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The rising incidence of anal cancer in England 1990-2010; a population-based study

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ABSTRACT

Aim: Although anal cancer is rare, its incidence has been reported to be rising in several countries. This study aimed to determine whether there had been any changes in incidence over time in England.

Method: 13,940 patients with a primary diagnosis of anal cancer made between 1990 and 2010 were identified in the cancer registry component of the English National Cancer Data Repository. Tumours were grouped according to the ICD-0 morphology codes into squamous cell carcinoma, basaloid and cloacogenic carcinoma, adenocarcinoma and other cancer types. The incidence over this period was investigated in relation to type of tumour, age and sex.

Results: In males there was a 69% increase in squamous cell anal carcinoma from 0.43 per 100,000 population in 1990-1994 to 0.73 in 2006-2010. For women these rates were 0.50 in 1990-1994 to 1.13 in 2006-2010, a rise of 126%.

Conclusion: The study showed that between 1990 and 2010 there was a substantial rise in the incidence of anal cancer in England. This effect was more marked in women than men.

What does this paper add to the literature?

This is one of the largest national studies on the incidence of anal cancer and shows a rise in anal cancer in England over the twenty years from 1990.
This study shows a steep rise in older people, not been seen before. This has important service implications
This supports the extension of the HPV immunisation programs to men.

INTRODUCTION

Several national studies have reported an increasing incidence of anal cancer in recent years.[1-7] This may be due to a rise in squamous cell carcinoma for which the major risk factor is infection with the human papilloma virus (HPV). Little is known about trends in the incidence of anal cancer in England. The present study investigated trends in the incidence between 1990 and 2010 by quantifying age-standardised and age-specific rates in relation to sex and age.

METHOD

Information was extracted from the cancer registry data component of the National Cancer Data Repository (NCDR) on every individual diagnosed with a primary anal cancer (International Classification of Diseases Version 10 code C21) in England between 1990 and 2010. The tumours were then categorised into squamous cell carcinoma, basaloid and cloacogenic carcinoma, adenocarcinoma or other cancers based on the ICD-O morphology code.[8]

Mid-year population estimates were obtained from the Office of National Statistics[9] and used to calculate five-year moving average age-standardised incidence rates by direct standardisation to the European Standard population. Age-specific incidence rates for males and females of anal cancer squamous cell tumours for four specific time periods (1990-1994, 1995-1999, 2000-2004 and 2005-2009) were also investigated.

RESULTS

Between 1990 and 2010, 13,940 individuals were diagnosed with anal cancer in England. Table 1 shows the distribution of the different morphological sub-types, showing that squamous cell carcinoma was the most common form. The morphological distribution of tumours between males and females was differed with a greater proportion of women having squamous cell carcinoma and men a higher proportion of adenocarcinoma ($P<0.01$).

Trends in the age-standardised incidence overall and for each morphological type of the disease for males are shown in Figure 1A. There was little change in the incidence of anal adenocarcinomas or basaloid or cloacogenic tumours over the study period but for squamour cell tumours, there was a 69% increase in incidence from 0.43 per 100,000 population in 1990-1994 to 0.73 in 2006-2010.

Among females there was little change in the age-standardised incidence of adenocarcinomas or basaloid or cloacogenic tumours (Figure 1B), but for squamous cell carcinomas he rate increased from 0.50 in 1990-1994 to 1.13 in 2006-2010 per 100,000 population, amounting to an increase of 126%.

Figures 2A and B show the age-specific incidence by gender of squamous tumours over the four time periods. There was an increase over time for males and females, which was particularly marked in middle aged and elderly females.

DISCUSSION

The study shows that compared with other large bowel tumours, anal cancer remains uncommon in England, but its incidence is increasing rapidly. Over the twenty years from 1990 the incidence of squamous cell carcinomas increased by 69% in males and in 126% in females. Age-specific analysis by gender shows a rising incidence in both sexes, but this was most marked in middle aged and elderly females. The disease also occurred significantly more frequently in those who resided in more socio-economically deprived areas.

These findings are similar to those reported for other countries, although not for all [6] . Thus a major increase in incidence has been observed in Denmark,[5;10] the United States of America,[3;4] Scotland,[2] Sweden[7]and Australia[6]. The present study includes one of the largest whole populations studied so far, but the cause for the rise is not clear. Smoking[11;12] and immunosuppression[11;11;13;14] have been associated with the disease, but the incidence of the former has declined during the period of study. The most important risk factor for squamous cell carcinoma is with human papilloma virus (HPV) infection.[11;15-17] The rising incidence of anal cancer is likely to be associated with increasing exposure

to HPV and probably owing to changes in sexual behaviour[11;18] such as multiple sexual partners, anal intercourse and sexually transmitted infection including human immunodeficiency virus (HIV).

