

Recent Trends in Prostate Cancer Incidence and Mortality in Southeast England

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Abstract

Objective: To investigate recent trends in prostate cancer incidence and mortality, with particular reference to changes in diagnostic techniques and treatment.

Methods: The Thames Cancer Registry was used to identify all men, resident in SE England, diagnosed with prostate cancer between 1990 and 1999. Information regarding prostate cancer mortality was obtained from the Office of National Statistics. Other data sources were used to ascertain the number of transurethral resections of the prostate (TURP) and open prostatectomies performed in SE England, and the number of prescriptions issued for the treatment of benign prostatic hyperplasia (BPH).

Results: There was a steady increase in the age-standardised incidence of prostate cancer from 1990, which then began to plateau in 1996. The increase was entirely restricted to localised tumours; non-localised tumours showed a slight downward trend over this period. Age-standardised mortality rates have remained constant, with a slight fall in 1997 corresponding to the decline in incidence rates. Medical treatment for BPH has increased, with a corresponding reduction in the number of TURPs.

Conclusion: The change in occurrence of prostate cancer is entirely due to changes in the incidence of localised cases. Incidence of non-localised cases and mortality remained almost constant. The increasing tendency in incidence of localised prostate cancer is likely to be principally due to increased detection, through increased use of prostate-specific antigen (PSA) testing followed by radical resections of the prostate. The aggregate effect of PSA testing and medical treatment of BPH is a stabilisation in the incidence level of localised cases in recent years.

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1. Introduction

There is wide variation in the incidence of prostate cancer around the world but a general pattern of rising incidence and mortality was seen until the late 1980s. More recently, however, mortality rates have declined in some countries including the USA, Canada, UK, France, Germany and Italy [1]. Recent sharp increases in incidence have been followed by decreases in some countries including the USA and the UK [2].

The incidence of prostate cancer in southeast England has increased markedly over the last 20 years and it is now the most common cancer in men, comprising 20% of the total incident cases of cancer in men recorded at the Thames Cancer Registry (TCR). It is not clear how much of this increase is due to improved diagnostic techniques and how much is due to a real increase in incidence. The prostate-specific antigen (PSA) test has been used in the United States for the detection of prostate cancer since the late 1980s, leading to a steep increase in incidence until 1992 followed by a decline [3]. Undoubtedly, the PSA test has also been increasingly applied in the United Kingdom even though the English Department of

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Health does not recommend mass screening for prostate cancer [4,5]. The use of PSA testing in Scotland showed a marked increase from 1991 onwards [6].

One of the main treatments for benign prostatic hyperplasia (BPH) has traditionally been a transurethral resection of the prostate (TURP). The tissue removed during this procedure is routinely sent for histopathological examination and in around 10% of the patients this results in an incidental diagnosis of prostate cancer [7]. An American study previously demonstrated a strong correlation between the incidence of prostate cancer and the increasing use of TURP [8]. Over the last decade, there has been a shift towards using medical treatments rather than surgery for the treatment of BPH. These include α -adrenergic receptor antagonists (α -blockers) and finasteride, a 5- α -reductase inhibitor. This shift in treatment is likely to have had an effect on the recorded incidence rates of prostate cancer [9].

2. Methods

The Thames Cancer Registry is one of the largest cancer registries in Europe, covering a total resident population of 14 million. All patients with prostatic cancer diagnosed between 1990 and 1999 were identified from the TCR database. Information extracted on each patient included details of the tumour site, histology, stage, the kind of treatment administered and survival. Information regarding prostate cancer mortality was obtained from the Office of National Statistics (ONS).

The tumour stage could be assigned by the TCR for just over two-thirds of the prostate cancers registered on the database (68%), using information in the patients' notes. We categorised the cancers as either localised or non-localised (cancers with extension beyond the organ of origin, regional lymph node involvement or metastases). Tumours with an unknown stage were proportionally assigned to each category, according to five-year age group and period of diagnosis.

The Hospital Episode Statistics database, held by the English Department of Health, was used to ascertain the number of transurethral resections of the prostate and open prostatectomies performed in southeast England over the last 10 years. Information regarding the dispensing of prescriptions of drugs used in the treatment of BPH was obtained from the Prescription Cost Analysis (PCA) system, also held by the Department of Health.

Age-standardised rates were calculated using the European standard population [10].

