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Cancer in minority ethnic populations: priorities from epidemiological data

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Abstract The aim of this paper is to review the literature on the frequency of cancers to develop priorities for cancer policy, prevention, services and research for black and minority ethnic populations in Britain. Data on populations originating in the Indian sub-continent, and Caribbean and African Commonwealth were extracted from published works. Cancers were ranked (top seven) on the basis of the number of cases, actual frequency, and also on relative frequency (SMR, SRR, PMR).

Cancer was found to be a common cause of death. For example, during 1979-83 the proportion of deaths resulting from neoplasms in immigrants living in England and Wales was 11% for Indian and African men aged 20-49, and 19% for Caribbeans. The corresponding proportions were higher among women. The pattern of cancer depended on the method used to assess rankings. On the basis of the number of cases the top 3 ranking cancers for adults were breast, lung and neoplasms of the lymphatic system. Based on SMR's cancer of the gallbladder, liver and oral cavity ranked amongst the top 3 for adults. For children the top ranking cancers were acute lymphoblastic leukaemia, central nervous system tumours and neuroblastoma. Variations by ethnic group were more evident in the rankings of relative frequency than in rankings based on numbers of cases.

In conclusion, the most common and preventable cancers among minority ethnic populations were the same as those for the general population. The different cancer pattern based on SMRs highlight additional needs and provide potential models for research into understanding the causes of these cancers. Health services policy and practice should ensure that the common and preventable cancers take priority over rare cancers and those for which there is no effective treatment or prevention. Priorities for policy, prevention, clinical care and research should be set separately, for they differ.

Introduction

Making choices between alternative actions, priority setting, is all-important, particularly when resources are insufficient to meet identified needs and demands, as in health care. Setting priorities for minority ethnic populations is an exacting challenge for they are extremely heterogeneous and their disease patterns and lifestyles are incompletely understood, and are changing rapidly within and between generations. Recently, Bhopal has argued for a strategic approach to setting priorities for the health and health care of minority ethnic groups and has offered a set of guiding principles including: focusing on a few priorities; being guided by priorities identified by and for the general population; and emphasis on basic needs irrespective of similarities and differences between minority ethnic groups.[1] Epidemiological data on disease frequency, causal and risk factors, and the population's characteristics can play a key role in identifying needs and setting priorities.

This paper reviews published epidemiological data on the frequency of cancer in UK minority ethnic populations to answer two key questions:

1. How common is cancer in these populations?; and

2. Which cancers deserve special attention in terms of policy, prevention, service provision, aetiological research and health services research. While the limitations of the published data mean that these questions can only be answered for a few of the minority ethnic groups in the UK, the principles of the approach outlined here, and possibly some of the conclusions, ought to be generalisable.

Terminology

There is no agreement on appropriate terms for the scientific study of health by ethnicity. We have followed general conventions used in the UK and, whenever possible, the terminology used by the original authors. For example, the term

Table I Overview of studies included in analysis of priorities

Authors Ref No. & Publication Date	Populations included in this paper	Time and place data relate to	Type of cancer data	Total no. of cases in ethnic minority groups
Marmot et al[2] 1984	Adults born in Indian subcontinent and Caribbean and African Commonwealth	1970-78 England and Wales	Mortality statistics	1378 Indian S.C. 578 Caribbean 152 African
Donaldson & Clayton[3] 1984	Adults identified as Asian by name	1976-1982 Leicestershire Health District	Cancer registration	251
Barker & Baker[4] 1990	Adults identified as Asian by name	1979-1984 Bradford Metropolitan District	Cancer registration	178
Balarajan & Bulusu[5] 1990	Adults born in Indian subcontinent, and Caribbean and African Commonwealth	1979-1983 England and Wales	Mortality statistics	3467 Indian S.C. 1610 Caribbean 482 African
Grulich et al[6] 1992	Adults born in Africa and Caribbean	1970-1985 England and Wales	Mortality statistics	4278 Caribbean 1129 Africa
Stiller et al[7] 1991	Children of Asian and West Indian ethnic origin	1981-1989 Britain	UK Children's Cancer Study Group database	366 Asians 63 W. Indians
Muir et al[8] 1992	Children of Asian ethnic origin	1980-1984 West Midlands	Cancer registration	49
Powell et al[9] 1994	Children of Asian ethnic origin	1982-1991 West Midlands Health Authority region	West Midlands Children's tumour research group records	144

Table II Cancer in adult South Asian males: examples of an overview for needs assessment

Author, Ref No & Date of Study	Total cancer cases (Overall SMR or SRR)	Cancer as % of all mortality or morbidity	Top 7 cancers - % of all cancers	Top 7 cancers on SMR or SRR as % of all cancers
A. Mortality				
Marmot et al[2] (1984)	722 (SMR = 69)	16.6%	69	30
Balarajan & Bulusu[5] (1990)				
• 20-69	1,183 (SMR = 59)	15.6%	68	32
• 70 +	646 (SMR = 65)	15.9%	74	33
B. Cancer Registration				
*Donaldson & Clayton[3] (1984)	251 (SRR not stated)	Unknown	53	14
Barker & Baker[4] (1990)	100 (SRR = 54)	Unknown	51	14

* Male and female data combined by authors.

minority ethnic group refers, effectively, to a small number of minority populations not of European origin and characterised by their non-white status. The term South Asian is preferred here to Asian to refer to populations originating from countries in the Indian sub-continent. The term Caribbean, West Indian and Afro-Caribbean usually refer to people born or originating in parts of the Caribbean previously in the British Commonwealth.

Similarly, the terms African, East African, West African refer to people born or originating in countries which were in the British Commonwealth.

Sources of data and methods

Published studies were identified using a range of methods including MEDLINE, follow-up of references and scrutiny of published reviews and bibliographies. From those papers and reports which provided information on cancer frequency in a defined population, and permitted analysis of cancer frequency for a range of causes, we extracted or calculated:

- total cancer cases;
- rankings of cancer (top seven) by frequency of occurrence;
- overall standardised mortality ratio (SMR);

and

- rankings of cancer (top seven) by excess risk as indicated by the standardised mortality / cancer registration ratio (SMR/SRR) or the proportional mortality/registration ratio (PMR/PRR).[a]

Measures of relative frequency were converted to percentages where authors had reported data differently.

The categorisation of cancers reported here is as given in the original reports, although very occasionally a decision has been made not to use sub-categories (e.g. overall retinoblastoma SMRs are used here, though the author did split cases into unilateral and bilateral retinoblastoma). Whenever possible, single cause rather than grouped causes were used eg leukaemia, rather than lymphoreticular tumours, and acute lymphoblastic leukaemia (ALL) rather than leukaemias.

