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Trends in cancer mortality among migrants in England and Wales, 1979–2003

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ABSTRACT

Aim: To examine trends in cancer mortality for migrants living in England and Wales.
Method: The Office for National Statistics provided anonymised death records for 1979–1983, 1989–1993 and 1999–2003, and tabulated population data from the 1981, 1991 and 2001 censuses for England and Wales. Age-adjusted rates and rate ratios for 16 cancer sites were derived by country of birth and time period.
Results: Compared with the declines for those born in England and Wales, smaller or non-significant declines in groups with historically low mortality lead to a pattern of convergence of rates towards those for England and Wales (e.g. breast cancer among women from the Caribbean or East Africa). However, for migrant groups with historically higher rates this had the effect of either maintaining or widening relative mortality (e.g. lung cancer among men from Republic of Ireland or Jamaica). Higher mortality among the Scots and Irish persisted for a range of cancers.
Conclusion: In spite of general declines in cancer death rates, inequalities in migrant mortality remain. There is an urgent need for prevention and treatment programmes to maximise coverage across all minority groups.

1. Introduction

Ethnic specific trends in cancer mortality provide aetiological clues about both how environmental exposure affects susceptibility to cancers and how successfully they are managed. However, remarkably little cancer incidence or survival data for ethnic minority groups exist in the United Kingdom (UK). Additionally, annual death rates by ethnicity are not available in the UK. Ethnic origin is not recorded at death registration in England and Wales and analysis relies on decennial rates based on information by country of birth from the census and from deaths registered around the time of the census. Previous studies have focused on mortality from main cancers and, compared with the England and Wales national average, have shown relatively high all cancer mortality for Scottish and Irish migrants and low mortality for South Asian and Caribbean migrants.[1,2] Mortality trends have never been explored. This paper examines trends for a range of cancers using data for 1979–1983, 1989–1993 and 1999–2003.

Most incidence research relates to South Asian migrants and findings suggest convergence in cancer risk towards that of the host population.[3,4] South Asian women appear to have both lower incidence and better survival from breast cancer compared with all other women.[5] Evidence is patchier for other migrant groups. While data from the England and Wales Longitudinal Study suggest that incidence of all combined cancers is lower in Caribbeans compared with the national average,[6] a later factory-based cohort in Birmingham estimated similar incidence rates for both Caribbean and White European men.[7] Incidence of prostate cancer is thought to be more than twice as high in Caribbean men than in other

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men.[8] Higher incidence of smoking-related cancers has been reported for Scottish and Irish migrants.[6]

2. Methods

The Office for National Statistics provided anonymised death records for 1979–1983, 1989–1993 and 1999–2003, and tabulated population data from the 1981, 1991 and 2001 censuses for England and Wales. Deaths and populations-at-risk were derived by country of birth and 5-year age groups. Due to the small number of deaths at younger ages, and potentially poor quality denominator data at older ages for some groups, analyses were restricted to those aged 30–69 years. Countries of birth were included if their definition was comparable over all three time periods in both the deaths and census data, and if there were at least 20 deaths in each 10-year age group in 1999–2003 and at least one in other periods. An East African group, comprising migrants from Kenya, Malawi, Tanzania, Uganda and Zambia, was separately defined because of the likelihood of this group containing large numbers of people of Indian origin. A group drawn from Western and Southern Africa (termed West Africa in the figures) was defined, comprising migrants from Gambia, Ghana, Sierra Leone, Nigeria, Botswana, Lesotho, Swaziland and Zimbabwe. In the 1981 census tables, Lesotho and Swaziland were not separately identifiable and were not included in either the populations or deaths for 1979–1983. The Caribbean islands are heterogeneous in culture and ethnic ancestry but only the Jamaica-born population was large enough to be identified separately.

The 9th International Classification of Disease was used to classify deaths occurring between 1979 and 2000 and the 10th for deaths between 2001 and 2003. Death rates for all malignant neoplasms (referred to as all cancers hereafter) were derived only for the migrant groups included in the cause specific analyses. Trends in absolute mortality were assessed using directly standardised rates adjusted to the European standard population 2000. Trends in relative mortality were assessed using rate ratios derived from these standardised rates, with the rate for those born in England and Wales as baseline. Significant differences between rate ratios and rates refer to $p < 0.05$; the first decade refers to the time between 1979–1983 and 1989–1993, the second to the time between 1989–1993 and 1999–2003.

3. Results

For women born in Scotland, Northern Ireland or the Republic of Ireland, lung cancer was the highest ranking cancer cause of death in all periods followed by breast cancer in the latter two periods. This ranking was reversed in most of the other female migrant groups. For men lung cancer was the most common cancer cause of death in all groups except in the other Caribbean group – where prostate cancer ranked highest in the final period. The second most common male cancer tended to be stomach or colon cancer in the first two time periods. In the final period oesophageal cancer ranked second for men born in England and Wales or Scotland, colon cancer for men from Northern Ireland or the Republic of Ireland and prostate cancer for those from Jamaica or India.

3.1. *Relative mortality from main cancers*

Men born in Scotland, Northern Ireland or the Republic of Ireland had high all cancer rate ratios (>1.00) in every period, with increasing divergence of mortality from that of England and Wales for those from the Republic of Ireland (Fig. 1). Consistently lower rate ratios (<1.00) were observed for those born in other Caribbean, East Africa, India or Pakistan. A broad pattern of convergence of mortality towards that of England and Wales, and hence reduction in the mortality advantage, was observed for those from the other Caribbean, Pakistan, Bangladesh or Italy. A striking change occurred for men born in Jamaica as in 1999–2003 they had higher mortality for the first time. Trends for lung cancer mortality mirrored that of all cancers combined. Mortality from colon cancer could be examined in only four groups. There was a consistent pattern of high rate ratios for colon cancer for men born in the Republic of Ireland and of low rate ratios for those born in India.

Among women (Fig. 2), all cancer rate ratios remained high for women born in Scotland or the Republic of Ireland, and these increased between 1989–1993 and 1999–2003 for women born in Republic of Ireland. Rate ratios remained low for those born in Jamaica, other Caribbean, India, Pakistan or Italy with a pattern of convergence for those born in Jamaica or Pakistan. The patterns for breast and lung cancers reflected those of all cancers combined. Breast cancer rate ratios remained low for women born in India or Pakistan. In 1999–2003, women born in Northern Ireland had a low rate ratio for the first time. A pattern of convergence can be seen for those from Jamaica, other Caribbean or East Africa. Lung cancer rate ratios remained higher for women from Scotland, Northern Ireland and Republic of Ireland and lower for women born in India.