Anorectal intercourse is associated with a greater risk of anal cancer and studies have shown an elevated risk in homosexual males. According to the National Survey of Sexual Attitudes and Lifestyle (Natsal) a much greater proportion of females have anal intercourse than males,[19] which would be in line with the results of the present study. In the most recent survey (Natsal 3), this trend has continued and the reporting of anal intercourse has increased in each successive birth cohort. [20]

In 2008 a national HPV vaccination programme was introduced for girls aged 12 and 13 in the UK[21] and although this could be anticipated to lead to a reduction in incidence of anal cancer in the future, given the age of the population affected by the disease the impact of the programme, it will take many decades to have an effect. No such screening programme has been implemented for males and while heterosexual men may be offered some 'herd immunity' via the current vaccination scheme, men who have sex with men would receive no such benefit. As a result, the increasing incidence rates of anal cancer in men could be anticipated to rise still further. This strengthens the arguments for introducing HPV immunisation in boys as has now occurred in Australia.[22]

The increasing incidence in older patients observed in this study is an important observation with significant service implications. The curative treatment of squamous type anal cancer involves an intensive schedule of chemotherapy with mitomycin C, 5 fluorouracil and a course of 50.4Gy of radiotherapy over five and a half weeks.[23] Many elderly patients have poor performance status and significant co-morbidity that may limit their suitability for standard treatment or result in them experiencing greater toxicity. Similarly, in those patients who have residual or recurrent disease the option of radical salvage surgery carries a considerable morbidity, particularly with increasing age. Whilst there is evidence of the efficacy of lower dose chemoradiotherapy in small case series,[24;25] further work is required to determine the optimum treatment schedule for the growing elderly population who may be considered unsuitable for standard therapy.

In addition, the major increases in incidence observed across England have implications for the NHS. Current guidance recommends that anal cancer should be managed in specialist centres with a

sufficient anal cancer workload to ensure optimal expertise and management.[26] With the significant increase in incidence of the disease it would appear likely that the workloads of these units will also increase. Ensuring that these centres are adequately resourced to deal with the new cases will be important.

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Table 1: Histological type of anal cancer in relation to gender (England 1990-2010)

Histological type	Males		Females		Total	
	n	%	n	%	n	%
Squamous cell carcinoma	3,235	58.4	5,248	62.5	8,483	60.9
Basaloid & cloacogenic carcinomas	327	5.9	792	9.4	1,119	8.0
Adenocarcinoma	1,145	20.7	1,228	14.6	2,373	17.0
Other	836	15.1	1,127	13.4	1,963	14.1
Total	5,543	100.0	8,395	100.0	13,938	100.0

