



**313 patients with breast cancer during  
pregnancy –  
a prospective and retrospective registry  
(GBG-20 / BIG02-03)**

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# Background

- **Breast cancer (BCP) is amongst the most common cancers diagnosed during pregnancy<sup>1</sup>**
- **About 2% of all breast cancers are diagnosed during pregnancy<sup>2</sup>**
- **1<sup>st</sup> international guideline for treatment of breast cancer during pregnancy has been developed in 2003<sup>3,4</sup>**
- **The 5-year survival rate is similar for pregnant and non-pregnant women (N-: 82%; N+: 59%)<sup>5</sup>**
- **Knowledge needs to be improved on BCP**

[1] Stensheim et al. Cause specific survival for women diagnosed with cancer during pregnancy or lactation. J Clin Oncol; 2009, 27:45-51

[2] Nulman et al. Neurodevelopment of children exposed in utero to treatment of maternal malignancy. Br J Cancer 6 (2001) 1611-18.

[3] Loibl et al. Breast carcinoma during pregnancy. International recommendations from an expert meeting. Cancer 106 (2006) 237-246

[4] Amant et al. Breast Cancer in pregnancy. Recommendations from an international consensus meeting. Eur J Cancer 2010 in press

[5] Petrek JA, Dukoff R, Rogatko A. Prognosis of pregnancy-associated breast cancer. Cancer 67 (1991) 869-872.



# Patients and Methods

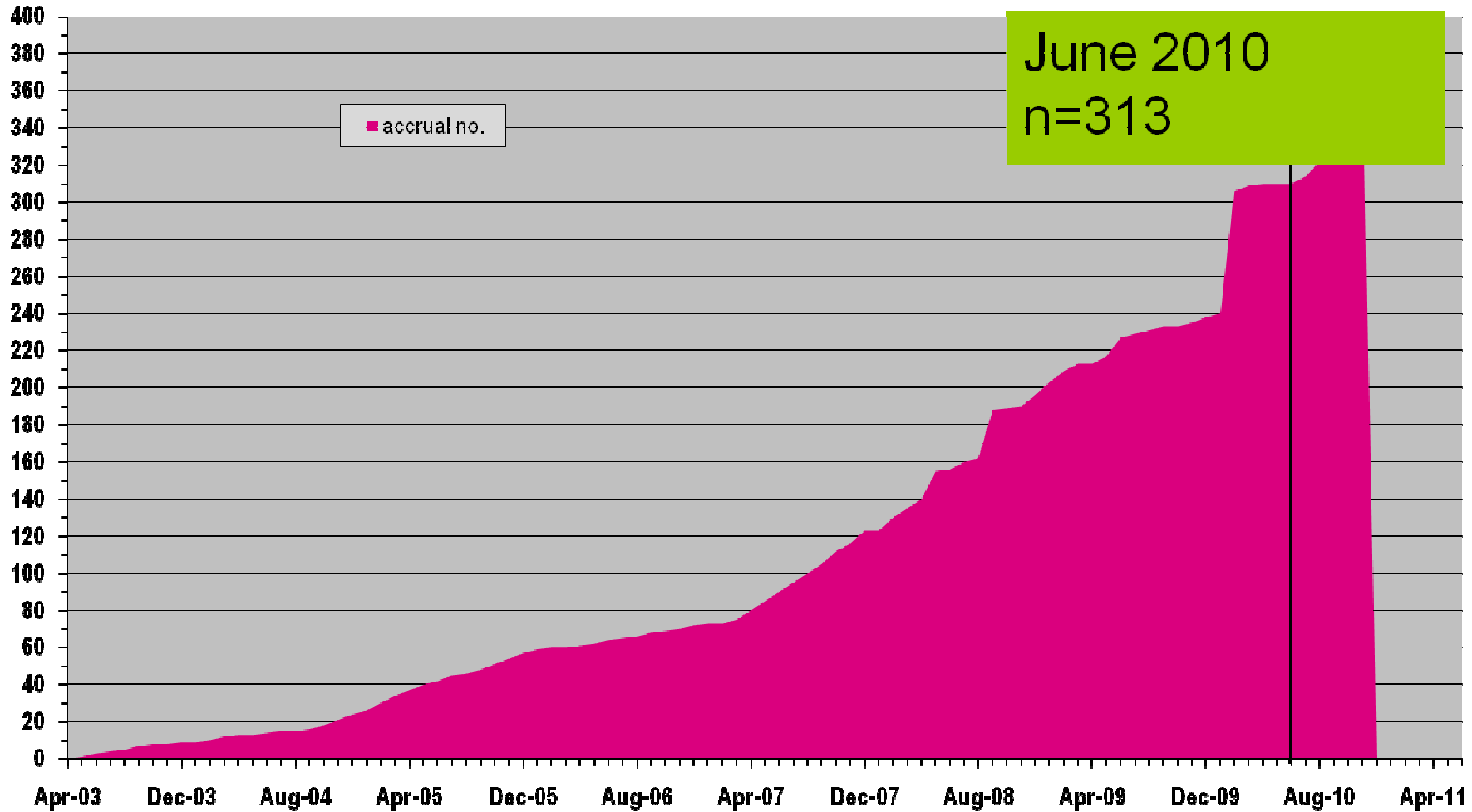
The registry includes all patients diagnosed with breast cancer during pregnancy independent from treatment and gestational age.