3.2. *Percentage declines in death rates for main cancers*

Death rates from all cancers combined and lung cancer declined consistently over the two decades for men born in England and Wales (Table 1a). Similar trends were observed for all cancers only for men from India, and for lung cancer only for those from India, Scotland, Northern Ireland or Republic of Ireland. The smaller declines for those born in Republic of Ireland compared with the declines for men born in England and Wales, and the second decade rate rise for Jamaica-born men account for the increasing relative mortality differences noted above. A decline in colon cancer death rates was observed only in the second decade and only among men born in England and Wales or Scotland.

Among women, death rates for all cancers combined and breast cancer declined over the two decades for women born in England and Wales (Table 1b). These consistent declines were observed only for those from Northern Ireland or Republic of Ireland. Generally changes in death rates for breast or lung cancer for migrant groups were not significantly different from those for women born in England and Wales. A pattern of non-significant second decade declines for breast cancer, however, among those from Jamaica,

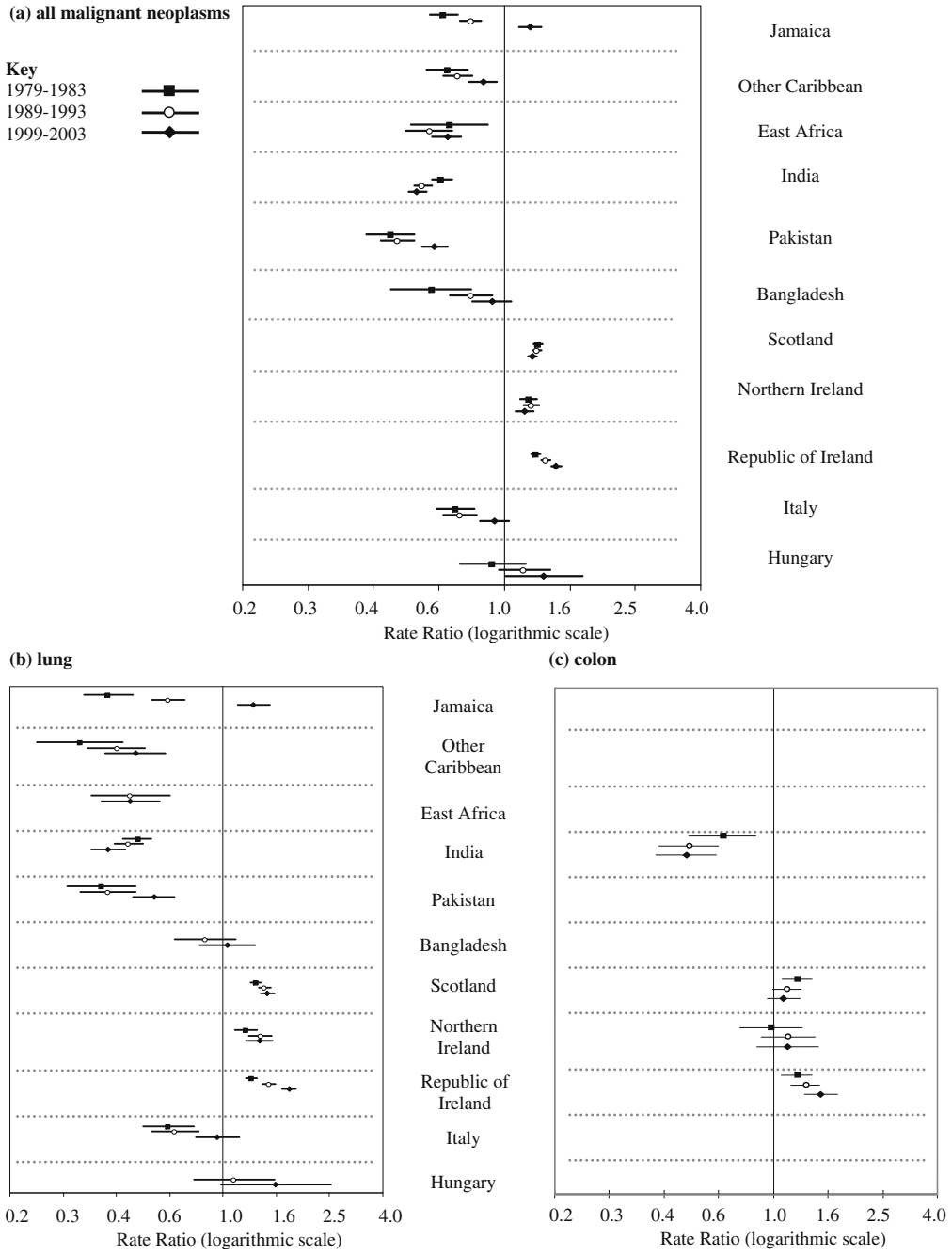

Fig. 1 – Men 30–69 years: All malignant neoplasms, and lung and colon cancers by country of birth and time period. Rate ratio[1] (rate for England and Wales born =1.00) and 95% confidence interval.
[1]Rates used to derive rate ratios were adjusted to the European standard population 2000.

other Caribbean or East Africa led to the convergence noted above.

3.3. *Mortality trends for other cancer sites*

Table 2a shows that among men there was a general trend of stability in relative mortality differences for other sites. Rate ratios remained high for men born in Scotland for oral-pharyngeal, oesophageal, and liver cancers. In the latter two time periods, rate ratios were also high for laryngeal cancer. Men born in the Republic of Ireland had consistently high rate ratios for cancer of the oral-pharynx, rectum, liver and larynx and, in the latter two time periods for cancer of the stomach, in 1979–1983 and 1999–2003 for cancer of the pancreas and also for oesophageal cancer in 1999–2003. Between 1979–1983 and 1999–2003 the rate ratios increased for stomach and laryngeal cancers among these men. Men born in Northern Ireland had high rate ratios for stomach cancer in the latter two time periods; Jamaica-born men had high rate ratios for prostate cancer in the latter two time periods, but also for stomach cancer in 1999–2003. Men born in India had lower mortality for oesophageal, pancreatic and prostate cancers in the latter two periods.

