

# Introduction to methodological issues in LS ethnicity research

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# Issues

- Sample sizes
- Item imputation in 2001
- Change in recorded ethnic group, 1991-2001
- Loss to follow-up

# Ethnicity in the LS

- 1971 Census: Country of birth, parental COB
- 1981 Census: Country of birth
- 1991 Census: Ethnicity, Country of birth
- 2001 Census: Ethnicity, Country of birth and religion (voluntary)

## Table 1 – Ethnic group at 2001 (all people)

	2001 Census LS traced		2001 ONC population	
	sample N	%	N	%
<b>WHITE</b>				
White British	467,822	87.5	45,533,741	87.5
White Irish	6,311	1.2	641,804	1.2
Other White	12,835	2.4	1,345,321	2.6
<b>MIXED</b>				
White & Black Caribbean	2,384	0.4	237,420	0.5
White & Black African	780	0.1	78,911	0.2
White & Asian	1,882	0.4	189,015	0.4
Other Mixed	1,496	0.3	155,688	0.3
<b>ASIAN or ASIAN BRITISH</b>				
Indian	12,487	2.3	1,036,807	2.0
Pakistani	8,350	1.6	714,826	1.4
Bangladeshi	3,277	0.6	280,830	0.5
Other Asian	2,606	0.5	241,274	0.5
<b>BLACK or BLACK BRITISH</b>				
Black Caribbean	4,837	0.9	563,843	1.1
Black African	3,993	0.7	479,665	0.9
Other Black	926	0.2	96,069	0.2
<b>CHINESE or OTHER ETHNIC GROUP</b>				
Chinese	2,213	0.4	226,948	0.4
Other Ethnic Group	2,174	0.4	219,754	0.4
<b>TOTAL</b>	<b>534,373</b>	<b>100.0</b>	<b>52,041,916</b>	<b>100.0</b>

Source: Table S01.6 2001 LS Sampling Fractions by sex and ethnic group

## Table 2 – Religion at 2001

	2001 LS traced sample		2001 ONC population	
	N	%	N	%
Christian	384,462	71.9	37,338,486	71.7
Buddhist	1,486	0.3	144,453	0.3
Hindu	6,251	1.2	552,421	1.1
Jewish	2,632	0.5	259,927	0.5
Muslim	17,586	3.3	1,546,626	3.0
Sikh	4,614	0.9	329,358	0.6
All other religions	1,501	0.3	150,720	0.3
No religion	76,093	14.2	7,709,267	14.8
Religion not stated	39,748	7.4	4,010,658	7.7
<b>TOTAL</b>	<b>534,373</b>	<b>100.0</b>	<b>52,041,916</b>	<b>100.0</b>

Source: Table S01.5 2001 LS Sampling fractions by sex and religion

### Table 3 – Country of birth at 2001

	2001 LS traced sample		2001 ONC population	
	N	%	N	%
<b>England</b>	445,054	83.3	43,566,005	83.7
<b>Scotland</b>	8,028	1.5	818,966	1.6
<b>Northern Ireland</b>	2,221	0.4	222,975	0.4
<b>Wales</b>	28,570	5.3	2,798,465	5.4
Rest of Europe	15,154	2.8	1,491,939	2.9
AFRICA	7,866	1.5	808,940	1.6
ASIA	20,893	3.9	1,594,302	3.1
NORTH AMERICA	4,088	0.8	466,995	0.9
SOUTH AMERICA	757	0.1	73,785	0.1
OCEANIA	1,288	0.2	158,488	0.3
Other	454	0.1	46,347	0.1
<b>TOTAL</b>	<b>534,373</b>	<b>100.0</b>	<b>52,047,207</b>	<b>100.0</b>

