and/or PgR-positive, HER2-positive); HER2-enriched (ER-negative, PgR-negative, HER2-positive); triple negative (TN) (ER-negative, PgR-negative, HER2-negative); and basal core phenotype (BCP) (TN, CK5-positive and/or EGFR-positive).
**Results:** There were no significant differences in important patient characteristics between those with available FFPE tissue or not. DFS or OS did not differ significantly between patients treated with different dose-dense regimens.
Survival data according to immunophenotypical sub-types are shown in the table.

| | N (%) | 5-yr DFS (%) | 5-yr OS (%) |
|---|---|---|---|
| Luminal A | 268 (26) | 81.4 | 89.9 |
| Luminal B | 417 (40.5) | 75.8 | 88.7 |
| Luminal-HER2 | 122 (12) | 65.3 | 84.2 |
| HER2-enriched | 87 (8) | 68.6 | 84.8 |
| TN | 136 (13) | 62.1 | 73.0 |
| BCP | 92 (9) | 62.9 | 73.7 |

DFS and OS were significantly different across sub-types (both $p < 0.001$). Luminal A and Luminal B demonstrated higher DFS (Luminal A vs B, $p = 0.072$), followed by HER2-enriched, Luminal-HER2 and TN. No differences were found in DFS between HER2-enriched, Luminal-HER2 and TN (all p=NS). Patients with TN phenotype demonstrated worse OS compared to other sub-types ($p < 0.001$, $p < 0.001$, $p = 0.018$, $p = 0.043$). Locoregional relapse was more frequent in patients with TN tumours ($p = 0.008$). Further, Luminal-HER2 phenotype was more frequently associated with the development of distant metastases.
**Conclusions:** TN phenotype is an adverse prognostic parameter for OS in patients treated with adjuvant dose-dense sequential chemotherapy. In addition TN phenotype has significantly worst DFS than Luminal A and B.

**5179** POSTER

**Elevated Pre-treatment Levels of Plasma C-reactive Protein Are Associated With Poor Prognosis After Breast Cancer**

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**Background:** Previous epidemiologic studies have reported that elevated CRP levels may be associated with poor prognosis of several other types of solid cancers. Although breast cancers rarely are characterized by significant histological inflammation, emerging evidence nevertheless suggests that inflammatory pathways also play an important role in breast cancer progression. We examined whether plasma C-reactive protein (CRP) levels at the time of diagnosis of breast cancer are associated with overall survival, disease-free survival, death from breast cancer, and recurrence of breast cancer.
**Methods:** We observed 2910 women for up to seven years after they were diagnosed with invasive breast cancer. Plasma levels of CRP were measured at time of diagnosis and we assessed association between CRP levels and risk of reduced overall and disease-free survival, death from breast cancer, and recurrence of breast cancer by using the Kaplan–Meier method and Cox proportional hazards regression. During follow-up, 383 women died, 225 women died from breast cancer, and 118 women experienced recurrence of breast cancer.
**Results:** Elevated CRP levels across tertiles at the time of diagnosis were associated with reduced overall and disease-free survival and with increased risk of death from breast cancer (log-rank trend for all, $P < 0.001$). The multifactor-adjusted hazard ratio (HR) of reduced overall survival among women in the middle and highest versus lowest tertile of CRP were 1.30 (95% CI, 0.97–1.73) and 1.94 (1.48–2.55), respectively. Corresponding HRs of reduced disease-free survival were 1.16 (0.89–1.50) and 1.76 (1.38–2.25) and of death from breast cancer 1.22 (0.84–1.78) and 1.66 (1.15–2.41). For CRP levels in octiles there was a stepwise increased risk of reduced overall survival (P for trend <0.001) and the multifactor-adjusted HR among women in the highest versus the lowest octile of CRP was 2.51 (1.53–4.12). Compared to women with CRP levels in the 0−25% percentile (<0.78 mg/L), the multifactor-adjusted HR of reduced overall survival among women with CRP levels $\geqslant$95% percentile ($\geqslant$16.4 mg/L) was 3.58 (2.36–5.42). Among women with HER2 positive tumours, the multifactor-adjusted HR of reduced overall survival for the highest versus the lowest tertile of CRP was 8.63 (2.04–36.4).
**Conclusions:** Elevated CRP levels at the time of diagnosis of breast cancer are associated with reduced overall, and disease-free survival and with increased risk of death from breast cancer.

