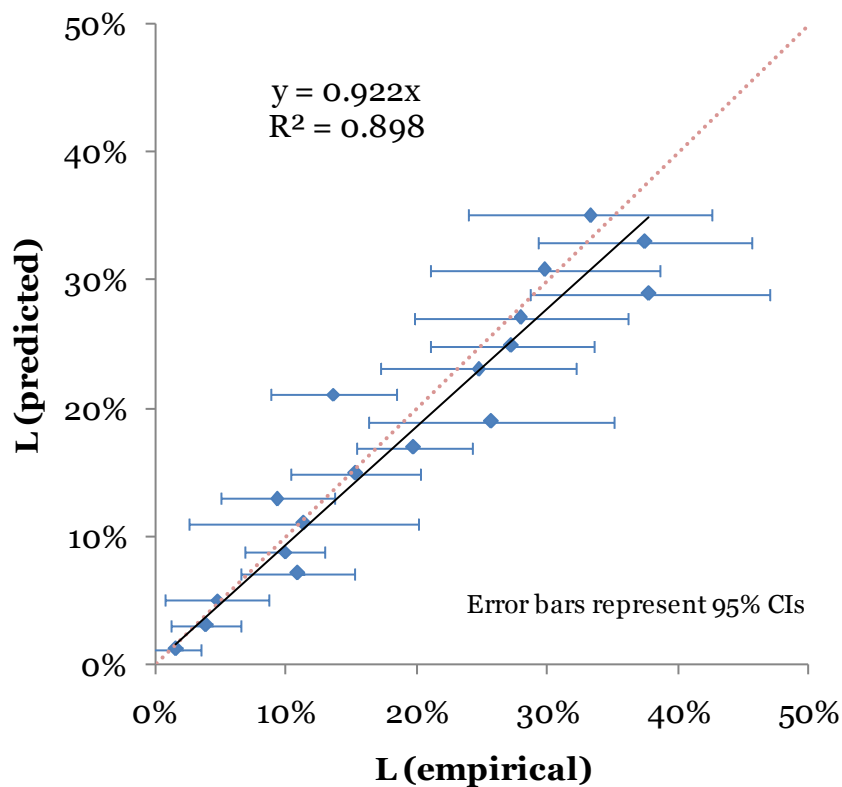
<sup>†</sup>51-55%, 56-60% ... 81-85%, 85-87% not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



Grouped by 2% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

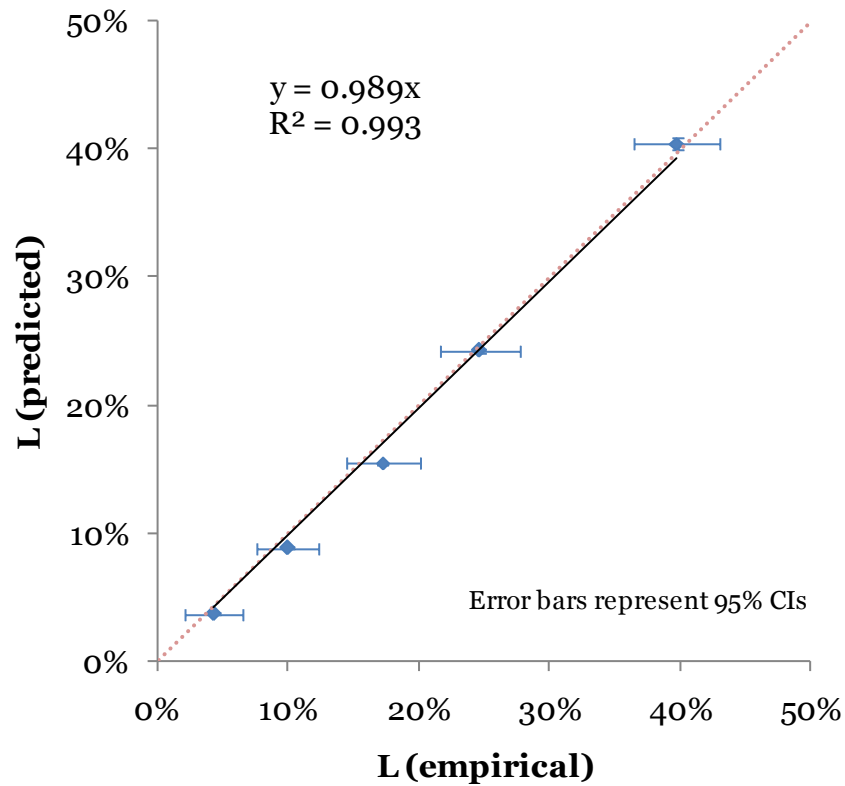
Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-2%	324	1.58%	(0.97%)	1.19%	(0.03%)	-0.39%
3-4%	572	3.85%	(1.37%)	3.03%	(0.03%)	-0.82%
5-6%	524	4.69%	(2.03%)	5.03%	(0.03%)	0.35%
7-8%	629	10.84%	(2.22%)	7.08%	(0.02%)	-3.76%
9-10%	736	9.84%	(1.59%)	8.76%	(0.02%)	-1.08%
11-12%	430	11.34%	(4.49%)	10.97%	(0.03%)	-0.37%
13-14%	373	9.27%	(2.22%)	12.93%	(0.03%)	3.66%
15-16%	442	15.25%	(2.55%)	14.90%	(0.03%)	-0.35%
17-18%	528	19.73%	(2.26%)	16.93%	(0.02%)	-2.80%
19-20%	329	25.65%	(4.77%)	18.98%	(0.03%)	-6.67%
21-22%	323	13.55%	(2.46%)	21.07%	(0.03%)	7.51%
23-24%	272	24.66%	(3.81%)	23.07%	(0.03%)	-1.60%
25-26%	356	27.25%	(3.18%)	24.89%	(0.02%)	-2.36%
27-28%	250	27.91%	(4.16%)	27.08%	(0.04%)	-0.83%
29-30%	213	37.77%	(4.66%)	28.95%	(0.04%)	-8.82%
31-32%	221	29.73%	(4.48%)	30.85%	(0.04%)	1.13%
33-34%	237	37.40%	(4.15%)	32.96%	(0.04%)	-4.44%
35-36%	196	33.22%	(4.74%)	35.07%	(0.04%)	1.85%
<i>Mean (std. dev.)</i>						-1.10% (3.66%)
<i>Mean weighted by N (std. dev.)</i>						-1.09% (3.07%)
<i>Root Mean Square (std. dev.)</i>						3.72% (4.75%)
<i>Root Mean Square weighted by N (std. dev.)</i>						3.17% (3.70%)

<sup>†</sup>37-38%, 39-40% ... 85-86%, 87-88% not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



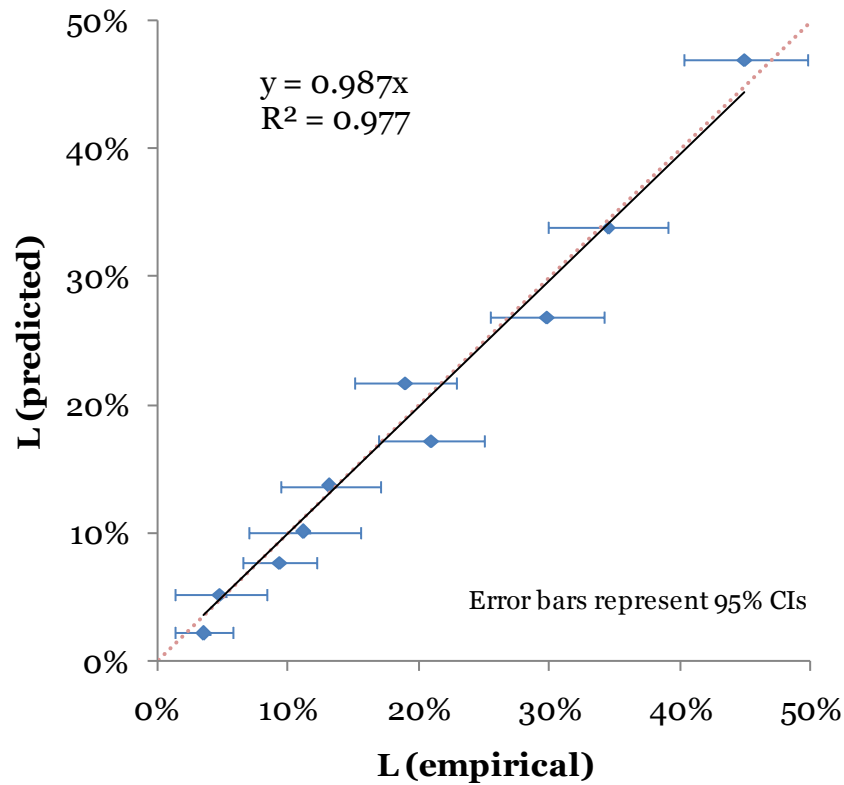
Grouped by 20% predicted lethality percentiles using the Size+Nodes+PrognosticFactors equation

Group	N	L empirical (SEM)	L predicted (SEM)	Difference (pred – emp)
0-7%	1581	4.28% (1.16%)	3.66% (0.04%)	-0.62%
8-12%	1582	9.98% (1.21%)	8.83% (0.04%)	-1.15%
13-19%	1582	17.20% (1.44%)	15.44% (0.05%)	-1.76%
20-30%	1580	24.65% (1.53%)	24.29% (0.08%)	-0.36%
31-87%	1582	39.76% (1.68%)	40.43% (0.21%)	0.66%
<i>Mean (std. dev.)</i>				-0.65% (0.91%)
<i>Mean weighted by N (std. dev.)</i>				-0.65% (0.91%)
<i>Root Mean Square (std. dev.)</i>				1.04% (1.10%)
<i>Root Mean Square weighted by N (std. dev.)</i>				1.04% (1.10%)



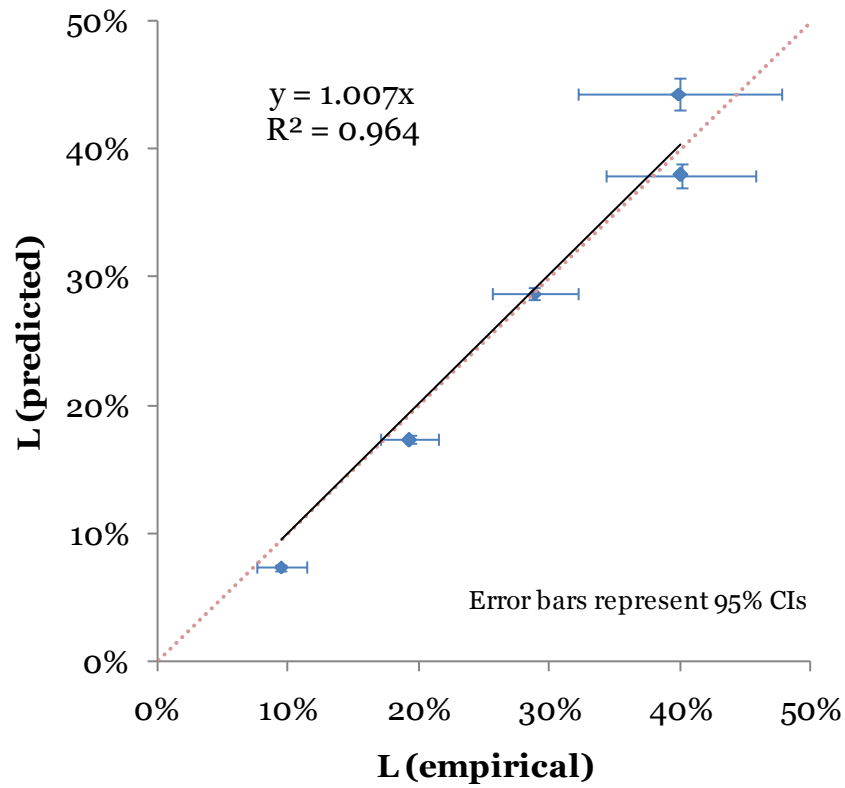
Grouped by 10% predicted lethality percentiles using the Size+Nodes+PrognosticFactors equation

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-4%	790	3.52%	(1.12%)	2.17%	(0.03%)	-1.35%
5-7%	791	4.77%	(1.81%)	5.15%	(0.03%)	0.38%
8%	801	9.28%	(1.43%)	7.67%	(0.02%)	-1.61%
9-12%	781	11.20%	(2.20%)	10.03%	(0.03%)	-1.17%
13-16%	792	13.19%	(1.95%)	13.69%	(0.04%)	0.49%
17-19%	790	20.89%	(2.09%)	17.19%	(0.03%)	-3.69%
20-24%	787	18.94%	(2.00%)	21.69%	(0.05%)	2.75%
25-30%	793	29.79%	(2.24%)	26.87%	(0.06%)	-2.91%
31-39%	791	34.47%	(2.33%)	33.87%	(0.08%)	-0.61%
40-87%	791	44.96%	(2.39%)	46.99%	(0.24%)	2.03%
<i>Mean (std. dev.)</i>						-0.57% (2.03%)
<i>Mean weighted by N (std. dev.)</i>						-0.57% (2.03%)
<i>Root Mean Square (std. dev.)</i>						2.01% (2.12%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.01% (2.12%)



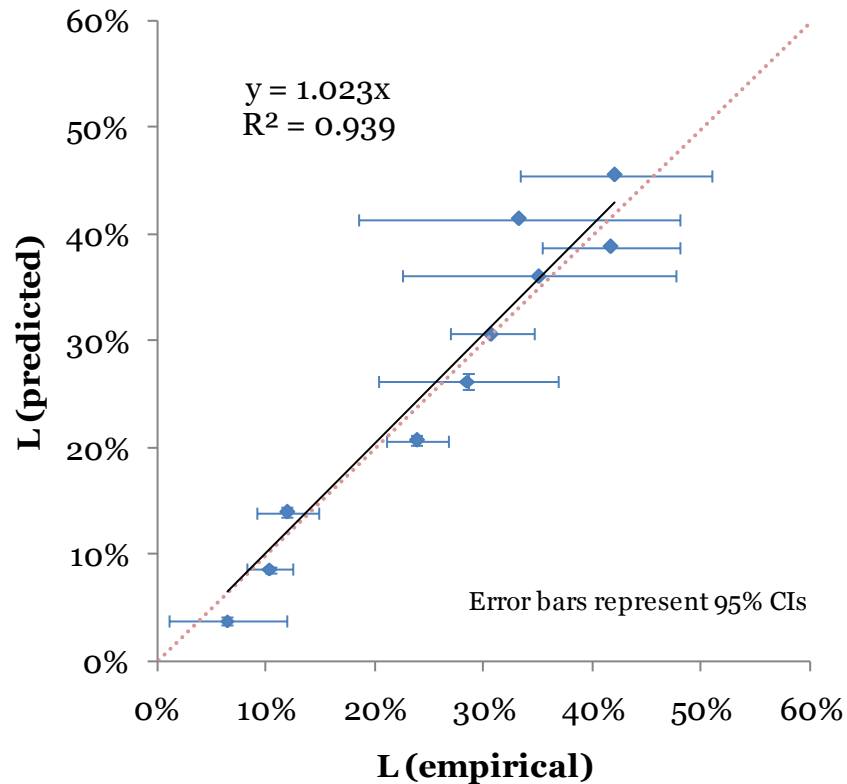
Grouped by 10 mm tumor size bins

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	2591	9.41%	(0.96%)	7.35%	(0.12%)	-2.06%
11-20 mm	3004	19.29%	(1.13%)	17.30%	(0.17%)	-1.99%
21-30 mm	1499	28.83%	(1.68%)	28.74%	(0.26%)	-0.09%
31-40 mm	569	40.07%	(2.92%)	37.96%	(0.45%)	-2.11%
41-50 mm	244	39.91%	(3.98%)	44.33%	(0.66%)	4.43%
<i>Mean (std. dev.)</i>						-0.36% (2.81%)
<i>Mean weighted by N (std. dev.)</i>						-1.46% (2.00%)
<i>Root Mean Square (std. dev.)</i>						2.54% (2.75%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.31% (2.63%)



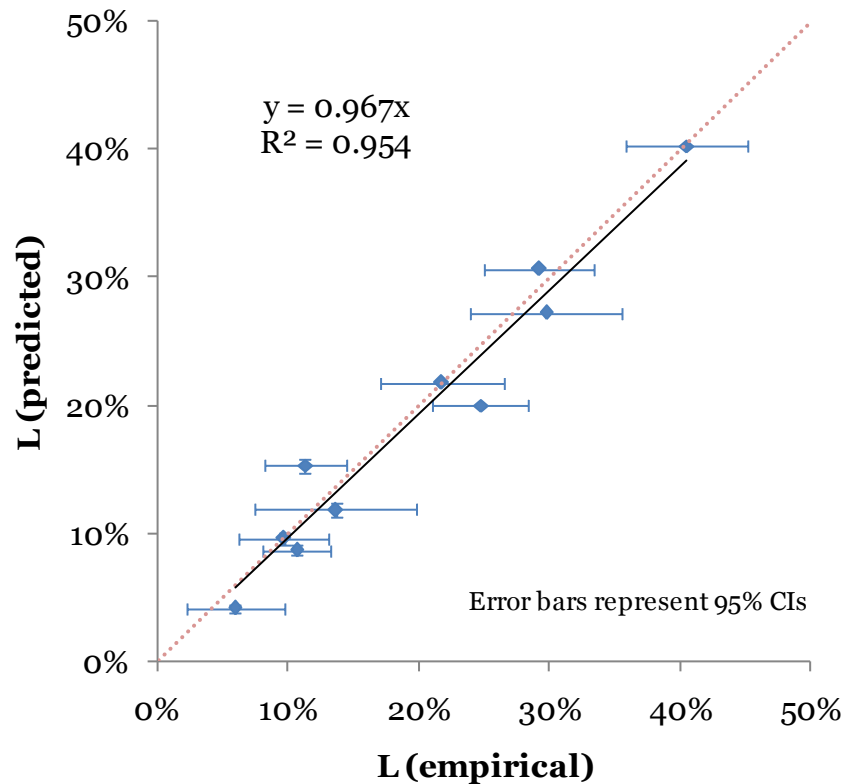
Grouped by 5 mm tumor size bins

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-5 mm	678	6.35%	(2.78%)	3.78%	(0.19%)	-2.57%
6-10 mm	1913	10.29%	(1.06%)	8.62%	(0.14%)	-1.67%
11-15 mm	1516	11.88%	(1.43%)	13.98%	(0.21%)	2.10%
16-20 mm	1488	23.82%	(1.48%)	20.68%	(0.24%)	-3.14%
21-25 mm	654	28.51%	(4.18%)	26.25%	(0.39%)	-2.26%
26-30 mm	845	30.66%	(1.97%)	30.67%	(0.33%)	0.01%
31-35 mm	189	35.03%	(6.37%)	36.09%	(0.87%)	1.06%
36-40 mm	380	41.65%	(3.25%)	38.89%	(0.51%)	-2.76%
41-45 mm	76	33.20%	(7.53%)	41.50%	(1.24%)	8.30%
46-50 mm	168	42.04%	(4.49%)	45.61%	(0.77%)	3.57%
<i>Mean (std. dev.)</i>						0.26% (3.63%)
<i>Mean weighted by N (std. dev.)</i>						-0.95% (2.79%)
<i>Root Mean Square (std. dev.)</i>						3.45% (4.52%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.81% (3.37%)



Grouped by 10% tumor size percentiles

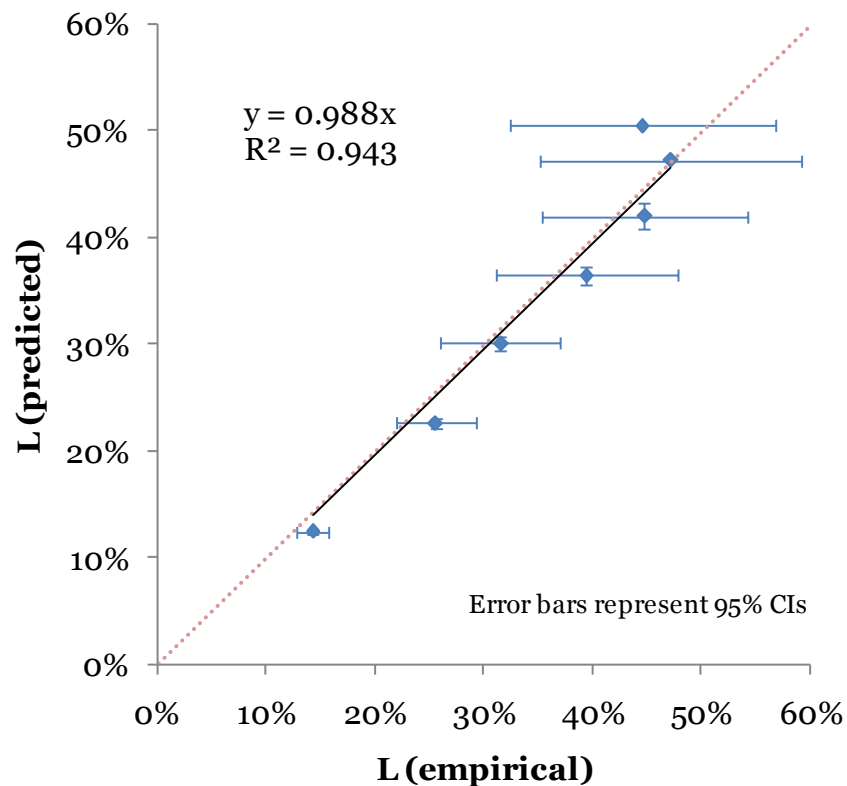
Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-6 mm	901	5.88%	(1.91%)	4.16%	(0.16%)	-1.72%
7-8 mm	979	10.61%	(1.31%)	8.65%	(0.19%)	-1.96%
8-10 mm	711	9.61%	(1.74%)	9.63%	(0.24%)	0.02%
11-12 mm	580	13.64%	(3.15%)	11.83%	(0.28%)	-1.81%
13-15 mm	936	11.28%	(1.57%)	15.31%	(0.28%)	4.03%
16-18 mm	909	24.71%	(1.86%)	19.99%	(0.30%)	-4.72%
19-20 mm	579	21.75%	(2.39%)	21.76%	(0.39%)	0.01%
21-27 mm	816	29.74%	(2.96%)	27.25%	(0.36%)	-2.49%
28-32 mm	727	29.16%	(2.12%)	30.66%	(0.35%)	1.49%
33-50 mm	769	40.46%	(2.40%)	40.28%	(0.39%)	-0.17%
<i>Mean (std. dev.)</i>						-0.73% (2.40%)
<i>Mean weighted by N (std. dev.)</i>						-0.77% (2.71%)
<i>Root Mean Square (std. dev.)</i>						2.39% (2.75%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.69% (3.22%)