The studies which have been used[2-9] are summarised in Table I. The largest studies are based on mortality data, and focus on the Indian subcontinent born/origin (South Asian) and Caribbean-origin populations, with some data on African-origin populations.

There are major limitations of the data which make their interpretation and utilisation for priority setting awkward:

1. The studies by Marmot *et al*,[2] Balarajan and Bulusu,[5] and Grulich[6] are based on the country of birth code on the death certificate. The country of birth does not accurately identify ethnic origin. For example many people of British origin were born and lived in Commonwealth countries and returned to Britain following the independence of their country of residence. Marmot *et al* have used a names analysis to identify the South Asian group within the Indian subcontinent born population.[2]
2. Accurate denominators (population at risk) have not been available, making the calculation of accurate disease rates and standardised mortality ratio impossible, particularly between census years.
   The population at risk has been estimated usually from census data on country of birth, but also from the labour force surveys.[9]
3. The assignment of ethnic origin has used various approaches eg names analysis for South Asian populations.[2,3,4] Two studies based ethnicity on information from medical records or asked doctors to assign it,[8,9] and one study gave no information on how ethnicity was assigned
   In general the categories for ethnic categorisation were extremely broad. Grulich *et al* reported data on East and West Africans[6], but in other studies there was no differentiation of population by sub-region.
4. The numbers of cases in several studies were very low, particularly those based on regional, cancer registry data.[3,4,7-9]. The precision of the estimates of frequency is low in these studies and especially so for rarer cancers.
5. The study of Powell *et al*,[9] uses data also used in the studies by Muir (71% of cases), and by Stiller (20% of cases), which means that the three studies on children are not independent.

Findings

i) Cancer as a health problem for minority ethnic populations

Cancer was a common and important cause of death and morbidity in the three ethnic groups reported on here causing about one-sixth of all deaths. Generally, cancer was less common in these ethnic groups than in the standard ("white") population, with the overall SMR mostly being in the range 50-80 for South Asian and Caribbean populations but about 100 in African populations (higher in West Africans and lower in East Africans). Table II illustrates, using data on South Asians, how published data can be used to provide an overview of the importance of cancer overall, and for top-ranking cancers. Clearly, a strategy focused on the commonest cancers captures a much higher proportion of all cancers (here 51-74%) than one focused on the cancers which are relatively common in relation to the standard population. This point is explored in the Tables.

ii) Patterns of cancer by cause

a) Adult South Asian populations

Two major studies based on mortality data, which permits country of birth analysis (and names analysis on South Asians), and two based on cancer registration where ethnic group was assigned by name provide a picture of the common, and relatively common cancers, as summarised in Table III (men) and Table IV (women), and for men and women together (Table V). Table III(Ai) shows that for men the seven commonest cancers

[a] For definition of terms see introduction to the Epidemiology section

accounted for about 70% of cancer deaths, and that leukaemia and lung (despite a low SMR, a dominating cause), stomach, prostate, pancreas and intestinal cancers were in the top ranks.

Those cancers which were relatively common in comparison to the population of England and Wales, including those of the liver and intrahepatic bile ducts, buccal cavity, gall-bladder, and larynx, accounted for a small proportion of the total cases. Table III(Aii) confirms these findings for those of South Asian ethnic origin, but cancer of the buccal cavity and pharynx, and of the liver reached both sets of top ranks.

Table III(B), based on data from the period 1979-1983, is largely in support of the pattern described above. The overall SMR for men born in the Indian subcontinent was 69 in the study by Marmot *et al* [2] and a little lower in that by Balarajan and Bulusu.[5] For immigrants of 'Indian' ethnic origin, the proportional mortality ratio (PMR) calculated by Marmot *et al* was 46.

The cancer registration data from Bradford (Table III(C)) are based on small numbers of cases, and those from Leicester (Table V) have the additional difficulty for interpretation of reporting on men and women together, but the pattern was concordant with mortality data.

As shown in Table IV(A) for women, as for men, the seven commonest cancers, of which three were of the female reproductive system, accounted for about 70% of cancers. Lung cancer was the second ranking neoplasm, and leukaemia third. The pattern when those of South Asian origin were separated (Table IV(Aii)) was a little changed, particularly with lung cancer dropping from the second to sixth rank. The findings from the 1979-1983 study (Table IV(B)), and from the cancer registration data (Table IV(C) and Table V) are concordant with the findings of the mortality data. The overall SMR for female immigrants from the Indian subcontinent was 90 in the study by Marmot *et al* and in that by Balarajan and Bulusu, 68 in the 20-69 age group, and 102 in the 70+ age group. The PMR was 46.[2]

The observation that while cancer of the liver and intrahepatic bile ducts was, on the basis of relative frequency, prominent in the mortality data but not in the cancer registration data is probably explained by its rarity and the fact that the latter data are based on small numbers of cases. Finally, it is worth noting that several of the cancers which ranked high on SMRs, tended to rank low on number of cases.

Figures 1a and 1b (data taken from the Marmot *et al* study) illustrate graphically the main points above, in particular the

Table III Cancer experience of South Asian men: top seven based on actual and relative frequency