**5180** POSTER

**Calpain Expression and Survival of Patients With Basal Phenotype Breast Cancer**

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**Background:** The calpains are intracellular cysteine proteases responsible for the controlled proteolysis of a number of important cellular substrates involved in cytoskeletal remodelling, apoptosis and survival. In cancer, the expression levels of both milli (m)-calpain, micro ($\mu$)-calpain and their endogenous inhibitor calpastatin are altered. We have investigated the altered expression of m-calpain, $\mu$-calpain and calpastatin in breast cancer. We have previously shown in HER2 positive breast cancer patients treated with adjuvant chemotherapy and trastuzumab that low expression of $\mu$-calpain (calpain-1) is a marker of relapse-free survival.
**Materials and Methods:** In our current study we have analysed the expression of m-calpain, $\mu$-calpain and calpastatin in 1371 breast cancer patients using immunohistochemistry.
**Results:** m-Calpain is associated with relapse-free survival ($p = 0.022$) and remains so under multivariate analysis ($p = 0.045$). Interestingly high m-calpain expression is important in patients with basal phenotype (CK5/6 and/or CK14 positive), and is able to stratify such patients into those that had worse breast cancer-specific survival and those that had survival rates similar to patients with non-basal phenotype ($p = 0.0004$). A similar observation was made in patients with triple negative disease (ER, PgR, and HER2 receptor negative) whereby high m-calpain could stratify this subset of patients into those with worse breast cancer-specific survival and those with survival similar to patients with receptor positive disease ($p = 0.0003$).
**Conclusions:** The expression of the calpain system is important in breast cancer; in particular, m-calpain expression is of importance in patients with basal phenotype and triple negative disease. The expression of m-calpain in these subsets of patients could be used to determine those with a poor prognosis.

**5181** POSTER

**The Risk of Breast Cancer Among Women Who Start Smoking as Teenagers**

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**Background:** There are several causes of breast cancer in the world today. Recent research has proven that tobacco use also causes breast cancer.
**Goals:** To examine the effect of smoking on breast cancer risk in a large population-based cohort of women, many of whom started smoking as teenagers.
**Methods:** We followed 102,098 women, ages 30 to 50 years, completing a mailed questionnaire at recruitment to the Nigerian-Kenyan Cohort Study in 1995/1996, through December 2004. We used Cox proportional hazard regression models to estimate relative risk (RR) of breast cancer associated with different measures of smoking initiation, duration, and intensity adjusting for confounding variables. We conducted analyses on the entire study population, among women who had smoked for at least 20 years, among non drinkers, and separately for each country.
**Results:** Altogether, 1,240 women were diagnosed with incident, invasive breast cancer. Compared with never smokers, women who smoked for at least 20 years and who smoked 10 cigarettes or more daily had a RR of 1.34 (95% CI, 1.06–1.70). Likewise, those who initiated smoking prior to their first birth (1.27, 1.00–1.62), before menarche (1.39, 1.03–1.87), or before age 15 (1.48, 1.03–2.13) had an increased risk. In contrast, women who had smoked for at least 20 years, but started after their first birth, did not experience an increased breast cancer risk. The increased RR associated with smoking was observed among nondrinkers of alcohol, women with and without a family history of breast cancer, pre-menopausal and post-menopausal women, and in both countries.
**Conclusion:** Our results support the notion that women who start smoking as teenagers and continue to smoke for at least 20 years may increase their breast cancer risk.