accident surveillance scheme.[2] Last year we reviewed the data for 1991; we estimate that there were roughly 285 000 new attendances at accident and emergency departments for accidental injuries sustained during leisure activities and 82 000 for sporting injuries in Scotland. These represented 24% and 7%, respectively, of all new attendances at accident and emergency departments. The annual direct patient costs associated with sporting injuries were therefore roughly £85 000-155 000 per 100 000 population.[3] The specific pattern of sporting injuries in Britain is different from that in Finland, with rugby and cricket associated with the highest injury rates[4] and basketball, volleyball, and ice hockey less important causes of injury.[3]

Other data on sport and leisure accidents and injuries are incomplete and found in disparate sources. Most importantly, they are not readily accessible to sporting organisations, sports safety bodies, and accident prevention agencies that could use them to review sports safety regulations and develop strategies to prevent injury. Nor are they readily accessible to health professionals, who have to deal with a changing pattern of sports injury as sports change and new activities such as roller blading are introduced.

We suggest that three particular areas merit attention. Firstly, a strategy should be formulated to collate all existing data on leisure accidents and injuries. Individual sports safety organisations and both statutory and voluntary agencies involved in preventing or responding to accidents currently invest substantial resources in gathering such data. These data, however, are currently not brought together to produce a detailed picture. Secondly, much better linkages (healthy alliances) need to exist between national sports organisations and health agencies and health professional bodies to facilitate a better understanding of the causation of leisure accidents and injuries and to promote joint action. Thirdly, although the Finnish insurance registries' data[1] and the data from the British leisure accident surveillance scheme give a broad picture of sports accidents and injuries, epidemiological research exploring these issues in greater depth[5] is necessary to give the detailed information required for the formulation of strategies to promote safety and prevent leisure accidents and injuries.

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Adverse life events and breast cancer

Other studies have found no association

EDITOR,—The latest interview study about adverse life events and breast cancer, by C C Chen and colleagues, reports a positive link,[1] but wider review of the literature shows a contradictory picture.[2] Retrospective interview studies on this topic are hampered by unavoidable problems. A diagnosis of cancer has often been correctly predicted by the patient or interviewer before the results of biopsy are known, which increases the likelihood of overreporting of stress in an effort to explain the illness. The temporal relation of previous life events to the onset of cancer is impossible to assess because the onset of cancer cannot be dated. Furthermore, patients with benign breast disease may not be a suitable comparison group.

These limitations can be overcome by large population record studies in which the focus of interest is restricted to two major adverse life events—widowhood and divorce—which can be objectively verified and dated. Such studies yield little or no evidence that widowhood or divorce is related to the onset or outcome of breast cancer.[3-5]

Interactions among external stress, psychoneuroimmunological responses, and the breast cancer process are complex and fascinating, but their clinical importance remains in doubt. Chen and colleagues have carried out a careful study, but their claim to have shown "a significant aetiological association between life events and development of breast cancer" goes beyond their data and could be misleading and unhelpful for the patients concerned.

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Association may be due to imbalance in ratio of adrenal androgens to glucocorticoid

EDITOR,—C C Chen and colleagues report convincing evidence for an association between life stress and breast cancer but suggest that it would be a formidable task to account for this association with a biologically plausible mechanism.[1] Recent studies carried out by my group into the regulation of the synthesis of oestrogen in breast tumours from postmenopausal women have indicated a possible mechanism by which adverse life events could enhance this synthesis.

Oestrogens are the most potent mitogens available to support tumour growth, and it has recently been established that the activities of several of the enzymes that are involved in tumour oestrogen synthesis—for example, aromatase, oestrone sulphatase, and oestradiol dehydrogenase—are regulated by cytokines such as interleukin 6 and tumour necrosis factor α.[2] Most of the cytokines that are available to stimulate tumour oestrogen synthesis result from the infiltration of lymphocytes into tumours. Some of these cells, the T helper cells, are now known to exist as two main subsets, Th1 and Th2 cells; each subset secretes a different profile of cytokines. Interleukin 6 is secreted by Th2 cells, and there is now good evidence that the progression of T helper cells to either the Th1 or the Th2 phenotype is governed by the ratio of adrenal androgens and their metabolites (for example, dehydroepiandrosterone and androstenediol) to glucocorticoids.[3] Whereas plasma concentrations of adrenal androgens decrease with advancing age, production of glucocorticoid remains relatively constant.

A series of adverse life events would result in an increase in the production of glucocorticoid, which would alter the balance of the progression of T helper cells in favour of a Th2 response and secretion of cytokines that stimulate tumour oestrogen synthesis. Interestingly, some years ago Bulbrook and Hayward showed that the excretion of a low ratio of androgen metabolites to glucocorticoid metabolites (the discriminant function test) indicated women at risk of breast cancer and was also associated with an unfavourable outlook in women with the disease.[4] The discriminant function test has recently been postulated to act as a marker of the production of Th1 and Th2 cytokines and oestrogen synthesis in breast tumours.[5]

If this postulated mechanism is correct then it is worth exploring the possibility of using adrenal androgen replacement therapy to prevent breast cancer.

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Reservations about conservative surgery for early breast cancer

EDITOR,—Several points need to be made before there is a wholesale switch to conservative surgery for breast cancer.[1]

I find the proposal that tumours up to 4 cm in diameter are suitable for conservation surgery extremely worrying. Whenever new and apparently less radical treatment becomes available it is important that patients should be carefully selected. Experience in Nottingham suggested that tumour size of over 2 cm was a risk factor for local recurrence after conservation surgery,[2] and I would therefore be reluctant to treat tumours much larger than 2 cm by such surgery. It goes without saying that the tumour must be unifocal, and surgical excision margins must be clear of tumour if local recurrence rates equivalent to those associated with mastectomy are to be achieved.

Removing all invasive carcinoma is not usually particularly difficult technically, but I find it much more difficult to ensure that all resection margins are clear of associated ductal carcinoma in situ. I have the feeling that pathologists are increasingly reporting associated in situ change, and radiotherapy cannot be expected to salvage inadequate surgery.

It is a moot point whether patients with high tumour grade and lymphatic and vascular invasion should be treated by conservation surgery.[3] While the grade of the tumour may be known preoperatively from fine needle aspiration cytology or biopsy, this is by no means always the case. Furthermore, the grade is not always accurately identified on cytology or biopsy, and lymphatic