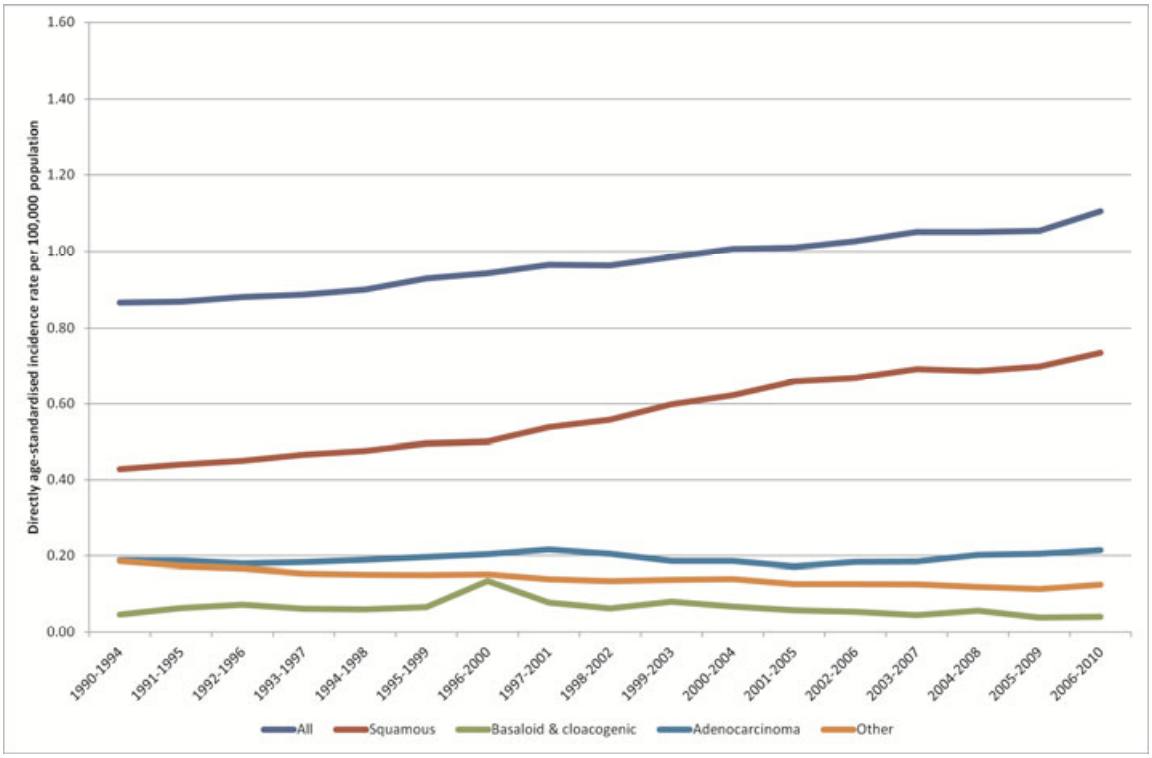

Figure 1A. Age standardised incidence rates of anal cancer according to histological type (five year average) 1990 - 2010 – Males

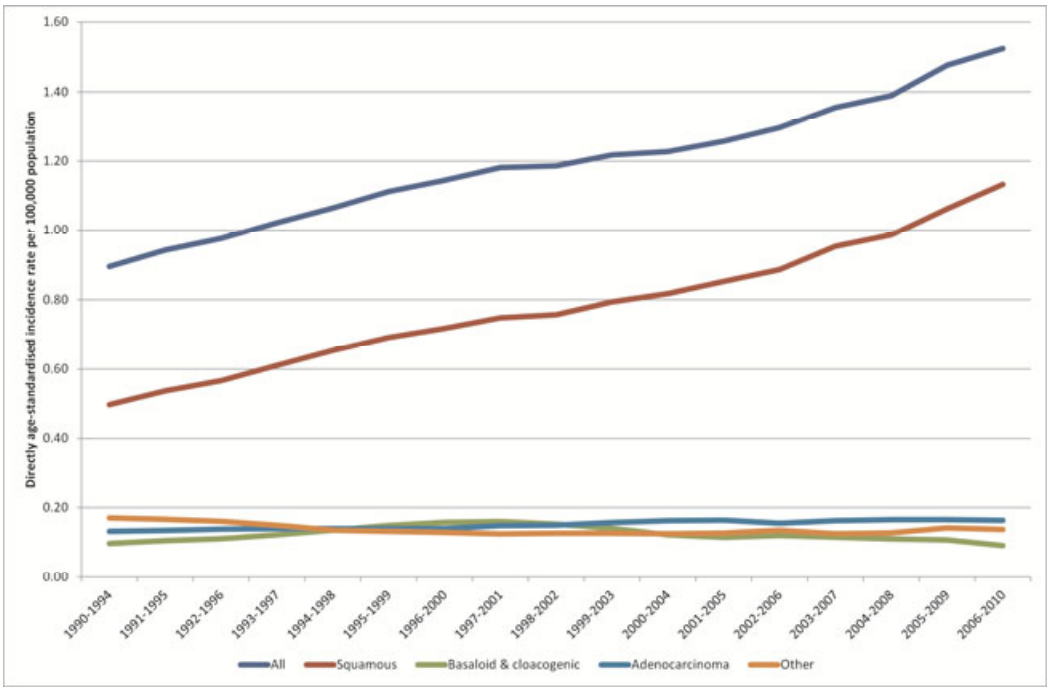

Figure 1B. Age standardised incidence rates of anal cancer according to histological type (five year average) 1990 - 2010 – Females