Source: Table S01.4 2001 LS Sampling fractions by sex and country of birth

**Table 4 – Ethnic group at 1991 (all people)**

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1991 LS traced sample

	N	%
White	499,853	93.4
Black Caribbean	5,220	1.0
Black African	2,001	0.4
Black Other	1,723	0.3
Indian	11,180	2.1
Pakistani	6,104	1.1
Bangladeshi	2,385	0.4
Chinese	1,641	0.3
Other Asian	2,071	0.4
Other	2,837	0.5
<b>Total</b>	<b>535,015</b>	<b>100</b>

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Source: Table L9101.7 Forward linkage rates between 1991 and 2001 Censuses

## Table 5 – Ethnic group at 2001 by sex and age

	MALE			FEMALE				
	0-15	16-59	60+	0-15	16-59	60+		
White	47,496	138,743	48,576	45,762	143,312	63,083		
Mixed	1,616	1,434	136	1,584	1,610	162		
Black Caribbean	474	1,287	476	453	1,658	490		
Black African	582	1,194	121	502	1,490	104		
Black Other	179	239	29	157	302	20		
Indian	1,112	4,063	928	1,097	4,456	832		
Pakistani	1,191	2,642	467	1,122	2,653	275		
Bangladeshi	427	943	187	464	1,165	91		
Chinese	203	755	129	181	817	129		
Other	517	1,659	218	463	1,748	175		
<b>TOTAL</b>	<b>53,797</b>	<b>152,959</b>	<b>51,267</b>	<b>258,023</b>	<b>51,785</b>	<b>159,211</b>	<b>65,361</b>	<b>276,357</b>

Source: ONS Longitudinal Study



**Table 6 – Ethnic group by NSSEC at 2001 (16-59 year olds)**

	NSSEC at 2001									
	Higher Man & Prof	Lower Prof & Higher Tech	Intermed	Employers in small orgs	Own Account	Lower tech & super	Semi routine	Routine	Never worked & l-t u/e	FT students
White	27,790	65,075	34,180	7,941	14,964	26,148	42,938	34,146	9,038	19,805
Mixed	288	561	323	53	101	187	396	277	273	584
Black Caribbean	207	666	433	41	89	227	442	315	207	316
Black African	245	454	234	45	58	137	399	196	354	562
Black Other	33	110	55	5	18	36	90	60	45	89
Indian	986	1,155	794	446	422	486	1,230	1,239	713	1,048
Pakistani	280	426	288	224	321	229	657	713	1,531	625
Bangladeshi	68	120	88	115	21	119	360	239	742	236
Chinese	188	231	99	159	73	54	186	77	102	403
Other	359	576	263	133	113	194	462	290	472	545
<b>TOTAL</b>	<b>30,444</b>	<b>69,374</b>	<b>36,757</b>	<b>9,162</b>	<b>16,180</b>	<b>27,817</b>	<b>47,160</b>	<b>37,552</b>	<b>13,477</b>	<b>24,213</b>

Source:ONS Longitudinal Study

**Table 7 – Ethnic group by Economic activity at 2001  
(16-59 year olds)**

	Economic Activity at 2001								
	Employed FT	Employed PT	Self- employed	Seeking work	Retired	Student	Looking after home	Perm sick	Other
White	138,874	39,497	26,102	9,768	4,071	20,265	21,156	14,396	7,896
Mixed	1,142	280	199	204	11	613	276	135	183
Black Caribbean	1,400	310	149	217	30	335	201	164	137
Black African	968	233	134	236	17	610	234	84	168
Indian	3,471	860	975	391	89	1,081	743	442	467
Pakistani	1,204	404	494	388	30	660	1,219	322	573
Bangladeshi	292	273	125	165	11	248	599	108	287
Chinese	505	130	236	44	20	408	135	27	67
Other	1,250	315	279	182	23	585	411	117	245
<b>TOTAL</b>	<b>149,106</b>	<b>42,302</b>	<b>28,693</b>	<b>11,595</b>	<b>4,302</b>	<b>24,805</b>	<b>24,974</b>	<b>15,795</b>	<b>10,023</b>

