being tested in clinical trials. Their perspectives will be discussed as well as the targeting of antibodies to minimal residual cancer cells in order to preempt metastasis formation.

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Clinical epidemiology

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A useful new concept is if clinical epidemiology would be recognised as the basic methodological tool for clinical cancer studies. The reasons are several:

1) Clinical epidemiology can be defined as the methodological arsenal for study of illness related outcomes in persons who have sought advice in the health care system. Epidemiology investigating causes of cancer has long grappled with problems in design and biostatistical analyses of studies done under difficult circumstances. The field has benefited methodologically and we can import these improvements to clinical studies as many of the basic problems (e.g. estimating risks, rates, relative and absolute effects of interventions etc) are the same. 2) Only in randomised clinical trials (RCT) and meta-analyses (MA) have we so far taken up the challenge, but both RCTs and MAs can improve even more. 3) Not everything can be studied by RCTs and methodologically sound designs are needed in such settings. Examples are studies of unintended effects of treatment and of prognostic markers. Today, many non-randomised cancer clinical studies do not make full use of their data due to unsuitable design and limited analytical scope. 4) In non-randomised clinical studies of intended effects of treatment, problems with bias are even larger than in other observational studies. All methodological lessons learnt from epidemiology are needed. 5) For some cancer diagnoses there exist large clinical databases, which however are little utilised. Well designed studies within those can be valuable for several purposes. 6) Research in diagnostic strategies need methodological improvement, correct diagnosis and early detection being key issues in cancer. 7) Studies in cancer forms with long survival entail problems such as effect modification from comorbidity and competing causes of death, which need to be analysed properly.

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Epidemiology in health policy

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Ideally, all of a society's activities should be assessed and particularly those carried out at the cost of the general public. Cancer prevention and control are not exceptions to this rule. Good, routine statistical back-up is very useful and can be supplemented by special studies. Experience from other countries is not necessarily always applicable or cannot always be repeated. Each country should thus make its own efforts for planning and evaluation.

The basic measure for health policy in cancer is the evaluation of the occurrence of cancer. The indicators incidence, prevalence and mortality can be used for various purposes in policy making. For planning and evaluation of health policy actions, predictions play a central role. Making reliable predictions for the occurrence of cancer is particularly challenging as the risk factors and their distributions and effects in a population are not precisely known for most cancers. Population-based survival rates provide a rough quality control of cancer care in a population. Unexpected differences have lead to studies elucidating the background of the findings.

A population-based cancer registry is an important instrument in this activity. It does not only provide the necessary numerical background but can also provide material for a variety of epidemiological studies of cancer aetiology and evaluation of interventions, provided that an adequate legal basis and sufficient resources exist. Under these conditions important economic savings may be achieved, both in the assessment and in the targets of assessment.

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Low penetrance susceptibility genes for breast cancer

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Mutations in BRCA1 and 2 account for about 15–20% of familial clustering of breast cancer. The number and type of genes that account for the remainder, is not clear. It is however plausible that at least some of this genetic predisposition is attributable to the effects of multiple, common, but individually weak genes.

The prospect of a polygenic approach to common disease, in which genotypic profiles are used to stratify individuals at different levels of risk, has raised much enthusiasm for its potential in targetting screening and prevention. Others are more sceptical, believing the size of genetic effects, compared with chance and environment, to be too small to be of practical use.

We have used a large population-based series of breast cancer cases to model the distribution of genetic risk in the population. The most plausible model gives a log-normal multiplicativity. The difference in risk between the lowest and highest quintiles is 40-fold. We conclude that genotype profiles are likely to be of use, and to provide more information than 'established' clinical risk factors.

To build a profile, one must identify the genes. Using association studies with snps in a large series of breast cancer cases and controls, we have identified 6 tentative positive associations in 29 candidate genes. The interpretation of these results will be discussed.

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Food consumption patterns, energy balance and cancer risk

Abstract not received.

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Impact of advanced technology in cancer of the head and neck

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Introduction: This paper discusses the merits of advanced technology; 3 clinical examples are taken from our own department. First, the evolution in intraoperative brachytherapy (IOBT). Secondly, Stereotactic Radiation Therapy (SRT) with modified frames, and thirdly the sparing potential of external beam Intensity Modulated Radiotherapy (IMRT) techniques.

Material & Methods: We routinely implant cancers of the base of tongue; the dosimetry of this volume implant is time consuming, due to the need for catheter identification on X-ray films. For that reason our protocol does not permit IOBT in volume implants. A solution was presented by CT-based automatic catheter recognition. An additional innovation is the introduction of inverse planning, making BT now a real 3DCRT/IMRT treatment option. The 2nd clinical example is SRT for boosting the primary. Recently the TLC/GTC-frame (Radionics), was modified in our institute to eliminate the problem of not being able to use SRT frames because of severe mucositis. Thirdly, the sparing potential of IMRT using dMLC or step and shoot techniques, will be illustrated (large fields and boost combined). For 3DCRT/IMRT in general, we developed a 3-D target definition of the neck. We are now working on similar guidelines for various primary sites.

Results and Discussion: All 3 clinical examples demonstrate advancement in technology being beneficial to the treatment of H & N cancer patients. However, a price is to be paid. First we will show cost computations for an exemplified tumor (T2bN2 Nasopharynx), treated in our center as of 1996 by neoadjuvant chemotherapy (CHT) in combination with conventional external RT (70 Gy), and brachytherapy (11 Gy). As of 2001, this patient will be treated by neoadjuvant CHT, IMRT 70 Gy and SRT (11.2 Gy), however, with a significant increase in total costs. Secondly, the departments of Radiation-Oncology in The Netherlands have on average a waiting time (WT) of 4–6 wks. The increasing effort in implementing advanced technology in the clinic, given also the shortage of highly skilled personnel, can lead to an increase in the WT and therefore to a less favourable situation. In fact,