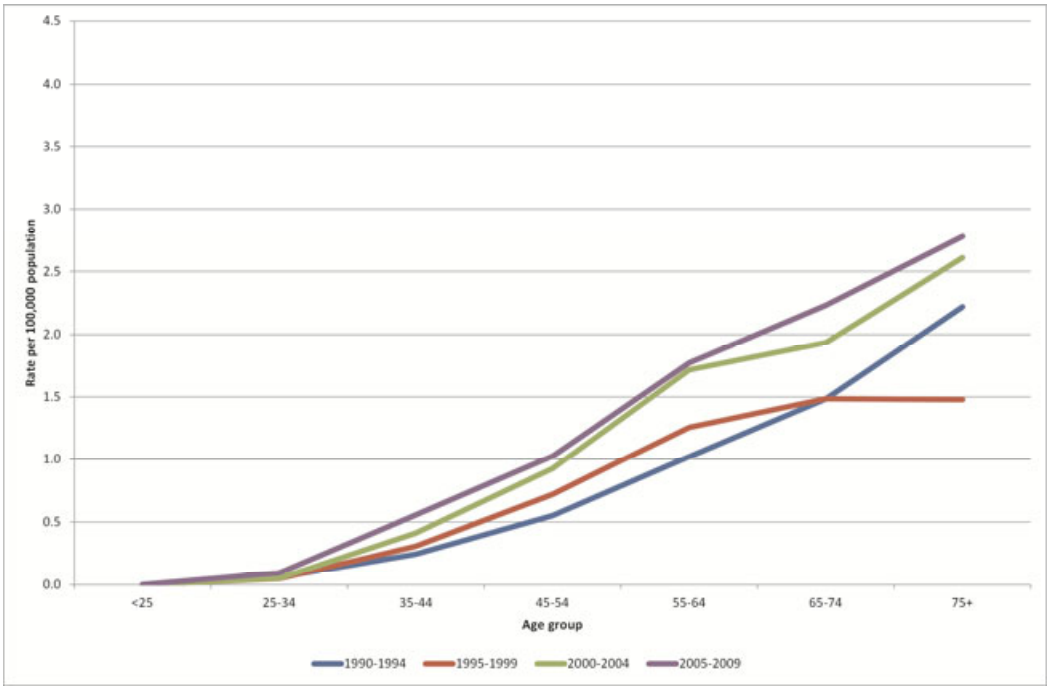

Figure 2A. Age specific incidence rates of squamous cell anal carcinoma according to five year periods of diagnosis between 1990 and 2009. Males

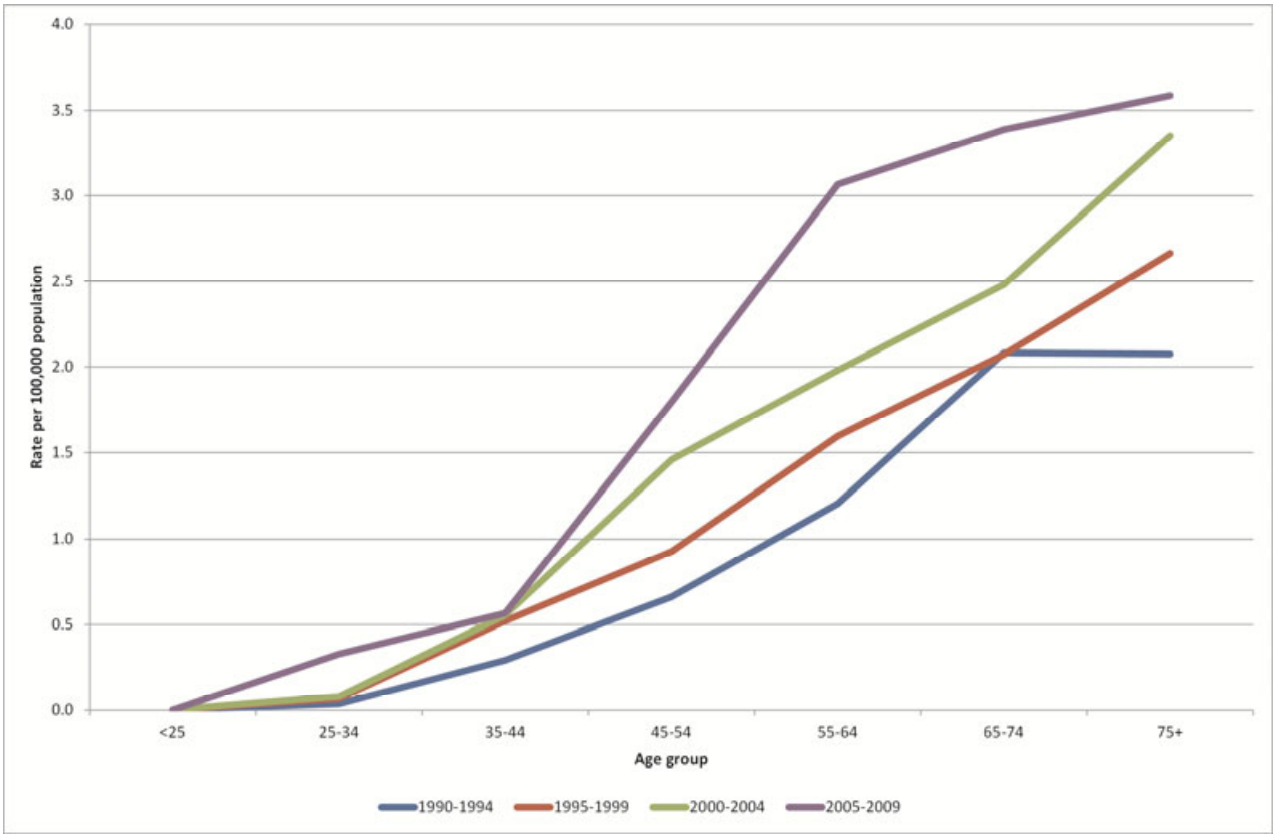

Figure 2B: Age specific incidence rates of squamous cell anal carcinoma according to five year periods of diagnosis between 1990 and 2009. Females