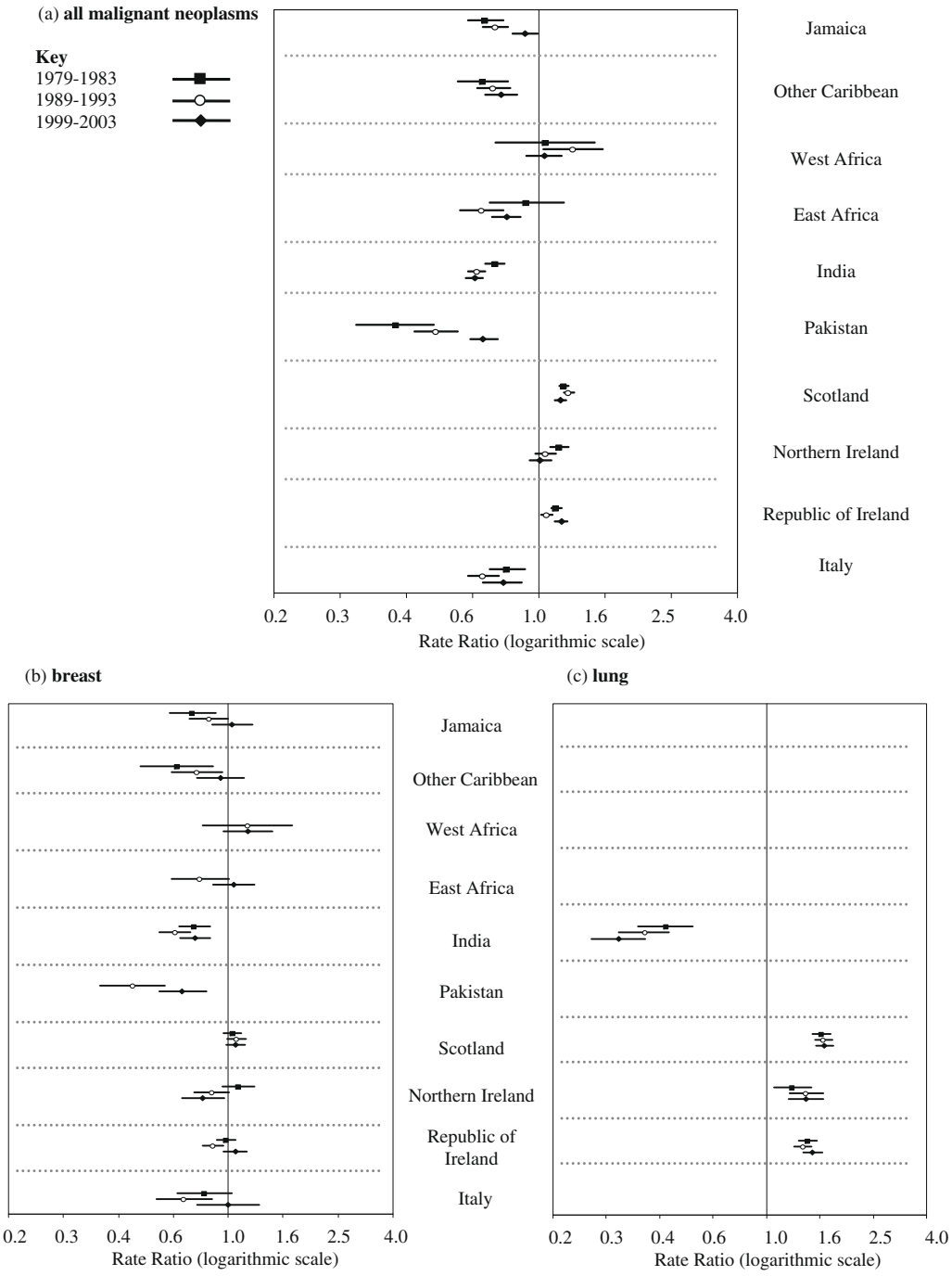

Fig. 2 – Women 30–69 years: All malignant neoplasms, and breast and lung cancers by country of birth and time period. Rate ratio[1] (rate for England and Wales born =1.00) and 95% confidence interval.
[1]Rates used to derive rate ratios were adjusted to the European standard population 2000.

A striking feature of the changes in death rates among men was that declines were less common in both decades for migrant groups than for those born in England and Wales. The relatively unfavourable trends for stomach and laryngeal cancers in the first decade among men from Scotland or Republic of Ireland account for the increase in relative mortality noted above. Jamaica-born men were the only group to show a rise in stomach cancer death rates in the second decade, accounting for the high rate ratios in 1999–2003.

Table 2b shows that rate ratios for colon cancer remained high among women born in Scotland. They also had higher mortality from rectal cancer for the first time in 1999–2003. Women born in the Republic of Ireland had high rate ratios for stomach and colon cancers in all three time periods and for cervical cancer in 1979–1983 and 1999–2003. Ovarian cancer mortality remained lower for women from India over time.

Death rates for many of these cancers declined among women born in Scotland, but generally in the second decade

Table 1a – Men 30–69 years: All malignant neoplasms, and lung and colon cancers by country of birth and time period. Percentage change in the death rates and 95% confidence interval (CI).