Source: ONS Longitudinal Study

**Table 8 – Ethnic groups by Government Office Regions at 2001 (all people)**

	Government Office Regions at 2001									
	North East	North West & Humber	Yorkshire	East Midlands	West Midlands	East of England	London	South East	South West	Wales
White	25,344	65,084	48,421	40,612	48,748	52,757	48,216	78,597	50,334	28,859
Mixed	153	607	478	468	693	548	2,157	850	389	199
Black Caribbean	11	172	241	220	785	246	2,785	222	130	26
Black African	35	139	96	75	108	128	3,060	247	68	37
Black Other	4	62	44	30	90	37	574	54	25	6
Indian	136	803	617	1,578	2,457	667	4,858	1,094	185	93
Pakistani	142	1,447	1,755	339	1,777	501	1,474	747	66	102
Bangladeshi	62	336	165	106	399	232	1,677	178	43	79
Chinese	42	222	141	160	171	252	706	328	130	62
Other	77	306	214	210	396	292	2,467	586	149	83
<b>TOTAL</b>	<b>26,006</b>	<b>69,178</b>	<b>52,172</b>	<b>43,798</b>	<b>55,624</b>	<b>55,660</b>	<b>67,974</b>	<b>82,903</b>	<b>51,519</b>	<b>29,546</b>

Source: ONS Longitudinal Study

**Table 9 – Ethnic group by religion at 2001 (all)**

	Religion 2001								
	Christian	Buddhist	Hindu	Jewish	Muslim	Sikh	Other	No religion	Not stated
White	372,022	545	67	2,549	2,077	72	1,149	72,119	36,372
Black	8,727	28	33	12	1,166	4	66	1,469	1,416
Asian	1,857	176	6,097	32	13,494	4,495	239	773	1,440
Other	1,860	737	55	39	849	43	47	1,734	520
Total	384,466	1,486	6,252	2,632	17,586	4,614	1,501	76,095	39,748

Source: ONS Longitudinal Study

# Imputation in the 1991 Census

- Edit & Imputation method
- Edit matrices
- Hotdeck method
- Not flagged in the LS
- Data imputed for wholly absent households

“Editing and imputing data for the 1991 Census”

I.Mills & A.Teague Pop Trends Summer 1991pp30-37

# Imputation in the 2001 Census

- Edit & Donor Imputation System (EDIS)
- Edit
- Imputation
- One Number Census

“Census 2001 Review & Evaluation  
Edit and Imputation: Evaluation Report” 2003

# Table 10 – Imputation rates in the 2001 Census and the LS

	2001 census		LS	
	Population 000's	Imputation rate %	Population	Imputation rate %
Age	49,359	0.56	539,879	0.20
Sex	49,359	0.44	539,879	0.40
Marital status	49,359	0.32	539,879	0.24
Student flag	49,359	1.30	539,879	1.24
Country of birth	48,848	1.70	538,026	1.65
Ethnic group	48,848	2.91	538,026	2.80
Health	48,848	1.09	538,026	1.02
Carer	48,848	1.42	538,026	1.34
Long-term illness	48,848	3.92	538,026	3.83
Address one year ago	48,848	4.53	538,026	4.45
Educational qualifications	35,367		391,841	6.05
Professional qualifications	35,367		391,841	6.05
Highest qualification	35,367	6.09	391,841	6.05
Activity last week	35,367	3.69	391,841	3.63
Employment status	33,686	6.14	369,784	5.72
Workplace size	33,686	9.15	369,784	8.85
Supervisor	33,686	3.34	369,784	3.25
Occupation - currently working	21,741	3.48	244,104	3.29
Occupation - ever worked	29,335	13.81	369,784	4.33
Economic activity			369,784	9.41
Relationship to Person 1	28,065	4.73	304,380	4.62

Source:

2001 Census data from

"Census 2001 Review & Evaluation - Edit and imputation: Evaluation Report"