## Grouped by number of positive lymph nodes

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0	5283	14.23%	(0.77%)	12.41%	(0.13%)	-1.82%
1	1186	25.14%	(1.85%)	22.63%	(0.27%)	-2.93%
2	597	31.52%	(2.80%)	30.12%	(0.32%)	-1.40%
3	332	39.37%	(4.26%)	36.46%	(0.44%)	-2.91%
4	193	44.73%	(4.83%)	42.06%	(0.60%)	-2.67%
5	124	47.16%	(6.13%)	47.25%	(0.64%)	0.09%
6	113	44.52%	(6.22%)	50.51%	(0.70%)	5.99%
<i>Mean (std. dev.)</i>						-0.81% (3.18%)
<i>Mean weighted by N (std. dev.)</i>						-1.88% (3.18%)
<i>Root Mean Square (std. dev.)</i>						3.06% (3.49%)
<i>Root Mean Square weighted by N (std. dev.)</i>						3.49% (5.24%)

<sup>†</sup>the group of patients with 7 positive nodes is not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group

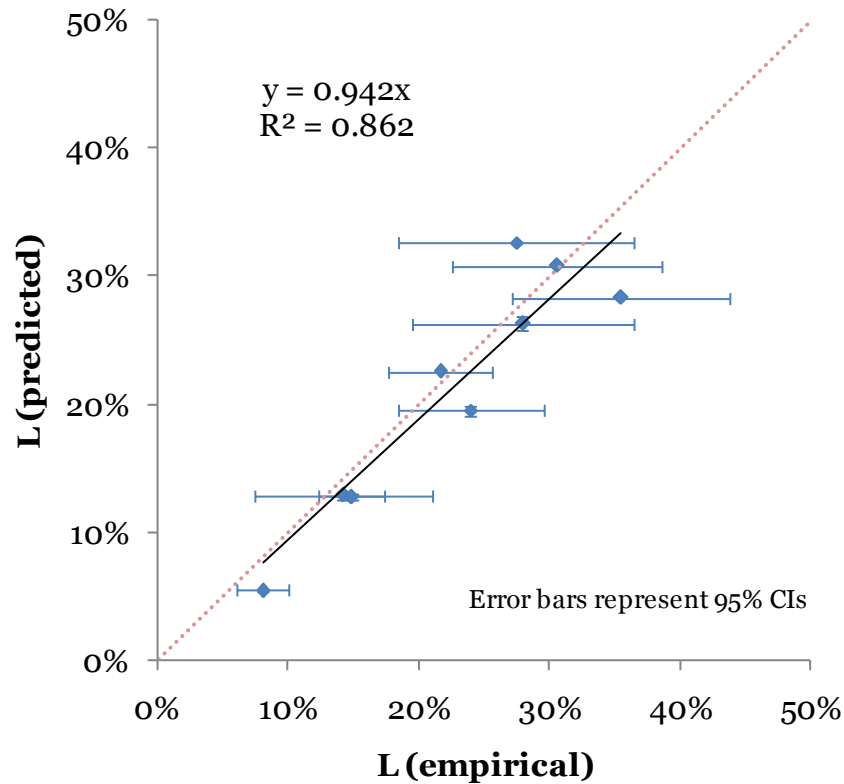




# Permutations of 10 mm tumor size bins and number of positive lymph nodes

Group <sup>†</sup> Size	Nodes	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	0	2193	8.04%	(1.03%)	5.44%	(0.06%)	-2.59%
1-10 mm	1	252	14.17%	(3.47%)	12.87%	(0.16%)	-1.30%
11-20 mm	0	1994	14.81%	(1.32%)	12.76%	(0.11%)	-2.05%
11-20 mm	1	480	23.94%	(2.82%)	19.51%	(0.21%)	-4.43%
11-20 mm	2	237	27.93%	(4.33%)	26.31%	(0.29%)	-1.62%
21-30 mm	0	753	21.61%	(2.06%)	22.57%	(0.22%)	-0.96%
21-30 mm	1	301	35.40%	(4.23%)	28.34%	(0.35%)	-7.06%
21-30 mm	2	196	27.42%	(4.62%)	32.60%	(0.35%)	5.18%
31-40 mm	0	255	30.56%	(4.10%)	30.83%	(0.44%)	0.27%
<i>Mean (std. dev.)</i>							-1.62% (3.33%)
<i>Mean weighted by N (std. dev.)</i>							-2.16% (2.90%)
<i>Root Mean Square (std. dev.)</i>							3.54% (4.10%)
<i>Root Mean Square weighted by N (std. dev.)</i>							3.48% (4.48%)

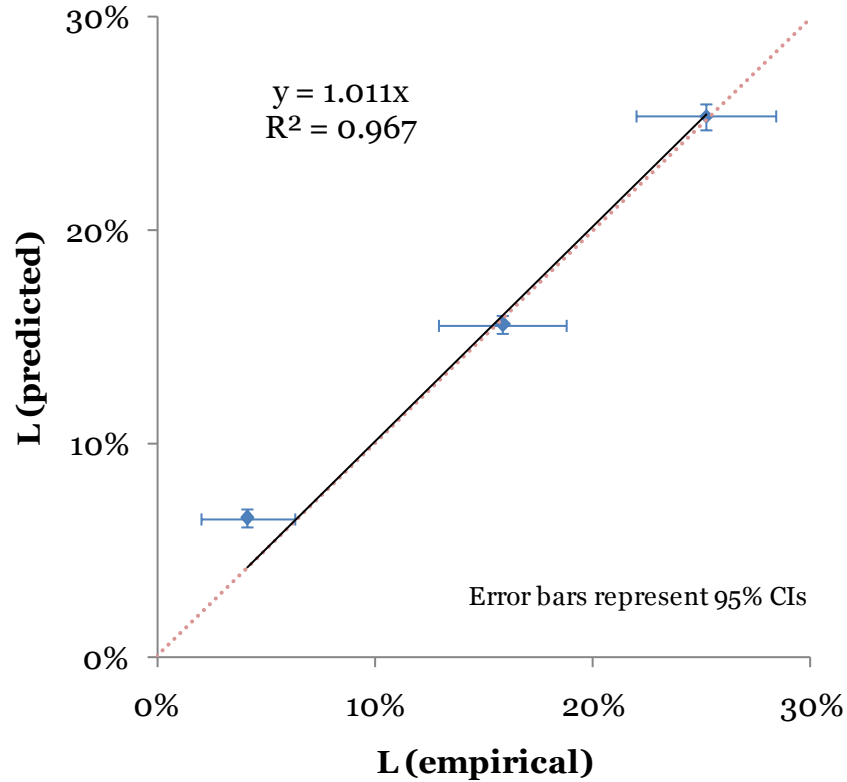
<sup>†</sup>all other permutation groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



## Grouped by tumor grade

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
grade 1	1078	4.10%	(1.10%)	6.51%	(0.21%)	2.41%
grade 2	2561	15.85%	(1.50%)	15.59%	(0.22%)	-0.26%
grade 3	2011	25.18%	(1.63%)	25.36%	(0.31%)	0.18%
<i>Mean (std. dev.)</i>						0.78% (1.43%)
<i>Mean weighted by N (std. dev.)</i>						0.41% (0.89%)
<i>Root Mean Square (std. dev.)</i>						1.40% (1.82%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.83% (1.03%)

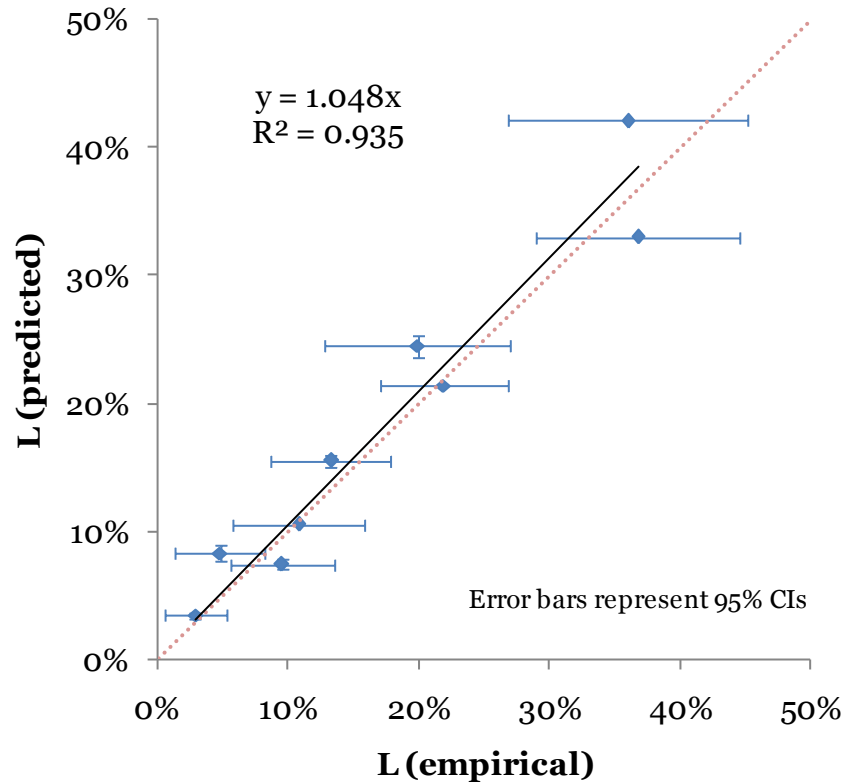
<sup>†</sup>grade 4 also exists in the dataset, but is not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group; in addition, grade 4 no longer exists



## Permutations of 10 mm tumor size bins and tumor grade

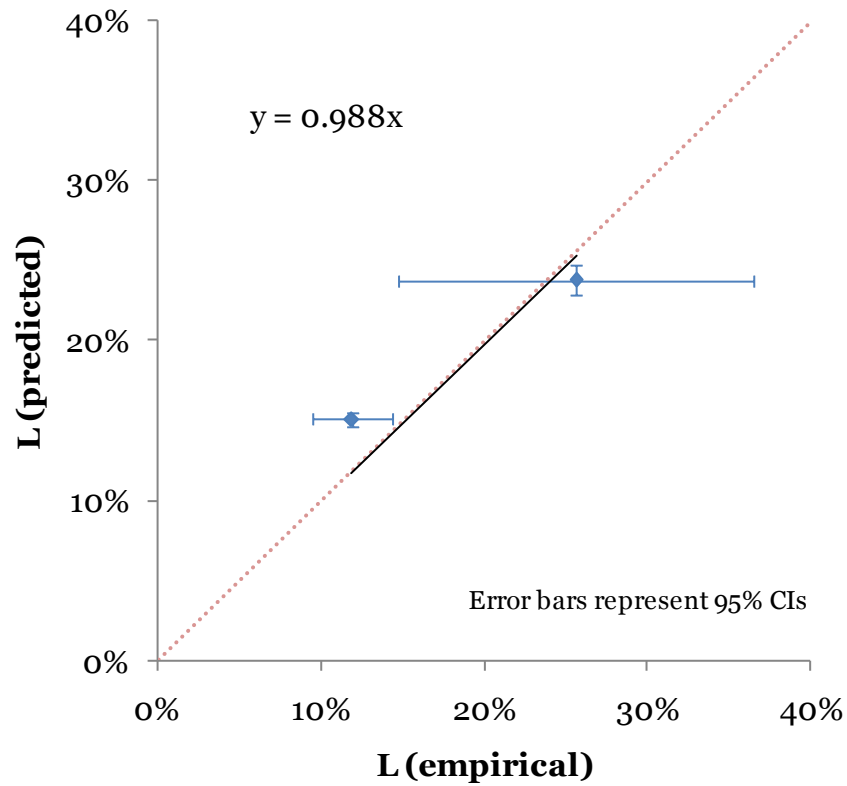
Group <sup>†</sup> Size	Grade	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	1	584	2.88%	(1.22%)	3.42%	(0.14%)	0.54%
11-20 mm	1	386	4.78%	(1.75%)	8.30%	(0.34%)	3.52%
1-10 mm	2	894	9.53%	(2.04%)	7.40%	(0.19%)	-2.13%
11-20 mm	2	1077	13.25%	(2.33%)	15.49%	(0.25%)	2.25%
21-30 mm	2	405	19.87%	(3.62%)	24.51%	(0.44%)	4.64%
1-10 mm	3	419	10.77%	(2.58%)	10.56%	(0.39%)	-0.20%
11-20 mm	3	788	21.89%	(2.52%)	21.39%	(0.31%)	-0.50%
21-30 mm	3	513	36.75%	(3.96%)	32.99%	(0.41%)	-3.76%
31-40 mm	3	207	35.97%	(4.65%)	42.09%	(0.69%)	6.11%
<i>Mean (std. dev.)</i>							1.16% (3.23%)
<i>Mean weighted by N (std. dev.)</i>							0.56% (2.66%)
<i>Root Mean Square (std. dev.)</i>							3.26% (3.53%)
<i>Root Mean Square weighted by N (std. dev.)</i>							2.57% (2.44%)

<sup>†</sup>grade 4 also exists in the dataset, but is not included in the calculation of the mean or displayed on graph; other permutation groups are also not included, because 95% CI is greater than 20% or there is insufficient follow-up data for the group; in addition, grade 4 no longer exists



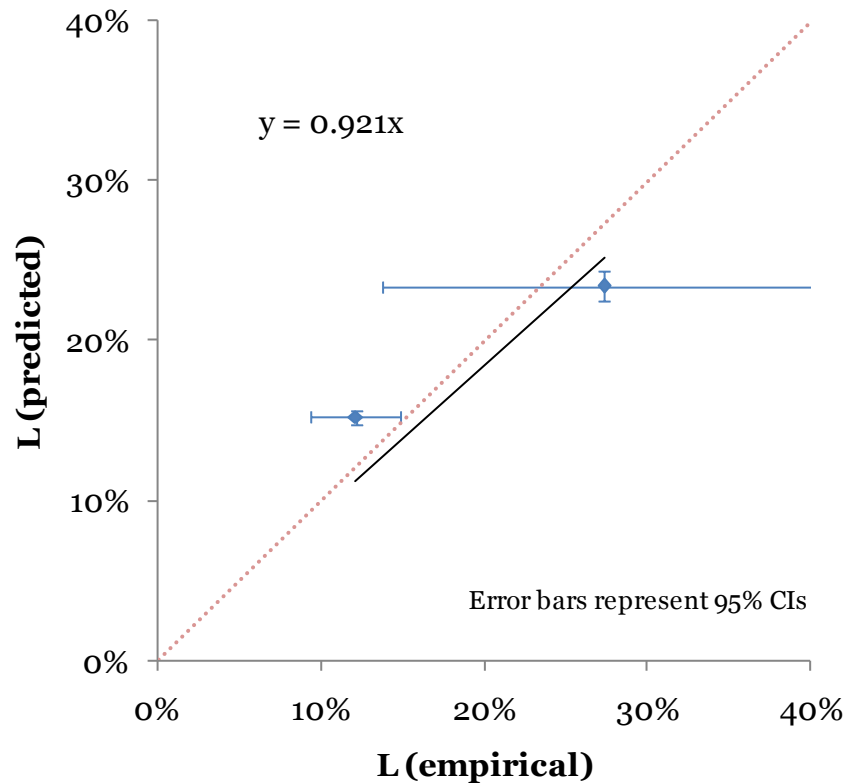
Grouped by estrogen receptor status

Group	N	L empirical (SEM)	L predicted (SEM)	Difference (pred – emp)
Positive	3694	11.90% (1.27%)	15.08% (0.20%)	3.18%
Negative	994	25.64% (5.57%)	23.79% (0.47%)	-1.86%
<i>Mean (std. dev.)</i>				0.66% (3.56%)
<i>Mean weighted by N (std. dev.)</i>				2.11% (4.10%)
<i>Root Mean Square (std. dev.)</i>				2.60% (2.17%)
<i>Root Mean Square weighted by N (std. dev.)</i>				3.59% (4.16%)



Grouped by progesterone receptor status

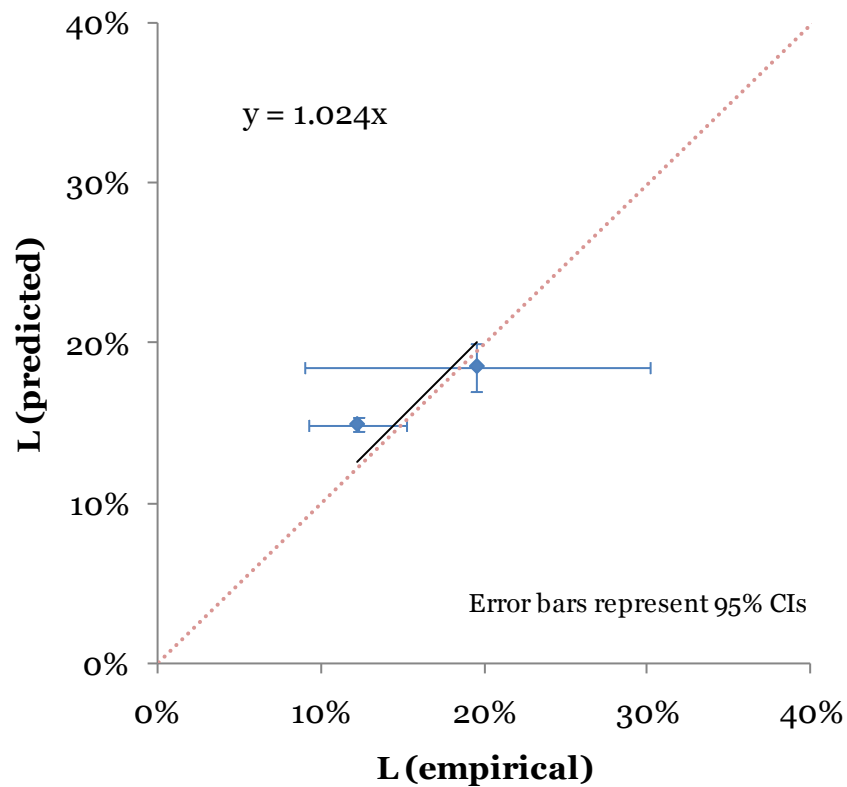
Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Positive	3092	12.11%	(1.39%)	15.22%	(0.22%)	3.11%
Negative	1028	27.36%	(6.94%)	23.42%	(0.46%)	-3.94%
<i>Mean (std. dev.)</i>						-0.42% (4.99%)
<i>Mean weighted by N (std. dev.)</i>						1.35% (4.69%)
<i>Root Mean Square (std. dev.)</i>						3.55% (2.03%)
<i>Root Mean Square weighted by N (std. dev.)</i>						3.58% (3.56%)



# Grouped by estrogen and progesterone receptor status

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
ER+/PR+	2941	12.22%	(1.54%)	14.91%	(0.22%)	2.68%
ER+/PR-	303	19.54%	(5.40%)	18.52%	(0.78%)	-1.03%
<i>Mean (std. dev.)</i>						0.83% (2.62%)
<i>Mean weighted by N (std. dev.)</i>						2.33% (3.57%)
<i>Root Mean Square (std. dev.)</i>						2.03% (2.08%)
<i>Root Mean Square weighted by N (std. dev.)</i>						3.44% (4.08%)