	Percentage change in cancer mortality rates			
	Change between 1989–93 and 1979–83[a]		Change between 1999–2003 and 1989–93[b]	
	%	95% CI	%	95% CI
All cancers				
England and Wales	–9.3	(–10.0, –8.6)	–20.4	(–21.1, –19.8)
Jamaica	11.4	(–1.7, 26.3)	19.8	(7.6, 33.2)
Other Caribbean	–2.7	(–18.5, 16.3)	–3.8	(–16.9, 11.3)
East Africa	–20.7	(–42.2, 8.8)	–9.6	(–25.1, 9.1)
India	–19.9	(–27.0, –12.2)	–23.9	(–30.4, –16.9)
Pakistan	–5.4	(–22.9, 16.0)	4.6	(–9.6, 21.1)
Bangladesh	19.7	(–12.8, 64.3)	–7.6	(–24.5, 13.2)
Scotland	–10.0	(–13.8, 6.0)	–22.5	(–25.9, 18.8)
Northern Ireland	–7.9	(–15.2, 0.1)	–24.3	(–30.7, –17.2)
Republic of Ireland	–2.9	(–7.1, 1.4)	–14.4	(–18.4, –10.3)
Italy	–7.2	(–22.1, 10.5)	1.0	(–13.1, 17.4)
Hungary	12.9	(–15.9, 51.7)	–8.4	(–34.1, 27.2)
Lung cancer				
England and Wales	–27.6	(–28.5, –26.7)	–35.9	(–36.9, –35.0)
Jamaica	22.2	(–5.2, 57.4)	33.9	(9.4, 63.8)
Other Caribbean			–24.6	(–47.5, 8.2)
East Africa			–35.4	(–57.8, –1.0)
India	–34.2	(–44.8, –21.6)	–45.4	(–54.9, –33.9)
Pakistan	–24.5	(–48.5, 10.6)	–4.1	(–28.8, 29.2)
Bangladesh			–23.2	(–46.3, 9.9)
Scotland	–22.2	(–27.4, –16.7)	–33.9	(–38.9, –28.5)
Northern Ireland	–18.3	(–28.5, –6.8)	–36.1	(–45.2, –25.6)
Republic of Ireland	–15.6	(–21.3, –9.5)	–23.6	(–29.5, –17.3)
Italy	–22.8	(–43.1, 4.8)	–7.9	(–30.5, 21.9)
Hungary			–8.3	(–49.0, 64.9)
Colon cancer				
England and Wales	8.0	(4.9, 11.2)	–26.3	(–28.5, –24.0)
India	–19.8	(–44.7, 16.2)	–27.1	(–49.1, 4.6)
Scotland	–0.5	(–16.5, 18.5)	–28.1	(–40.2, –13.4)
Northern Ireland	23.9	(–12.5, 75.5)	–25.9	(–47.3, 4.2)
Republic of Ireland	15.7	(–2.7, 37.4)	–16.2	(–30.0, 0.4)

a Derived from the ratio of rates for 1989–1993 versus 1979–1983 for each of the country of birth groupings.
b Derived from the ratio of rates for 1999–2003 versus 1989–1993 for each of the country of birth groupings.

only. For those born in the Republic of Ireland, the lack of second decade declines for stomach, colon and cervical account of the unfavourable trends in relative mortality.

4. Discussion

Trends in cancer mortality reflect changes in risk behaviours (for example, smoking or diet), new screening practices and the development and use of new and more effective treatments. Large mortality declines for common cancers in the 1990s among those born in England and Wales, including cancers with high case fatality such as lung and pancreatic cancers, correspond with trends in other Western European countries.[9–11] Compared with those born in England and Wales, smaller or similarly sized declines in some migrant groups with historically low mortality lead to a convergence in rates to those of England and Wales. However, for migrant groups with historically higher rates this had the effect of either maintaining or widening relative mortality. Interpreting these trends is difficult as there are few long term data on risk behaviours or access to cancer care.

Smoking is linked to many cancers, including lung, larynx, pharynx, oesophagus, pancreas, stomach, liver and cervix, and is the single biggest avoidable risk factor for cancer.[12] It accounts for around 25% of all cancer deaths and about 90% of lung cancer deaths. Rising smoking trends provide some indication of an emergent harmful exposure in some groups. In 2004, smoking prevalence in Black Caribbeans was similar to that of the general population but higher among Pakistani and Bangladeshi men.[13] A rapid change in behaviour for Caribbean and South Asian migrants is plausible: in the late 1970s smoking prevalence in these groups was less than half the national levels,[14,15] but by 1992 Black Caribbeans were as likely to smoke as their White counterparts.[16] Given that cancers have long latency periods, changes in smoking behaviour are probably too recent to fully explain the second decade rise in lung cancer mortality for Jamaican born men, signalling that, for this group, the peak of risk is yet to be reached. An

Table 1b – Women 30–69 years: All malignant neoplasms, and breast and lung cancers by country of birth and time period. Percentage change in the death rates and 95% confidence interval (CI).

	Percentage change in cancer mortality rates			
	Change between 1989–93 and 1979–83[a]		Change between 1999–2003 and 1989–93[b]	
	%	95% CI	%	95% CI
All cancers				
England and Wales	–4.1	(–4.9, –3.3)	–18.9	(–19.6, –18.2)
Jamaica	3.6	(–10.8, 20.4)	–0.8	(–12.4, 12.2)
Other Caribbean	2.9	(–16.7, 27.3)	–14.6	(–27.2, 0.3)
West Africa	15.5	(–22.8, 72.8)	–33.5	(–47.6, –15.6)
East Africa	–30.1	(–47.9, 6.1)	–3.7	(–19.4, 15.1)
India	–15.8	(–23.4, 7.4)	–20.6	(–27.5, 13.1)
Pakistan	26.4	(–6.3, 70.6)	13.3	(–4.8, 34.8)
Scotland	–1.4	(–6.2, 3.8)	–23.2	(–27.2, –19.1)
Northern Ireland	–12.4	(–20.4, –3.4)	–22.6	(–30.2, –14.2)
Republic of Ireland	–10.6	(–15.1, –6.0)	–10.5	(–15.4, –5.3)
Italy	–18.2	(–30.9, –3.0)	–7.5	(–22.6, 10.7)
Breast cancer				
England and Wales	–5.5	(–7.0, –4.0)	–27.6	(–28.9, –26.4)
Jamaica	9.1	(–15.7, 41.0)	–12.8	(–31.1, 10.4)
Other Caribbean	10.8	(–23.7, 61.0)	–11.2	(–33.3, 18.4)
West Africa			–27.2	(–52.4, 11.4)
East Africa			–3.9	(–28.8, 29.6)
India	–19.6	(–32.9, –3.6)	–14.2	(–27.8, 2.1)
Pakistan			9.8	(–21.6, 53.8)
Scotland	–2.3	(–12.2, 8.7)	–28.8	(–36.3, –20.3)
Northern Ireland	–24.4	(–38.3, –7.3)	–32.3	(–46.8, –15.3)
Republic of Ireland	–15.3	(–24.1, –5.5)	–12.7	(–23.1, –0.8)
Italy	–20.0	(–42.0, 10.4)	4.7	(–26.0, 48.3)
Lung cancer				
England and Wales	3.2	(1.2, 5.3)	–16.1	(–17.8, –14.4)
India	–14.6	(–38.0, 17.6)	–32.5	(–50.6, –7.7)
Scotland	4.9	(–5.7, 16.7)	–15.7	(–24.2, –6.2)
Northern Ireland	16.6	(–5.8, 44.3)	–16.2	(–31.8, 2.9)
Republic of Ireland	–1.4	(–11.6, 9.9)	–8.7	(–18.5, 2.3)

a Derived from the ratio of rates for 1989–1993 versus 1979–1983 for each of the country of birth groupings.
b Derived from the ratio of rates for 1999–2003 versus 1989–1993 for each of the country of birth groupings.