								Total (SMR /SRR/ PMR)	Total of top 7	Top 7 as % of total
A Marmot et al[2]										
i) Indian subcontinent, Indian and British ethnic origin (aged 20 years+)										
Neoplasm ranked by frequency	Trachea, bronchus & lung	Leukaemia & lymphatic	Stomach	Prostate	Instestine except rectum	Pancreas	Oesophagus			
No of cases	218	74	50	48	38	37	30	722	495	69
SMR	53	96	45	105	55	65	110	(69)		
Neoplasm ranked by relative frequency	Liver & bile ducts	Buccal cavity & pharynx	Gallbladder & bile ducts	Larynx	Oesophagus	Prostate	Leukaemia & lymphatic			
SMR	338	178	139	127	110	105	96			
No of cases	19	28	9	12	30	48	74	722	220	30
ii) Indian subcontinent, Indian ethnic origin only (aged 20-69 years)										
Neoplasm ranked by frequency	Trachea, Bronchus & Lung	Leukaemia & lymphatic	Buccal* cavity & pharynx	Pancreas	Stomach	Liver	Intestine			
No of cases	39	36	15	12	11	11	10	190	134	71
PMR	25	84	221	65	28	369	38	(46)		
Neoplasm ranked by PMR	Liver*	Buccal* cavity & pharynx	Larynx	Leukaemia & lymphatic	Pancreas	Oesophagus *	Rectum			
PMR	369	221	88	84	65	52	48			
No of cases	11	15	3	36	12	6	8	190	91	48
B Balarajan and Bulusu[5]										
i) Age 20-69										
Neoplasm ranked by frequency	Trachea, Bronchus & Lung	Lymphatic	Stomach	Pancreas	Colon	Oesophagus	Buccal cavity & pharynx			
No of cases	346	153	78	76	66	45	40	1183	804	68
SMR	47	98	48	84	56	64	108	(59)		
Neoplasm ranked by relative frequency	Liver & bile ducts	Gall bladder	Buccal cavity & pharynx	Lymphatic	Pancreas	Larynx	Oesophagus			
SMR	170	166	108	98	84	80	64			
No of cases	36	17	40	153	76	16	45	1183	383	32
ii) Age over 70										
Neoplasm ranked by frequency	Trachea, Bronchus & Lung	Prostate	Lymphatic	Stomach	Colon	Pancreas	Rectum			
No of cases	197	85	44	42	40	39	29	646	476	74
SMR	54	80	92	44	59	96	60	(65)		
Neoplasm ranked by relative frequency	Buccal cavity & pharynx	Liver & bile ducts	Larynx	Pancreas	Lymphatic	Prostate	Skin			
SMR	161	135	122	96	92	80	80			
No of cases	19	9	10	39	44	85	2	646	208	32
C Barker and Baker[4]										
i) Neoplasm ranked by frequency	Trachea, Bronchus & Lung	Brain	Rectum	Bladder	Stomach	Pancreas	Other urinary			
No of cases	22	7	5	5	4	4	4	100	51	51
SRRs	49	100	51	41	37	81	98	(54)		
ii) Neoplasm ranked by relative frequency	Hypo-pharynx	Other endocrine	Naso-pharynx	Other mouth	Oro-pharynx	Nervous system	Floor of mouth			
SRRs	714	417	333	303	278	278	238			
No of cases	3	3	1	2	2	2	1	100	14	14

*20 years and over, not 20-69 years (latter data not reported by authors). The small effects on the row totals have been ignored here.

disparity in terms of cancer rankings when based on the number of cases and on SMRs.

b) Populations of Caribbean origin

Table VI(A) shows that for men born in the Caribbean Commonwealth the commonest seven cancers, which include lung cancer, stomach cancer, and leukaemia, accounted for about 70% of cancers. In this group four of the cancers which were common, were also relatively common in comparison to the standard population i.e. stomach, leukaemia, prostate and liver cancer. This pattern was also found in the later study by Balarajan and Bulusu[5] (Table VI(B)). The overall SMR for Caribbean men was 79 in the study by Marmot *et al*,[2] a figure comparable to that in the studies of Balarajan and Bulusu, and Grulich.[6]

For women, Table VII(A) shows that the seven commonest cancers contributed 67% of cancers, and the ranking was dominated by the reproductive tract (breast, cervix, ovary).

The cancers ranking highest on SMRs were uncommon, but those of the lymphatic system, oesophagus, cervix and stomach appeared on both sets of rankings. The studies by Balarajan and Bulusu[5] and by Grulich *et al*[6] (Table VII(B and C)) gave similar findings.

Table IV Cancer experience of South Asian women: top seven based on actual and relative frequency

A Marmot et al[2] **i) Indian subcontinent, Indian and British ethnic origin (aged 20 years+)**								Total (SMR /SRR/ PMR)	Total of top 7	Top 7 as % of total
Neoplasm ranked by frequency	Breast	Trachea, Bronchus & Lung	Leukaemia & lymphatic	Instestine except rectum	Ovary	Cervix uteri	Stomach			
No of cases	131	65	64	58	57	43	41	656	459	70
SMR	80	86	143	80	104	115	68	(90)		
Neoplasm ranked by relative frequency	Liver & bile ducts	Leukaemia & lymphatic	Pancreas	Gallbladder & bile ducts	Cervix uteri	Uterus	Trachea, Bronchus & Lung			
SMR	213	143	136	133	115	94	86			
No of cases	5	64	39	11	43	18	65	656	245	37
ii) Indian subcontinent, Indian ethnic origin only (aged 20-69 years)										
Neoplasm ranked by frequency	Breast	Leukaemia & lymphatic	Cervix uteri	Ovary*	Stomach	Trachea, Bronchus & Lung	Oesophagus*			
No of cases	21	12	10	10	7	6	3	88	69	78
PMR	37	73	69	53	78	32	100	(46)		
Neoplasm ranked by PMR	Liver	Oesophagus*	Stomach	Leukaemia & lymphatic	Cervix uteri	Ovary*	Bladder*			
PMR	137	100	78	73	69	53	49			
No of cases	1	3	7	12	10	10	1	88	44	50
B Balarajan and Bulusu[5] **i) Age 20-69**										
Neoplasm ranked by frequency	Breast	Lymphatic	Trachea, Bronchus & Lung	Ovary & uterus	Colon	Cervix	Pancreas			
No of cases	267	183	74	60	56	52	38	939	630	67
SMR	71	100	38	96	64	66	89	(68)		
Neoplasm ranked by relative frequency	Gall bladder	Pharynx & oral cavity	Liver	Lymphatic	Oesophagus	Body of uterus	Breast			
SMR	309	202	104	100	81	76	71			
No of cases	28	27	9	83	19	15	267	939	448	48
ii) Age over 70										
Neoplasm ranked by frequency	Breast	Trachea & Bronchus	Colon	Lymphatic	Stomach	Pancreas	Ovary & uterus			
No of cases	102	80	70	57	48	45	40	699	422	63
SMR	93	93	87	137	75	121	131	(102)		
Neoplasm ranked by relative frequency	Gall-bladder	Skin	Pharynx & oral cavity	Cervix	Lymphatic	Liver	Ovary & uterus			
SMR	217	186	162	143	137	133	131			
No of cases	18	6	12	20	57	6	40	699	159	23
C Barker and Baker[4]										
Neoplasm ranked by frequency	Breast	Cervix in situ	Trachea, Bronchus & Lung	Cervix invasive	Stomach	Pancreas	Other urinary			
No of cases	15	7	4	4	3	3	3	78	39	50
SRR	44	13	47	39	94	85	1000			
Neoplasm ranked by relative frequency	Gall bladder	Tongue	Hypo-pharynx	Placenta	Thyroid	Nervous system	Myeloma			
SRR	1000	556	556	294	263	256	256			
No of cases	3	1	1	3	3	2	2	78	15	19

*20 years and over, not 20-69 years (latter data not reported by authors). The small effects on the row totals have been ignored here.