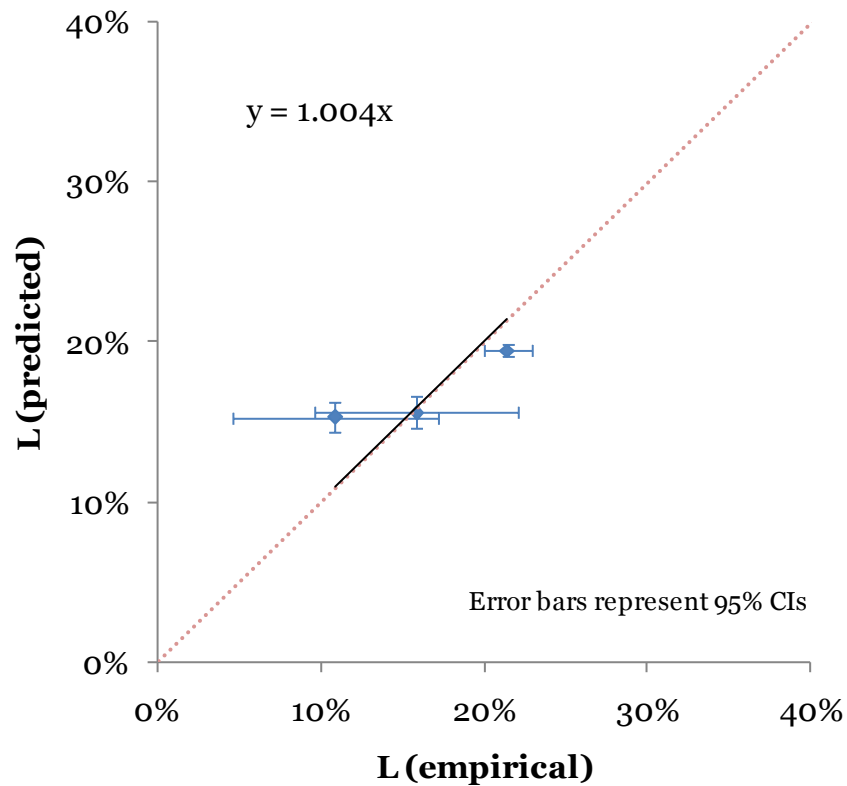
†the groups of ER+/PR+ and ER+/PR- are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



## Grouped by histological type

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Ductal	6267	21.40%	(0.75%)	19.50%	(0.17%)	-1.90%
Lobular	507	15.83%	(3.18%)	15.58%	(0.51%)	-0.25%
Ductal and Lobular	724	10.87%	(3.19%)	15.30%	(0.47%)	4.43%
<i>Mean (std. dev.)</i>						0.76% (3.28%)
<i>Mean weighted by N (std. dev.)</i>						-1.18% (3.18%)
<i>Root Mean Square (std. dev.)</i>						2.79% (3.23%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.85% (3.56%)

†the other histology groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group

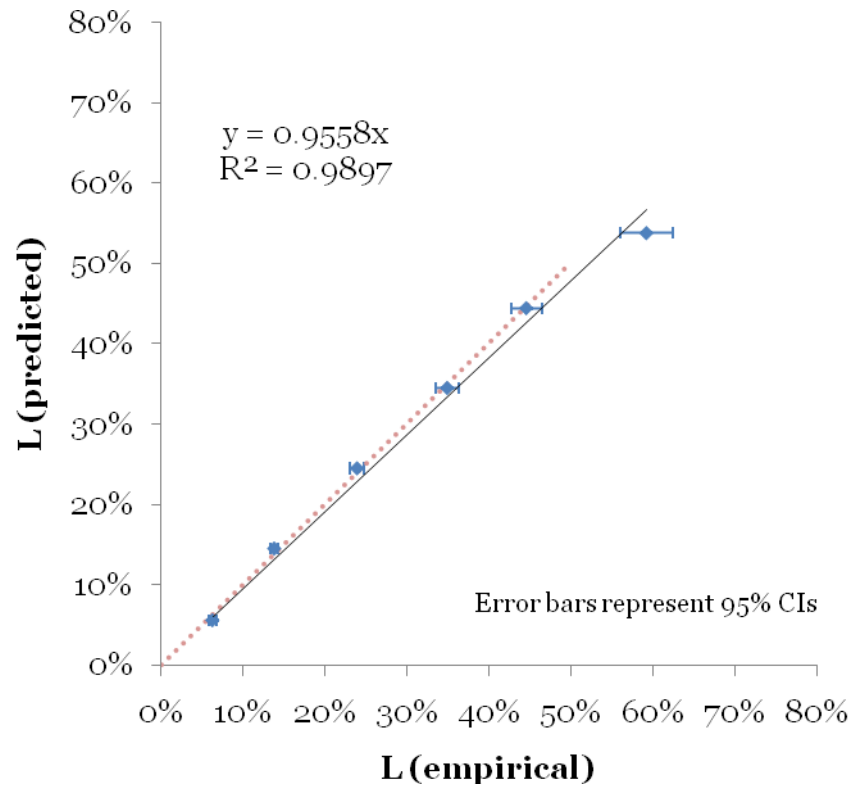


## V. Verification on the Post-1987 SEER dataset

Grouped by 10% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-10%	113839	6.30%	0.40%	5.57%	0.01%	-0.73%
10.1-20%	90667	13.84%	0.48%	14.50%	0.02%	0.66%
20.1-30%	46747	23.96%	0.87%	24.49%	0.03%	0.53%
30.1-40%	24348	34.95%	1.36%	34.49%	0.04%	-0.46%
40.1-50%	12845	44.60%	1.82%	44.43%	0.05%	-0.17%
50.1-60%	4556	59.27%	3.16%	53.77%	0.08%	-5.50%
<i>Mean (std. dev.)</i>						-0.95% (2.30%)
<i>Mean weighted by N (std. dev.)</i>						-0.13% (0.99)
<i>Root Mean Square (std. dev.)</i>						2.30% (3.50%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.91% (1.07)

<sup>†</sup>60.1-70%, 70.1-80% and 80.1+% groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group

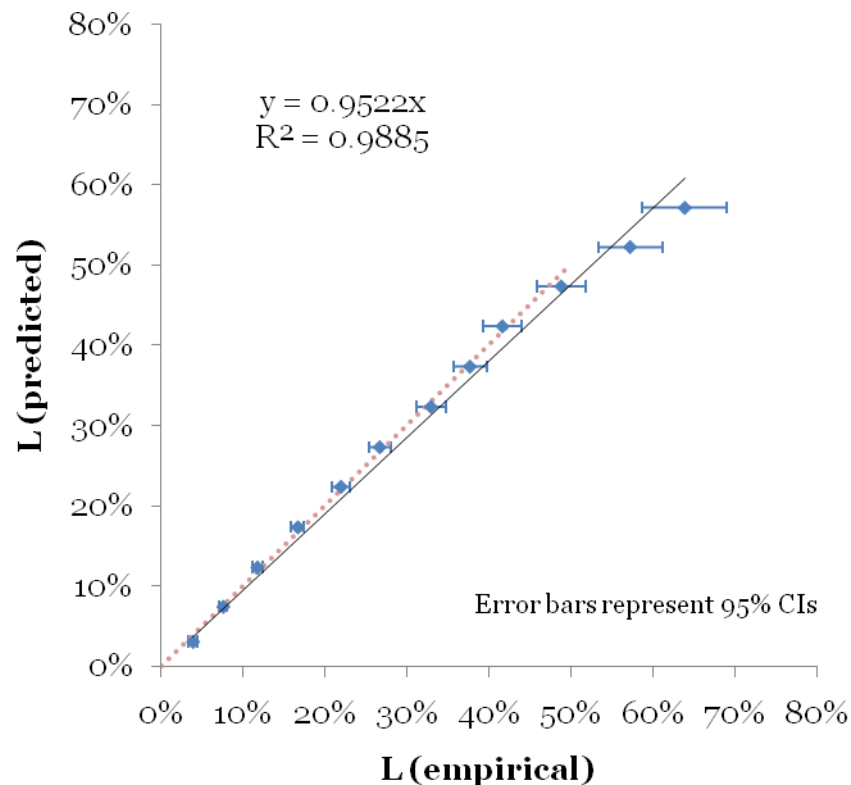




Grouped by 5% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-5%	49022	3.88%	(0.55%)	3.08%	(0.01%)	-0.80%
5.1-10%	64817	7.56%	(0.51%)	7.45%	(0.01%)	-0.11%
10.1-15%	51578	11.73%	(0.59%)	12.34%	(0.01%)	0.61%
15.1-20%	39089	16.67%	(0.79%)	17.35%	(0.01%)	0.68%
20.1-25%	26809	21.92%	(1.14%)	22.38%	(0.02%)	0.45%
25.1-30%	19938	26.66%	(1.33%)	27.33%	(0.02%)	0.67%
30.1-35%	13951	32.91%	(1.81%)	32.35%	(0.02%)	-0.56%
35.1-40%	10397	37.68%	(2.05%)	37.35%	(0.03%)	-0.32%
40.1-45%	7538	41.64%	(2.30%)	42.38%	(0.03%)	0.74%
45.1-50%	5307	48.82%	(3.00%)	47.35%	(0.04%)	-1.47%
50.1-55%	3138	57.24%	(3.91%)	52.25%	(0.05%)	-4.98%
55.1-60%	1418	63.92%	(5.18%)	57.12%	(0.07%)	-6.79%
Mean (std. dev.)						-0.99% (2.42%)
Mean weighted by N (std. dev.)						-0.01% (0.79%)
Root Mean Square (std. dev.)						2.52% (3.79%)
Root Mean Square weighted by N (std. dev.)						0.76% (0.90%)

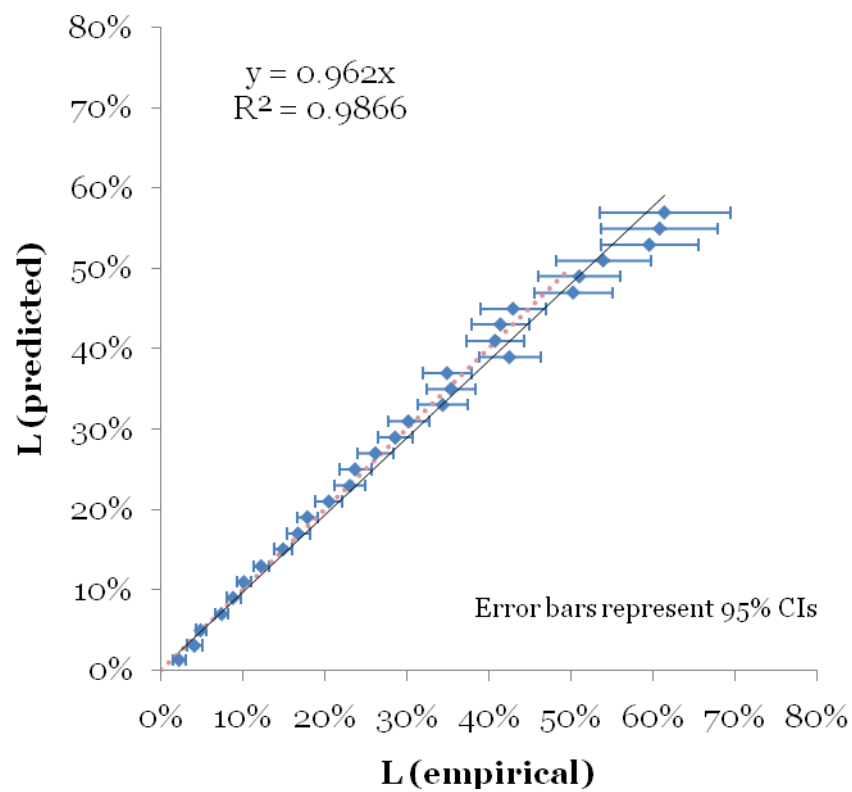
<sup>†</sup>60.1-65.0%, 65.1-70%, 70.1-75%, 80.1+ % groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



Grouped by 2% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-2%	10517	2.23%	(0.77%)	1.31%	(0.01%)	-0.92%
3-4%	25313	4.10%	(0.87%)	3.07%	(0.01%)	-1.03%
5-6%	26559	4.86%	(0.64%)	4.99%	(0.01%)	0.13%
7-8%	27230	7.41%	(0.83%)	7.01%	(0.01%)	-0.40%
9-10%	24220	8.82%	(0.85%)	9.02%	(0.01%)	0.21%
11-12%	22387	10.13%	(0.88%)	10.97%	(0.01%)	0.85%
13-14%	21147	12.23%	(0.89%)	12.96%	(0.01%)	0.72%
15-16%	17883	14.92%	(1.12%)	15.06%	(0.01%)	0.14%
17-18%	15394	16.75%	(1.38%)	17.01%	(0.01%)	0.27%
19-20%	13856	17.89%	(1.29%)	19.03%	(0.01%)	1.15%
21-22%	11825	20.51%	(1.64%)	21.00%	(0.01%)	0.49%
23-24%	10093	23.07%	(1.87%)	22.95%	(0.01%)	-0.12%
25-26%	9946	23.70%	(1.92%)	24.99%	(0.01%)	1.29%
27-28%	7504	26.19%	(2.19%)	27.00%	(0.01%)	0.81%
29-30%	7379	28.60%	(2.15%)	28.95%	(0.01%)	0.35%
31-32%	6174	30.21%	(2.53%)	30.97%	(0.01%)	0.76%
33-34%	5471	34.40%	(3.06%)	33.01%	(0.02%)	-1.39%
35-36%	4680	35.41%	(2.95%)	34.99%	(0.02%)	-0.42%
37-38%	4203	34.93%	(2.99%)	36.97%	(0.02%)	2.04%
39-40%	3820	42.54%	(3.73%)	38.94%	(0.02%)	-3.59%
41-42%	3327	40.79%	(3.48%)	40.99%	(0.02%)	0.19%
43-44%	2886	41.45%	(3.55%)	43.02%	(0.02%)	1.57%
45-46%	2537	42.98%	(3.93%)	44.97%	(0.02%)	1.99%
47-48%	2214	50.32%	(4.80%)	46.98%	(0.02%)	-3.34%
49-50%	1881	51.08%	(5.00%)	48.98%	(0.03%)	-2.09%
51-52%	1471	53.98%	(5.75%)	50.97%	(0.03%)	-3.01%
53-54%	1175	59.62%	(5.95%)	52.93%	(0.03%)	-6.69%
55-56%	887	60.87%	(7.12%)	54.94%	(0.04%)	-5.93%
57-58%	600	61.45%	(7.99%)	56.94%	(0.05%)	-4.51%
Mean (std. dev.)						-0.71% (2.27%)
Mean weighted by N (std. dev.)						-0.05% (0.96%)
Root Mean Square (std. dev.)						2.34% (3.28%)
Root Mean Square weighted by N (std. dev.)						0.94% (1.19%)

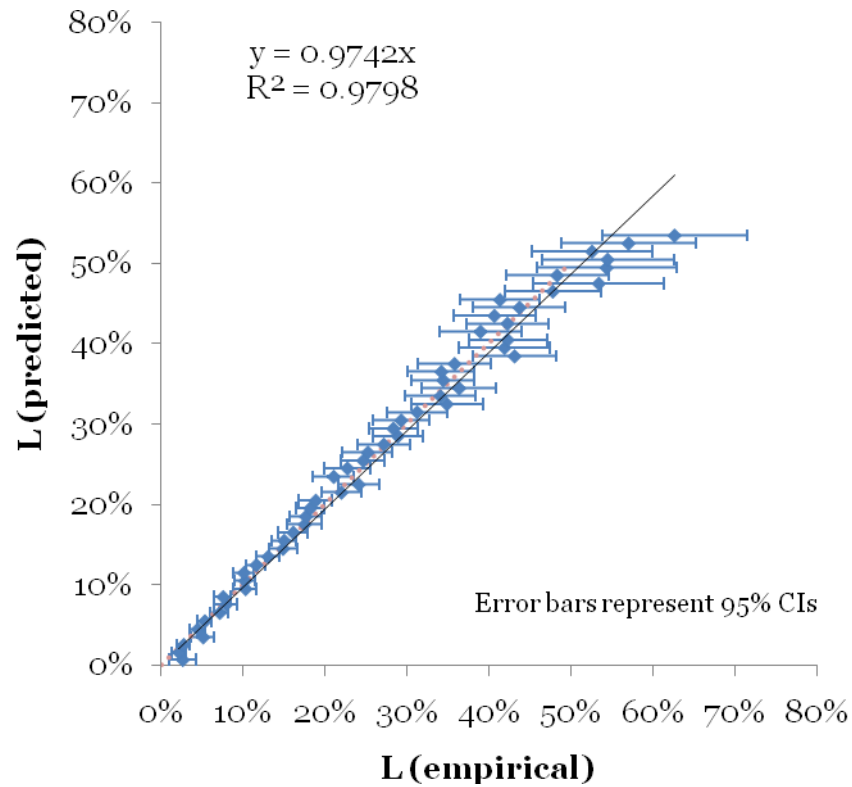
<sup>†</sup>59-60%, 61-62% ... 87-88%, 89-90% not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



Grouped by 1% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

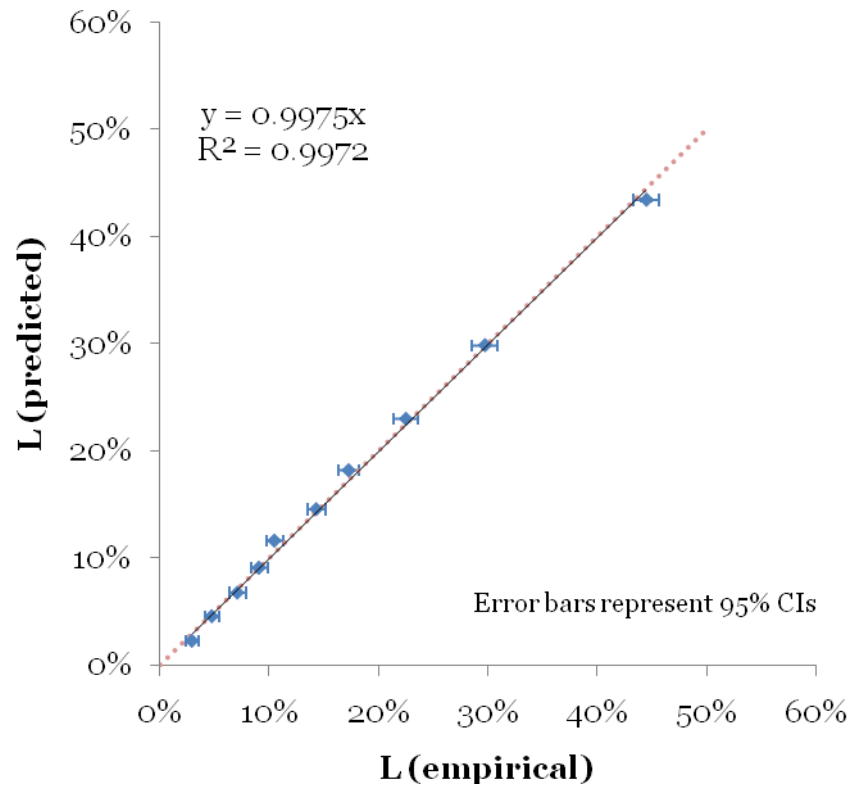
Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1	3153	2.58%	1.65%	0.67%	0.01%	-1.91%
2	7364	2.11%	0.87%	1.58%	0.01%	-0.53%
3	11392	2.69%	0.75%	2.55%	0.01%	-0.14%
4	13921	5.07%	1.36%	3.50%	0.00%	-1.57%
5	13192	4.40%	0.88%	4.49%	0.00%	0.09%
6	13367	5.27%	0.91%	5.48%	0.00%	0.21%
7	14690	7.09%	1.04%	6.53%	0.00%	-0.56%
8	12540	7.89%	1.39%	7.58%	0.00%	-0.32%
9	11605	7.51%	1.02%	8.50%	0.00%	0.99%
10	12615	10.25%	1.43%	9.50%	0.00%	-0.75%
11	11780	10.19%	1.20%	10.50%	0.01%	0.31%
12	10607	10.04%	1.30%	11.50%	0.01%	1.46%
13	11394	11.57%	1.18%	12.48%	0.01%	0.91%
14	9753	13.01%	1.36%	13.51%	0.01%	0.50%
15	8044	14.83%	1.71%	14.51%	0.01%	-0.33%
16	9839	14.98%	1.48%	15.51%	0.01%	0.54%
17	7879	16.06%	1.84%	16.53%	0.01%	0.46%
18	7515	17.49%	2.10%	17.52%	0.01%	0.03%
19	6681	17.63%	1.90%	18.50%	0.01%	0.88%
20	7175	18.15%	1.75%	19.53%	0.01%	1.38%
21	5918	18.84%	2.08%	20.50%	0.01%	1.66%
22	5907	21.96%	2.45%	21.51%	0.01%	-0.46%
23	5322	24.10%	2.50%	22.49%	0.01%	-1.61%
24	4771	21.03%	2.46%	23.47%	0.01%	2.44%
25	4891	22.70%	2.80%	24.51%	0.01%	1.81%
26	5055	24.63%	2.66%	25.46%	0.01%	0.83%
27	3629	25.20%	3.04%	26.49%	0.01%	1.28%
28	3875	27.15%	3.16%	27.48%	0.01%	0.33%
29	3903	28.88%	3.06%	28.50%	0.01%	-0.38%
30	3476	28.31%	3.00%	29.46%	0.01%	1.15%
31	3218	29.27%	3.42%	30.48%	0.01%	1.21%
32	2956	31.21%	3.68%	31.50%	0.01%	0.29%
33	2630	34.86%	4.38%	32.50%	0.01%	-2.35%
34	2841	34.07%	4.28%	33.49%	0.01%	-0.59%
35	2306	36.36%	4.52%	34.49%	0.01%	-1.87%
36	2374	34.41%	3.81%	35.48%	0.01%	1.07%
37	2319	34.18%	4.06%	36.53%	0.01%	2.35%
38	1884	35.80%	4.42%	37.51%	0.01%	1.71%
39	2082	43.13%	5.07%	38.47%	0.01%	-4.66%
40	1738	41.90%	5.56%	39.51%	0.01%	-2.39%
41	1758	42.31%	4.74%	40.51%	0.01%	-1.80%
42	1569	38.96%	5.04%	41.52%	0.01%	2.56%
43	1423	42.25%	5.05%	42.52%	0.01%	0.27%
44	1463	40.67%	4.99%	43.49%	0.01%	2.82%
45	1325	43.74%	5.65%	44.51%	0.01%	0.77%
46	1212	41.34%	4.88%	45.48%	0.02%	4.14%
47	1168	47.81%	5.86%	46.52%	0.02%	-1.28%
48	1046	53.43%	7.96%	47.50%	0.02%	-5.93%
49	958	48.33%	6.25%	48.51%	0.02%	0.18%
50	923	54.37%	8.52%	49.47%	0.02%	-4.90%
51	771	54.51%	8.04%	50.49%	0.02%	-4.02%
52	700	52.60%	7.36%	51.49%	0.02%	-1.11%