ONS Longitudinal Study

# Table 10A – Imputation rates for Ethnic groups

	%
<b>ALL PEOPLE</b>	2.8
<b>WHITE</b>	
White British	2.6
White Irish	2.9
Other White	4.0
<b>MIXED</b>	
White & Black Caribbean	5.4
White & Black African	3.0
White & Asian	3.5
Other Mixed	3.6
<b>BLACK OR BLACK BRITISH</b>	
Black Caribbean	4.4
Black African	5.2
Other Black	4.0
<b>ASIAN OR ASIAN BRITISH</b>	
Indian	3.0
Pakistani	4.8
Bangladeshi	4.1
Other Asian	4.1
<b>CHINESE OR OTHER ETHNIC GROUP</b>	
Chinese	2.5
Other Ethnic group	2.9

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Source: ONS Longitudinal Study



# Table 10B - Relationships

## IMPUTATION RATES

<b>RELATIONSHIPS</b>	<b>N</b>	<b>%</b>
Person relationship	529,874	8.47
Family relationship	529,874	10.37
Household relationship	529,874	11.39

Source: ONS Longitudinal Study

# Table 11 – Imputation rates for a derived variable

## All people aged 16 to 74 ever worked

SOCIAL CLASS	Variable	Imputation rate
		%
SOC2000	OCCP0	4.33
Employment status	EMTP0	5.72
Supervisor status	SUMP0	3.25
Size of establishment	SIZP0	8.85
Social class		11.00

Source: ONS Longitudinal Study

# Imputation and analysis

- Analysis with imputed values
- Analysis without imputed values in the dataset
- Analysis without imputed values in the variables of interest