- **Primary endpoint:**
  - Fetal outcome 4 weeks after delivery.
- **Secondary endpoint:**
  - Maternal outcome of pregnancy.
  - Stage at presentation and biological characteristics
  - Breast cancer therapy, type of surgery.
  - Mode of delivery (vaginal vs. caesarean)
  - Outcome of the new-born after 5 years after diagnosis.
  - Outcome of breast cancer 5 years after diagnosis.
- **Translational Research: tbd**



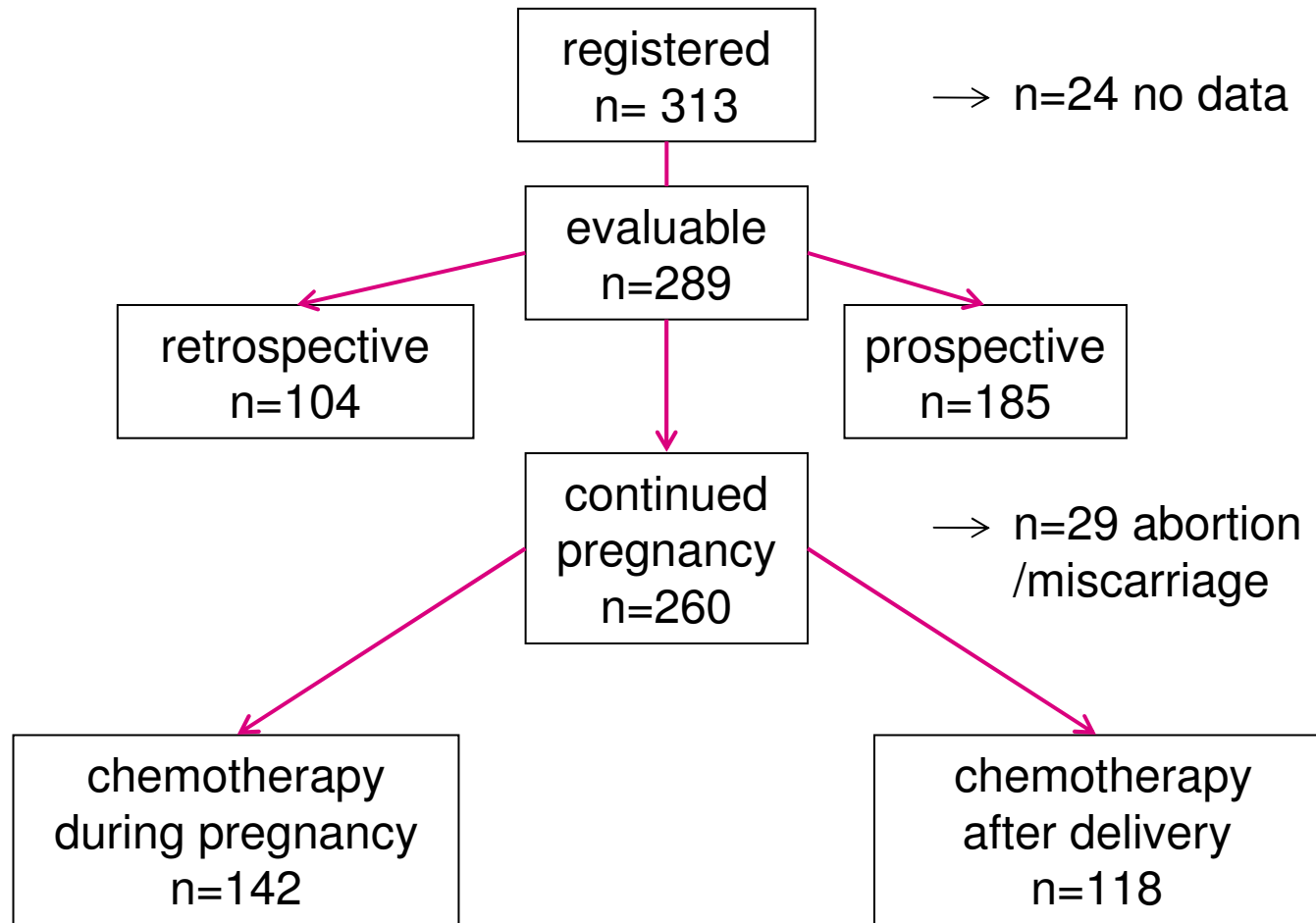
# BCP - recruitment on 01.12.2010

## n = 364





# Patients



**Patients diagnosed after April 2003 were defined as prospective**



# Baseline characteristics

		all % (N)	CHT during pregnancy %	CHT after delivery %
<b>age median (range)</b>		<b>34 (21-47)</b>	<b>34 (23-47)</b>	<b>33 (21-44)</b>
<b>T status</b>	<b>1</b>	<b>22.3</b>	<b>19.7</b>	<b>23.9</b>
	<b>2</b>	<b>47.6</b>	<b>43.1</b>	<b>52.3</b>
	<b>3</b>	<b>20.1</b>	<b>22.6</b>	<b>18.3</b>
	<b>4 a-c</b>	<b>6.2</b>	<b>8.8</b>	<b>4.6</b>
	<b>4 d</b>	<b>3.7</b>	<b>0.9</b>	<b>3.7</b>
<b>Nodal status</b>	<b>N+</b>	<b>48.1</b>	<b>51.4</b>	<b>40.0</b>
<b>Histological type</b>	<b>Ductal</b>	<b>97.1</b>	<b>98.6</b>	<b>95.8</b>
<b>Grading</b>	<b>G3</b>	<b>64.4</b>	<b>63.9</b>	<b>66.7</b>
<b>ER</b>	<b>Negative</b>	<b>60.9</b>	<b>59.9</b>	<b>63.9</b>