53	664	57.07%	8.24%	52.50%	0.02%	-4.56%
54	511	62.69%	8.77%	53.48%	0.02%	-9.21%
<i>Mean (std. dev.)</i>						-0.34% (2.36%)
<i>Mean weighted by N (std. dev.)</i>						-0.09% (1.21%)
<i>Root Mean Square (std. dev.)</i>						2.36% (3.62%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.20% (1.61%)
†55%,56%,57% ... 87%, 88% groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group						



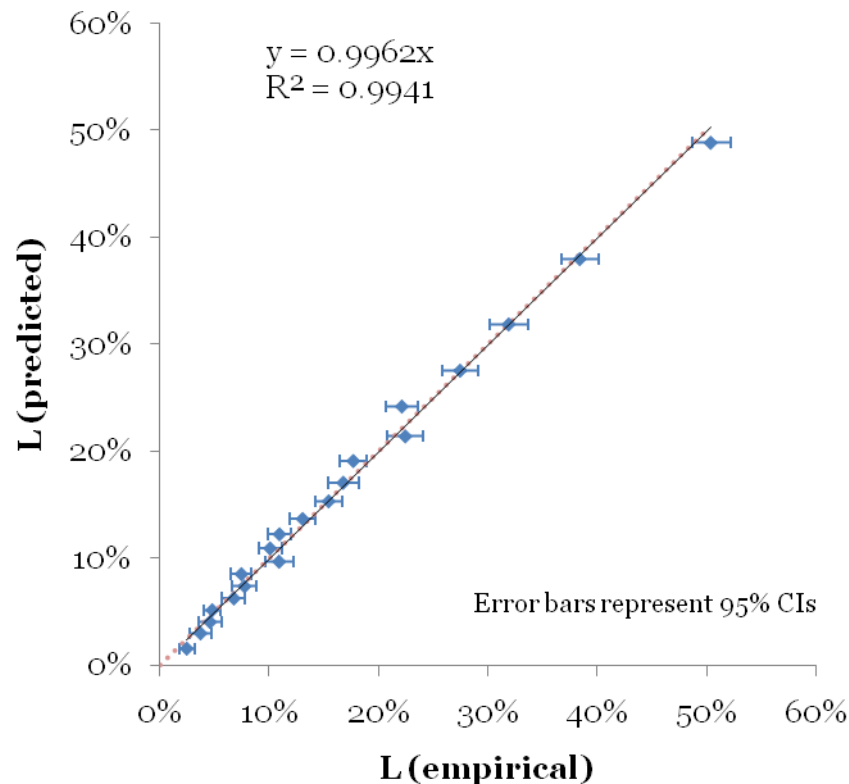
Grouped by 10% predicted lethality percentiles using the Size+Nodes+PrognosticFactors equation

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-3.5%	28735	2.98%	0.63%	2.26%	0.01%	-0.71%
3.6-5.7%	29067	4.78%	0.66%	4.55%	0.01%	-0.23%
5.8-7.9%	29563	7.11%	0.77%	6.76%	0.01%	-0.36%
7.9-10.3%	30056	9.08%	0.78%	9.07%	0.01%	-0.01%
10.4-12.9%	29497	10.50%	0.75%	11.61%	0.01%	1.11%
13.0-16.2%	29594	14.32%	0.84%	14.54%	0.01%	0.22%
16.3-20.3%	29620	17.28%	0.92%	18.17%	0.01%	0.89%
20.4-25.9%	29779	22.51%	1.09%	22.97%	0.02%	0.45%
26.0-34.5%	28228	29.74%	1.20%	29.85%	0.03%	0.11%
34.6+%	29437	44.49%	1.22%	43.41%	0.08%	-1.08%
<i>Mean (std. dev.)</i>						0.04% (0.68%)
<i>Mean weighted by N (std. dev.)</i>						0.04% (0.68%)
<i>Root Mean Square (std. dev.)</i>						0.64% (0.70%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.64% (0.70%)



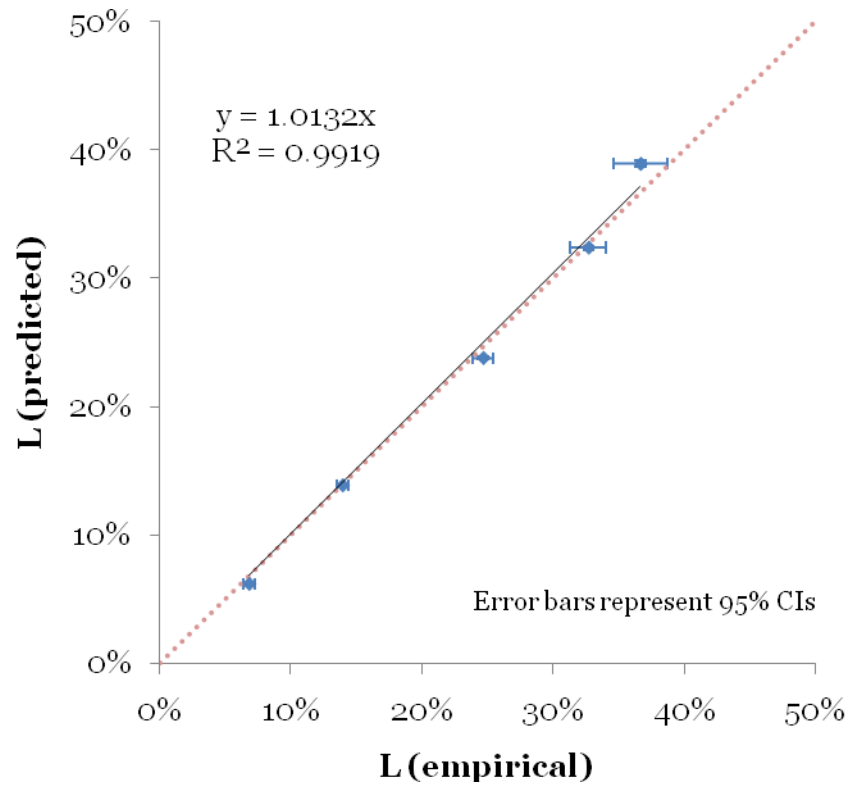
Grouped by 5% predicted lethality percentiles using the Size+Nodes+PrognosticFactors equation

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-2.4%	14679	2.45%	0.72%	1.57%	0.01%	-0.88%
2.5-3.5%	14697	3.71%	1.00%	3.00%	0.00%	-0.71%
3.6-4.6%	14660	4.57%	1.05%	4.06%	0.01%	-0.51%
4.7-5.7%	14800	4.79%	0.80%	5.17%	0.01%	0.38%
5.8-6.8%	14663	6.76%	1.05%	6.27%	0.00%	-0.49%
6.9-7.9%	15192	7.74%	1.13%	7.40%	0.01%	-0.34%
8.0-9.2%	14171	7.45%	0.94%	8.54%	0.01%	1.09%
9.3-10.2%	14563	10.91%	1.30%	9.70%	0.01%	-1.20%
10.3-11.6%	14656	10.07%	1.07%	10.94%	0.01%	0.87%
11.7-12.9%	14805	10.94%	1.06%	12.26%	0.01%	1.32%
13.0-14.5%	14577	13.07%	1.16%	13.69%	0.01%	0.63%
14.6-16.2%	14696	15.45%	1.23%	15.34%	0.01%	-0.10%
16.3-18.0%	14664	16.78%	1.40%	17.08%	0.01%	0.30%
18.1-20.2%	14680	17.71%	1.24%	19.12%	0.01%	1.41%
20.3-22.7%	14684	22.47%	1.63%	21.42%	0.01%	-1.05%
22.8-25.7%	14786	22.15%	1.42%	24.21%	0.01%	2.06%
25.8-29.4%	14568	27.49%	1.62%	27.56%	0.02%	0.07%
29.5-34.4%	14677	31.94%	1.74%	31.88%	0.02%	-0.05%
34.5-42.0%	14678	38.46%	1.72%	37.99%	0.03%	-0.46%
42.1+%	14679	50.45%	1.73%	48.86%	0.09%	-1.58%
Mean (std. dev.)						0.04% (0.96%)
Mean weighted by N (std. dev.)						0.04% (0.96%)
Root Mean Square (std. dev.)						0.94% (1.04%)
Root Mean Square weighted by N (std. dev.)						0.94% (1.04%)



Grouped by 10 mm tumor size bins

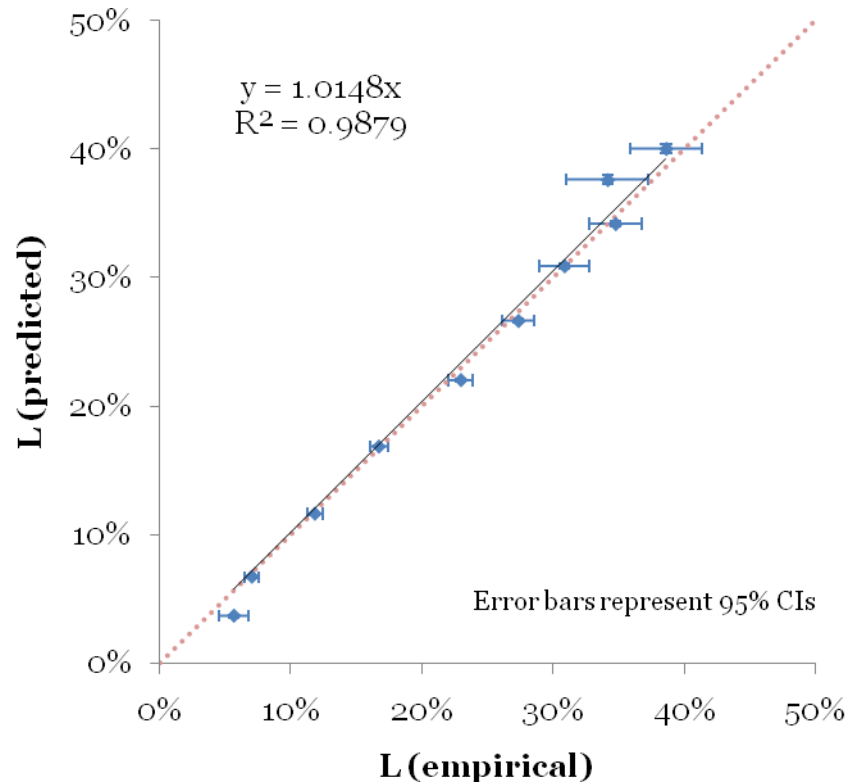
Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	72129	6.83%	(0.46%)	6.18%	(0.04%)	-0.64%
11-20 mm	128000	13.95%	(0.44%)	13.86%	(0.05%)	-0.09%
21-30 mm	61307	24.68%	(0.76%)	23.78%	(0.08%)	-0.89%
31-40 mm	22011	32.72%	(1.37%)	32.38%	(0.15%)	-0.33%
41-50 mm	10129	36.67%	(2.07%)	38.90%	(0.23%)	2.23%
<i>Mean (std. dev.)</i>						-0.06% (1.25%)
<i>Mean weighted by N (std. dev.)</i>						-0.33% (0.53)
<i>Root Mean Square (std. dev.)</i>						1.12% (1.45%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.58% (0.62)





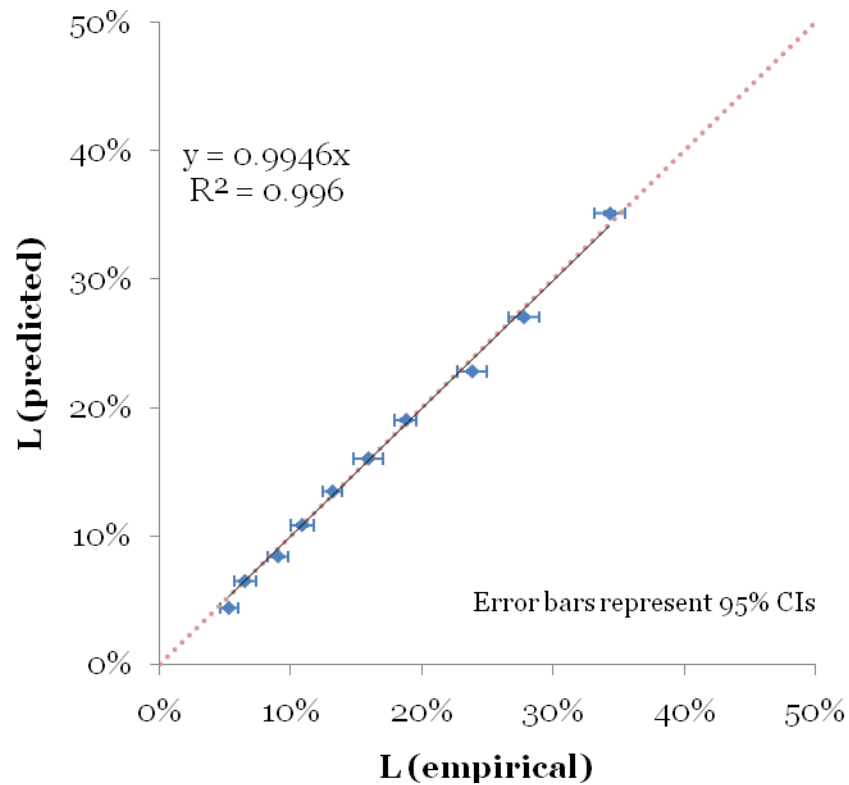
Grouped by 5 mm tumor size bins

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-5 mm	12229	5.66%	(1.12%)	3.66%	(0.08%)	-2.00%
6-10 mm	59900	7.02%	(0.50%)	6.70%	(0.04%)	-0.32%
11-15 mm	72892	11.83%	(0.58%)	11.61%	(0.05%)	-0.22%
16-20 mm	55108	16.70%	(0.69%)	16.84%	(0.07%)	0.14%
21-25 mm	37894	22.96%	(0.94%)	22.02%	(0.10%)	-0.94%
26-30 mm	23413	27.35%	(1.24%)	26.63%	(0.14%)	-0.72%
31-35 mm	12049	30.87%	(1.87%)	30.89%	(0.20%)	0.03%
36-40 mm	9962	34.76%	(2.01%)	34.18%	(0.22%)	-0.58%
41-45 mm	4733	34.16%	(3.14%)	37.61%	(0.34%)	3.44%
46-50 mm	5396	38.62%	(2.75%)	40.04%	(0.32%)	1.41%
<i>Mean (std. dev.)</i>						0.02% (1.48%)
<i>Mean weighted by N (std. dev.)</i>						-0.29% (0.56)
<i>Root Mean Square (std. dev.)</i>						1.40% (1.92%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.61% (0.67)



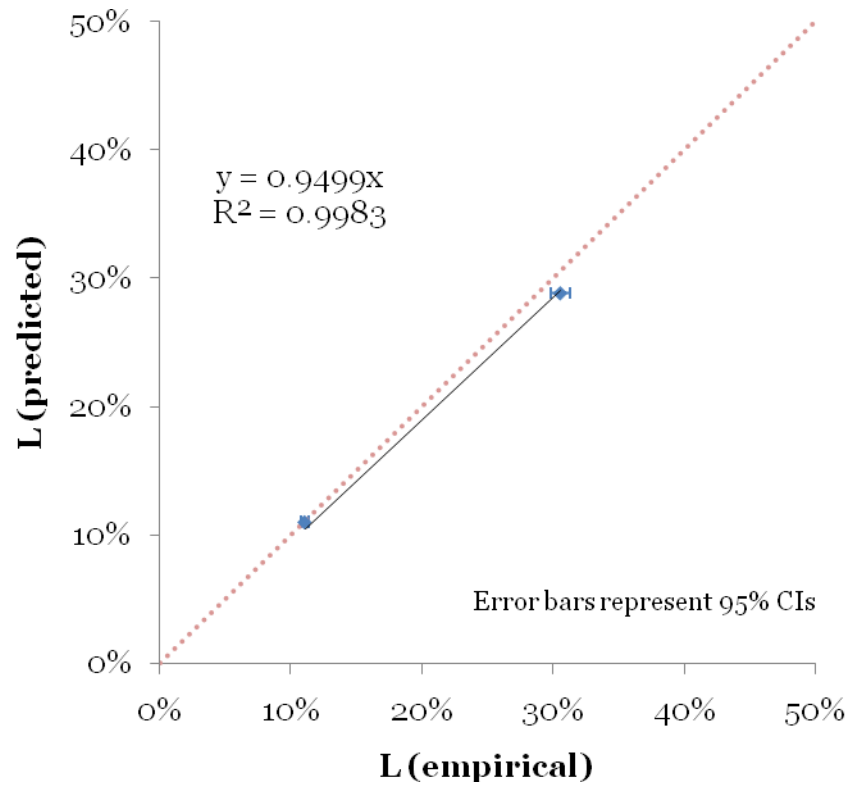
## Grouped by 10% tumor size percentiles

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-7 mm	28270	5.28%	(0.67%)	4.37%	(0.05%)	-1.74%
8-9 mm	21414	6.49%	(0.83%)	6.46%	(0.07%)	-0.37%
10-12 mm	31275	9.03%	(0.82%)	8.40%	(0.07%)	-0.59%
13-14 mm	34538	10.86%	(0.85%)	10.84%	(0.07%)	-2.28%
15-16 mm	36259	13.19%	(0.75%)	13.45%	(0.08%)	-0.24%
17-19 mm	24023	15.91%	(1.16%)	16.03%	(0.11%)	0.49%
20-22 mm	36118	18.79%	(0.83%)	19.02%	(0.10%)	-4.50%
23-25 mm	26126	23.83%	(1.11%)	22.81%	(0.12%)	0.44%
26-33 mm	27261	27.77%	(1.18%)	27.03%	(0.13%)	-1.84%
34-50 mm	28292	34.33%	(1.20%)	35.11%	(0.14%)	2.05%
<i>Mean (std. dev.)</i>						-0.86% (1.82%)
<i>Mean weighted by N (std. dev.)</i>						-1.00% (2.06)
<i>Root Mean Square (std. dev.)</i>						1.92% (2.48%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.20% (3.06)



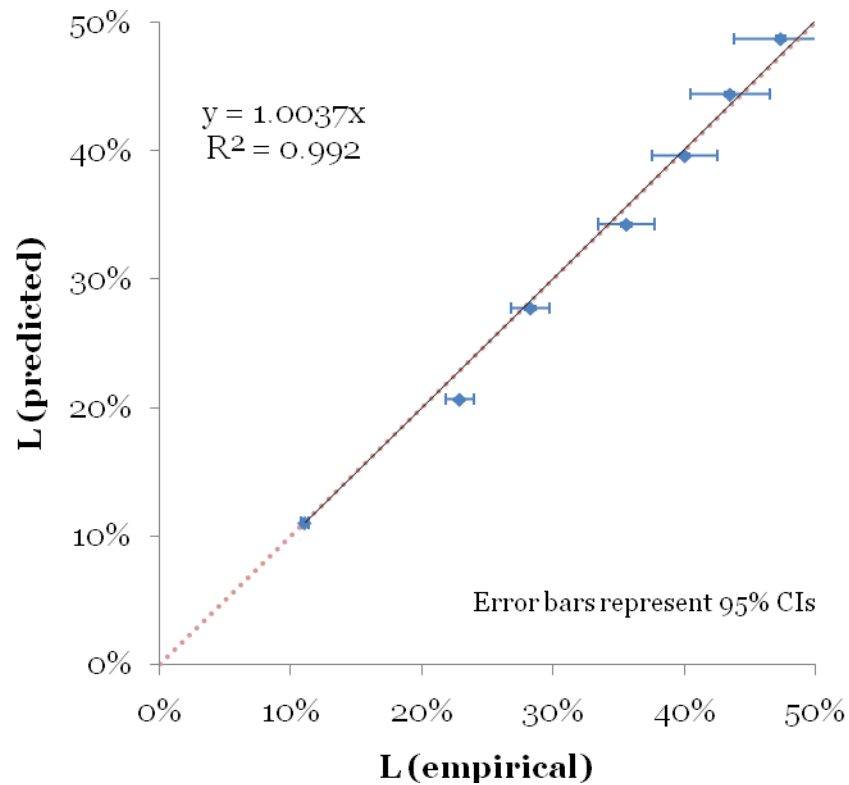
## Grouped by lymph nodes positivity status

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Negative	206572	11.07%	(0.31%)	11.01%	(0.03%)	-0.06%
Positive	87004	30.56%	(0.72%)	28.86%	(0.08%)	-1.71%
<i>Mean (std. dev.)</i>						-0.89% (1.17%)
<i>Mean weighted by N (std. dev.)</i>						-0.55% (0.66%)
<i>Root Mean Square (std. dev.)</i>						1.21% (1.44%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.72% (0.85%)