Table V Cancer experience of South Asian men and women together: top seven based on actual and relative frequency

Donaldson and Clayton[3]								Total (SMR/ SRR)	Total of top 7	Top 7 as % of total
i) Neoplasm ranked by frequency	Breast	Trachea, Bronchus & Lung	Colon & rectum	Cervix	Oesophagus	Secondary (respiratory &digestive)	Leukaemia			
No of cases	34	26	18	16	15	13	11	251	133	53
SRR	65	46	48	120	221	85	76			
ii) Neoplasm ranked by relative frequency	Tongue	Other oral cavity	Oro-naso-hypo-pharynx	Lymph nodes etc	Oesophagus	Gum, floor of mouth	Uterus, unspecified			
SRR	456	433	348	318	221	218	208			
No of cases	5	2	6	4	15	3	1	251	36	14

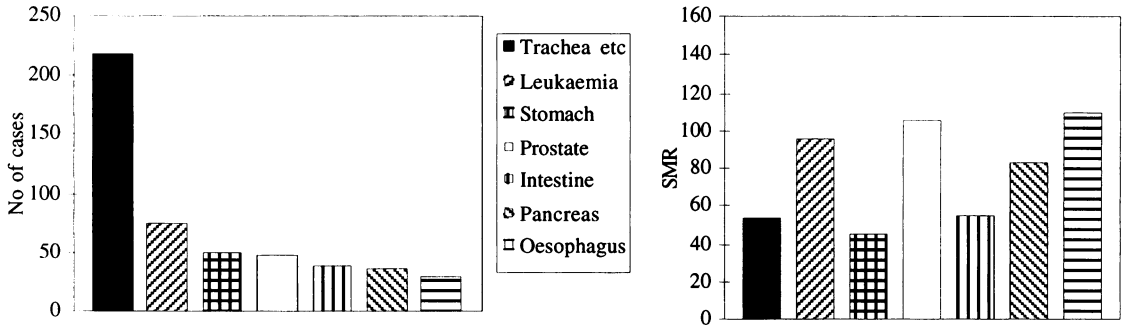

Figure 1a Top 7 cancers in South Asian men based on the number of cases and SMRs

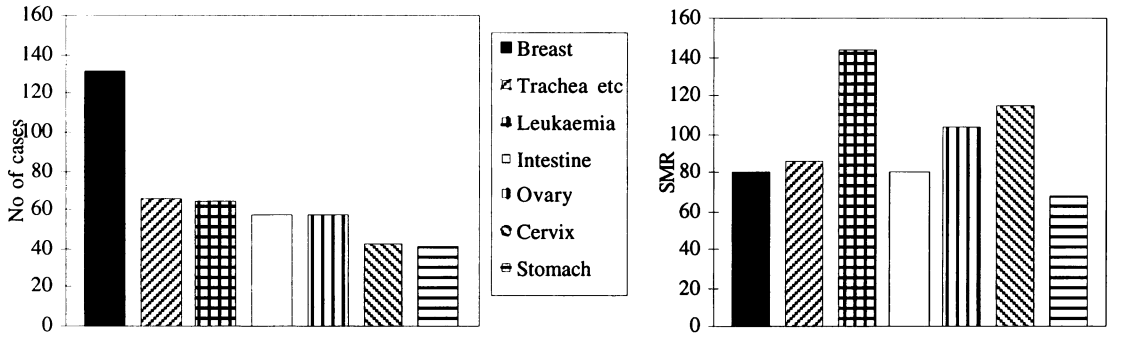

Figure 1b Top 7 cancers in South Asian women based on the number of cases and SMRs

Table VI Cancer experience of Caribbean origin men: top seven based on actual and relative frequency

								Total (SMR/ SRR)	Total of top 7	Top 7 as % of total
A Marmot et al [2] (aged 20 years +)										
i) Neoplasm ranked by frequency	Trachea, Bronchus & Lung	Stomach	Leukaemia & lymphatic	Prostate	Instestine except rectum	Liver & bile ducts	Pancreas			
No of cases	61	47	46	21	17	16	15	316	223	71
SMR	40	119	126	204	65	635	88	(79)		
ii) Neoplasm ranked by relative frequency	Liver & bile ducts	Prostate	Leukaemia & lymphatic	Stomach	Buccal cavity & pharynx	Pancreas	Gallbladder & bile ducts			
SMR	635	204	126	119	117	88	83			
No of cases	16	21	46	47	7	15	2	316	154	49
B Balarajan and Bulusu[5]										
i) Age 20-69										
Neoplasm ranked by frequency	Trachea, Bronchus & Lung	Lymphatic	Stomach	Prostate	Pancreas	Liver	Colon			
No of cases	151	116	108	54	41	39	29	744	538	72
SMR	35	135	116	175	77	317	43	(65)		
Neoplasm ranked by relative frequency	Liver	Prostate	Lymphatic	Gallbladder	Stomach	Buccal cavity & pharynx	Colon			
SMR	317	175	135	118	116	78	43			
No of cases	39	54	116	7	108	17	29	744	370	50
ii) Age over 70										
Neoplasm ranked by frequency	Prostate	Trachea, Bronchus & Lung	Stomach	Lymphatic	Colon	Oesophagus	Rectum			
No of cases	36	27	19	18	9	6	4	153	119	78
SMR	181	37	100	191	69	106	42	(78)		
Neoplasm ranked by relative frequency	Liver	Lymphatic	Gallbladder	Prostate	Oesophagus	Stomach	Colon			
SMR	297	191	184	181	106	100	69			
No of cases	4	18	2	36	6	19	9	153	94	61
C Grulich et al[6]										
i) Neoplasm ranked by frequency	Lung	Stomach	Prostate	Colon & Rectum	Unspec	Pancreas	Non-Hodgkin's			
No of cases	473	339	201	189	153	131	117	2388	1603	67
SRR	40	110	170	50	100	90	160	(71)		
ii) Neoplasm ranked by relative frequency	Liver	Naso-pharynx	Multiple myeloma	Prostate	Non-Hodgkin's	Penis	Leukaemia			
SRR	530	310	220	170	160	150	110			
No of cases	114	19	80	201	117	9	114	2388	654	27

Table VII Cancer experience of Caribbean origin women: top seven based on actual and relative frequency