<b>HER-2 status</b>	<b>positive</b>	<b>42.2</b>	<b>43</b>	<b>42.2</b>
	<b>missing</b>	<b>(62)</b>		
	<b>TNBC</b>	<b>34.7</b>	<b>33.0</b>	<b>34.7</b>



# BCP-Pathology

Author	Study Design	Number of patients	Histology	Nuclear Grade	ER/PR	Her2
Middleton 2003	Prospective case series	38 cases (pregnant) and 1 PABC	100% invasive ductal carcinoma	Poorly differentiated: 84%	ER (-): 72% PR (-): 76%	Her-2/neu (+): 28%
Ishida 1992	Case control	72 cases (pregnant); 120 cases (lactating); 191 controls	No difference	nd	Fewer ER(+) and PR(+) pregnant and lactating women	nd
Reed 2003	Retrospective case series	122 PABC (20 pregnant)	ductal Invasive 82%	95% G2-3	ER(-): 66% PR (-): 72%	Her-2/neu (+): 44%
Shousha 2000	Case-control	14 cases PABC; 13 controls	Invasive ductal: 71% PABC vs 69% controls	G3: 80% PABC vs 33% controls	ER (-): 50% PABC vs 9% controls PR(-): 70% PABC vs 36% controls	Her-2/neu (+): 44% PABC vs 18% controls
Tobon and Horowitz 1993	Retrospective case series	14 cases	(93% had invasive ductal carcinoma)	nd	ER (-) or low in 50%; PR (-) in 64%	nd
Elledge 1993	Case-control	15 cases (pregnant); 411 controls	nd	nd	No difference in ER(+) and PR(+)	58% of cases Her-2/neu (+) vs 16%
Bonnier 1997	Case Control	154 PABC (62 pregnant) 308 controls	No difference	No difference	Pregnant women less likely to be ER or PR positive	nd