## Grouped by number of positive lymph nodes

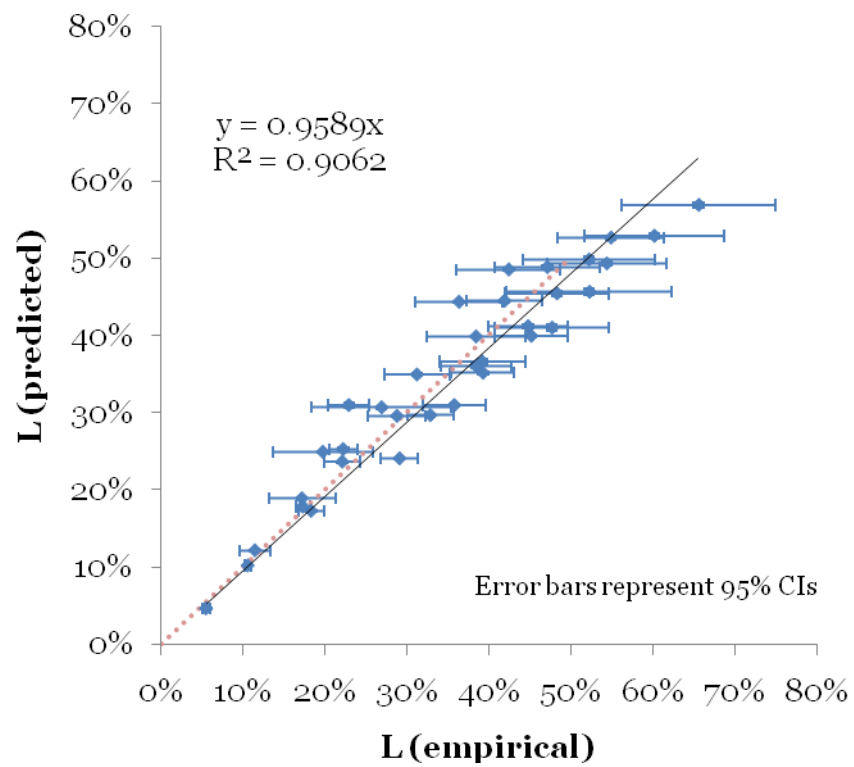
Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0	206572	11.07%	(0.31%)	11.01%	(0.03%)	-0.06%
1	39610	22.88%	(1.05%)	20.63%	(0.08%)	-2.25%
2	18710	28.29%	(1.47%)	27.74%	(0.11%)	-0.55%
3	10578	35.61%	(2.15%)	34.27%	(0.14%)	-1.33%
4	6804	40.05%	(2.49%)	39.62%	(0.16%)	-0.43%
5	4807	43.50%	(3.03%)	44.40%	(0.17%)	0.90%
6	3656	47.37%	(3.50%)	48.73%	(0.18%)	1.36%
7	2839	51.67%	(3.75%)	53.02%	(0.20%)	1.35%
<i>Mean (std. dev.)</i>						-0.13% (1.29%)
<i>Mean weighted by N (std. dev.)</i>						-0.39% (0.85%)
<i>Root Mean Square (std. dev.)</i>						1.21% (1.28%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.89% (1.44%)



# Permutations of 10 mm tumor size bins and number of positive lymph nodes

Group <sup>†</sup> Size	Nodes	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	0	63286	5.52%	(0.46%)	4.64%	(0.02%)	-0.88%
11-20 mm	0	93107	10.60%	(0.46%)	10.19%	(0.03%)	-0.40%
21-30 mm	0	35154	17.30%	(0.85%)	17.84%	(0.06%)	0.54%
31-40 mm	0	10632	22.23%	(1.72%)	25.28%	(0.14%)	3.05%
41-50 mm	0	4393	22.91%	(2.54%)	30.97%	(0.27%)	8.06%
1-10 mm	1	5356	11.47%	(1.87%)	12.17%	(0.06%)	0.69%
11-20 mm	1	17856	18.32%	(1.51%)	17.28%	(0.06%)	-1.05%
21-30 mm	1	10707	29.10%	(2.26%)	24.07%	(0.10%)	-5.03%
31-40 mm	1	3965	35.77%	(3.88%)	30.96%	(0.20%)	-4.80%
41-50 mm	1	1726	39.18%	(5.26%)	36.61%	(0.37%)	-2.58%
1-10 mm	2	1754	17.20%	(4.06%)	18.90%	(0.10%)	1.70%
11-20 mm	2	7653	22.12%	(2.18%)	23.65%	(0.08%)	1.53%
21-30 mm	2	5677	32.85%	(2.81%)	29.67%	(0.12%)	-3.18%
31-40 mm	2	2445	38.42%	(4.30%)	36.03%	(0.23%)	-2.39%
41-50 mm	2	1181	47.68%	(6.98%)	40.99%	(0.39%)	-6.69%
1-10 mm	3	709	19.75%	(6.16%)	24.92%	(0.13%)	5.17%
11-20 mm	3	3790	28.78%	(3.54%)	29.57%	(0.10%)	0.79%
21-30 mm	3	3531	39.27%	(3.84%)	35.15%	(0.14%)	-4.12%
31-40 mm	3	1712	44.75%	(4.89%)	41.18%	(0.27%)	-3.57%
41-50 mm	3	836	52.24%	(10.11%)	45.64%	(0.46%)	-6.60%
1-10 mm	4	427	26.91%	(8.53%)	30.68%	(0.18%)	3.77%
11-20 mm	4	2245	31.22%	(4.04%)	34.93%	(0.12%)	3.71%
21-30 mm	4	2287	45.14%	(4.49%)	39.94%	(0.16%)	-5.20%
31-40 mm	4	1185	48.29%	(6.36%)	45.44%	(0.29%)	-2.85%
41-50 mm	4	660	52.18%	(8.04%)	49.83%	(0.47%)	-2.35%
11-20 mm	5	1460	38.42%	(6.00%)	39.86%	(0.14%)	1.44%
21-30 mm	5	1717	41.88%	(4.67%)	44.49%	(0.17%)	2.60%
31-40 mm	5	833	54.36%	(7.24%)	49.31%	(0.31%)	-5.04%
11-20 mm	6	1096	36.35%	(5.31%)	44.34%	(0.15%)	7.99%
21-30 mm	6	1256	47.10%	(6.43%)	48.85%	(0.19%)	1.75%
31-40 mm	6	682	60.15%	(8.55%)	52.90%	(0.30%)	-7.25%
11-20 mm	7	793	42.41%	(6.31%)	48.54%	(0.17%)	6.13%
21-30 mm	7	978	54.87%	(6.51%)	52.66%	(0.21%)	-2.21%
31-40 mm	7	557	65.56%	(9.42%)	56.89%	(0.35%)	-8.67%
<i>Mean (std. dev.)</i>							-0.76% (4.33%)
<i>Mean weighted by N (std. dev.)</i>							-0.47% (2.18%)
<i>Root Mean Square (std. dev.)</i>							4.33% (4.59%)
<i>Root Mean Square weighted by N (std. dev.)</i>							2.20% (3.21%)

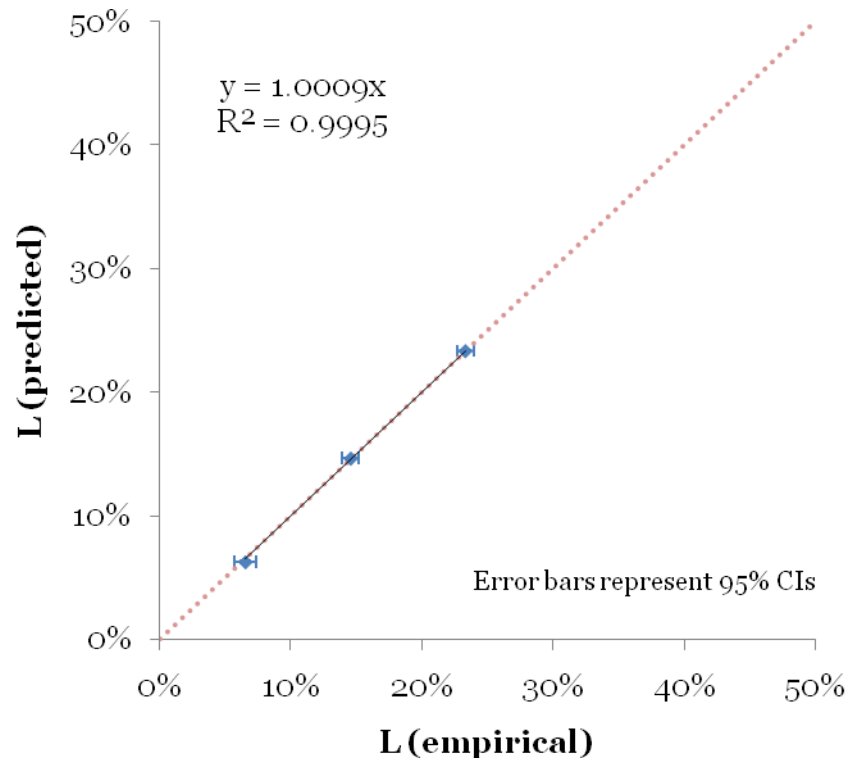
<sup>†</sup>for the combinations of 1-10 mm or 41-50mm with 5, 6, and 7 positive nodes, the groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



## Grouped by tumor grade

Group†	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
grade 1	49344	6.53%	(0.85%)	6.28%	(0.06%)	-0.24%
grade 2	108483	14.57%	(0.64%)	14.67%	(0.06%)	0.11%
grade 3	88369	23.33%	(0.64%)	23.37%	(0.08%)	0.04%
<i>Mean (std. dev.)</i>						-0.03% (0.19%)
<i>Mean weighted by N (std. dev.)</i>						-0.01% (0.15%)
<i>Root Mean Square (std. dev.)</i>						0.05% (0.18%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.12% (0.11%)

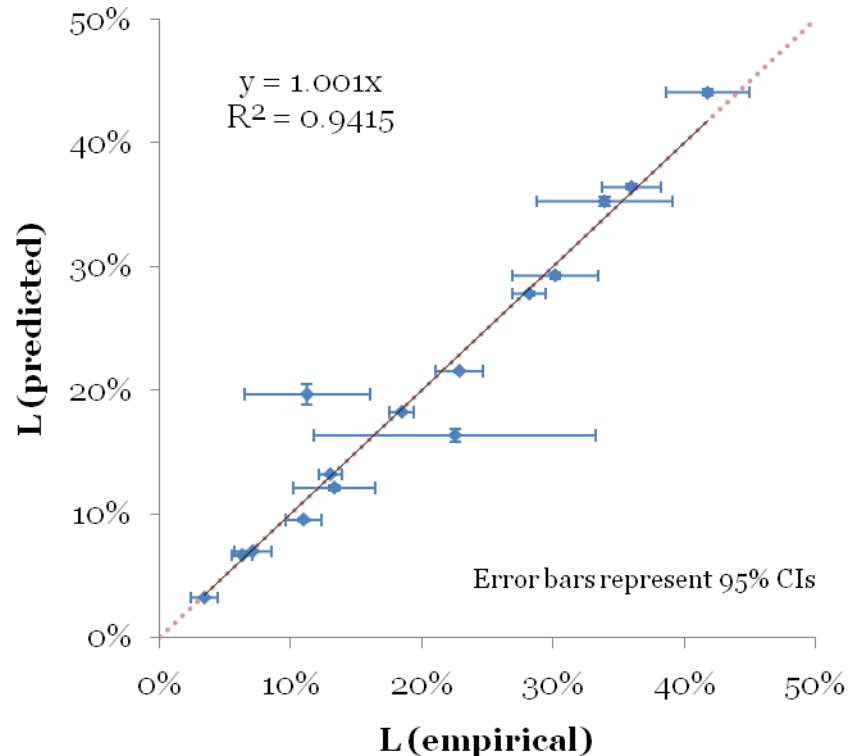
†grade 4 also exists in the dataset, but is not included in the calculation of the mean or displayed on graph; grade 4 no longer exists



## Permutations of 10 mm tumor size bins and tumor grade

Group <sup>†</sup> Size	Grade	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	1	21282	3.41%	(1.00%)	3.19%	(0.05%)	-0.22%
11-20 mm	1	20982	7.09%	(1.40%)	6.95%	(0.08%)	-0.14%
21-30 mm	1	5092	13.32%	(3.08%)	12.10%	(0.23%)	-1.22%
31-40 mm	1	1315	22.54%	(10.7%)	16.34%	(0.52%)	-6.20%
41-50 mm	1	673	11.25%	(4.81%)	19.67%	(0.79%)	8.42%
1-10 mm	2	27446	6.29%	(0.82%)	6.63%	(0.06%)	0.35%
11-20 mm	2	50953	13.01%	(0.91%)	13.18%	(0.07%)	0.17%
21-30 mm	2	20759	22.88%	(1.81%)	21.55%	(0.13%)	-1.33%
31-40 mm	2	6401	30.19%	(3.26%)	29.30%	(0.25%)	-0.90%
41-50 mm	2	2924	33.95%	(5.18%)	35.29%	(0.37%)	1.34%
1-10 mm	3	11735	10.96%	(1.40%)	9.51%	(0.12%)	-1.45%
11-20 mm	3	35984	18.47%	(0.95%)	18.23%	(0.09%)	-0.24%
21-30 mm	3	25495	28.21%	(1.26%)	27.82%	(0.11%)	-0.39%
31-40 mm	3	10460	36.01%	(2.26%)	36.45%	(0.18%)	0.44%
41-50 mm	3	4695	41.82%	(3.16%)	44.08%	(0.28%)	2.25%
<i>Mean (std. dev.)</i>							0.06% (2.96%)
<i>Mean weighted by N (std. dev.)</i>							-0.20% (0.65%)
<i>Root Mean Square (std. dev.)</i>							2.86% (4.46%)
<i>Root Mean Square weighted by N (std. dev.)</i>							0.66% (0.84%)

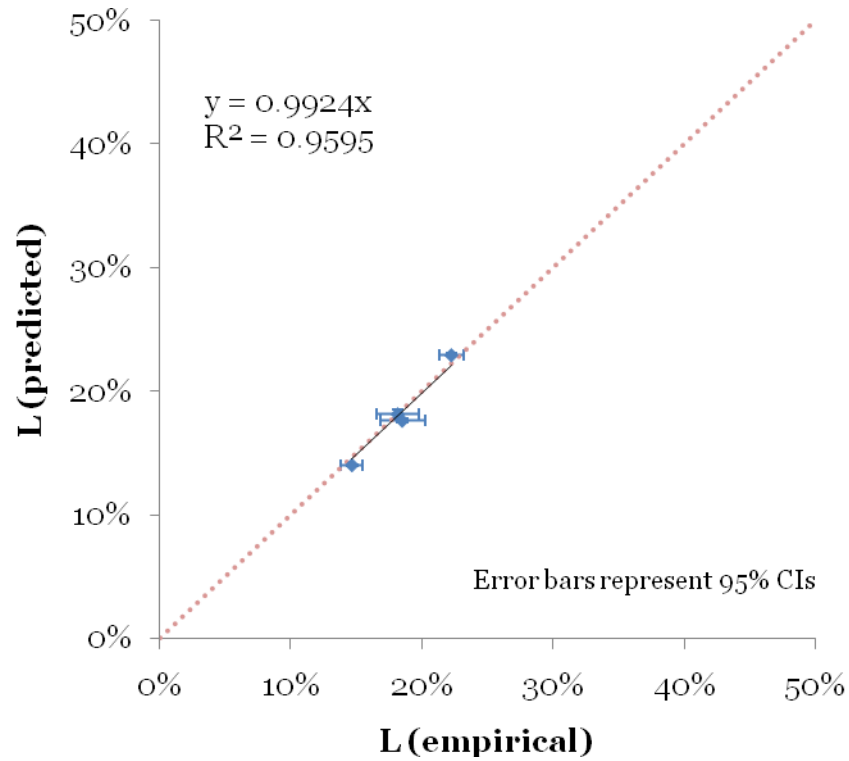
<sup>†</sup>grade 4 also exists in the dataset, but is not included in the calculation of the mean or displayed on graph; grade 4 no longer exists





Grouped by estrogen and progesterone receptor status

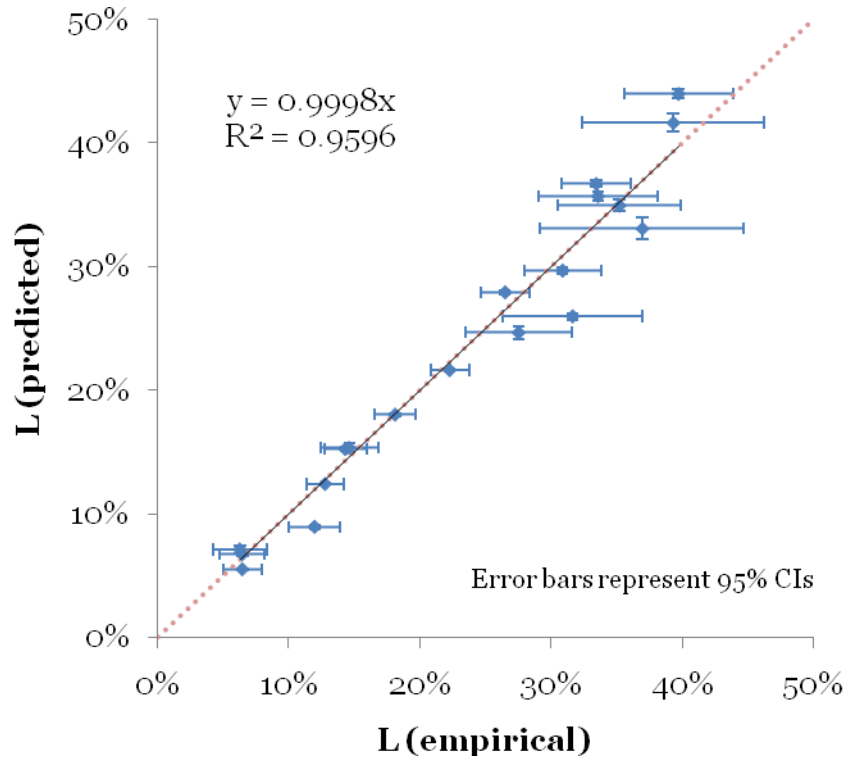
Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
ER+/PR+	151742	14.68%	(0.84%)	14.01%	(0.06%)	-0.66%
ER+/PR-	28880	18.51%	(1.71%)	17.63%	(0.15%)	-0.88%
ER-/PR+	5519	18.16%	(1.58%)	18.16%	(0.33%)	0.00%
ER-/PR-	44672	22.25%	(0.94%)	22.96%	(0.12%)	0.71%
<i>Mean (std. dev.)</i>						-0.21% (0.72%)
<i>Mean weighted by N (std. dev.)</i>						-0.41% (0.97%)
<i>Root Mean Square (std. dev.)</i>						0.66% (0.57%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.94% (1.20%)



# Permutations of 10 mm tumor size bins and estrogen/progesterone receptor status

Group <sup>†</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Size	ER/PR						
1-10 mm	ER+/PR+	40037	6.48%	(1.48%)	5.51%	(0.05%)	-0.97%
11-20 mm	ER+/PR+	69671	12.79%	(1.42%)	12.41%	(0.06%)	-0.37%
21-30 mm	ER+/PR+	28800	22.27%	(1.47%)	21.63%	(0.12%)	-0.64%
31-40 mm	ER+/PR+	9105	30.89%	(2.95%)	29.69%	(0.23%)	-1.19%
41-50 mm	ER+/PR+	4129	33.59%	(4.56%)	35.71%	(0.37%)	2.12%
1-10 mm	ER+/PR-	7515	6.48%	(1.71%)	6.73%	(0.13%)	0.26%
11-20 mm	ER+/PR-	12295	14.32%	(1.59%)	15.24%	(0.15%)	0.92%
21-30 mm	ER+/PR-	5864	31.65%	(5.29%)	25.99%	(0.26%)	-5.66%
31-40 mm	ER+/PR-	2208	35.22%	(4.73%)	34.95%	(0.46%)	-0.28%
41-50 mm	ER+/PR-	998	39.33%	(6.92%)	41.65%	(0.71%)	2.32%
1-10 mm	ER-/PR+	1196	6.29%	(2.03%)	7.11%	(0.34%)	0.83%
11-20 mm	ER-/PR+	2378	14.62%	(2.18%)	15.33%	(0.35%)	0.72%
21-30 mm	ER-/PR+	1250	27.53%	(4.07%)	24.67%	(0.55%)	-2.86%
31-40 mm	ER-/PR+	486	36.97%	(7.77%)	33.08%	(0.91%)	-3.89%
1-10 mm	ER-/PR-	7058	11.98%	(1.96%)	8.95%	(0.15%)	-3.04%
11-20 mm	ER-/PR-	17516	18.12%	(1.60%)	18.03%	(0.12%)	-0.09%
21-30 mm	ER-/PR-	12393	26.50%	(1.87%)	27.93%	(0.16%)	1.43%
31-40 mm	ER-/PR-	5283	33.44%	(2.62%)	36.71%	(0.26%)	3.26%
41-50 mm	ER-/PR-	2422	39.72%	(4.16%)	43.99%	(0.40%)	4.27%
Mean (std. dev.)							-0.15% (2.47%)
Mean weighted by N (std. dev.)							-0.36% (1.34%)
Root Mean Square (std. dev.)							2.41% (2.90%)
Root Mean Square weighted by N (std. dev.)							1.36% (1.68%)