interesting contrast is the relatively low lung cancer mortality for migrants from neighbouring countries (Antilles, Aruba and Suriname) in the Netherlands.[17]

Smoking prevalence among Scottish and Irish migrants has remained high over the last three decades when compared with the general population,[14,15] with the lag in decline of female lung cancer mortality possibly reflecting gender differences in smoking declines for these groups (a pattern similar to the general population). Excess alcohol consumption among the Irish has been documented since the late 1970s[15] and this correlates with continuing high mortality from oral-pharyngeal and oesophageal cancers among Irish men, though not women. Differences in alcohol consumption between the general population and the Irish have narrowed over the last two decades, suggesting that future trends may change. Excess alcohol consumption was documented for Scottish female migrants (though not men) in the late 1970s and there are no known later studies. Consistently high oral-pharyngeal and oesophageal cancer mortality among male Scottish migrants is at variance with past low alcohol consumption.

At the ages examined here (30–69 years), prostate cancer was among the two most commonly occurring cancer causes of death for Jamaican and Indian men. Rising incidence and declining mortality rates for those born in England and Wales reflect early diagnosis of latent prostate cancer through serum prostate-specific antigen testing and aggressive treatment of advanced cancer. In 1999–2003 prostate cancer death rates for men born in Jamaica were more than double that of those born in England and Wales (24.4 and 10.6 per 100000, respectively). The reason for the high incidence in African origin men is unclear. Some studies have shown lower incidence in the Caribbean and Africa[18–20] than in African origin men in the UK[8] or United States (USA),[21] possibly signalling modifiable environmental factors or differences in case ascertainment. The lack of a decline in death rates for Jamaicans could point to delayed uptake of care and/or poorer quality of clinical management. A recent study suggested poor awareness of prostate cancer risk in Black men in the UK.[22]

Cancer mortality varies by individual and area-based indices of socio-economic disadvantage and Pakistani, Banglade-

Table 2a – Men 30–69 years: Other selected cancer sites by country of birth and time period. Rate ratio[a] (rate for England and Wales born =1.00) and 95% confidence interval (CI), and percentage change in death rates[b] and 95% CI.

	1979–1983			1989–1993					1999–2003				
	Deaths	Rate ratio		Deaths	Rate ratio		Change in death rates between 1989–93 and 1979–1983		Deaths	Rate ratio		Change in death rates between 1999–2003 and 1989–93	
		RR	95% CI		RR	95% CI	%	95% CI		RR	95% CI	%	95% CI
Lip/pharynx/oral cavity (ICD-9 140–149, ICD-10 C00–14)													
England and Wales (rate[a])	2347	(4.5)	(4.3–4.6)	2536	(4.8)	(4.6–5.0)	6.7	(0.8, 12.9)	2587	(4.6)	(4.5–4.8)	–4.2	(–9.3, 1.3)
Scotland	84	1.47	(1.18–1.83)[c]	123	2.10	(1.75–2.52)[c]	53.0	(15.6, 102.5)	126	1.87	(1.56–2.24)[c]	–14.9	(–33.7, 9.3)
Republic of Ireland	131	2.38	(2.00–2.84)[c]	153	2.71	(2.30–3.20)[c]	21.5	(–4.0, 53.7)	155	3.13	(2.64–3.71)[c]	10.8	(–12.1, 39.5)
Oesophagus (ICD-9 150, ICD-10 C15)													
England and Wales (rate[a])	5300	(9.9)	(9.6–10.1)	6976	(12.9)	(12.6–13.0)	30.3	(25.7, 35.1)	7728	(13.8)	(13.4–14.1)	7.0	(3.5, 10.5)
India	–	–	–	47	0.50	(0.38–0.67)[c]			47	0.36	(0.27–0.48)[c]	–23.1	(48.4, 15.5)
Scotland	197	1.56	(1.35 –1.80)[c]	196	1.21	(1.05–1.40)[c]	1.3	(–17.1, 23.7)	276	1.38	(1.22–1.56)[c]	21.8	(1.3, 46.4)
Northern Ireland	–	–	–	47	0.95	(0.71–1.27)			49	0.91	(0.69–1.21)	3.3	(–30.9, 54.4)
Republic of Ireland	125	1.03	(0.86–1.23)	186	1.16	(1.00–1.34)	47.1	(17.1, 84.6)	199	128	(1.11–1.48)[c]	17.3	(–4.4, 44.0)
Stomach (ICD-9 151, ICD-10 C16)													
England and Wales (rate)	12,837	(23.5)	(23.1–23.9)	8799	(15.9)	(15.6–16.2)	–32.3	(–34.2, –30.5)	4962	(8.7)	(8.5–9.0)	–45.3	(–47.2, 43.3)
Jamaica	69	1.10	(0.85–1.42)	59	0.97	(0.74–1.27)	–39.9	(–58.4, –13.2)	76	2.38	(1.86–3.04)[c]	33.5	(–6.8, 91.4)[c]
Scotland	345	1.13	(1.01–1.26)[c]	217	1.07	(0.93–1.23)	–35.8	(–46.0, –23.9)	147	1.16	(0.98–1.37)	–40.6	(–51.9, –26.7)
Northern Ireland	92	1.11	(0.90–1.36)	87	1.43	(1.16–1.77)[c]	–13.4	(–35.5, 16.3)	47	1.36	(1.02–1.81)[c]	–48.0	(–63.6, –25.8)
Republic of Ireland	301	1.06	(0.95–1.19)	254	1.30	(1.15–1.48)[c]	–16.5	(–29.5, –1.2)	146	1.49	(1.25–1.78)[c,]	–37.2	(–49.3, –22.3)
Rectum (ICD-9 154, ICD-10 C20)													
England and Wales (rate)	6680	(12.4)	(12.1–12.7)	6042	(11.1)	(10.8–11.4)	–10.5	(–13.6, –7.3)	4766	(8.4)	(8.2–8.7)	–24.3	(–27.2, –21.4)
Scotland	187	1.15	(0.99–1.33)	174	1.23	(1.06–1.43)[c]	–4.2	(–22.2, 18.0)	134	1.10	(0.93–1.31)	–32.8	(–46.5, –15.8)
Republic of Ireland	238	1.58	(1.39–1.80)[c]	193	1.40	(1.21–1.62)[c]	–20.9	(–34.7, –4.3)	151	1.61	(1.36–1.91)[c]	–12.9	(–30.2, 8.7)
Liver (ICD-9 155, ICD-10 C22)													
England and Wales (rate)	1267	(2.4)	(2.2–2.5)	1616	(3.0)	(2.8–3.1)	25.0	(16.1, 34.6)	1988	(3.5)	(3.4–3.7)	16.7	(9.2, 24.6)
Scotland	69	2.21	(1.73–2.82)[c]	59	1.53	(1.18–1.99)[c]	–13.2	(–38.9, 23.2)	84	1.66	(1.33–2.07)[c]	26.1	(–9.8, 76.2)
Republic of Ireland	50	1.71	(1.29–2.27)[c]	61	1.67	(1.29–2.17)[c]	22.0	(–16.4, 77.9)	61	1.49	(1.14–1.94)[c]	4.0	(–27.8, 49.9)

