

on a cohort of patients surviving over 5 years. Their continuing care needs were then considered.

Results: Actuarial 5-year survival for all cancers combined increased from 23% for patients diagnosed in the 1960s to 70% for those diagnosed in the 1990s. The number of patients surviving their disease for 5 years or more grew from 98 in 1970 to 1,747 in 2000 and by 2005 could exceed 2,100. Among 948 survivors (52% of those in the Region), 5% had received surgery alone, 55% radiotherapy and 85% chemotherapy. Exposure to anthracyclines had occurred in 53% of survivors, to alkylating agents in 40%, to epipodophyllotoxins in 33% and to platinum in 14%. Cranial irradiation had been given to 34%, at 24 Gy or more in 14%. No chronic medical problems were recorded in 18% of patients; only 3% of brain/CNS tumour survivors had no problems recorded, compared with 11% of other solid tumour and 34% of leukaemia survivors. Organ or system damage/toxicity affected 36% and 30% had growth, endocrine or fertility disorders. Obesity/overweight was present in 18% and in some may have been due to as yet undiagnosed endocrine problems. Neuro-cognitive, mobility, visual, hearing, dental and cosmetic effects were also seen. Many patients had several problems recorded. Consequently few were suitable for postal follow-up and most require multi-disciplinary care.

Conclusions: The remarkable improvements in survival rates have resulted in a steady increase in the number of patients requiring follow-up per annum, mostly in specialist late effects clinics. Protocol-driven care permitting audit to determine the most cost-effective management is required.

Public health and costs

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ORAL

Socio-economic status and breast cancer in Denmark

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Background: Breast cancer is the most frequent cancer in women, the incidence is increasing and the risk is highest in well-educated women. We studied:

The socio-economic differences in breast cancer incidence and mortality in Denmark measured by the women's own and the spouses occupation, and

The contribution of different socio-economic groups to the increasing incidence.

Material and Methods: 1 402 225 women aged 20-64 at the census in 1970 in Denmark were followed up for death, emigration, and incident breast cancer. During the period 1970-1995, 51 721 women developed breast cancer, and 21 576 died of breast cancer. Of the 1 402 225 women included in the study, 730 549 were economically active in 1970, and 480 379 women were both married and economically active. Socio-economic status was assessed based on the 1970 occupation.

Results: For women classified by their own socio-economic group, the standardised incidence (SIR) and the standardised mortality ratios (SMR) were highest in academics (SIR 1.39, SMR 1.29), and lowest in women in agriculture (SIR 0.77, SMR 0.75).

For married, economically active women classified by their own socio-economic group the SIR and SMR were highest in academics (SIR 1.40, SMR 1.44) and lowest in women in agriculture (SIR 0.76, SMR 0.76). Classified by their husbands' socio-economic group, the SIR and SMR were highest in women married to academics (SIR 1.21, SMR 1.16) and lowest in women married to men in agriculture (SIR 0.79, SMR 0.79). The gradient was thus steeper for women when they were classified by their own socio-economic group than when they were classified by their husbands' socio-economic group, and steeper for incidence than for mortality. From 1970 to 1995, the risk of developing breast cancer increased by 38% in women aged 50-64. All social groups contributed to this increase, but the increase was 45% in unskilled workers, and only 26% in academics.

Conclusion: In 1970-1995 academics had the highest risk of breast cancer in Denmark. The size of the social gradient in breast cancer occurrence was steepest when women were classified by their own occupation. The time trend in the social distribution tends to equalise the occurrence of breast cancer across social groups. As a consequence of this breast cancer is also expected to become more frequent.

We are currently studying how much of the socio-economic distribution, that can be ascribed to differences in fertility patterns. Fertility information

was combining from the household information of the 1970 census and the Danish Fertility Database. This procedure created a file covering the entire reproductive history of women aged 20-39 in 1970.

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ORAL

Influence of obesity on prognosis after breast cancer in Denmark.

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Background: There is evidence to suggest that obesity is associated with a poor prognosis after breast cancer. This may be due to several factors. Compared to lean women, obese women may be diagnosed with more advanced disease and respond poorer to adjuvant treatment.

Material and methods: With the aim of elucidating these points, we performed an analysis of 10,270 breast cancer patients diagnosed and treated in Denmark between 1977 and 2001 for whom information on height and weight at diagnosis was available in the database of the Danish Breast Cancer Co-operative Group.

Results: Univariate analyses showed that patients with a body mass index (BMI = weight/height squared) exceeding 30 had significantly larger tumours and more positive lymph nodes than patients with a BMI of 25 or less, while BMI was not related to histological type, grade or oestrogen receptor status. Survival was analysed by Cox proportional hazards models where the effect of obesity can be examined in relation to other known prognostic factors. Since the intensities were not proportional for age at diagnosis and grade, the analyses were stratified for these variables. Adjusting for the effects of tumour size, tumour invasion into the fascia, number of removed and number of positive lymph nodes and treatment, there was an independent prognostic significance of BMI on overall survival, the adjusted hazard ratio of dying being 1.19 (95% confidence interval 1.09-1.30) for a BMI of 30 or more compared with a BMI of 25 or less. The effect of BMI on recurrence free survival was borderline significant ($p=0.07$). We examined the effect of adjuvant systemic treatment (chemotherapy or endocrine treatment) in patients grouped according to BMI and found both treatment modalities to be less effective in women with BMI exceeding 30.