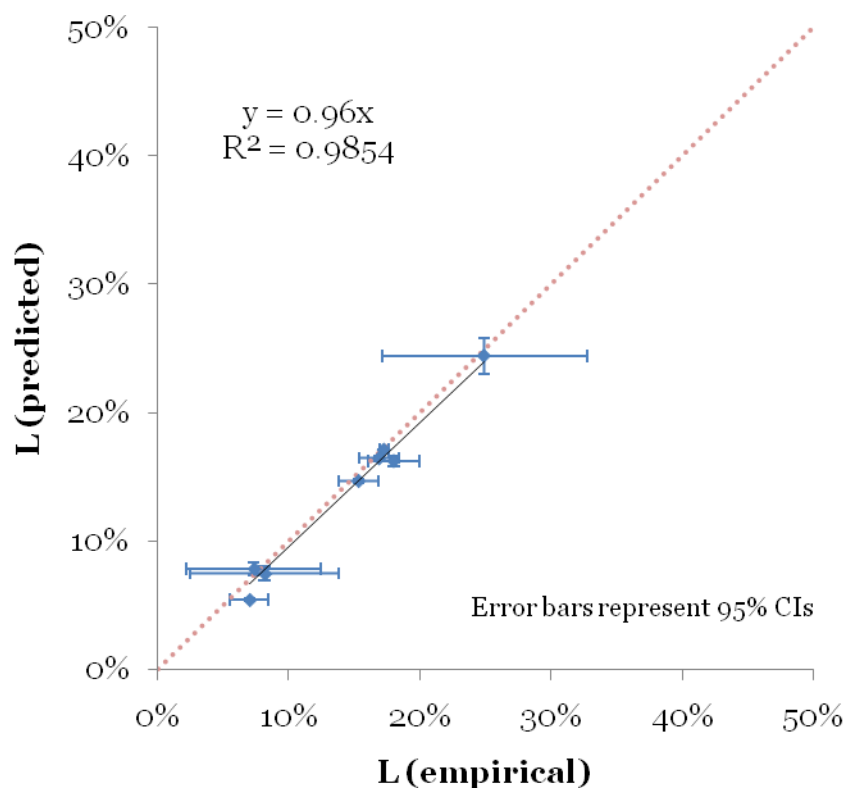
<sup>†</sup> the group that is the combination of 41-50 mm with ER-/PR+ is not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



## Grouped by histological type

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Ductal	215920	17.25%	(0.35%)	17.11%	(0.05%)	-0.14%
Lobular	21169	16.88%	(1.52%)	16.44%	(0.16%)	-0.44%
Intraductal+						
LCIS	22282	15.31%	(1.51%)	14.67%	(0.15%)	-0.64%
Mucinous	7258	6.99%	(1.46%)	5.42%	(0.13%)	-1.57%
Comedo	3078	18.00%	(1.95%)	16.23%	(0.40%)	-1.77%
Scirrhous	369	24.91%	(7.83%)	24.41%	(1.44%)	-0.51%
Papillary	536	8.15%	(5.70%)	7.45%	(0.56%)	-0.70%
Cribriform	708	7.34%	(5.14%)	7.84%	(0.53%)	0.50%
<i>Mean (std. dev.)</i>						-0.66% (0.73%)
<i>Mean weighted by N (std. dev.)</i>						-0.26% (0.30%)
<i>Root Mean Square (std. dev.)</i>						0.95% (1.09%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.38% (0.52%)

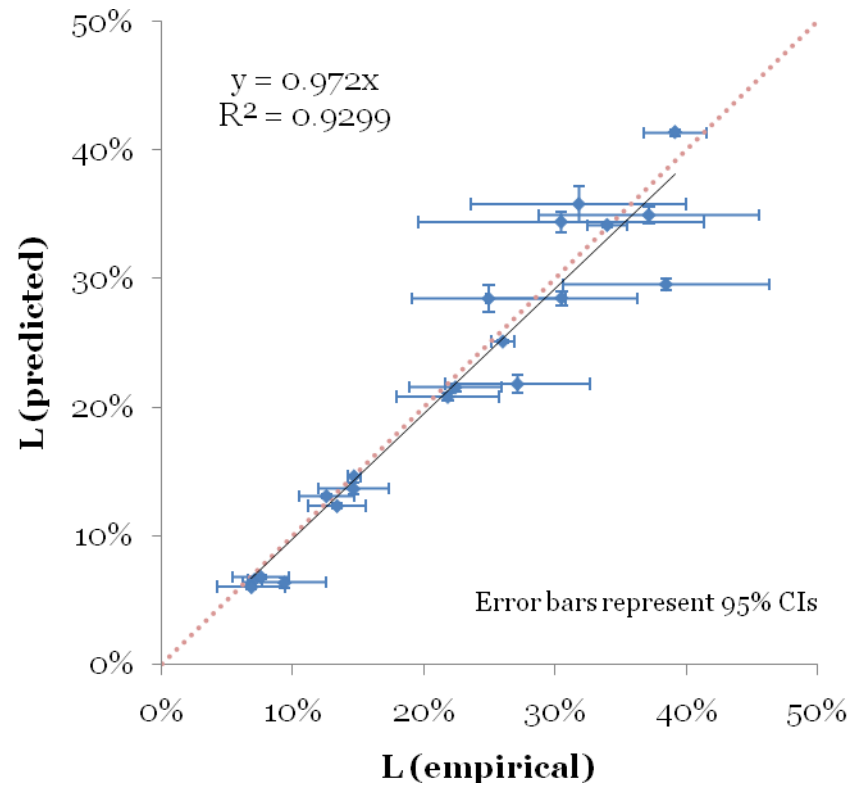
<sup>†</sup>Medullary, Tubular, inflammatory, Paget's disease, Apocrine, and Phyllodes histologies are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



# Permutations of 10 mm tumor size bins and histological type

Group <sup>†</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Size	Histology						
1-10 mm	Ductal	53119	7.07%	(0.53%)	6.59%	(0.05%)	-0.49%
11-20 mm	Ductal	95130	14.67%	(0.51%)	14.63%	(0.05%)	-0.04%
21-30 mm	Ductal	44982	26.04%	(0.87%)	25.09%	(0.09%)	-0.94%
31-40 mm	Ductal	15876	34.00%	(1.54%)	34.13%	(0.16%)	0.14%
41-50 mm	Ductal	6813	39.18%	(2.37%)	41.35%	(0.25%)	2.17%
1-10 mm	Lobular	4225	7.57%	(2.14%)	6.81%	(0.17%)	-0.76%
11-20 mm	Lobular	9070	12.56%	(2.08%)	13.10%	(0.16%)	0.53%
21-30 mm	Lobular	4794	22.41%	(3.47%)	21.53%	(0.28%)	-0.89%
31-40 mm	Lobular	1907	38.49%	(7.86%)	29.53%	(0.47%)	-8.96%
41-50 mm	Lobular	1173	37.18%	(8.43%)	34.91%	(0.64%)	-2.28%
1-10 mm	Intraductal +LCIS	4913	6.84%	(2.58%)	6.03%	(0.16%)	-0.81%
11-20 mm	Intraductal +LCIS	10239	13.38%	(2.18%)	12.32%	(0.16%)	-1.06%
21-30 mm	Intraductal +LCIS	4783	21.83%	(3.92%)	20.80%	(0.29%)	-1.03%
31-40 mm	Intraductal +LCIS	1514	30.51%	(5.76%)	28.47%	(0.54%)	-2.04%
41-50 mm	Intraductal +LCIS	833	30.49%	(10.93%)	34.39%	(0.82%)	3.90%
1-10 mm	Tubular	775	9.36%	(3.15%)	6.37%	(0.39%)	-3.00%
11-20 mm	Tubular	1170	14.63%	(2.72%)	13.65%	(0.44%)	-0.98%
21-30 mm	Tubular	664	27.16%	(5.54%)	21.79%	(0.70%)	-5.37%
31-40 mm	Tubular	299	24.96%	(5.82%)	28.43%	(1.04%)	3.47%
41-50 mm	Tubular	170	31.84%	(8.21%)	35.77%	(1.42%)	3.93%
Mean (std. dev.)							-0.72% (3.00%)
Mean weighted by N (std. dev.)							-0.39% (0.91%)
Root Mean Square (std. dev.)							3.01% (4.28%)
Root Mean Square weighted by N (std. dev.)							0.97% (1.55%)

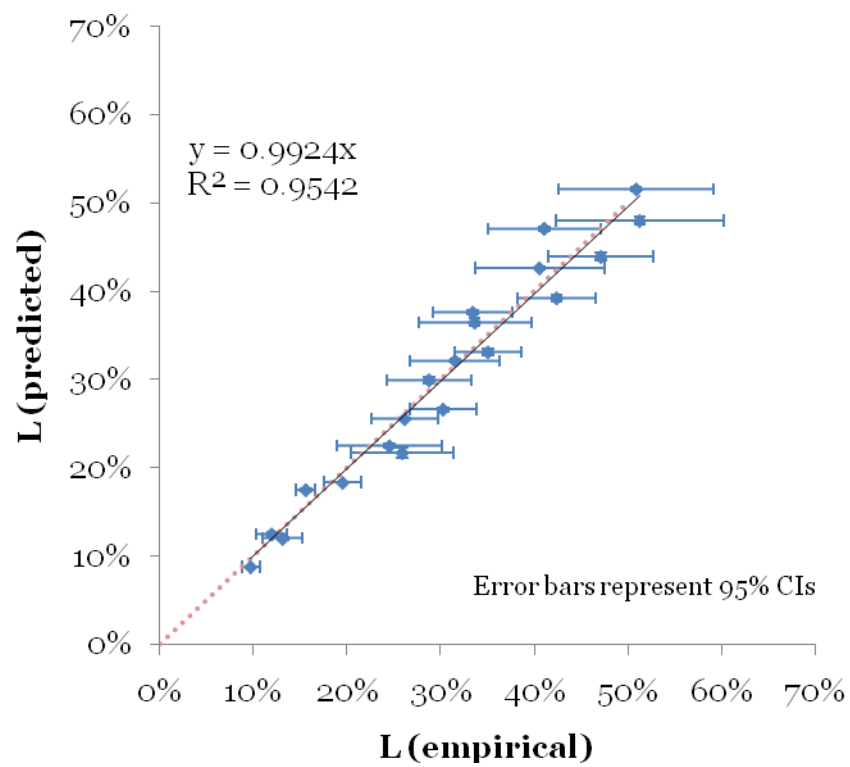
<sup>†</sup>all other permutation groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



Permutations of number of positive lymph nodes and estrogen/progesterone receptor status

Group <sup>†</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Nodes	ER/PR status						
0	ER+/PR+	106881	9.74%	(1.00%)	8.81%	(0.04%)	-0.93%
1	ER+/PR+	20980	19.56%	(1.96%)	18.36%	(0.09%)	-1.19%
2	ER+/PR+	9637	26.18%	(3.57%)	25.58%	(0.12%)	-0.60%
3	ER+/PR+	5446	31.56%	(4.78%)	32.15%	(0.16%)	0.59%
4	ER+/PR+	3369	33.45%	(4.28%)	37.62%	(0.19%)	4.17%
5	ER+/PR+	2369	40.57%	(6.90%)	42.64%	(0.21%)	2.07%
6	ER+/PR+	1742	41.08%	(6.04%)	47.11%	(0.24%)	6.03%
7	ER+/PR+	1318	50.92%	(8.27%)	51.56%	(0.25%)	0.64%
0	ER+/PR-	20228	13.15%	(2.10%)	12.02%	(0.11%)	-1.13%
1	ER+/PR-	3994	24.56%	(5.62%)	22.50%	(0.26%)	-2.06%
2	ER+/PR-	1817	28.79%	(4.50%)	29.96%	(0.36%)	1.17%
3	ER+/PR-	1040	33.66%	(6.01%)	36.50%	(0.46%)	2.84%
0	ER-/PR+	3754	11.97%	(1.68%)	12.52%	(0.24%)	0.55%
1	ER-/PR+	749	25.92%	(5.50%)	21.75%	(0.54%)	-4.18%
0	ER-/PR-	30538	15.62%	(1.04%)	17.53%	(0.10%)	1.91%
1	ER-/PR-	6119	30.28%	(3.59%)	26.66%	(0.22%)	-3.63%
2	ER-/PR-	2959	35.07%	(3.60%)	33.12%	(0.30%)	-1.94%
3	ER-/PR-	1781	42.41%	(4.23%)	39.25%	(0.36%)	-3.16%
4	ER-/PR-	1195	47.14%	(5.58%)	43.93%	(0.41%)	-3.21%
5	ER-/PR-	843	51.27%	(8.97%)	47.99%	(0.47%)	-3.28%
<i>Mean (std. dev.)</i>							-0.27% (2.76%)
<i>Mean weighted by N (std. dev.)</i>							-0.47% (2.47%)
<i>Root Mean Square (std. dev.)</i>							2.70% (2.98%)
<i>Root Mean Square weighted by N (std. dev.)</i>							2.45% (4.21%)

<sup>†</sup> the groups that are the combinations of 4,5,6,7 positive nodes with ER+/PR-, and 2,3,4, 5,6,7 positive nodes with ER-/PR+, and 6,7 positive nodes with ER-/PR-, are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group

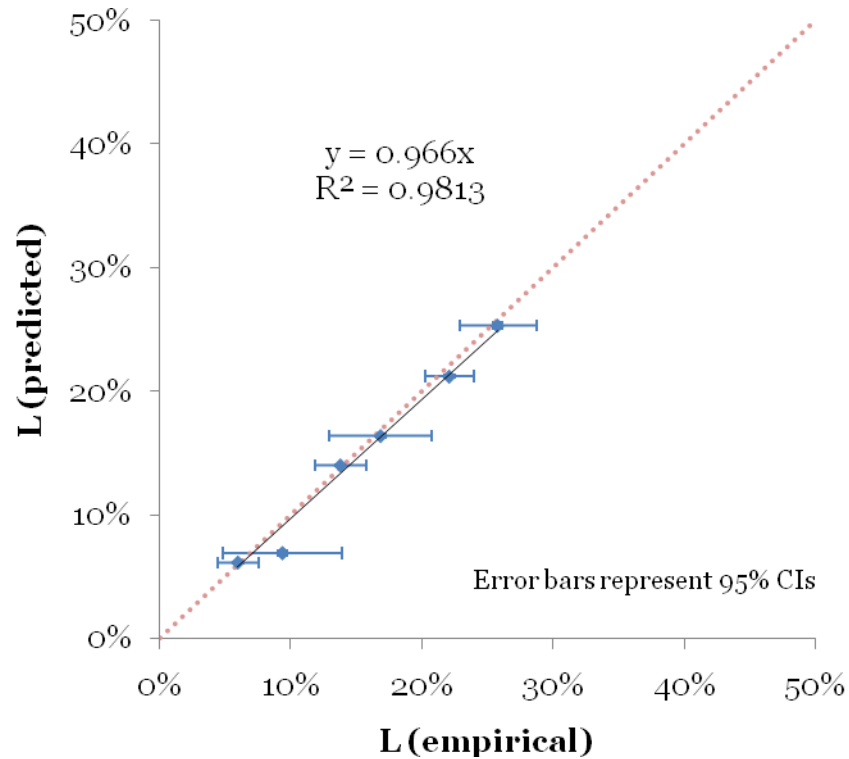


## Permutations of tumor grade and estrogen/progesterone receptor status

Group <sup>† ††</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Grade	ER/PR status						
1	ER+/PR+	33359	5.97%	(1.55%)	6.12%	(0.07%)	0.15%
2	ER+/PR+	67774	13.81%	(1.97%)	14.00%	(0.08%)	0.19%
3	ER+/PR+	32077	22.11%	(1.87%)	21.21%	(0.13%)	-0.90%
1	ER+/PR-	5260	9.38%	(4.57%)	6.89%	(0.19%)	-2.49%
2	ER+/PR-	11461	16.86%	(3.89%)	16.39%	(0.20%)	-0.48%
3	ER+/PR-	8407	25.80%	(2.92%)	25.34%	(0.28%)	-0.46%
<i>Mean (std. dev.)</i>							-0.66% (0.99%)
<i>Mean weighted by N (std. dev.)</i>							-0.21% (0.55%)
<i>Root Mean Square (std. dev.)</i>							1.12% (1.56%)
<i>Root Mean Square weighted by N (std. dev.)</i>							0.54% (0.67%)

<sup>†</sup> grade 4 also exists in the dataset, but is not included in the calculation of the mean or displayed on graph; grade 4 no longer exists

<sup>††</sup> all groups with ER- status are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group

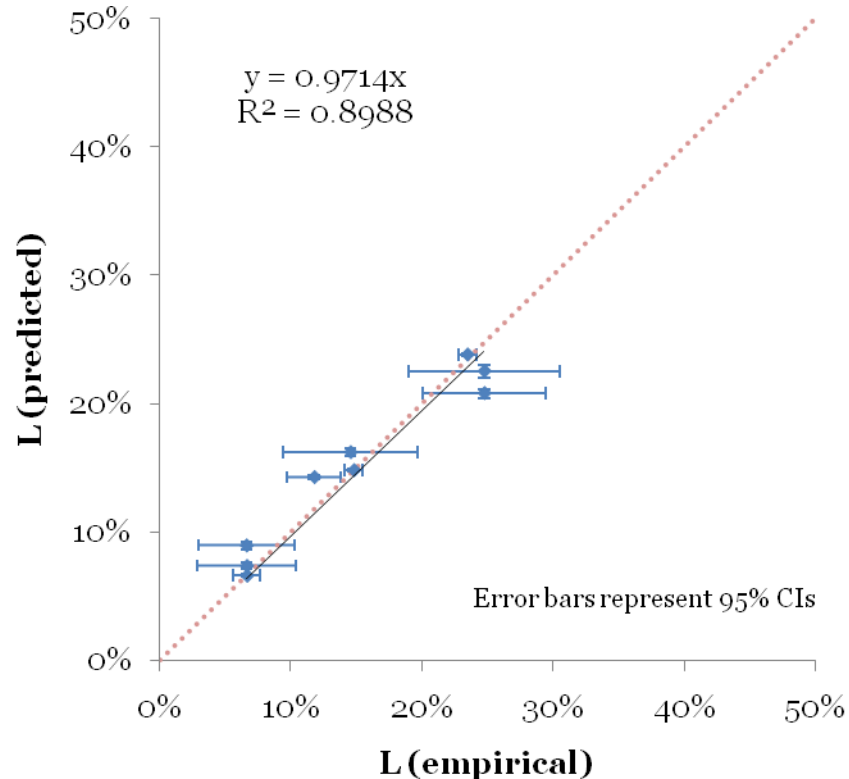




## Permutations of tumor grade and histological type

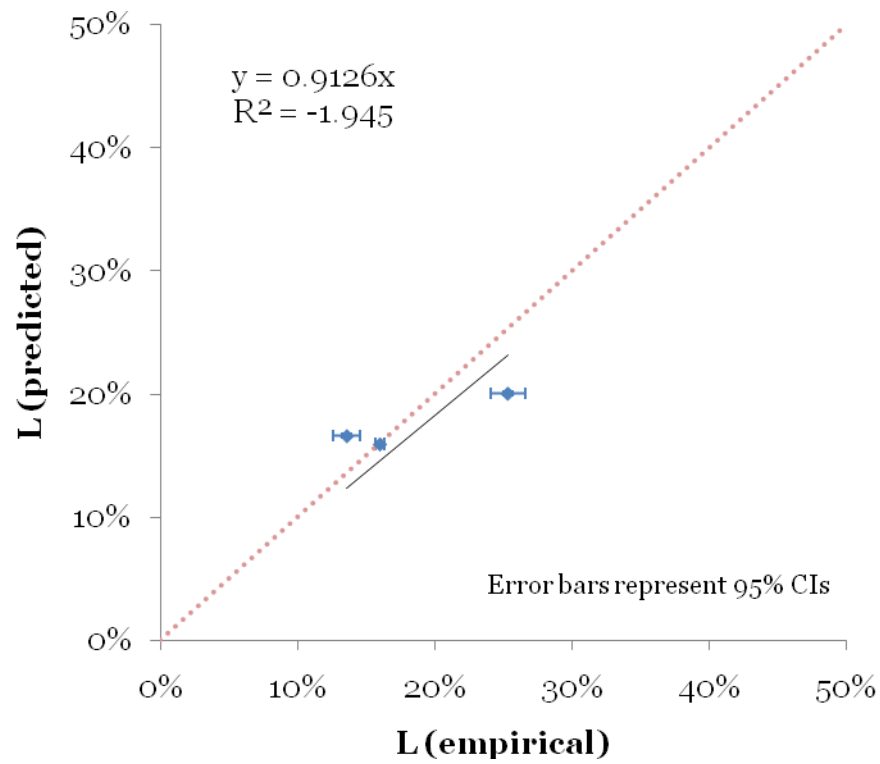
Group <sup>†</sup>		N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Grade	Histology						
1	Ductal	33086	6.64%	(1.00%)	6.61%	(0.07%)	-0.03%
2	Ductal	83705	14.79%	(0.69%)	14.81%	(0.07%)	0.02%
3	Ductal	73999	23.45%	(0.68%)	23.79%	(0.09%)	0.34%
1	Lobular	3131	6.60%	(3.67%)	8.96%	(0.29%)	2.36%
2	Lobular	6511	14.54%	(5.10%)	16.21%	(0.26%)	1.67%
3	Lobular	2174	24.75%	(5.78%)	22.51%	(0.54%)	-2.24%
1	Intraductal +LCIS	4001	6.62%	(3.80%)	7.37%	(0.24%)	0.75%
2	Intraductal +LCIS	10507	11.77%	(2.09%)	14.27%	(0.20%)	2.50%
3	Intraductal +LCIS	4600	24.74%	(4.72%)	20.80%	(0.36%)	-3.95%
Mean (std. dev.)							0.16% (2.11%)
Mean weighted by N (std. dev.)							0.23% (0.57)
Root Mean Square (std. dev.)							2.00% (2.25%)
Root Mean Square weighted by N (std. dev.)							0.58% (0.68%)