Pancreas (ICD-9 157, ICD-10 C25)													
England and Wales (rate)	6770	(12.6)	(12.3–12.9)	5759	(10.6)	(10.3–10.9)	–15.9	(–18.8, –12.8)	5530	(9.8)	(9.6–10.1)	–7.5	(–10.9, –4.0)
India	60	0.94	(0.73–1.22)	46	0.60	(0.45–0.80)[c]	–46.2	(–63.5, –20.7)	61	0.65	(0.50–0.84)[c]	0.0	(–31.9, 46.9)
Scotland	196	1.21	(1.05–1.40)[c]	174	1.30	(1.12–1.51)[c]	–9.8	(–26.6, 10.8)	152	1.06	(0.90–1.25)	–24.6	(–39.4, –6.2)
Northern Ireland	53	1.20	(0.92–1.57)	40	1.01	(0.74–1.38)	–29.1	(–53.1, 7.0)	43	1.13	(0.84–1.53)	3.7	(–32.7, 59.9)
Republic of Ireland	186	1.21	(1.05–1.40)[c]	155	1.18	(1.00–1.39)	–18.3	(–34.1, 1.2)	142	1.30	(1.09–1.55)[c]	1.6	(–19.6, 28.5)
Larynx (ICD-9 161, ICD-10 C32)													
England and Wales (rate)	1482	(2.8)	(2.6–2.9)	1431	(2.7)	(2.5–2.8)	–3.6	(–10.4, 3.8)	1175	(2.1)	(2.0–2.2)	–22.2	(–28.0, –15.9)
Scotland	49	1.32	(0.99–1.76)	54	1.59	(1.21–2.09)[c]	16.2	(–21.3, 71.6)	49	1.57	(1.18–2.09)[c]	–23.3	(–48.0, 13.3)
Republic of Ireland	49	1.43	(1.08–1.90)[c]	88	2.67	(2.15–3.32)[c]	80.0	(–26.7, 155.6)	73	3.10	(2.42–3.96)[c]	–9.7	(–34.4, 24.2)
Prostate (ICD-9 185, ICD-10 C61)													
England and Wales (rate)	5512	(9.5)	(9.3–9.8)	7211	(12.4)	(12.1–12.7)	30.5	(26.0, 35.2)	6091	(10.6)	(10.3–10.8)	–14.5	(–17.4, –11.5)
Jamaica	–	–	–	72	1.49	(1.18–1.88)[c]			107	2.30	(1.88–2.82)[c]	31.9	(–3.1, 79.5)[c]
India	–	–	–	60	0.68	(0.53–0.88)[c]			72	0.70	(0.55–0.88)[c]	–11.9	(–37.6, 24.3)
Scotland	119	0.93	(0.78–1.12)	152	0.90	(0.77–1.06)	27.3	(0.0, 62.0)	149	0.98	(0.83–1.15)	–7.1	(–26.0, 16.5)
Northern Ireland	–	–	–	49	0.98	(0.74–1.30)			53	1.25	(0.95–1.64)	8.2	(–26.7, 59.8)
Republic of Ireland	166	1.39	(1.19–1.62)[c]	179	1.09	(0.94–1.26)	2.3	(–17.2, 26.4)	143	1.05	(0.89–1.24)	–17.8	(–34.1, 2.7)
Non-Hodgkins Lymphoma (ICD-9 200–202, ICD-10 C82–85)													
England and Wales (rate)	2977	(5.7)	(5.5–5.9)	4160	(7.8)	(7.6–8.1)	36.8	(30.5, 43.5)	4128	(7.3)	(7.1–7.5)	–6.4	(–10.4, –2.3)
India	–	–	–	56	0.99	(0.76–1.29)			64	0.96	(0.75–1.23)	–9.1	(–36.7, 30.5)
Scotland	78	1.09	(0.87–1.37)	101	1.04	(0.85–1.27)	30.6	(–3.0, 76.1)	105	1.00	(0.82–1.21)	–9.9	(–31.5, 18.6)
Republic of Ireland	69	1.02	(0.80–1.30)	106	1.19	(0.98–1.45)	60.3	(17.9, 118.1)	85	1.10	(0.87–1.39)	–14.0	(–36.6, 16.7)
Leukaemia (ICD-9 204–208, ICD-10 C90–95)													
England and Wales (rate)	3377	(6.4)	(6.2–6.6)	3270	(6.0)	(5.8–6.2)	–6.3	(–10.7, –1.6)	3132	(5.5)	(5.3–5.7)	–8.3	(–12.7, –3.7)
India	42	1.17	(0.85–1.60)	49	1.10	(0.83–1.46)	–12.0	(–42.2, 33.9)	55	1.09	(0.83–1.43)	–9.1	(–38.3, 34.0)
Scotland	101	1.22	(1.00–1.49)	96	1.12	(0.90–1.39)	–14.1	(–35.7, 14.8)	95	1.20	(0.98–1.47)	–1.5	(–26.6, 32.1)
Republic of Ireland	64	0.84	(0.66–1.08)	72	1.02	(0.80–1.30)	13.0	(–19.7, 58.9)	60	0.96	(0.74–1.25)	–13.1	(–39.0, 23.7)