3. Results

There were 48,205 men diagnosed with prostate cancer between 1990 and 1999 in the region covered by the TCR. Over two thirds of the cancers (69%) were adenocarcinomas, 26% were carcinomas (the majority of which were not otherwise specified) and 5% were

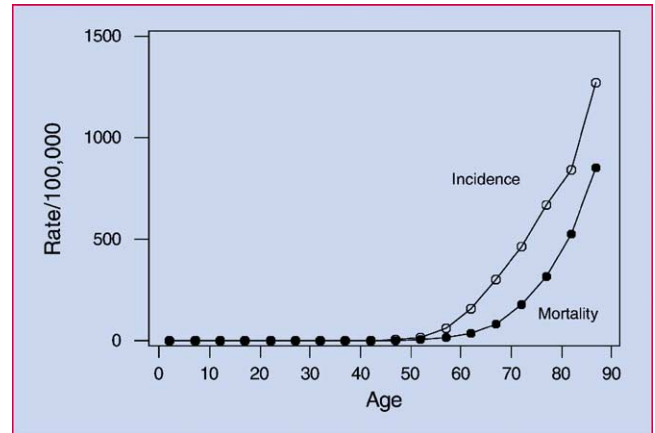


Fig. 1. Prostate cancer in southeast England. Age-specific incidence and mortality rates, 1995–1999.

described as malignant neoplasms, not otherwise specified. Over 12% of the prostate cancers were registered on the basis of the death certificate only (DCOs). Nearly half of all the tumours were described as localised (47%) and 18% were described as metastatic. About 2% of tumours had direct extension beyond the organ of origin and less than 1% of tumours had regional lymph node involvement. The stage was unknown for 32% of cases overall and this varied from a peak of 40% in 1994 to the lowest level of 26% in 1998. In 1999, the most recent year being presented, 27% of cases could not be allocated a stage.

Fig. 1 shows the age-specific incidence and mortality rates of prostate cancer in the study population. A steady increase in the age-standardised incidence of prostate cancer was observed since the beginning of the 1990s until 1996 when it began to plateau (Fig. 2). The rising trend in incidence was seen in all age groups

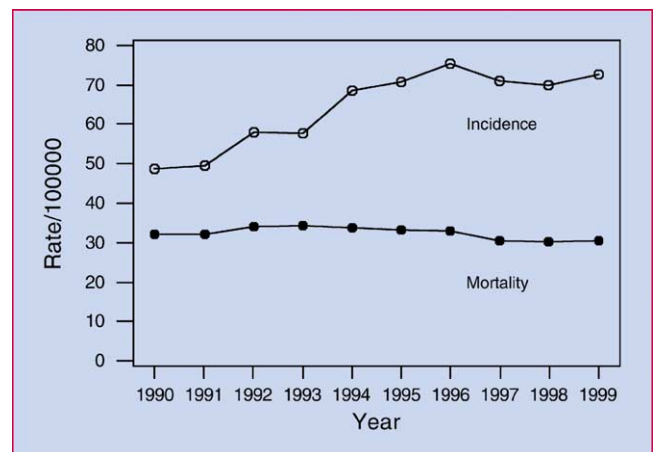


Fig. 2. Age-standardised mortality and incidence rate (European standard population) of prostate cancer in southeast England, 1990–1999.

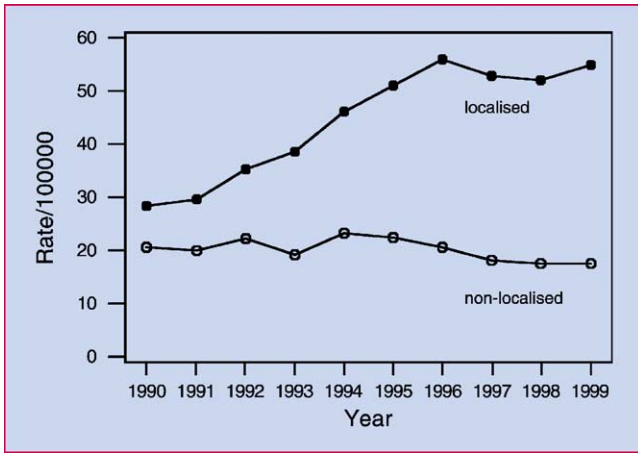


Fig. 3. Age-standardised incidence rate (European standard population) of prostate cancer in southeast England, 1990–1999 by stage at diagnosis.

over 50 years, but the decline from 1996 was most marked in the older age groups. The proportion of men diagnosed before the age of 75 increased from about 20% in 1990 to nearly 30% in 1999. In contrast to the incidence rates, the age-standardised mortality rates remained fairly constant over the last 10 years, although there was a very slight decrease in the most recent years.