<sup>†</sup> all other permutation groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



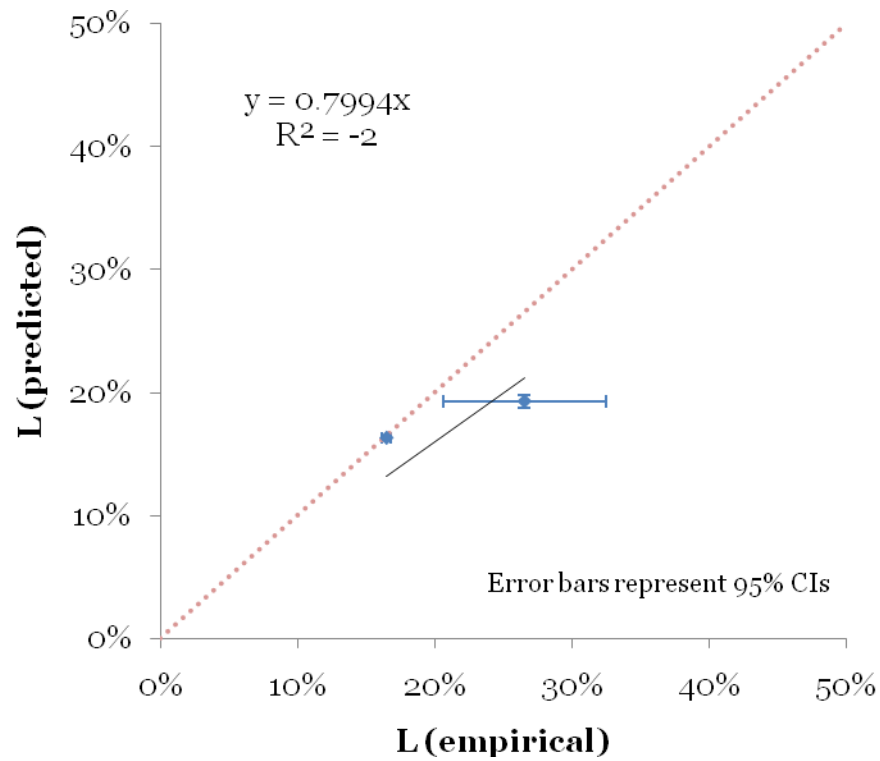
## Grouped by race

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Black	22458	25.36%	(1.28%)	20.06%	(0.17%)	-5.30%
White	248716	16.01%	(0.33%)	15.93%	(0.05%)	-0.08%
Unknown/ Other	22402	13.59%	(0.98%)	16.61%	(0.16%)	3.02%
<i>Mean (std. dev.)</i>						-0.79% (4.2%)
<i>Mean weighted by N (std. dev.)</i>						-0.24% (0.95%)
<i>Root Mean Square (std. dev.)</i>						3.52% (3.79%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.82% (0.86%)



## Grouped by sex

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Female	291713	16.48%	(0.3%)	16.28%	(0.04%)	-0.20%
Male	1863	26.51%	(5.93%)	19.26%	(0.56%)	-7.25%
<i>Mean (std. dev.)</i>						-3.73% (4.98%)
<i>Mean weighted by N (std. dev.)</i>						-0.25% (0.22%)
<i>Root Mean Square (std. dev.)</i>						5.13% (6.09%)
<i>Root Mean Square weighted by N (std. dev.)</i>						0.29% (0.33%)

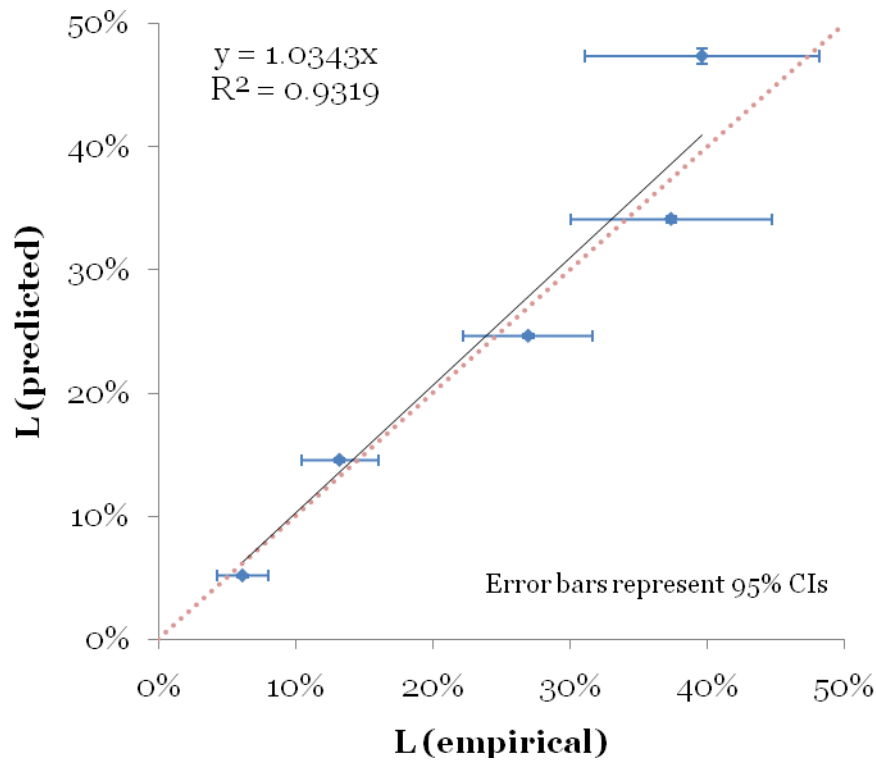


## VI. Validation on the Post-1987 Partners dataset

Grouped by 10% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-10%	2923	6.15%	(1.86%)	5.17%	(0.1%)	-0.98%
11-20%	1737	13.22%	(2.79%)	14.55%	(0.13%)	1.34%
21-30%	937	26.96%	(4.72%)	24.63%	(0.18%)	-2.33%
31-40%	499	37.36%	(7.32%)	34.12%	(0.24%)	-3.25%
40+%	319	39.61%	(8.56%)	47.34%	(0.65%)	7.73%
<i>Mean (std. dev.)</i>						0.50% (4.39%)
<i>Mean weighted by N (std. dev.)</i>						-0.29% (2.00%)
<i>Root Mean Square (std. dev.)</i>						3.96% (4.99%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.81% (1.11%)

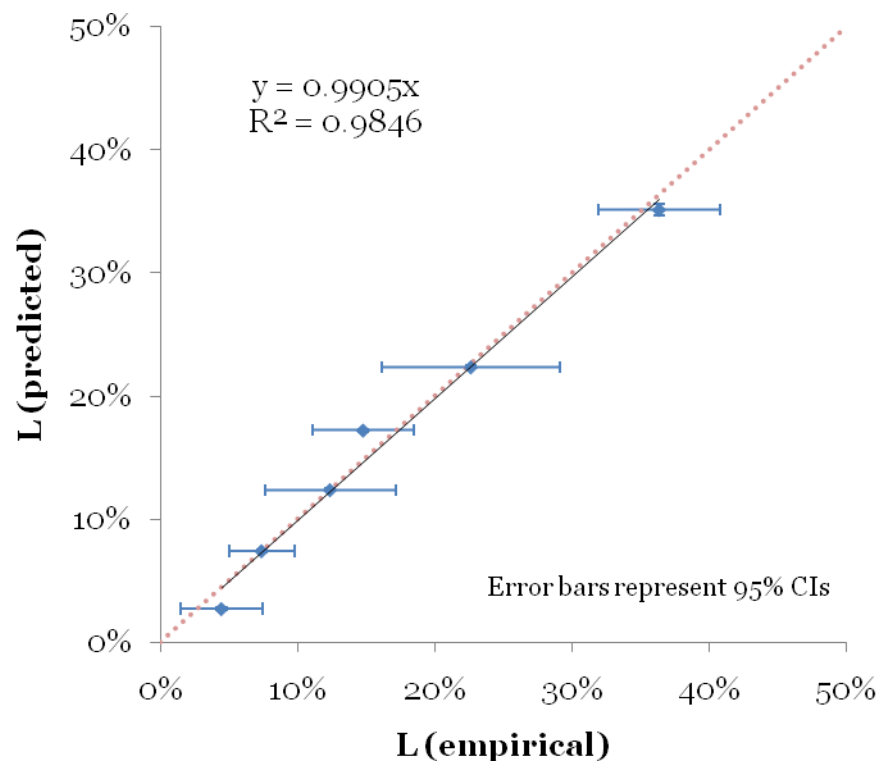
<sup>†</sup>individual groups of 41-50%, 51-60%, ... 81-90% not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



# Grouped by 5% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-5%	1402	4.47%	(2.98%)	2.72%	(0.07%)	-1.75%
6-10%	1521	7.39%	(2.36%)	7.42%	(0.07%)	0.03%
11-15%	959	12.38%	(4.79%)	12.39%	(0.09%)	0.00%
16-20%	778	14.79%	(3.7%)	17.23%	(0.1%)	2.44%
21-25%	507	22.64%	(6.47%)	22.36%	(0.12%)	-0.28%
26+%	1248	36.35%	(4.43%)	35.15%	(0.47%)	-1.20%
<i>Mean (std. dev.)</i>						-0.13% (1.44%)
<i>Mean weighted by N (std. dev.)</i>						-0.34% (1.4%)
<i>Root Mean Square (std. dev.)</i>						1.32% (1.54%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.32% (1.47%)

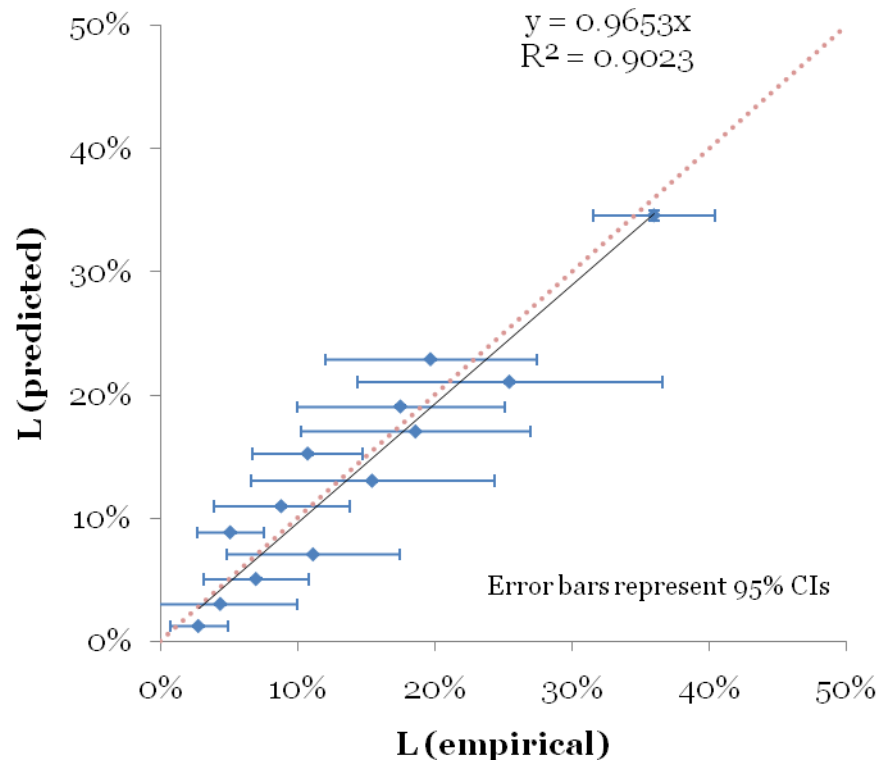
<sup>†</sup>individual groups of 26-30% ... 81-85%, 86-90% not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



Grouped by 2% predicted lethality bins using the Size+Nodes+PrognosticFactors equation

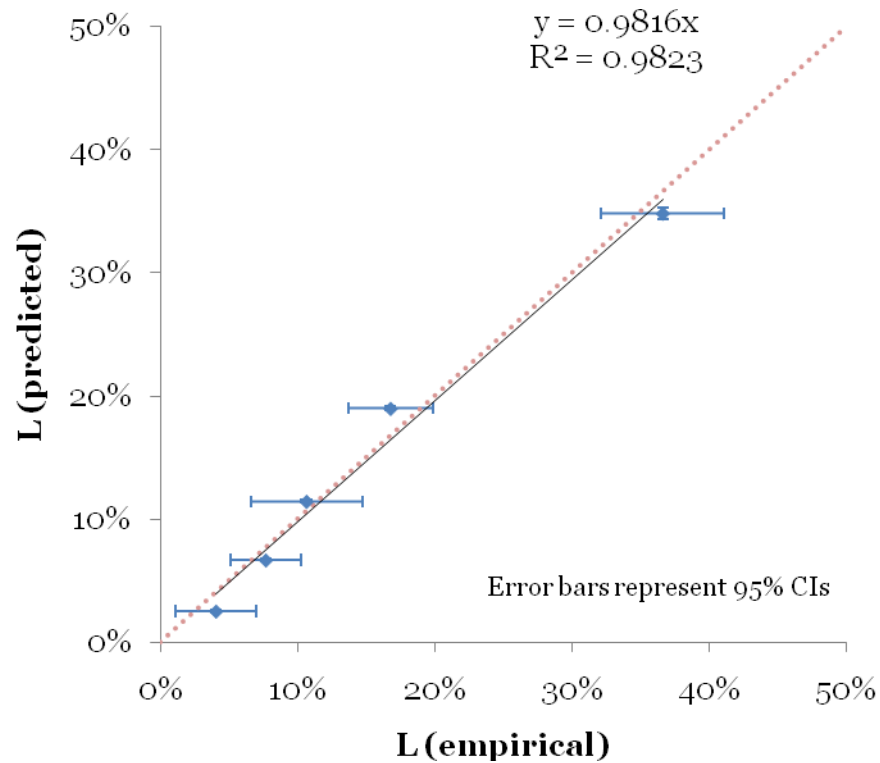
Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-2%	467	2.79%	(2.11%)	1.21%	(0.05%)	-1.57%
3-4%	646	4.39%	(5.6%)	3.01%	(0.04%)	-1.37%
5-6%	621	6.98%	(3.83%)	5.04%	(0.05%)	-1.95%
7-8%	575	11.15%	(6.3%)	7.04%	(0.05%)	-4.11%
9-10%	614	5.11%	(2.4%)	8.82%	(0.04%)	3.72%
11-12%	406	8.83%	(4.93%)	10.95%	(0.06%)	2.12%
13-14%	400	15.45%	(8.87%)	13.02%	(0.05%)	-2.44%
15-16%	403	10.76%	(4.02%)	15.22%	(0.06%)	4.46%
17-18%	276	18.62%	(8.4%)	17.01%	(0.06%)	-1.60%
19-20%	252	17.52%	(7.59%)	19.04%	(0.07%)	1.52%
21-22%	212	25.46%	(11.13%)	21.06%	(0.08%)	-4.41%
23-24%	222	19.71%	(7.69%)	22.88%	(0.07%)	3.17%
25+%	1321	36.01%	(4.44%)	34.56%	(0.46%)	-1.44%
<i>Mean (std. dev.)</i>						-0.3% (2.95%)
<i>Mean weighted by N (std. dev.)</i>						-0.53% (2.8%)
<i>Root Mean Square (std. dev.)</i>						2.85% (2.65%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.74% (2.8%)

<sup>†</sup>individual groups of 25-26%, 27-28% ... 85-86%, 87-88% not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



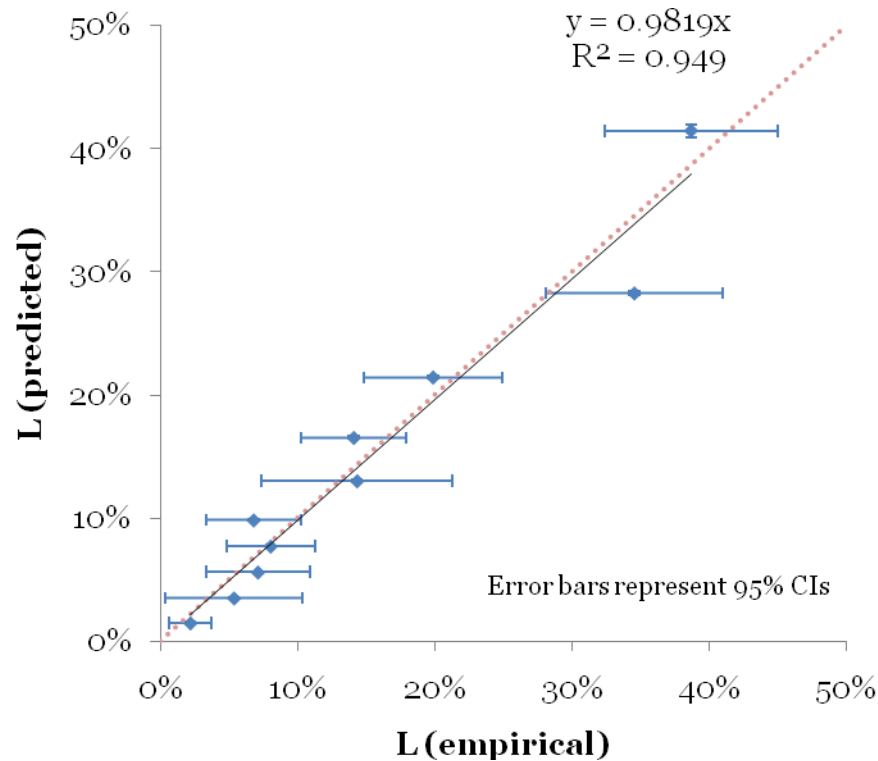
Grouped by 20% predicted lethality percentiles using the Size+Nodes+PrognosticFactors equation

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-4.5%	1282	4.04%	(2.97%)	2.53%	(0.06%)	-1.52%
4.6-8.5%	1285	7.67%	(2.58%)	6.68%	(0.07%)	-0.99%
8.6-14.9%	1283	10.64%	(4.07%)	11.44%	(0.1%)	0.80%
15-25%	1282	16.77%	(3.09%)	18.99%	(0.15%)	2.22%
26-77%	1282	36.62%	(4.49%)	34.84%	(0.46%)	-1.78%
<i>Mean (std. dev.)</i>						-0.25% (1.71%)
<i>Mean weighted by N (std. dev.)</i>						-0.25% (1.71%)
<i>Root Mean Square (std. dev.)</i>						1.55% (1.32%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.55% (1.32%)



Grouped by 10% predicted lethality percentiles using the Size+Nodes+PrognosticFactors equation

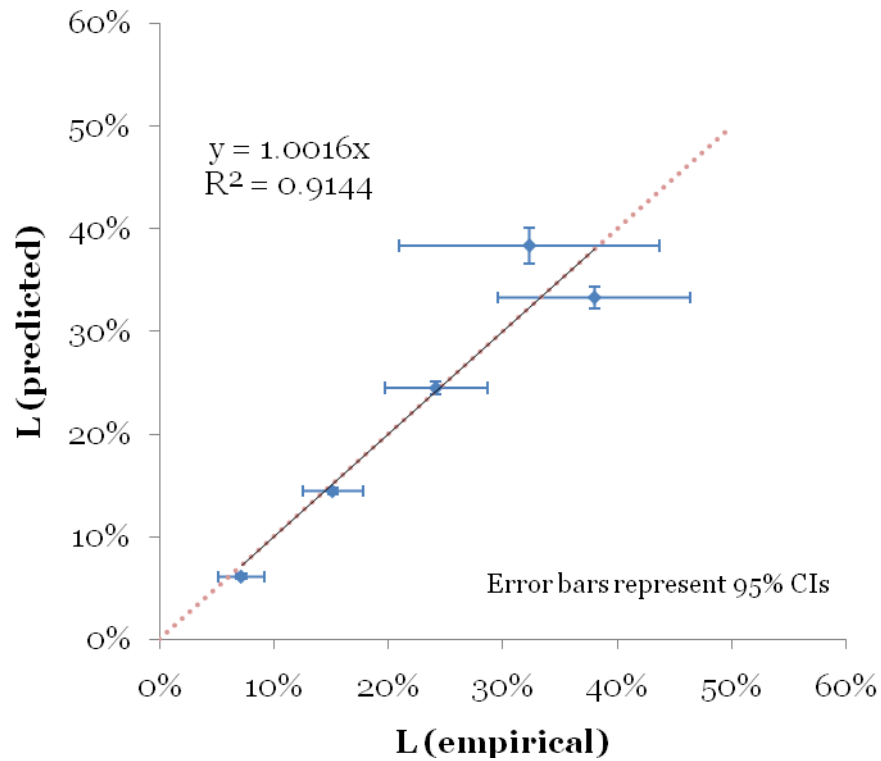
Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0-2.6%	635	2.19%	(1.56%)	1.51%	(0.05%)	-0.68%
2.7-4.6%	647	5.37%	(5.03%)	3.53%	(0.04%)	-1.84%
4.7-6.7%	643	7.10%	(3.77%)	5.63%	(0.05%)	-1.47%
6.8-8.5%	642	8.03%	(3.22%)	7.73%	(0.04%)	-0.30%
8.6-11.3%	641	6.79%	(3.46%)	9.85%	(0.06%)	3.06%
11.4-14.9%	642	14.34%	(6.94%)	13.03%	(0.07%)	-1.31%
15.0-18.6%	640	14.09%	(3.81%)	16.54%	(0.08%)	2.45%
18.7-24.6%	642	19.87%	(5.01%)	21.44%	(0.13%)	1.56%
24.7-32.6%	642	34.54%	(6.4%)	28.25%	(0.18%)	-6.29%
32.7-77%	640	38.67%	(6.32%)	41.44%	(0.56%)	2.77%
<i>Mean (std. dev.)</i>						-0.21% (2.84%)
<i>Mean weighted by N (std. dev.)</i>						-0.21% (2.84%)
<i>Root Mean Square (std. dev.)</i>						2.7% (3.43%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.7% (3.43%)