'–' Rate not derived as <10 deaths per gender and 10-year age group.

a Rates used to derive rate ratios were adjusted to the European standard population 2000.

b Derived from the ratio of rates for 1989–1993 versus 1979–1983 and 1999–2003 versus 1989–1993 for each country of birth grouping.

c $p < 0.05$ compared with born in England and Wales.

Table 2b – Women 30–69 years: Other selected cancer sites by country of birth and time period. Rate ratio[a] (rate for England and Wales born =1.00) and 95% confidence interval (CI), and percentage change in death rates[b] and 95% CI.

	1979–1983			1989–1993					1999–2003				
	Deaths	Rate ratio		Deaths	Rate ratio		Change in death rates between 1989–1993 and 1979–1983		Deaths	Rate ratio		Change in death rates between 1999–2003 and 1989–1993	
		RR	95% CI		RR	95% CI	%	95% CI		%	95% CI	%	95% CI
Oesophagus (ICD-9 150, ICD-10 C15)													
England and Wales (rate)	2478	(4.1)	(3.9, 4.2)	2610	(4.4)	(4.2–4.6)	7.3	(1.5, 13.5)	2446	(4.2)	(4.0–4.3)	–4.5	(–9.7, 0.9)
Scotland	64	1.29	(1.00–1.66)	84	1.45	(1.16–1.82)[c]	20.8	(–13.4, 68.4)	71	1.24	(0.98–1.57)	–18.8	(–41.1, 12.0)
Republic of Ireland	82	1.49	(1.19–1.86)[c]	69	1.11	(0.87–1.41)	–19.7	(–41.8, 10.9)	62	1.10	(0.85–1.43)	–6.1	(–34.0, 33.5)
Stomach (ICD-9 151, ICD-10 C16)													
England and Wales (rate)	5434	(8.9)	(8.6–9.1)	3381	(5.6)	(5.4–5.8)	–37.1	(–39.8, 34.3)	1934	(3.3)	(3.1–3.4)	–41.1	(–44.3, –37.6)
Scotland	121	1.09	(0.91–1.31)	95	1.36	(1.10–1.68)[c]	–21.6	(–40.5, 3.1)	53	1.18	(0.90–1.55)	–48.7	(–63.5, –27.9)
Republic of Ireland	159	1.36	(1.16–1.59)[c]	103	1.36	(1.11–1.66)[c]	–37.2	(–51.1, –19.3)	82	1.85	(1.46–2.34)[c]	–19.7	(–40.7, 8.6)
Colon (ICD-9 153, ICD-10 C18)													
England and Wales (rate)	8855	(14.8)	(14.5–15.1)	7964	(13.5)	(13.2–13.9)	–8.8	(–11.6, –5.9)	5249	(8.9)	(8.7–9.1)	–34.1	(–36.4, –31.7)
Scotland	220	1.20	(1.05–1.37)[c]	208	1.22	(1.06–1.41)[c]	–6.8	(–23.2, 13.2)	147	1.21	(1.03–1.43)[c]	–34.5	(–47.2, –18.9)
Republic of Ireland	227	1.18	(1.03–1.35)[c]	240	1.30	(1.14–1.48)[c]	1.1	(–15.8, 21.5)	141	1.20	(1.01–1.43)[c]	–39.2	(–51.0, 24.5)
Rectum (ICD-9 154, ICD-10 C20)													
England and Wales (rate)	4203	(7.0)	(6.8–7.2)	3311	(5.6)	(5.4–5.8)	–20.0	(–23.6, –16.2)	2352	(4.0)	(3.9–4.2)	–28.6	(–32.3, –24.7)
Scotland	90	1.03	(0.83–1.27)	81	1.20	(0.96–1.51)	–6.9	(–31.6, 26.5)	69	1.28	(1.01–1.63)[c]	–23.9	(–45.1, 5.5)
Republic of Ireland	107	1.17	(0.96–1.42)	74	0.98	(0.78–1.24)	–32.9	(–50.3, –9.5)	64	1.25	(0.96–1.63)	–9.1	(–35.8, 28.7)
Pancreas (ICD-9 157, ICD-10 C25)													
England and Wales (rate)	4521	(7.4)	(7.2–7.6)	4363	(7.4)	(7.2–7.6)	0.0	(–4.2, 4.3)	3990	(6.8)	(6.6–7.0)	–8.1	(–12.0, –4.0)
Scotland	123	1.34	(1.12–1.61)[c]	113	1.24	(1.02–1.51)[c]	–7.1	(–28.5, 20.8)	113	1.21	(1.00–1.46)	–10.9	(–31.7, 16.3)
Republic of Ireland	122	1.23	(1.03–1.47)[c]	108	1.01	(0.83–1.22)	–17.6	(–36.5, 7.0)	107	1.13	(0.92–1.39)	2.7	(–22.2, 35.5)
Cervix (ICD-9 180, ICD-10 C53)													
England and Wales (rate)	5847	(10.7)	(10.4–10.9)	4457	(8.1)	(7.9–8.4)	–24.3	(–27.2, –21.2)	2480	(4.3)	(4.2–4.5)	–46.9	(–49.5, –44.2)
Scotland	179	1.44	(1.24–1.68)[c]	128	1.38	(1.15–1.65)[c]	–27.3	(–42.3, –8.4)	68	1.19	(0.93–1.52)	–54.5	(–66.2, –38.7)
Republic of Ireland	164	1.22	(1.04–1.43)[c]	109	1.14	(0.94–1.39)	–29.8	(–45.2, –10.0)	71	1.58	(1.22–2.04)[c]	–26.1	(–46.3, 1.8)