The increase in prostate cancer incidence was entirely restricted to localised tumours, which almost doubled from 1990 to 1996, and subsequently stabilised at a fairly constant rate between 1997 and 1999 (Fig. 3). Non-localised tumours showed a relatively stable incidence, with a small reduction in the last six years. This analysis was not materially influenced by the exclusion of all cases with missing value for stage.

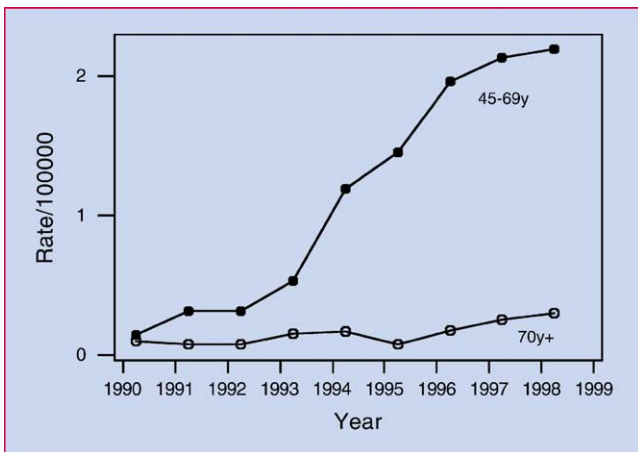


Fig. 4. Age-standardised rate of total excision of prostate and capsule of prostate (OPCS4 M61.1) in southeast England, 1990–1998. Source of data: Hospital Episode Statistics (HES), Department of Health.

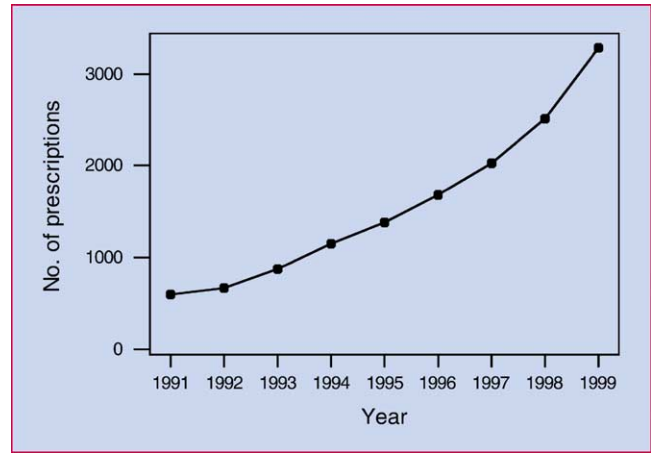


Fig. 5. Number of prescriptions for drugs used in the treatment of benign prostatic hyperplasia (doxasin mesylate, indoramin HCl, prazosin HCl, terazosin HCl, finasteride, alfuzosin HCl, indoramin, tamsulosin HCl) dispensed in England. Source of data: Prescription Cost Analysis (PCA) System, Department of Health.

No direct information is available on the use of PSA testing in this population, but the age-standardised rate of total prostate resections (total excision of the prostate and capsule of prostate; OPCS4 M61.1) increased more than 10-fold in men aged 45–69 years and 3-fold in older men, albeit from a very low baseline level in 1990 (Fig. 4).

The number of prescriptions for drugs used in the treatment of benign prostatic hyperplasia (including α -blockers and finasteride) dispensed in England has risen from around 600,000 in 1991 to over 3,000,000 in 1999 (Fig. 5). The number of TURPs performed in southeast England reached a peak at over 16,000 procedures (218 per 100,000 population) per year in 1995 (Fig. 6). Since then, there has been a marked reduction

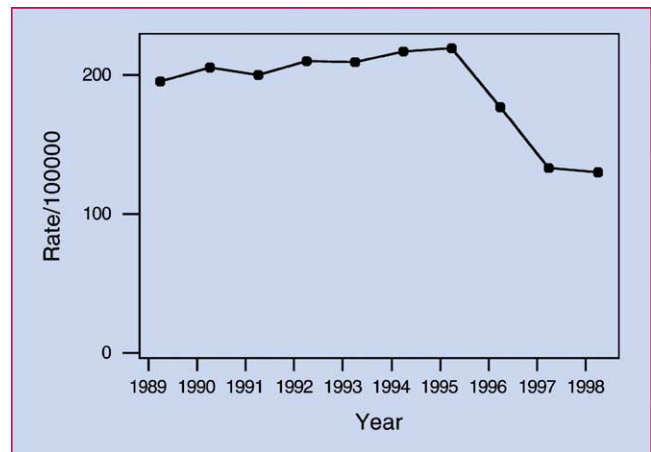


Fig. 6. Age-standardised rate of transurethral resections of the prostate (TURP) in southeast England, 1989–1998. Source of data: Hospital Episode Statistics (HES), Department of Health.

in this type of operation. This pattern was seen for all the age groups.