# Patients' obstetrical characteristics

		<b>All % (N)</b>	<b>Prospective % (N)</b>	<b>Retrospective % (N)</b>
<b>Time of diagnosis</b>	<b>week of gestation</b>	<b>23 weeks</b>	<b>24 weeks</b>	<b>20 weeks</b>
	<b>1<sup>st</sup> trimester</b>	<b>22.8</b>	<b>19.4</b>	<b>28.9</b>
	<b>2<sup>nd</sup> trimester</b>	<b>41.5</b>	<b>40.0</b>	<b>44.3</b>
	<b>3<sup>rd</sup> trimester</b>	<b>35.7</b>	<b>40.6</b>	<b>26.8</b>
<b>Pregnancy outcome</b>	<b>abortion /miscarriage*</b>	<b>(29)</b>	<b>(20)</b>	<b>(9)</b>
<b>Mode of delivery</b>	<b>Caesarean</b>	<b>48.7</b>	<b>44.4</b>	<b>56.1</b>
<b>Type of surgery</b>	<b>mastectomy</b>	<b>50.4</b>	<b>49.1</b>	<b>52.7</b>





# Delivery outcome

	All patients with pregnancy (N=260)	chemotherapy during pregnancy (N=142)	Chemotherapy after delivery (N=118)
Week of gestation at diagnosis		20 weeks	28 weeks
Week of delivery			
median	36	37	36
range	30-42	31-42	30-42
Birth weight			
median	2772	2810	2730
range	1260-4295	1270-4050	1260-4295
% of premature deliveries <35th week	24.0	16.9	33.0
		P = 0.009	



# Chemotherapies during pregnancy (n=142)

Regimen	AC/EC	FE(A)C	CMF	Vinca alkaloids	E/A mono	Taxanes
<b>N (142)</b>	<b>71</b>	<b>29</b>	<b>14</b>	<b>12</b>	<b>10</b>	<b>6</b>

Cycles during pregnancy	1	2	3	4	5	6	8
<b>N (527)</b>	<b>8</b>	<b>25</b>	<b>23</b>	<b>52</b>	<b>14</b>	<b>19</b>	<b>1</b>

•The 142 patients evaluable received in the median 4 cycles during pregnancy (1-8).



# Events of the newborn

	With CHT n=142	w/o CHT n=118
<b>Total</b>	<b>17 (12%)</b>	<b>8 (6.7%)**</b>
<b>Premature deliveries</b>	<b>8</b>	<b>5</b>
<b>congenital malformations ***</b>	<b>3</b>	<b>1</b>
<b>Trisomy 18</b>	<b>1*</b>	
<b>persistent foramen ovale</b>	<b>2</b>	
<b>CPAP (cont pos airway pressure)</b>	<b>1</b>	<b>1</b>
<b>necrotic enterocolitis</b>	<b>1*</b>	
<b>apnoe</b>		<b>1</b>
<b>hyperbilirubinemia/icterus</b>	<b>1</b>	<b>2</b>
<b>cerebral paresis</b>		<b>1</b>
<b>hypoglycemia</b>		<b>1</b>
<b>infections</b>	<b>4</b>	
<b>neutropenia</b>	<b>2</b>	<b>1</b>
<b>anemia</b>	<b>2</b>	