								Total (SMR /SRR)	Total of top 7	Top 7 as % of total
A Marmot et al [2] (aged 20 years +)										
i) Neoplasm ranked by frequency	Breast	Leukaemia & lymphatic	Cervix uteri	Stomach	Instestine	Trachea, bronchus & lung	Ovary			
No of cases	60	34	29	22	11	10	10	262	176	67
SMR	73	155	140	122	47	33	37	(86)		
ii) Neoplasm ranked by relative frequency	Liver & bile ducts	Gallbladder & bile ducts	Uterus	Leukaemia & lymphatic	Oesophagus	Cervix uteri	Stomach			
SMR	495	280	179	155	148	140	122			
No of cases	5	7	12	34	7	29	22	262	116	44
B Balarajan and Bulusu[5]										
i) Age 20-69										
Neoplasm ranked by frequency	Breast	Lymphatic	Cervix	Trachea, bronchus & lung	Ovary & Uterus	Stomach	Colon			
No of cases	191	69	55	36	35	31	20	590	437	74
SMR	78	143	112	32	49	106	40	(71)		
Neoplasm ranked by relative frequency	Gall-bladder	Lymphatic	Cervix	Body of uterus	Stomach	Buccal cavity &pharynx	Liver			
SMR	235	143	112	108	106	102	98			
No of cases	12	69	55	12	31	8	5	590	192	33
ii) Age over 70										
Neoplasm ranked by frequency	Breast	Stomach	Lymphatic	Pancreas	Colon	Rectum	Trachea, bronchus & lung			
No of cases	18	14	13	10	9	8	8	123	80	65
SMR	74	99	142	121	51	97	42	(81)		
Neoplasm ranked by relative frequency	Buccal cavity &pharynx	Lymphatic	Skin	Cervix	Pancreas	Liver	Stomach			
SMR	243	142	139	129	121	100	99			
No of cases	4	13	1	4	10	1	14	123	47	38
C Grulich et al[6]										
i) Neoplasm ranked by frequency	Breast	Cervix	Colon & rectum	Stomach	Lung	Ill defined	Ovary			
No of cases	538	185	136	129	100	97	93	1890	1278	68
SRR	80	130	50	100	30	90	50	(76)		
ii) Neoplasm ranked by relative frequency	Placenta	Liver	Non-Hodgkin's	Gallbladder	Multiple myeloma	Naso-pharynx	Uterus			
SRR	710	320	210	200	200	160	130			
No of cases	5	34	92	38	46	4	68	1890	287	15

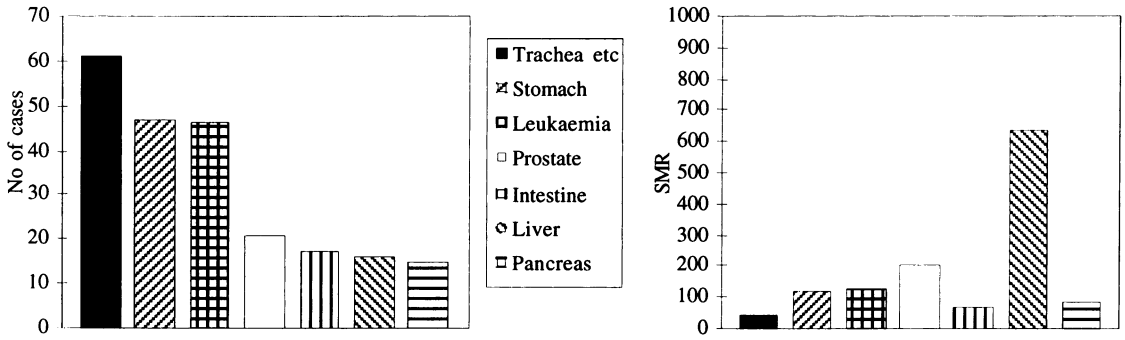

Figure 2a Top 7 cancers in Caribbean origin men based on the number of cases and SMRs

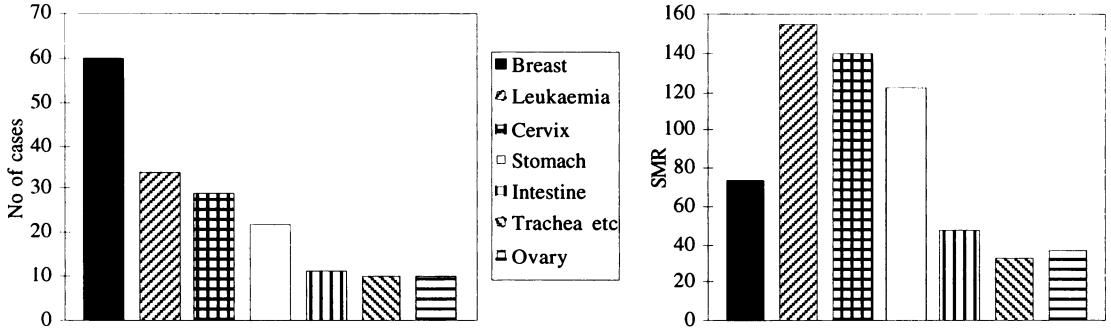

Figure 2b Top 7 cancers in Caribbean origin women based on the number of cases and SMRs

The overall SMR in the study by Marmot *et al*[2] was 86, a figure a little higher than those given by Balarajan and Bulusu, and Grulich *et al.*

The main differences in cancer rankings to emerge when the number of cases are compared with SMRs for Caribbean origin populations are shown in Figures 2a and 2b.

c) Populations of African origin

Table VIII(A) shows that the seven commonest cancers in African-born men, led by lung, leukaemia, and stomach, accounted for 66% of all cancers. Cancers of the liver, pancreas, stomach and of the prostate were shown to be both common and relatively common, appearing in both sets of rankings. The overall SMR was 102.

Table VIII Cancer experience of African origin men: top seven based on actual and relative frequency

								Total (SMR/ SRR)	Total of top 7	Top 7 as % of total
A Marmot et al[2] (aged 20 years +)										
i) Neoplasm ranked by frequency	Trachea, Bronchus & Lung	Leukaemia & lymphatic	Stomach	Pancreas	Prostate	Instestine except rectum	Liver			
No of cases	13	11	10	9	8	7	6	97	64	66
SMR	42	93	117	249	303	116	977	(102)		
ii) Neoplasm ranked by relative frequency	Liver & bile ducts	Prostate	Pancreas	Oesophagus	Gallbladder & bile ducts	Larynx	Stomach			
SMR	977	303	249	186	184	142	117			
No of cases	6	8	9	4	1	1	10	97	39	40
B Balarajan and Bulusu[5]										
i) Age 20-69										
Neoplasm ranked by frequency	Lymphatic	Trachea, Bronchus & Lung	Liver	Stomach	Colon	Buccal cavity & pharynx	Pancreas			
No of cases	40	37	19	13	12	9	8	219	138	63
SMR	104	39	552	60	68	150	62	(71)		
Neoplasm ranked by relative frequency	Liver	Buccal cavity & pharynx	Lymphatic	Prostate	Stomach	Colon	Pancreas			
SMR	552	150	104	101	60	68	62			
No of cases	19	9	40	6	13	12	8	219	107	49
ii) Age over 70										
Neoplasm ranked by frequency	Trachea, Bronchus & Lung	Prostate	Stomach	Colon	Oesophagus	Pancreas	Larynx			
No of cases	13	8	5	4	2	2	2	43	36	84
SMR	58	122	84	95	112	78	387	(70)		
Neoplasm ranked by relative frequency	Larynx	Prostate	Oesophagus	Colon	Stomach	Pancreas	Trachea, Bronchus & Lung			
SMR	387	122	112	95	84	78	58			
No of cases	2	8	2	4	5	2	13	43	36	84
C Grulich et al :[6] West African										
i) Neoplasm ranked by frequency	Lung	Liver	Prostate	Colon & Rectum	Stomach	Ill-defined	Non-Hodgkin's			
No of cases	60	50	26	26	25	23	20	343	230	67
SRR	70	3160	350	100	120	210	260	(138)		
ii) Neoplasm ranked by relative frequency	Liver	Multiple myeloma	Naso-pharynx	Prostate	Non-Hodgkin's	Oesophagus	Penis			
SRR	3160	410	370	350	260	250	210			
No of cases	50	10	2	26	20	18	1	343	127	37
D Grulich et al :[6] East African										
i) Neoplasm ranked by frequency	Leukaemia	Lung	Colon & rectum	Brain & nervous system	Ill-defined	Oral cavity	Non-Hodgkin's			
No of cases	53	51	35	32	14	14	13	326	212	65
SRR	140	30	70	100	60	430	70	(63)		
ii) Neoplasm ranked by relative frequency	Oral cavity	Pharynx	Penis	Multiple myeloma	Leukaemia	Liver	Brain & nervous system			
SRR	430	260	260	190	140	110	100			
No of cases	14	6	2	9	53	4	32	326	120	37

