Using Interaction Data in the (Public Sector) GLA

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'Exploring the Research Potential of the 2011 Census'
University of Manchester

7th July 2011

Overview

Experience of using 2001 Census interaction data at GLA

- Migration

- Journey to Work

- Ethnicity of Mother, Father and Infant

- 2011?

Migration in Population Modelling

- GLA projection models for:
  - Boroughs
  - Ethnic groups in boroughs
  - Wards

- (0) 1-90+ SYA
- Gender

- 10 Ethnic groups – based on 1991 Census
  - No 'Mixed' groups – add into 'Other Asian', etc
  - No split of 'White' group

Borough Model - 1

- 32 Boroughs plus City of London
  - Inter-borough matrix
  - 3 Borough Groups - Central (3 + City) , Rest of Inner (10), Outer (19)

- 4 External origins and destinations
  - South East region
  - East region
  - Rest of UK
  - Overseas

- 'No Usual Address a year ago' - 60k out of 271k

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Borough Model – 2

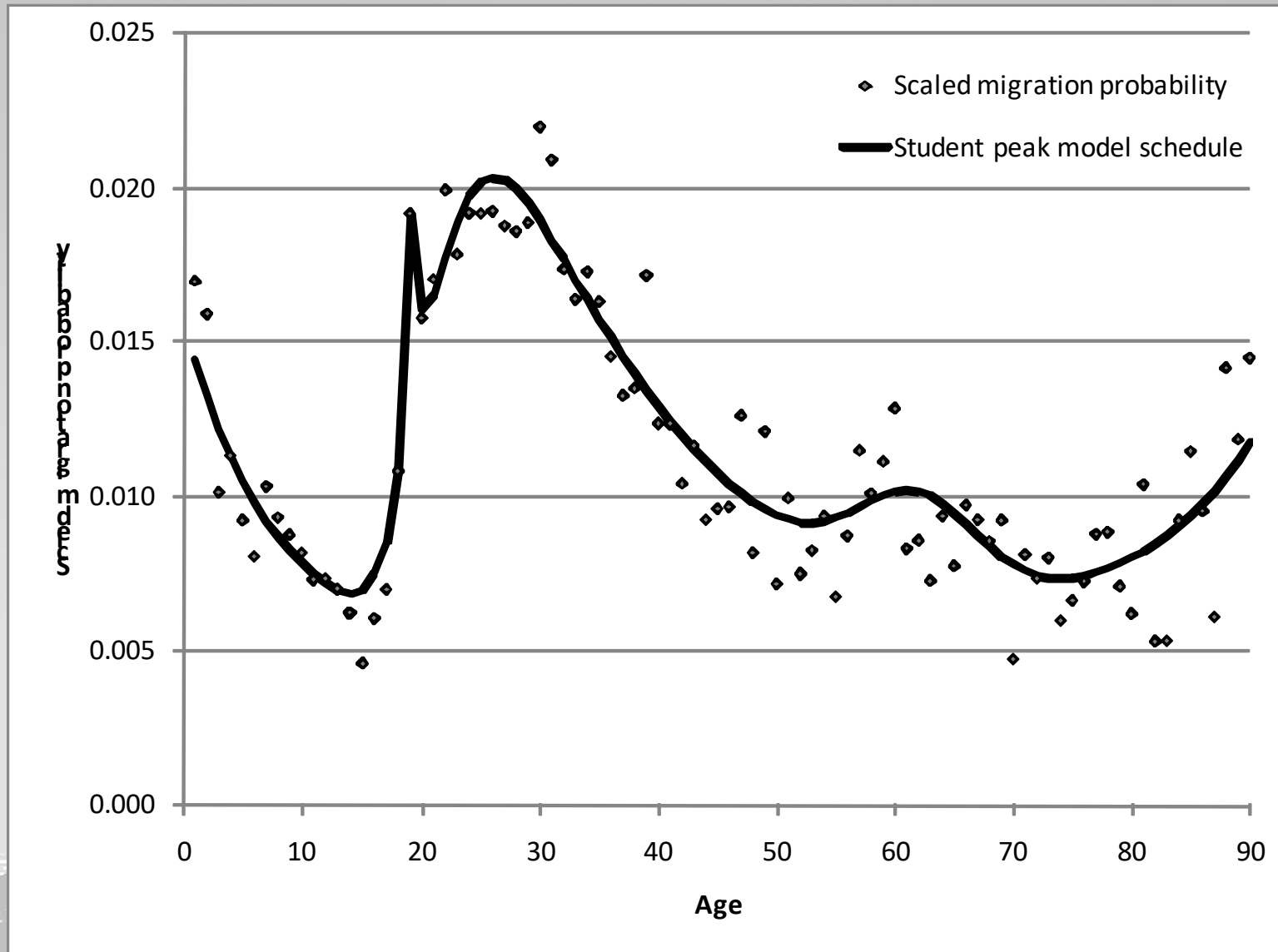| From: \ To:	Central	Rest Inner	Outer	East	South East	Rest UK	Overseas
Central	Probability	Probability	Probability	Probability	Probability	Probability	Not Census
Rest Inner	Probability	Probability	Probability	Probability	Probability	Probability	Not Census
Outer	Probability	Probability	Probability	Probability	Probability	Probability	Not Census
East	Probability	Probability	Probability	NA	NA	NA	NA
South East	Probability	Probability	Probability	NA	NA	NA	NA
Rest UK	Probability	Probability	Probability	NA	NA	NA	NA
Overseas	Structure	Structure	Structure	NA	NA	NA	NA

Borough Model – 3

- Population at Risk of Migrating

- Migration is continuous over year
- In models all migration 'takes place' at end of projection year – after survival
  - Census also relies on survival to end of year

- Enumerated population contains inflow over last year and not the outflow
- Population at risk – add total outflow and subtract total inflow
  - Which inflow and which outflow?