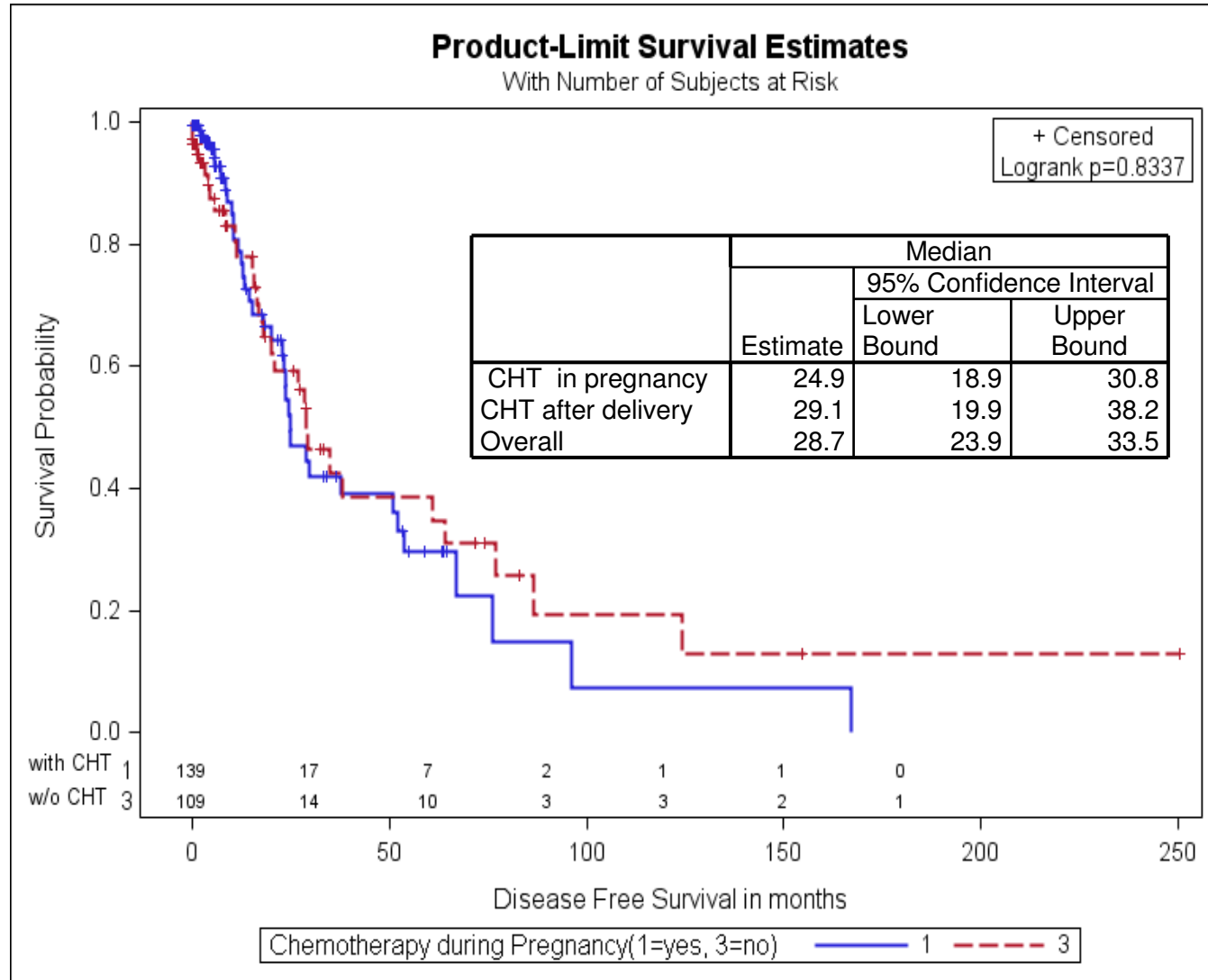


•\*died; \*\* p=0.16; \*\*\* polydactylia 2x, rectal atresia1x, hypospadias 1x  
 •13/25 events in premature deliveries