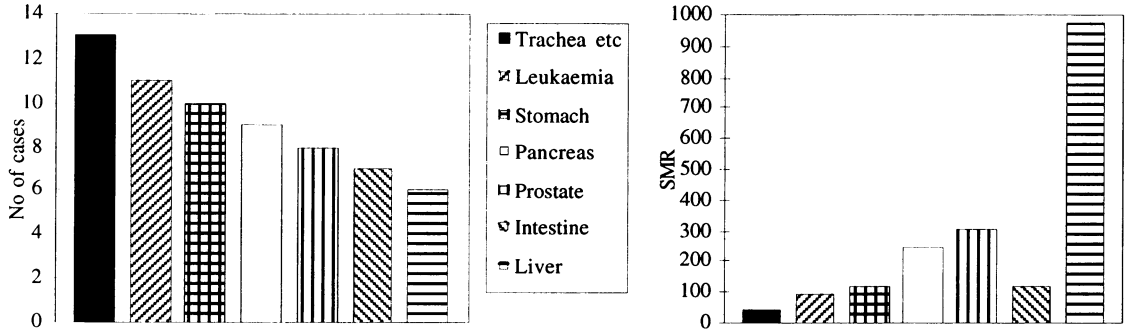

Figure 3a Top 7 cancers in African origin men based on the number of cases and SMRs

The studies by Balarajan and Bulusu,[5] and by Grulich *et al*,[6] supported the above analysis and provided additional patterns of interest. Balarajan and Bulusu showed that liver cancer was common in the 20-69 year age group, but not in those over 70 years (Table VIII(B). Grulich *et al* showed that liver cancer was only common in West Africans, not East Africans. In East Africans, cancer of the oral cavity was one of the prominent cancers. In the study by Grulich *et al*, the overall SMR for West Africans was 138, and for East Africans 63.

Table IX(A) shows that for African-born women the cancers of the reproductive tract, with breast cancer being top ranking, were common. The top ranking seven cancers were 62% of the total.

Most of the cancers which ranked highest on SMRs were uncommon, but cancer of the pancreas was common in actual and relative terms. The study of Balarajan and Bulusu[5] (Table IX(B)) confirmed the above picture and, in addition, showed cancers of the pharynx and oral cavity to be common. In this study, for women unlike for men, liver cancer was uncommon in those 20-69, and there was only one case in the 70+ age group.

Table IX Cancer experience of African origin women: top seven based on actual and relative frequency

A Marmot et al [2] (aged 20 years +)								Total (SMR /SRR	Total of top 7	Top 7 as % of total
i) Neoplasm ranked by frequency	Breast	Leukaemia & lymphatic	Cervix uteri	Ovary	Pancreas	Instestine excluding rectum	Trachea, Bronchus & Lung			
No of cases	10	6	4	4	4	3	3	55	34	62
SMR	69	105	107	83	226	66	56	(92)		
ii) Neoplasm ranked by relative frequency	Gallbladder & bile ducts	Buccal cavity & pharynx	Pancreas	Skin	Oesophagus	Cervix uteri	Leukaemia & lymphatic			
SMR	398	305	226	180	112	107	105			
No of cases	2	2	4	2	1	4	6	55	21	38
B Balarajan and Bulusu[5]										
i) Age 20-69										
Neoplasm ranked by frequency	Breast	Lymphatic	Trachea, bronchus & lung	Ovary & uterus	Stomach	Pharynx & oral cavity	Cervix			
No of cases	52	26	19	11	10	9	7	195	134	69
SMR	77	131	75	58	135	409	38	(83)		
Neoplasm ranked by relative frequency	Buccal cavity & pharynx	Oesophagus	Stomach	Lymphatic	Liver	Rectum	Gallbladder & bile ducts			
SMR	409	168	135	131	118	103	85			
No of cases	9	5	10	26	2	6	1	195	59	30
ii) Age over 70										
Neoplasm ranked by frequency	Breast	Stomach	Rectum	Trachea bronchus & lung	Pancreas	Oesophagus	Liver			
No of cases	7	2	2	2	2	1	1	25	17	68
SMR	109	53	91	39	91	76	375	(62)		
Neoplasm ranked by relative frequency	Liver	Gallbladder & bile ducts	Body of uterus	Breast	Rectum	Pancreas	Oesophagus			
SMR	375	204	132	109	91	91	76			
No of cases	1	1	1	7	2	2	1	25	15	60
C Grulich et al :[6] West African										
Neoplasm ranked by frequency	Breast	Leukaemia	Colon & rectum	Ill defined	Stomach	Cervix	Ovary			
No of cases	37	11	10	6	6	5	5	119	80	67
SRR	130	180	120	160	150	60	60	(114)		
Neoplasm ranked by relative frequency	Oral cavity	Naso-pharynx	Liver	Gallbladder	Uterus	Leukaemia	Pancreas			
SRR	920	620	540	370	200	180	170			
No of cases	3	1	3	2	3	11	4	119	27	23
D Grulich et al :[6] East African										
Neoplasm ranked by frequency	Breast	Leukaemia	Lung	Colon & rectum	Ovary	Oral cavity	Oesophagus			
No of cases	102	32	25	19	18	14	14	341	224	66
SRR	90	130	60	50	50	1070	240	(80)		
Neoplasm ranked by relative frequency	Oral cavity	Oesophagus	Liver	Multiple myeloma	Naso-pharynx	Leukaemia	Non-Hodgkin's			
SRR	1070	240	180	170	160	130	110			
No of cases	14	14	4	5	1	32	11	341	81	24