4. Discussion

Prostate cancer is the most common cancer in men in southeast England, with about 5300 new cases per year and 2200 deaths per year [11].

The most important finding from the present analysis is that the change in prostate cancer occurrence in this population is largely due to changes in incidence of localised prostate cancer. The incidence rate of non-localised cancer and the mortality rate of prostate cancer both remained relatively constant. The percentage of patients with metastases in this population, according to the TCR, was very similar to the figure reported in the Yorkshire region between 1981 and 1990 [12]. It is noteworthy that prostate cancer tends to be classified either as localised or as metastatic at the time of diagnosis. Very few cases are diagnosed at a time where the tumour has grown to adjacent tissues or with extension to regional lymph nodes. In the dataset used for this report, only 3% were characterised as such.

One limitation of the data held by the TCR is the lack of staging information. We chose to assign cancers with unknown stage proportionally to either the localised group or non-localised group, although we accept that these cancers may not have the same stage distribution. In particular, cases registered by a death certificate only were included and would be likely to have a higher distribution of non-localised cancers than the general population of prostate cancers. However, the same trend of increasing localised cases and decreasing or stable non-localised cases was seen without the proportional assignment, and even if all cancers with unknown stage were classified as non-localised.

Autopsy studies have shown that a high proportion of middle aged and older men have localised foci of invasive prostate cancer [13] and it is therefore very plausible that the recorded incidence of prostate cancer is sensitive to the level of diagnostic activity in the population. The main diagnostic events that lead to diagnosis of localised prostate cancer are testing for prostate specific antigen and surgical treatment for urinary obstruction by TURP.

There is currently no organised nationwide screening programme for prostate cancer in England, and there are no controlled data to prove that such screening would be beneficial [14,15].

Although PSA testing in asymptomatic men was discouraged during this period in the UK, a recent

study reported that in 1999, 3.5% of men aged over 45 years on a GP database, who had no previous record of prostate cancer, had a PSA test recorded [16]. This compares with a figure of 1.4% of men aged over 45 years with no previous history of prostate cancer, having a PSA test noted on their GP record during 1994 [4]. Unfortunately, there is no national scheme for systematically monitoring the volume of PSA tests being carried out in England, along with indications for the test and result. Such monitoring was one of the recommendations in a recent review commissioned by the NHS Executive [4].

It is very likely that the use of PSA testing in England has been increasing throughout the period of this study, and that this explains the strongly increasing trend of radical prostatectomy in men aged 45–69 years (Fig. 4). PSA based screening advances the diagnosis of prostate cancer by 6–10 years and leads to a significant reduction in the stage at diagnosis [14].

Another strong factor in detection of localised prostate cancer is the treatment of benign prostatic hyperplasia. A large proportion of cases may be diagnosed incidentally, following a TURP, which is routinely performed for the treatment of BPH. The annual number of TURP operations carried out in this population rose steadily until 1995 and then steeply declined. The decline was evident in all age groups. Medical treatments for BPH, such as the anti-androgen finasteride, have increasingly been prescribed since 1992, and this could account for the drop in TURPs.

We hypothesise that the apparent stabilisation of the incidence rate of localised prostate cancer since 1996 at a level of about 50 per 100,000 is due to the aggregate effect of two forces acting in opposite directions. Increasing use of PSA testing since 1990, as indicated primarily by the increasing frequency of radical prostatectomy, has led to an increasing tendency in the incidence of localised prostate cancer. In the other direction the incidence of localised prostate cancer is influenced by the increasing use of medical treatment for BPH since 1992, with the associated decrease in the frequency of TURP since 1995. The stabilisation of the incidence rate may be the net result of a new equilibrium between these two opposing tendencies. In addition, PSA testing may have identified the established cases in the system leaving the underlying year on year rate to stabilise at a lower level.

It is evident that the recorded incidence of localised prostate cancer is highly sensitive to the level of diagnostic investigation. Despite the apparent changes in incidence, the true underlying disease occurrence may not have changed at all.

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