Ovary (ICD-9 183, ICD-10 C56)													
England and Wales (rate)	10,176	(18.2)	(17.8–18.5)	9564	(17.1)	(16.8–17.5)	−6.0	(−8.7, −3.3)	8480	(14.6)	(14.3–14.9)	−14.6	(−17.1, −12.1)
India	53	0.60	(0.46–0.79)[c]	81	0.68	(0.55–0.85)[c]	7.3	(−24.2, 52.0)	88	0.67	(0.54–0.83)[c]	−16.2	(−38.1, 13.3)
Scotland	211	0.95	(0.83–1.09)	216	1.11	(0.97–1.27)	9.9	(−9.4, 33.3)	159	0.79	(0.68–0.92)[c]	−38.6	(−50.1, −24.5)
Northern Ireland	52	0.82	(0.62–1.08)	65	1.06	(0.83–1.36)	21.5	(−16.0, 75.7)	56	0.94	(0.72–1.22)	−24.3	(−47.2, 8.5)
Republic of Ireland	206	0.88	(0.77–1.01)	196	0.87	(0.75–1.00)	−7.5	(−24.1, 12.7)	164	0.86	(0.73–1.01)	−15.5	(−31.8, 4.7)
Non-Hodgkins Lymphoma (ICD-9 200–202, ICD-10 C82–85)													
England and Wales (rate)	2111	(3.6)	(3.5–3.8)	2852	(5.0)	(4.8–5.2)	38.9	(31.1, 47.1)	2740	(4.7)	(4.5–4.9)	−6.0	(−10.9, −0.9)
Scotland	58	1.33	(1.02–1.73)	78	1.20	(0.95–1.51)	25.0	(−11.7, 77.0)	53	0.83	(0.63–1.09)	−35.0	(−54.4, −7.4)
Republic of Ireland	56	1.19	(0.91–1.55)	75	1.12	(0.89–1.41)	30.2	(−8.2, 84.7)	56	0.98	(0.74–1.30)	−17.9	(−42.9, 18.2)
Leukaemia (ICD-9 204–208, ICD-10 C90–95)													
England and Wales (rate)	2522	(4.4)	(4.3–4.6)	2313	(4.1)	(3.9–4.2)	−6.8	(−12.0, −1.3)	2114	(3.6)	(3.5–3.8)	−12.2	(−17.3, −6.8)
Scotland	43	0.80	(0.59–1.09)	45	0.88	(0.65–1.19)	2.9	(−32.8, 57.5)	51	1.03	(0.78–1.36)	2.8	(−31.6, 54.3)
Republic of Ireland	59	1.05	(0.81–1.36)	48	0.85	(0.63–1.14)	−23.9	(−48.3, 12.1)	42	1.03	(0.73–1.45)	5.7	(−32.2, 64.9)

'–' Rate not derived as <10 deaths per gender and 10-year age group.
a Rates used to derive rate ratios were adjusted to the European standard population 2000.
b Derived from the ratio of rates for 1989–1993 versus 1979–1983 and 1999–2003 versus 1989–1993 for each country of birth grouping.
c $p < 0.05$ compared with born in England and Wales.

shi, Caribbean and Irish people are among the most deprived in the UK. They also tend to live in deprived inner city areas which could affect access to cancer health services. Greater diagnostic delays have been reported for breast cancer among African and South Asian origin groups.[23] Uptake of breast, cervical and colorectal cancer screening among South Asians is low, especially in those socio-economically disadvantaged.[24] Disadvantage is also linked to poorer general health[25] and cancer mortality[26] which could impact on clinical management and treatment outcomes. Co-morbidity could affect tolerance to treatment or risk of post-operative complications.

Historic exposures in home environments could influence these reported trends. Prevalence of smoking and alcohol-related cancers in Scotland and that of bowel cancer in the Republic of Ireland is higher than in England[27]. The Republic of Ireland does not have a population-based organised screening programme and unfamiliarity with such services may affect uptake of services in England and Wales. One recent study of potential barriers to uptake of preventative cancer services among Irish people living in the UK found that they perceived possible prognostic outcomes to be poor and linked to 'historic' negative cancer experiences of family members in Ireland.[28] Very little is known about the risk profiles of other White migrant groups in the UK, such as the Italians or Hungarians. Lung cancer incidence and mortality are higher in Italy and Hungary than in the UK.[29] The death rates for Italian men in the UK were initially lower but appeared to be converging, whereas for Hungarian men the rate was higher and appeared to be diverging. Relatively high lung cancer incidence has been observed for Italian and Hungarian migrant men in Sweden[30] but whether they fare worse than their migrant peers in the UK cannot be gleamed from these studies.

These findings are subject to the usual limitations of cross-sectional data, notably misclassification of country of birth between the census and death certificates and selection bias (health status on migration). Temporal trends could be influenced by cohort trends, age at entry to the UK and migration flows. The trends presented here are not of a static population but reflect different cohorts of migrants with potentially different health risks. For example, migrants for the Caribbean or India who arrived in the 1980s were likely to be more economically advantaged than those who arrived in the 1950s and 1960s due to stricter regulatory migration rules and hence stronger selection effects. Later migrants, however, would have been exposed to the changing environments of home countries such as the increase in chronic diseases, including cancers, and in related lifestyle factors. New migrants could also contribute to slower declines due to low uptake of health care. The Caribbean and Hungarian groups are least likely to be affected by this bias as most arrived more than 50 years ago. The EUROCARE studies showed better survival for some cancers (e.g. lung and colorectal) in Ireland than in England and Wales,[31] suggesting that in-flows of ill-fit individuals may have contributed to adverse trends for Irish migrants. It is difficult to disentangle these influences in cross-sectional data.

5. Conclusion

A pattern of declines in the death rates for the major cancers was observed across many countries of birth groups, more so in the second than the first decade, but smaller or non-significant shifts compared with those for England and Wales led to little or no improvement in the mortality differentials between migrants and those born in England and Wales. The majority of cancer deaths among migrants are attributed to commonly occurring cancers and there is no reason to believe that there is greater inherent susceptibility to these cancers among migrant groups. These data signal a need to improve data collection systems and access-enhancing strategies to optimise the coverage of preventative and treatment programmes across diverse population groups.

Conflict of interest statement

None declared.

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Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.ejca.2009.02.029.

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