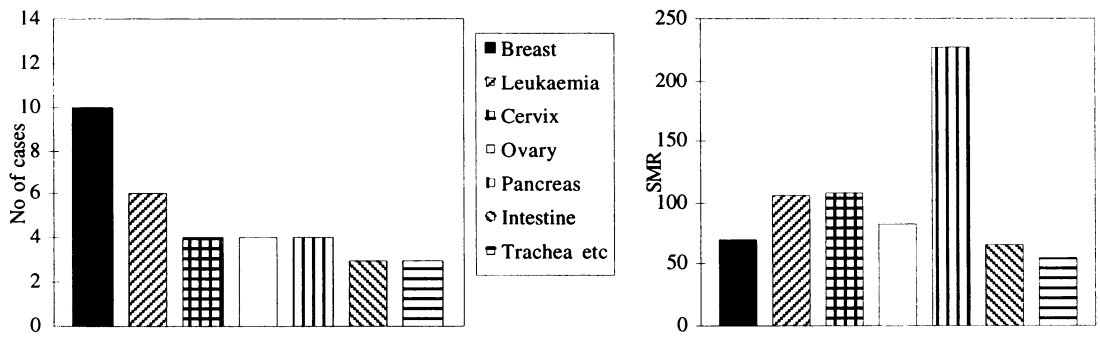

Figure 3b Top 7 cancers in African origin women based on the number of cases and SMRs

The study by Grulich *et al*[6] (Table IX(C and D)) showed that the pattern for West and East African women generally conformed with that above, but notably cancer of the oral cavity and of the liver was relatively common in both West and East Africans, but only cancer of the oral cavity in East Africans appeared in the rankings of common cancers.

Cancer rankings based on the number of cases and SMRs for African origin populations are presented in Figures 3a and b.

d) Children

South Asian children

Table X(A) shows that leukaemia was the dominant cause of cancer in South Asian children, accounting for about one-third of all cases. The seven commonest cancers accounted for 78% of cases. There was a major overlap between the two sets of rankings. Hodgkin's Disease stood as both common and having a substantially raised SMR, and retinoblastoma (SMR =119) was noted by the authors, particularly in relation to unilateral disease (SMR = 186). The study by Muir *et al*[8] and by Powell *et al*[9] confirmed the above picture. In addition, the study by Powell *et al* drew attention to malignant germ cell tumours as being both common and relatively common. The study by Stiller showed 16 cases of gonadal germ cell tumours in Asians (ranked equal 7th on frequency with Wilm's tumour) but no estimate of relative frequency was provided.

West Indian children

Table XI shows that the seven commonest childhood cancers, led by acute lymphoblastic leukaemia, accounted for 83% of cancer. There was marked overlap between the two sets of rankings with Wilm's Tumour, Hodgkin's Disease and neuroblastoma prominent in both lists.

Discussion

The methodological limitations of the work reviewed, referred to in the methods section, need to be borne in mind in reaching conclusions. Patterns based on rankings, particularly when substantiated by several studies, are probably sound, even where there is uncertainty about rates and ratios arising from the difficulty of measuring numbers of cases and population at risk with certainty. Clearly, these data need to be interpreted alongside information on the lifestyle and behaviour of and, minority ethnic groups, and their access to services, some of which has been reviewed in other chapters of this publication.

The sense of priority gained from this analysis differs from previous publications. Firstly, cancer is unequivocally a key cause of death and morbidity in the minority ethnic groups considered here. The comparative lack of attention given to cancer in the past, and the perception even amongst some informed observers that cancer is not a key issue for minority ethnic groups, is not justifiable. Certainly, the statement by Karmi and McKeigue that "Although cancer is one of the key areas in the Health of Nation's white paper, it is not especially relevant to ethnic groups in the UK"[10] is untrue. In Smaje's comprehensive review[11] scientific literature on cancer and minority ethnic groups in Britain is discussed in under two pages, noting that although relatively little attention has been given to cancer research, cancer is a major killing disease in minority ethnic groups and its incidence is likely to increase.

Table X Cancer experience of South Asian children: top seven based on actual and relative frequency

A Stiller et al[7]								Total (SMR /SRR)	Total of top 7	Top 7 as % of total
i) Neoplasm ranked by frequency	ALL	Neuro-blastoma	Brain, spinal	Hodgkin's disease	Non-Hodgkin's	ANLL	Wilm's tumour			
No of cases	121	38	36	29	26	21	16	366	287	78
SRR	108	119	75	209	104	94	51			
ii) Neoplasm ranked on relative frequency	Hodgkin's disease	Retino-blastoma	Neuro-blastoma	Osteo-sarcoma	ALL	Non-Hodgkin's	Ewing's sarcoma			
SRR	209	123	119	110	108	104	100			
No of cases	29	13	38	7	121	26	8	366	242	66
B Muir et al[8]										
i) Neoplasm ranked by frequency	ALL	CNS	Neuro-blastoma	Hodgkin's disease	Miscellaneous	Bone	Retino-blastoma			
No of cases	14	8	5	5	4	3	3	49	42	86
PRR	93	65	208	204	140	140	429			
ii) Neoplasm ranked on proportions	Retino-blastoma	Neuro-blastoma	Hodgkin's disease	Bone	Miscellaneous	ALL	Non-Hodgkin's			
PRR	429	208	204	140	140	93	78			
No of cases	3	5	5	3	4	14	2	49	36	74
C Powell et al[9]										
i) Neoplasm ranked by frequency	ALL	CNS tumours	Other malignant solid tumours	Hodgkin's disease	Non-Hodgkin's	Malignant germ cell tumour	Sarcoma			
No of cases	35	23	16	10	10	9	8	144	111	77
SRR	114	77	189	216	189	329	60	(122)		
ii) Neoplasm ranked on relative frequency	Malignant germ cell tumour	Hodgkin's disease	Retino-blastoma	Non-Hodgkin's lymphoma	Other malignant solid tumours	ALL	Wilm's tumour			
SRR	329	216	214	189	189	114	132			
No of cases	9	10	8	10	16	35	8	144	96	67

Table XI Cancer experience of West Indian children: top seven based on actual and relative frequency