## Table 12 – The effects of imputation Ethnic group by marital status (16-74 year olds, ever worked)

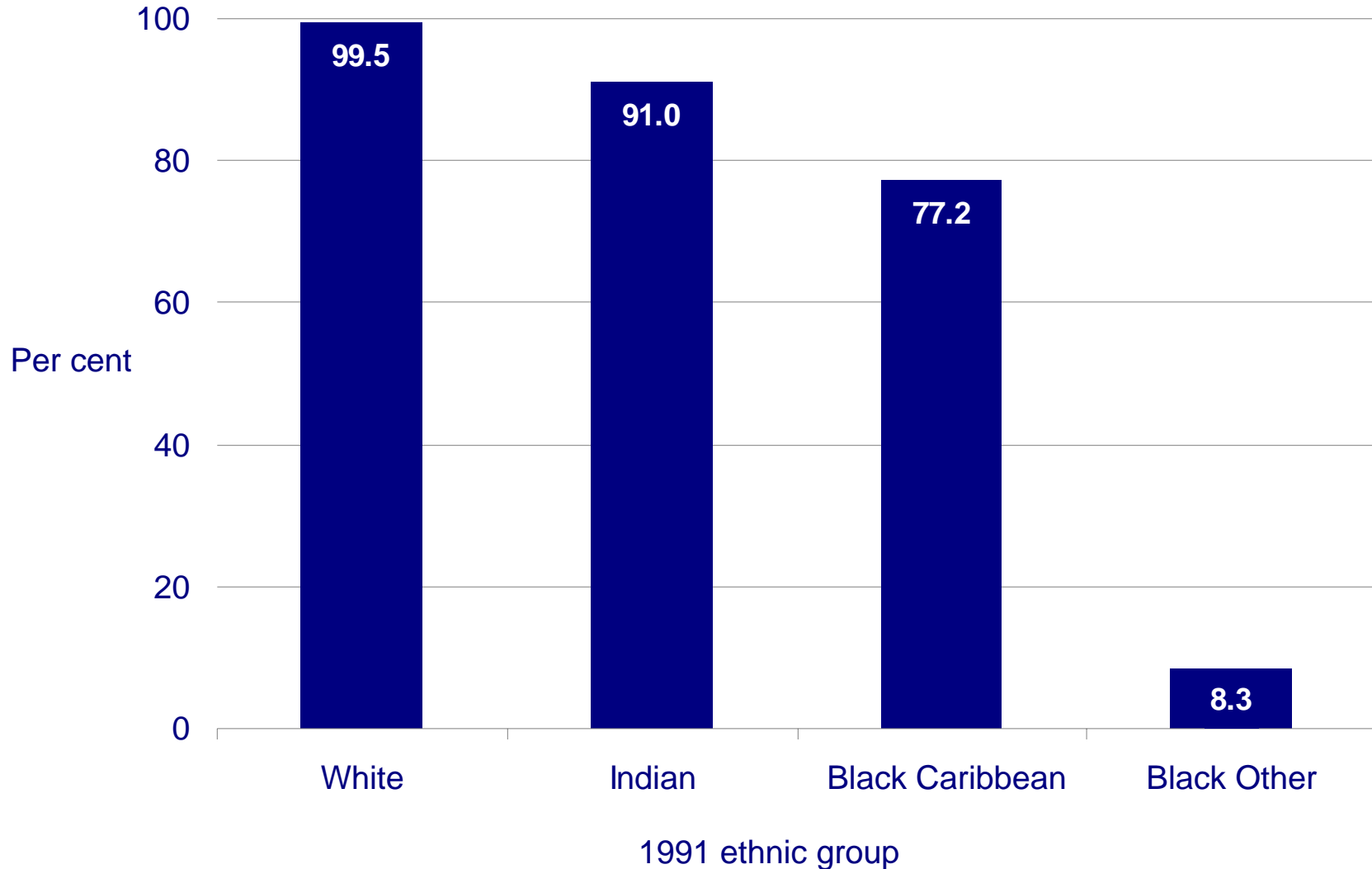
	Marital status (16-74 year olds, ever worked)		
	Single	Married/ Remarried	Sep/Wdwd/ Divorced
<b>INDIAN</b>			
With imputed values	1659	6426	725
LESS	<b>54</b>	<b>162</b>	<b>25</b>
Without imputed values	1605	6264	700
LESS	<b>187</b>	<b>692</b>	<b>101</b>
status			
Without imputed values for economic activity	1418	5572	599
<b>BLACK CARIBBEAN</b>			
With imputed values	1521	1277	709
LESS	<b>61</b>	<b>33</b>	<b>42</b>
Without imputed values	1460	1244	667
LESS			
status	<b>232</b>	<b>189</b>	<b>131</b>
Without imputed values for economic activity	1228	1055	536