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ORAL

Prognostic characteristics and mortality from breast cancer in women using hormone replacement therapy (HRT).

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Background: Women currently using HRT regimen common in Europe might develop breast cancers with more favourable prognostic characteristics and experience a different overall mortality from breast cancer compared to never users.

Material and Methods: A nationwide cohort of Danish nurses was established in 1993. In total 23,178 nurses received a mailed questionnaire (response rate 86%), which was used as baseline information. Follow-up ended December 31st 1999. Follow-up for mortality ended October 22nd 2001. Cases were ascertained using Danish registries. The Danish Breast Cancer Group Cooperation (DBCG) registry provided information on histology, tumour size, receptor-status, lymph node status, malignancy grade and stage of disease. Women with missing information on HRT, premenopausal women, women with a surgical menopause and hysterectomized women were excluded, leaving 10,874 women for analyses. Statistical analyses were performed using Cox Proportional Hazards model and Kaplan Maier survival analysis.

Results: A total of 244 women developed breast cancer during follow-up. Of these 172 women were diagnosed with invasive ductal carcinoma to which analysis on prognostic factors was limited. For current users of HRT compared to never users, the risk of developing breast cancer with a low malignancy grade and a high malignancy grade was $RR=3.88$ (2.23-6.75) and $RR=2.09$ (1.35-3.23), respectively. These two estimates were not statistically significantly different. Other factors such as receptor status, lymph node status and stage were similarly associated with highest risks for

the prognostic favorable outcome, but not statistically significantly different from the non-favorable outcome. The risk of dying from breast cancer was based on 51 deaths among the 10,874 women. The risk of dying for current users of HRT was RR 1.06 (0.44-2.51) compared to never users.

Conclusions: For current users of HRT, the risk of developing breast cancer with various favorable prognostic characteristics was increased 2-3-fold compared to never users, but estimates for non-favorable prognostic characteristics were significantly increased as well. The difference between the more favorable and the non-favorable outcome was not statistically significant. Although the risk of breast cancer was increased for current users of HRT, mortality from breast cancer was not increased.

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ORAL

Breast cancer incidence among mothers of a population-based series of 2604 children with cancer: evidence of mother-fetal interaction

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Background: To determine breast cancer incidence among mothers of children with solid tumours and to formulate hypotheses about hormonal risk factors associated with both breast cancer in mothers and cancers in children.

Materials and methods: Mothers of 2604 children aged < 15 years with solid tumours included in the Manchester Children's Tumour Registry, 1954-1996 were traced and followed up to 31st December 2000 through the UK National Health Service Central Register. Data on breast cancer diagnosis were obtained through the UK National Cancer Registration System. Standardised Incidence Ratio (SIR), P-values and 95% confidence intervals were calculated from serial age and sex-specific breast cancer incidence for England and Wales.

Results: There was a significant excess of breast cancers in mothers (Observed number, O = 95, Expected number, E=73.5, SIR 1.3, $p < 0.05$). Significant excesses were found among mothers of children below the median age for diagnosis of their tumours (SIR 1.5, $p < 0.01$), mothers of case boys (SIR 1.6, $p < 0.001$), with a borderline significance in mothers with age at breast cancer diagnosis < 50 years (SIR 1.4, $p = 0.06$). There is a marginally significant trend of breast cancer risk decreasing with increasing time from date of birth of the index child to the date of diagnosis in mothers (trend $p = 0.09$).

Conclusions: These results indicate that there is an excess of breast cancer among mothers of children with solid tumours which may be due to mother-fetal interaction, possibly hormonally mediated during the index pregnancy. The cancer predisposition may be due, in part, to certain high and low penetrance genes, such as TP53 and hCHK2. But other low-penetrance inherited genes, for example, estrogen metabolizing genes and estrogen-regulated genes, may also be involved in those genetically susceptible individuals.

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ORAL

Self reported stress levels predict subsequent breast cancer in a cohort of Swedish women.

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Background: The association between stress and breast cancer has been studied, mostly using case-control designs, but rarely examined prospectively. The purpose of this paper is to describe the role of stress as a predictor of subsequent breast cancer.

Methods: A representative cohort of 1462 Swedish women aged 38-60 years were followed for 24 years. Stress experience at a baseline examination in 1968/69 was analyzed in relation to incidence of breast cancer with proportional hazards regression.

Results: Women reporting experience of stress during the five years preceding the first examination displayed a two-fold rate of breast cancer compared to women reporting no stress (age-adjusted relative risk 2.1; 95% CI (1.2-3.7)). This association was independent of potential confounders including reproductive and lifestyle factors.

Conclusions: The significant, positive relationship between stress and breast cancer in this prospective study is based on information that is unbiased with respect to knowledge of disease, and can be regarded as more valid than results drawn from case-control studies.