Grouped by 10 mm tumor size bins

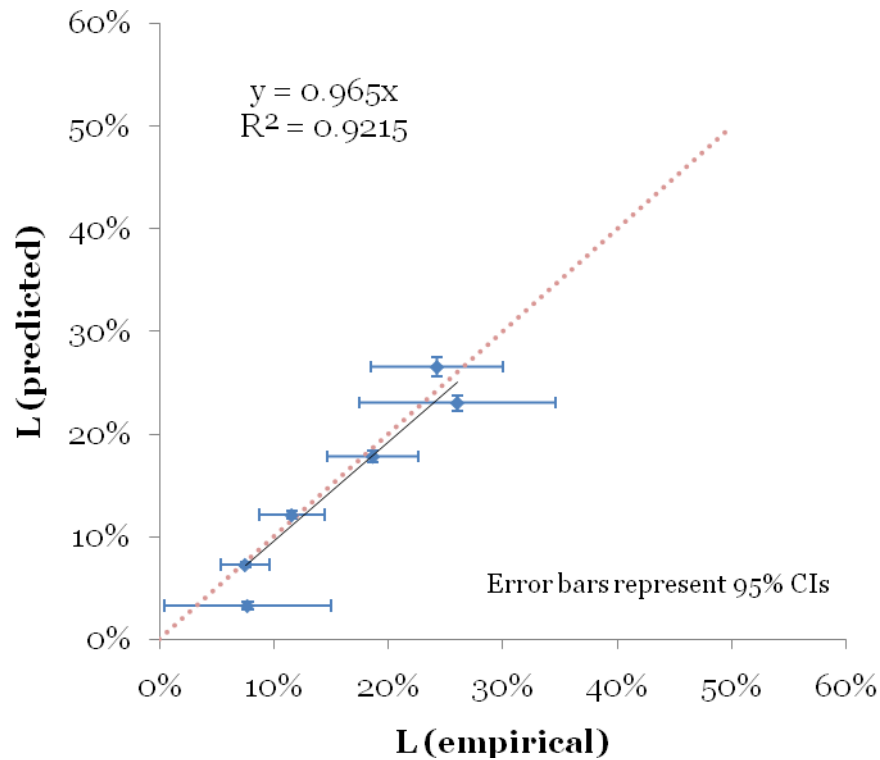
Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	2283	7.15%	(2%)	6.13%	(0.24%)	-1.03%
11-20 mm	2508	15.13%	(2.65%)	14.44%	(0.35%)	-0.69%
21-30 mm	1080	24.16%	(4.47%)	24.48%	(0.59%)	0.32%
31-40 mm	381	38.00%	(8.41%)	33.29%	(1.09%)	-4.71%
41-50 mm	163	32.33%	(11.4%)	38.35%	(1.74%)	6.02%
<i>Mean (std. dev.)</i>						-0.02% (3.87%)
<i>Mean weighted by N (std. dev.)</i>						-0.71% (1.15%)
<i>Root Mean Square (std. dev.)</i>						3.47% (4.06%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.25% (1.13%)



## Grouped by 5 mm tumor size bins

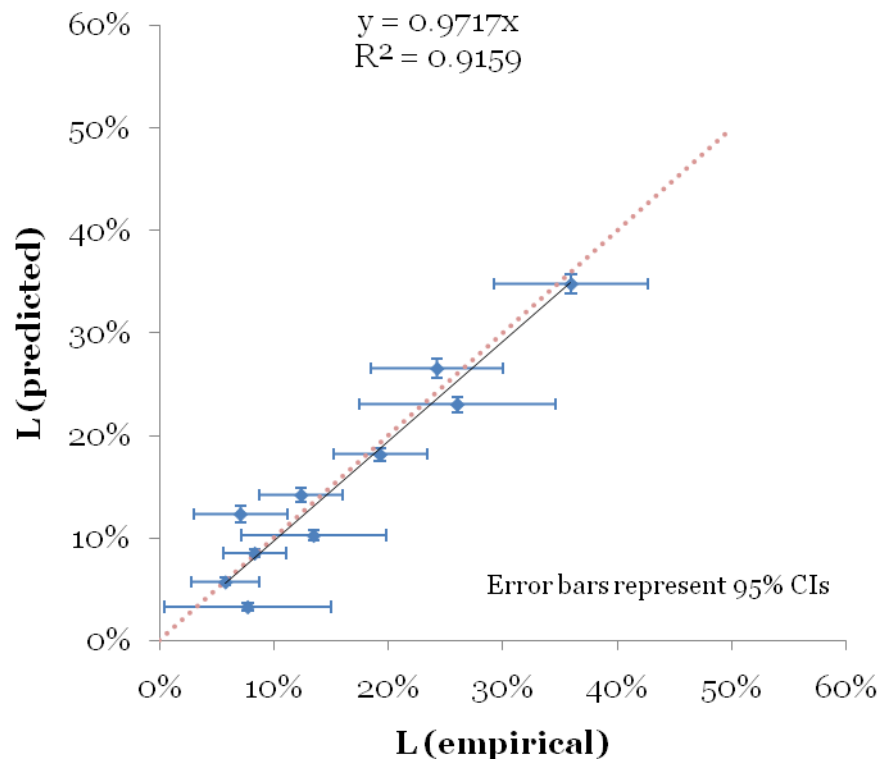
Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-5 mm	666	7.70%	(7.31%)	3.30%	(0.37%)	-4.40%
6-10 mm	1617	7.50%	(2.15%)	7.29%	(0.29%)	-0.21%
11-15 mm	1493	11.58%	(2.84%)	12.14%	(0.4%)	0.56%
16-20 mm	1015	18.66%	(3.96%)	17.84%	(0.56%)	-0.82%
21-25 mm	640	26.01%	(8.57%)	23.05%	(0.74%)	-2.96%
26-30 mm	440	24.24%	(5.78%)	26.56%	(0.95%)	2.32%
<i>Mean (std. dev.)</i>						-0.92% (2.43%)
<i>Mean weighted by N (std. dev.)</i>						-0.71% (1.58%)
<i>Root Mean Square (std. dev.)</i>						2.4% (2.74%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.6% (1.84%)

<sup>†</sup>groups of 30-35, 35-40, 40-45, and 45-50mm are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



Grouped by 10% tumor size percentiles

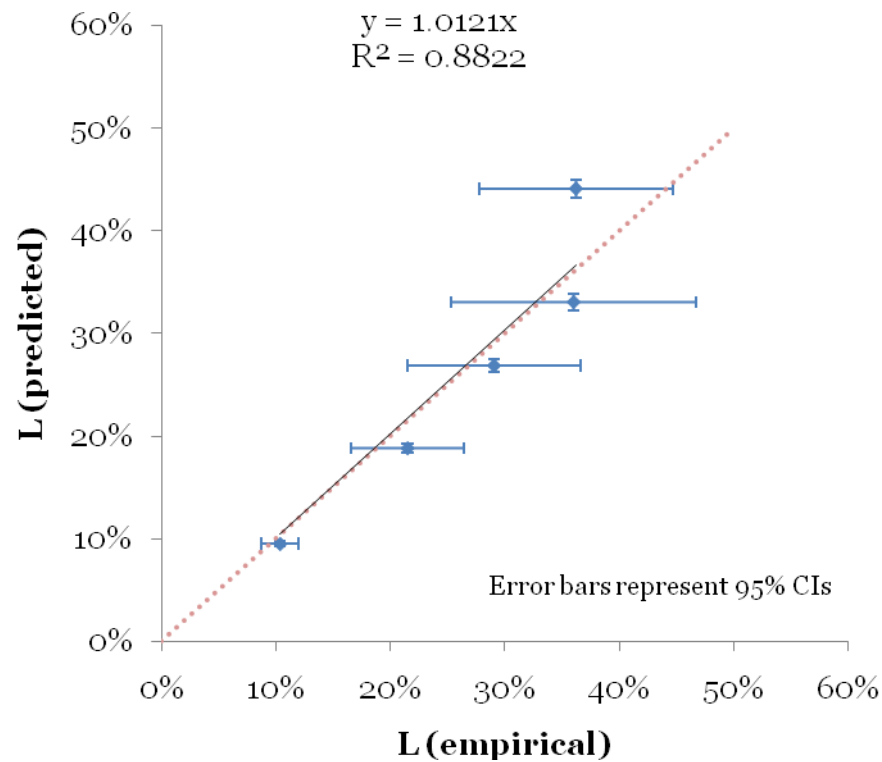
Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-6 mm	666	7.70%	(7.31%)	3.30%	(0.37%)	-4.40%
7-8 mm	716	5.76%	(2.98%)	5.72%	(0.38%)	-0.04%
8-10 mm	901	8.32%	(2.73%)	8.54%	(0.4%)	0.22%
11-12 mm	578	13.47%	(6.31%)	10.27%	(0.54%)	-3.20%
13-15 mm	375	7.07%	(4.08%)	12.36%	(0.84%)	5.29%
16-18 mm	656	12.38%	(3.66%)	14.22%	(0.65%)	1.84%
19-20 mm	899	19.26%	(4.09%)	18.17%	(0.6%)	-1.10%
21-27 mm	640	26.01%	(8.57%)	23.05%	(0.74%)	-2.96%
28-32 mm	440	24.24%	(5.78%)	26.56%	(0.95%)	2.32%
33-50 mm	544	35.95%	(6.74%)	34.81%	(0.95%)	-1.15%
<i>Mean (std. dev.)</i>						-0.32% (2.92%)
<i>Mean weighted by N (std. dev.)</i>						-0.61% (2.43%)
<i>Root Mean Square (std. dev.)</i>						2.79% (3.05%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.39% (2.54%)



## Grouped by number of positive lymph nodes

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
0	4441	10.31%	(1.64%)	9.53%	(0.22%)	-0.79%
1	917	21.48%	(4.92%)	18.83%	(0.48%)	-2.65%
2	452	29.05%	(7.55%)	26.88%	(0.63%)	-2.18%
3	254	36.03%	(10.74%)	33.05%	(0.83%)	-2.98%
4-7	351	36.23%	(8.48%)	44.08%	(0.88%)	7.85%
<i>Mean (std. dev.)</i>						-0.81% (3.18%)
<i>Mean weighted by N (std. dev.)</i>						-1.88% (3.18%)
<i>Root Mean Square (std. dev.)</i>						3.06% (3.49%)
<i>Root Mean Square weighted by N (std. dev.)</i>						3.49% (5.24%)

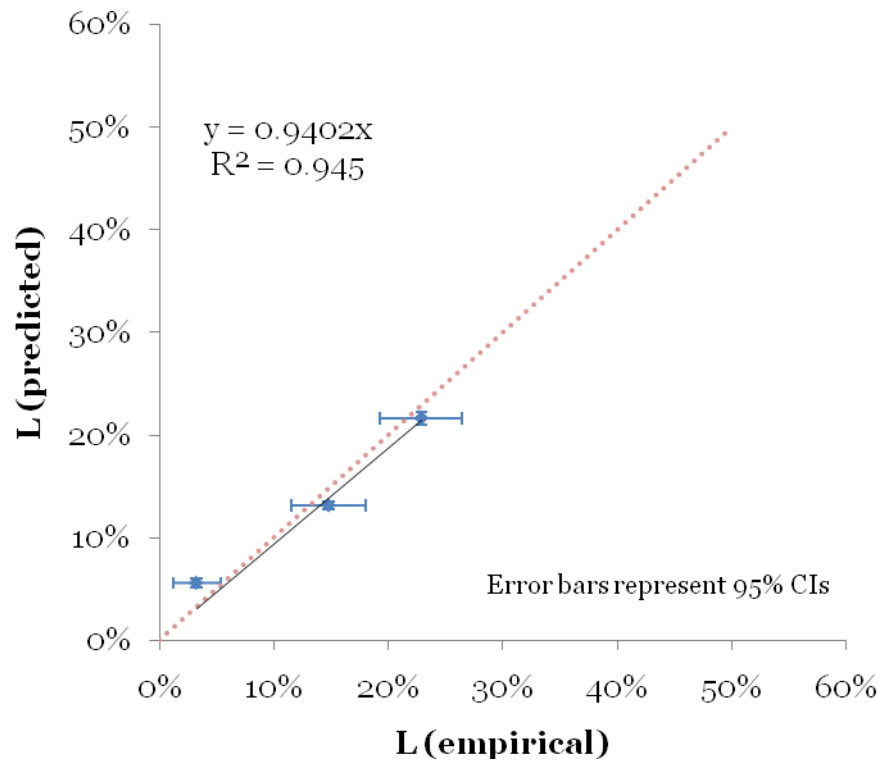
<sup>†</sup>the group of patients with 4,5,6 and 7 positive nodes is not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group



## Grouped by tumor grade

Group <sup>†</sup>	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
grade 1	1043	3.23%	(2.07%)	5.58%	(0.4%)	2.36%
grade 2	2427	14.77%	(3.22%)	13.14%	(0.41%)	-1.63%
grade 3	1821	22.87%	(3.6%)	21.62%	(0.59%)	-1.25%
<i>Mean (std. dev.)</i>						-0.17% (2.2%)
<i>Mean weighted by N (std. dev.)</i>						-0.71% (1.89%)
<i>Root Mean Square (std. dev.)</i>						1.8% (1.44%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.7% (1.37%)

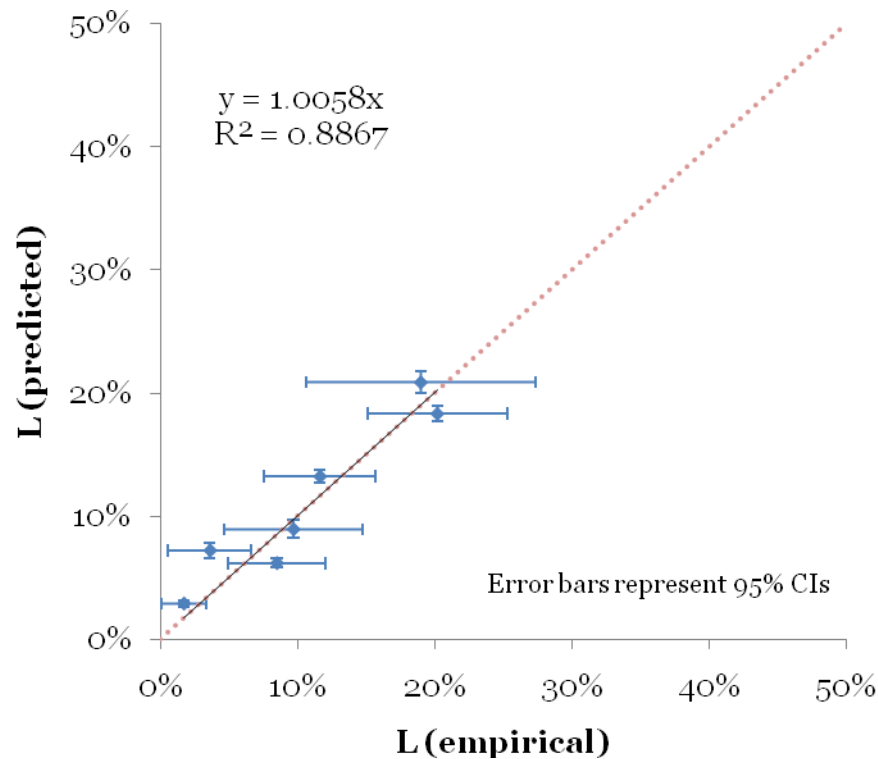
<sup>†</sup>grade 4 also exists in the dataset, but is not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group; in addition, grade 4 no longer exists



## Permutations of 10 mm tumor size bins and tumor grade

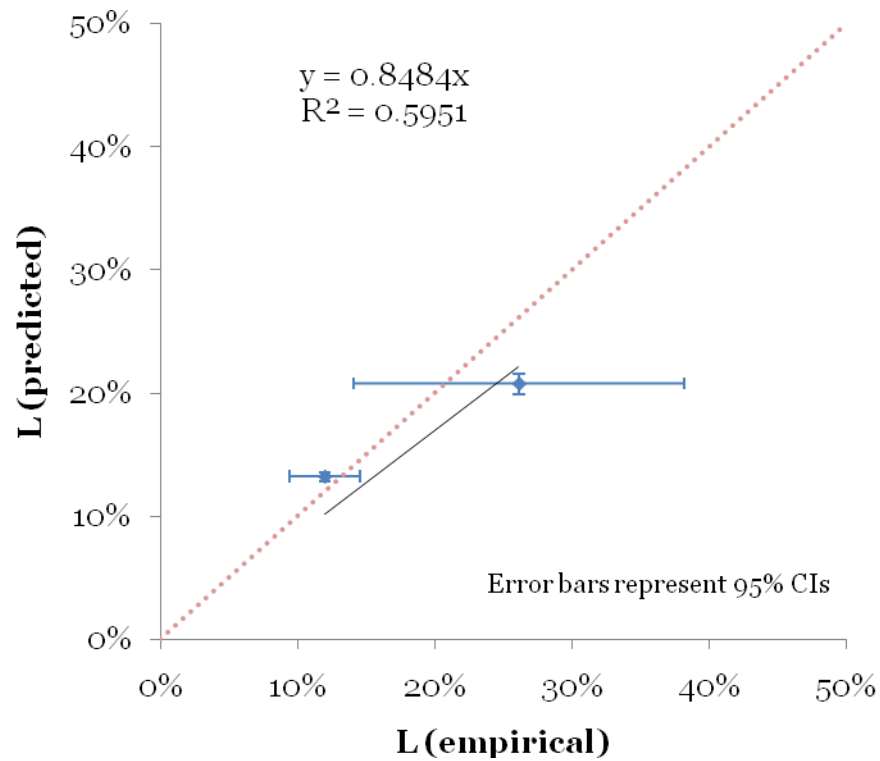
Group <sup>†</sup> Size	Grade	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
1-10 mm	1	571	1.69%	(1.65%)	2.89%	(0.26%)	1.20%
11-20 mm	1	373	3.60%	(3.02%)	7.22%	(0.66%)	3.62%
1-10 mm	2	861	8.49%	(3.57%)	6.19%	(0.36%)	-2.30%
11-20 mm	2	1034	11.63%	(4.09%)	13.24%	(0.49%)	1.61%
21-30 mm	2	369	18.99%	(8.35%)	20.91%	(0.87%)	1.92%
1-10 mm	3	387	9.69%	(5.05%)	8.94%	(0.74%)	-0.75%
11-20 mm	3	725	20.19%	(5.09%)	18.36%	(0.63%)	-1.84%
<i>Mean (std. dev.)</i>							0.49% (2.17%)
<i>Mean weighted by N (std. dev.)</i>							0.19% (2.22%)
<i>Root Mean Square (std. dev.)</i>							2.07% (2.04%)
<i>Root Mean Square weighted by N (std. dev.)</i>							2.06% (1.91%)

<sup>†</sup> other permutation groups are also not included, because 95% CI is greater than 20% or there is insufficient follow-up data for the group; in addition, grade 4 no longer exists



# Grouped by estrogen receptor status

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Positive	3681	11.96%	(2.59%)	13.23%	(0.37%)	1.27%
Negative	993	26.12%	(12.04%)	20.75%	(0.84%)	-5.37%
<i>Mean (std. dev.)</i>						-2.05% (4.69%)
<i>Mean weighted by N (std. dev.)</i>						-0.14% (3.02%)
<i>Root Mean Square (std. dev.)</i>						3.9% (4.39%)
<i>Root Mean Square weighted by N (std. dev.)</i>						2.14% (0.93%)



## Grouped by histological type

Group	N	L empirical (SEM)		L predicted (SEM)		Difference (pred – emp)
Ductal	4909	16.59%	(1.78%)	15.57%	(0.34%)	-1.01%
Lobular	448	9.59%	(4.95%)	13.93%	(1.02%)	4.34%
Ductal and Lobular	722	10.88%	(6.32%)	13.65%	(0.88%)	2.77%
Mucinous	81	7.56%	(7.48%)	5.24%	(1.37%)	-2.33%
<i>Mean (std. dev.)</i>						0.94% (3.13%)
<i>Mean weighted by N (std. dev.)</i>						-0.2% (2.13%)
<i>Root Mean Square (std. dev.)</i>						2.87% (2.75%)
<i>Root Mean Square weighted by N (std. dev.)</i>						1.85% (2.18%)

†the other histology groups are not included in the calculation of the mean or displayed on graph; 95% CI is greater than 20% or there is insufficient follow-up data for the group