Source: ONS Longitudinal Study

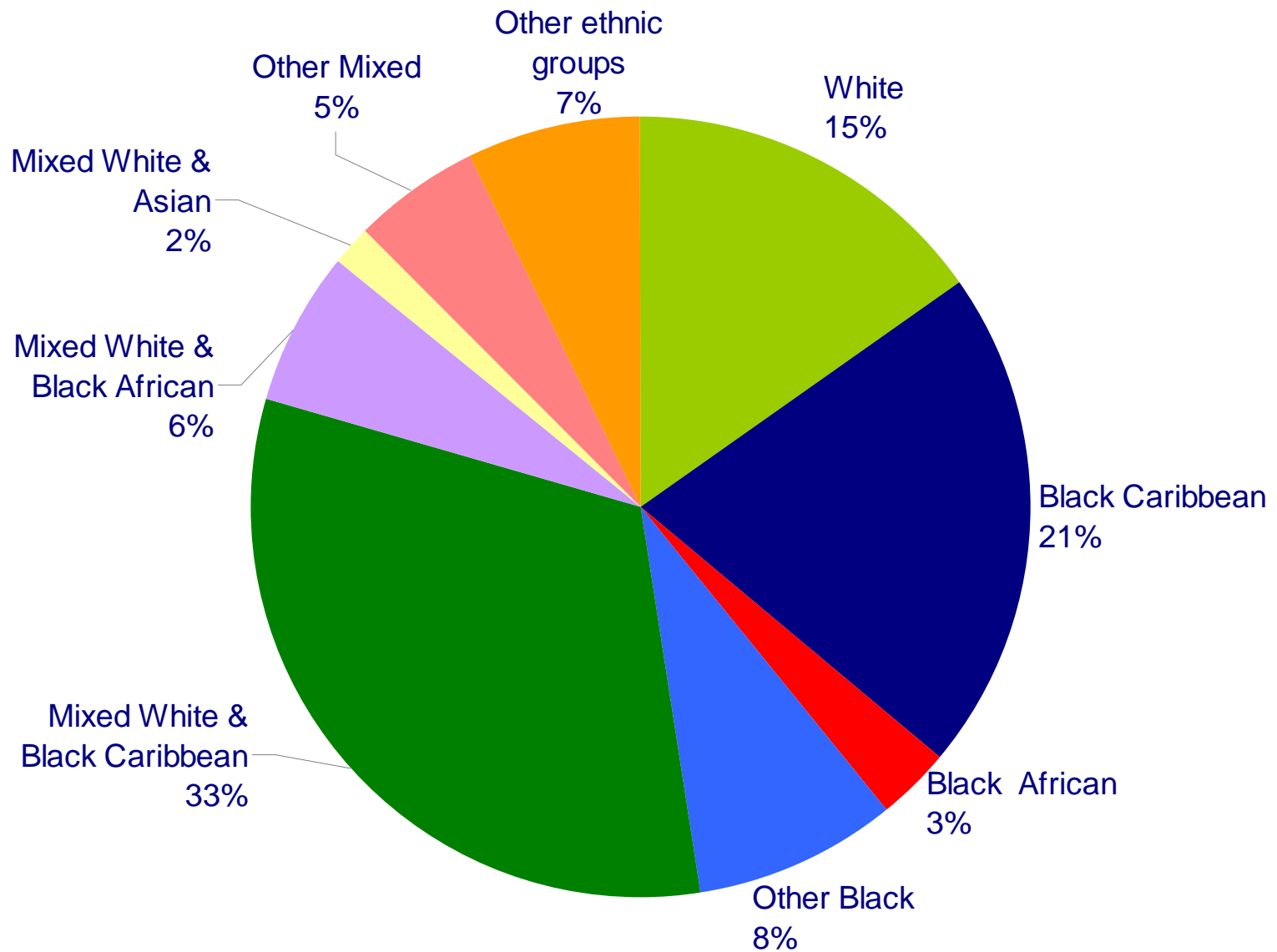
# Change in ethnic group

- Consideration of change in ethnic group is important for understanding the composition of groups over time
- Almost 1 in 4 people recorded as Black African or Black Caribbean in the 1991 Census reported a different ethnicity in 2001, compared with less than 1 in 10 South Asian and Chinese people, and less than 1 in 200 White people
- Change in individuals' reported ethnic group between the 1991 and 2001 Censuses reflected the introduction of new response categories in 2001, especially for mixed ethnicities

