

S4. Fitting Steroid Hormones into a Risk Algorithm for Breast Cancer

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Over recent years a series of prospective studies have assessed the possibility that steroid hormone levels in blood might be associated with breast cancer risk in postmenopausal women. Overview analysis of the data from these studies has shown that the plasma levels of oestradiol and its immediate precursor testosterone are associated with increases in the relative risk of breast cancer of 1.29 and 1.37 respectively for each doubling of hormonal levels. These studies involved many different assays several of which were non-optimal. Additionally the samples depended on a single blood sample. Studies of reproducibility have indicated that with optimal sampling and analysis the relative risk could increase to at least 1.6 and 1.7 respectively for each doubling in hormone level. While testosterone and oestradiol levels were correlated some independent relationship with risk was present that could enhance risk prediction further

by combination of the 2 measures. The well known relationship between BMI and breast cancer risk was almost entirely explainable by the higher free oestradiol levels in postmenopausal women with high BMI. These observations indicate that it may be possible to estimate a woman's risk of breast cancer by inclusion of hormone analyses and replacing or adding these measures to components of existing risk algorithms. This will, however, require reliable well standardized assays and an improved understanding of the determinants of within-person hormone variability and of the features of storage and processing that affect analytical performance. Conducting hormone analyses in on-going prevention studies is important to substantiate these concepts and to allow the hormone levels to be integrated with existing risk algorithms.