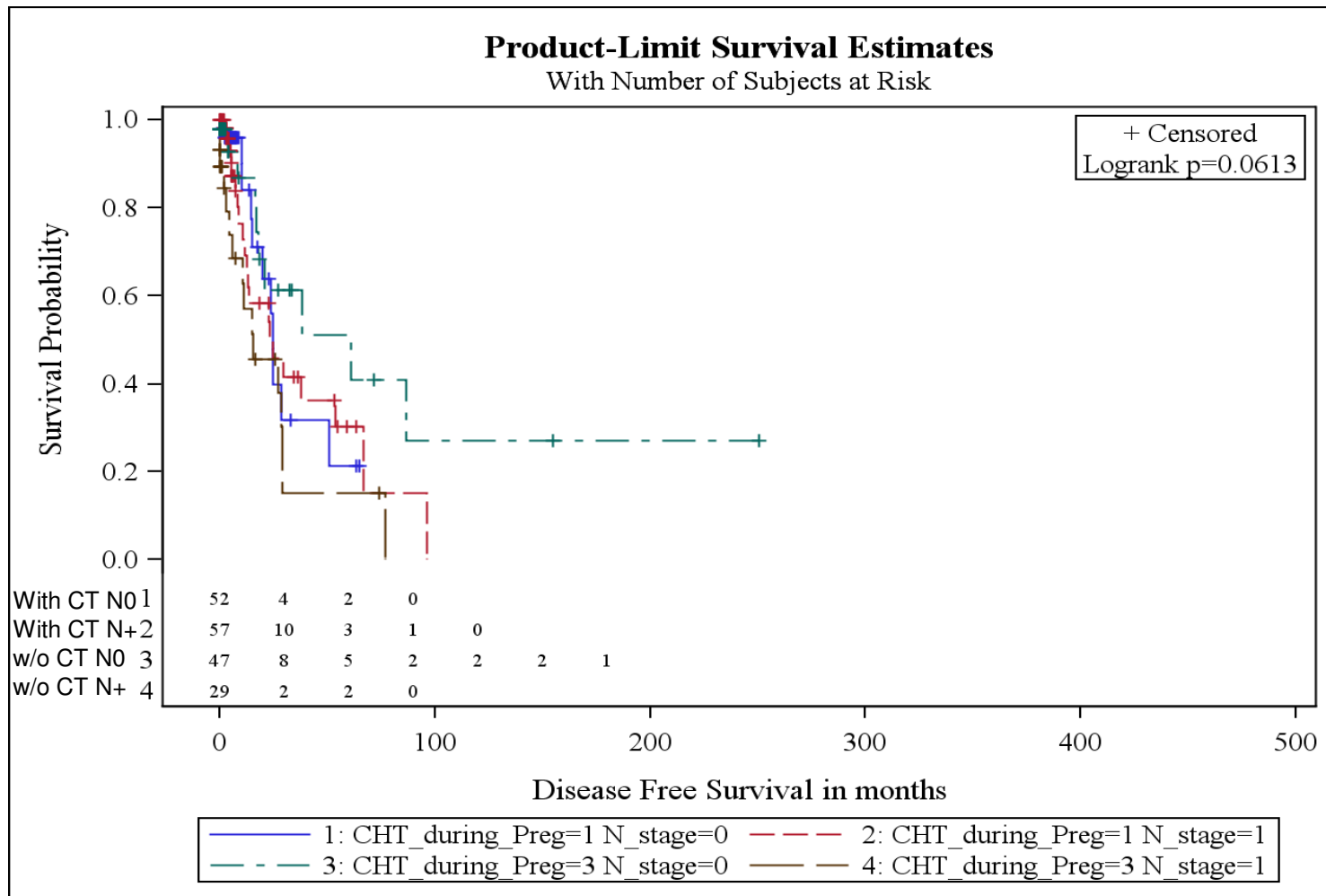
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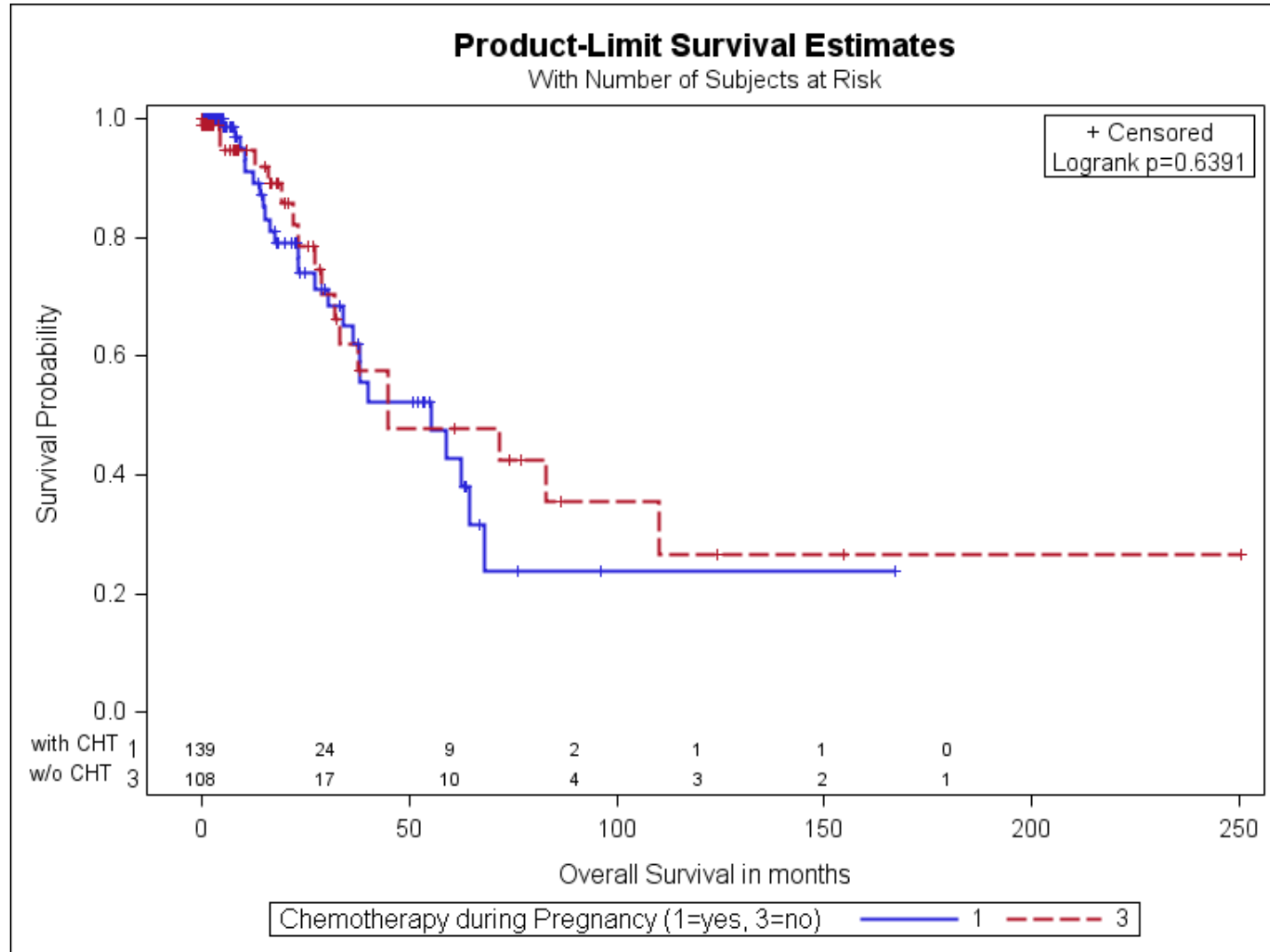
# Disease Free Survival



# DFS according to Nodal Status



# Overall Survival





# Summary

- **More than 50% of the patients received chemotherapy (median 4 cycles) during pregnancy**
- **77% received an anthracycline-based regimen – only 6 patients received a taxane during pregnancy**
- **Premature deliveries were significantly more common in the group not receiving chemotherapy during pregnancy – probably to allow for an early treatment start**
- **Fetal outcome was comparable between the groups with and w/o chemotherapy during pregnancy**
- **Outcome of breast cancer patients with chemotherapy during pregnancy or after delivery is comparable.**

# Conclusion

- **Premature delivery increasing fetal morbidity and unfavorable long-term outcome is unnecessary**
- **Patients should be treated as closely as possible to standard recommendations for non-pregnant women**



„... in the face of general enthusiasm for terminating the pregnancy we believe the evidence is that the cancer should be terminated.“

*B.F. Byrd, 1962*



# Acknowledgement

- **Patients**
- **Doctors and nurses who registered patients**
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[www.germanbreastgroup.de](http://www.germanbreastgroup.de)