# Per cent of people in selected 1991 ethnic groups reporting the same group in 2001



# 2001 ethnicity reported by people in the 1991 Other Black group

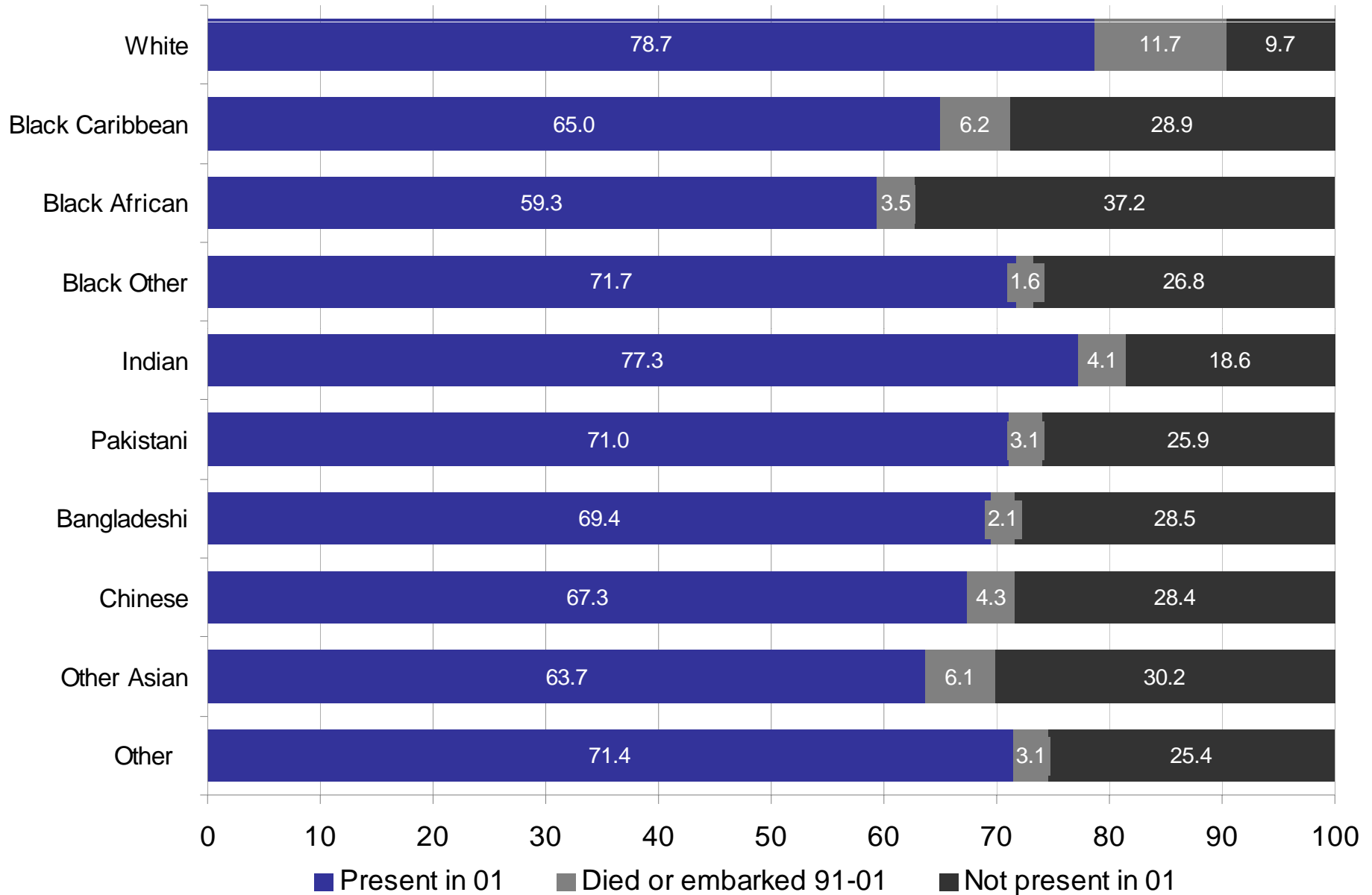


# Loss to follow-up

- Loss between two censuses without valid exit (death or embarkation)
- Caused by:
  - Unobserved embarkation
  - Census underenumeration
  - Linkage failure (mismatched records)
- Higher rates of loss to follow-up among minority ethnic groups
  - 16 per cent of 1991 Black Africans expected in 2001 were not found



# Follow-up of the 1991 traced LS sample by ethnic group



# Summary

- Small sample sizes may constrain ethnic group analysis
- Need to consider how to treat 2001 item imputation
- Change in ethnic group between 1991 and 2001 should also be considered
- Loss to follow-up is higher among minority ethnic groups
  - Potential for bias
  - Impact on sample sizes when measuring transitions