A Stiller et al[7]								Total (SMR/ SRR)	Total of top 7	Top 7 as % of total
i) Neoplasm ranked by frequency	ALL	Wilm's tumour	Neuro-blastoma	Hodgkin's disease	Non-Hodgkin's	Brain, spinal	Rhabdo-myosarcoma			
No of cases	17	10	8	5	4	4	4	63	52	83
SRR	90	255	178	185	91	51	84			
ii) Neoplasm ranked on relative frequency	Wilm's tumour	Hodgkin's disease	Neuro-blastoma	Retino-blastoma	Non-Hodgkin's	ALL	Osteosarcoma			
SRR	255	185	178	112	91	90	85			
No of cases	10	5	8	2	4	17	1	63	47	75

Secondly, in this analysis, cancers such as those of the lung, breast, cervix, stomach and leukaemia emerge as among the highest priorities. Previously, in the context of ethnicity and health, these cancers have remained in the shadow, while others such as those of the liver and the oro-pharynx gained the limelight. The reason for the marked shift in perspective is this: all previous analyses have been based on comparing the cancer patterns in ethnic minority groups with the majority population as the standard. In the context of setting priorities such an approach is inappropriate as Bhopal and colleagues have recently discussed,[12] yet as it is so deeply rooted, the alternative and more appropriate method of focusing on actual numbers of cases (or disease rates) is rarely used. This fundamental point, so straightforward that it is almost always overlooked, can be strengthened by an analogy. To set priorities for minority ethnic groups on the basis of comparisons against the majority population and focusing on those diseases which are more common is akin to developing a national strategy primarily on a comparison with an international population (say Europe or the World). That, however, is not the way that national priority is decided. The variations between populations are, however, useful as an adjunct to disease frequency data in refining the picture of health and health care needs, and for generating hypotheses. Given this, principles for priority setting for ethnic minorities in the field of cancer can be generated (Table XII) and applied as discussed below.

Table XII Principles of priority setting

POLICY
- Base on actual frequency
- Refine on relative frequency
- Incorporate ethnic dimension to national policy

PREVENTION
- Primary focus on common cancers with avoidable risk factors
- Base on population attributable risk

CARE
- Common cancers are important
- Clinical awareness of rare cancers which are relatively common, and rare presentations

ACCESS/QUALITY/OUTCOMES/RESEARCH
- Focus on cancer as a whole
- Relative vs actual frequency unimportant

AETIOLOGICAL RESEARCH
- Focus where cause is obscure and ethnic variation provides a hypothesis or model

Policy needs to note that cancer is important in minority ethnic populations, and to address the issue. With rare exceptions[13], national policy documents and national initiatives on cancer generally have not addressed the needs of minority ethnic populations. Furthermore, a recent bibliography of research on ethnic health[10] identified only a few papers on cancer, Hopkins and Bahl[14] made no reference to cancer research or services in their book and only one item on cancer is listed in a recent Health Education Authority publication[15] listing health education materials. One potential explanation for this might be that the needs of ethnic minorities are so different that priorities, principles, and initiatives for the general population are deemed by planners to be unsuitable for minority ethnic groups. This explanation is, however, unsatisfactory. This analysis has demonstrated that while there are indeed differences, national initiatives on cancers common in the general population (lung, stomach, colon, breast, cervix, leukaemia etc.) are highly relevant to minority ethnic groups. These common cancers should be tackled as part of national initiatives.

Priorities for prevention need to be founded on the concept of population attributable risk, whereby both the actual frequency of cancer and the excess preventable risk of cancer are considered, to derive an estimate of the potential amount of cancer preventable in the community by an effective strategy. Based on this concept, cancers for which the aetiology is known, those which are common, and those which are much commoner in those with known and reversible risk factors get higher priority. Priorities for prevention are likely to lie within the top ranking cancers. On this basis, for example, for South Asian men the priorities would be cancer of the lung, oesophagus, liver and buccal cavity. For South Asian women, cancer of the breast, lung, cervix, liver and oro-pharynx stand out. For men of Caribbean origin cancer of the lung, liver and colon are prominent, and for women those of the breast, cervix, colon, lung and liver. For African origin men cancer of the lung, liver, colon, oesophagus, and oro-pharynx (East Africans only) are priorities. For African origin women the priorities include cancer of the breast, colon, and oro-pharynx (East Africans only).

In the clinical setting the pattern of disease is less important for each case will be diagnosed and treated individually. Doctors are more likely to see cancers which are in the top ranks on the basis of frequency, not relative frequency. However, doctors' perceptions about the patterns of disease are likely to be based on the scientific literature and will influence the process of diagnosis. For example, if there were a (mis-)perception that cancer of the lung is rare in South Asians and this diagnosis was not considered in investigating a lung mass (in favour of, say, TB) delay in diagnosis could occur. Alternatively, investigation and accurate diagnosis of a liver mass might be hastened by a high level of awareness of the relative frequency of liver cancer in some minority ethnic groups, most notably of Caribbean and African origin. A knowledge of cancer patterns by ethnic group is potentially of value in the clinical setting but the benefits can too easily be overstated, and the dangers of false generalisation overlooked. As the patterns are so complex, it would be a difficult task to educate, adequately, all doctors.

There is a paucity of research on access to, quality of, and outcomes of health care. The priority here is a focus on cancer as a whole. The rare cancers deserve as much attention as the common ones for problems are more likely to arise with these.

The demonstration of variation in disease experience in population subgroups provides enormous opportunity for the development of hypotheses about the causes of disease. The fact that certain cancers are common in minority ethnic populations may permit epidemiological studies otherwise impossible, because the assembling of a case-series of rare cancers may be possible in one centre. Finally, hypotheses about disease causation (developed outside the context of ethnicity and health research) might be explored using the ethnicity/health model. For sparking off high quality research we need to have unanswered questions, disease variation, testable hypotheses, and the resources and will to pursue the hypothesis until valuable observations have been made or the hypothesis is discarded. Many authors have proclaimed the potential value of ethnic variations in cancer, yet research rarely proceeds beyond the description of variation, which is insufficient to provide valuable aetiological insight. In this analysis, as in others, interesting variations deserving attention have been demonstrated including:

- the low SMR/SRR for many cancers including those of the stomach and colon in South Asians;
- the high SMRs for liver and oro-pharyngeal cancers in several ethnic groups;
- the high SMRs for prostatic cancer in West African and Caribbean populations but the low SMRs for South Asian and East African populations;
- and, the surprisingly high SMR for lung cancer in South Asian women in the light of insignificant reported levels of smoking.

The priorities in relation to research are different from those relating to policy, prevention and practice. For instance, cancers which are comparatively rare in ethnic minorities may be of especial research importance.

In future, unlike the past, priorities for policy, prevention, clinical care and research need to be analysed and stated separately. Research priorities will continue to be largely guided by relative frequency but priorities in policy, prevention and clinical care need to pay more attention than hitherto to the actual, not relative, frequency of cancers.

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