- $P'(a, g, A) = P(a, g, A) + M(a, g, A, \Sigma D) - M(a, g, \Sigma O, A)$
  - a – age, g – gender, A –area of interest, D – destination area, O – origin area
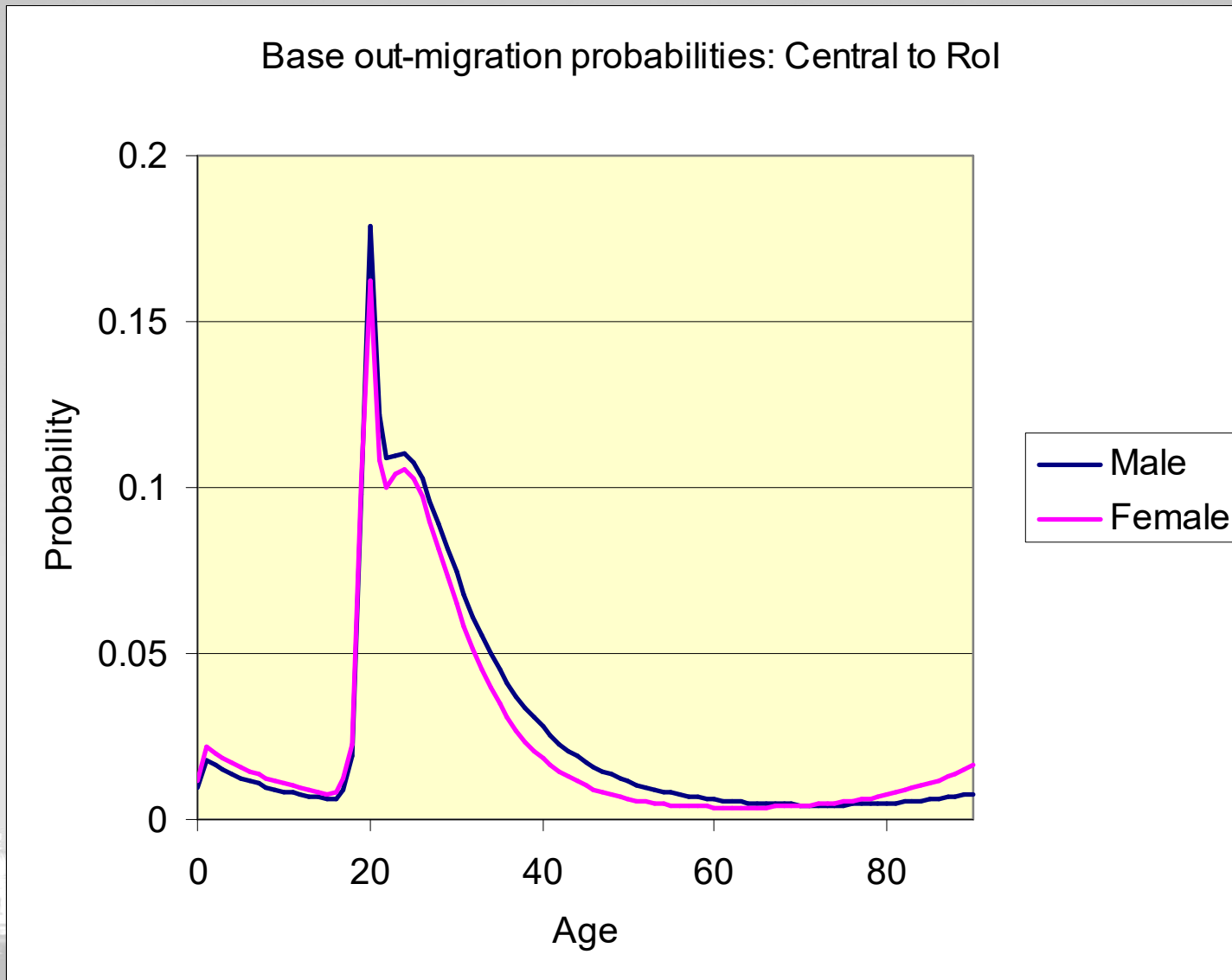 - Sum origins and destinations over all in UK

Borough Model – 4

- Probability of Migrating (From Area A to Destination D)

- Ages 1-90+

- $Pr(a, g, A, D) = M(a, g, A, D)/\{P(a, g, A) + M(a, g, A, \Sigma D) - M(a, g, \Sigma O, A)\}$

- Smooth schedule using Tom Wilson method

  Wilson, T. (2010). "Model migration schedules incorporating student migration peaks", *Demographic Research*, 23, 8: 191-222.

- Age 0
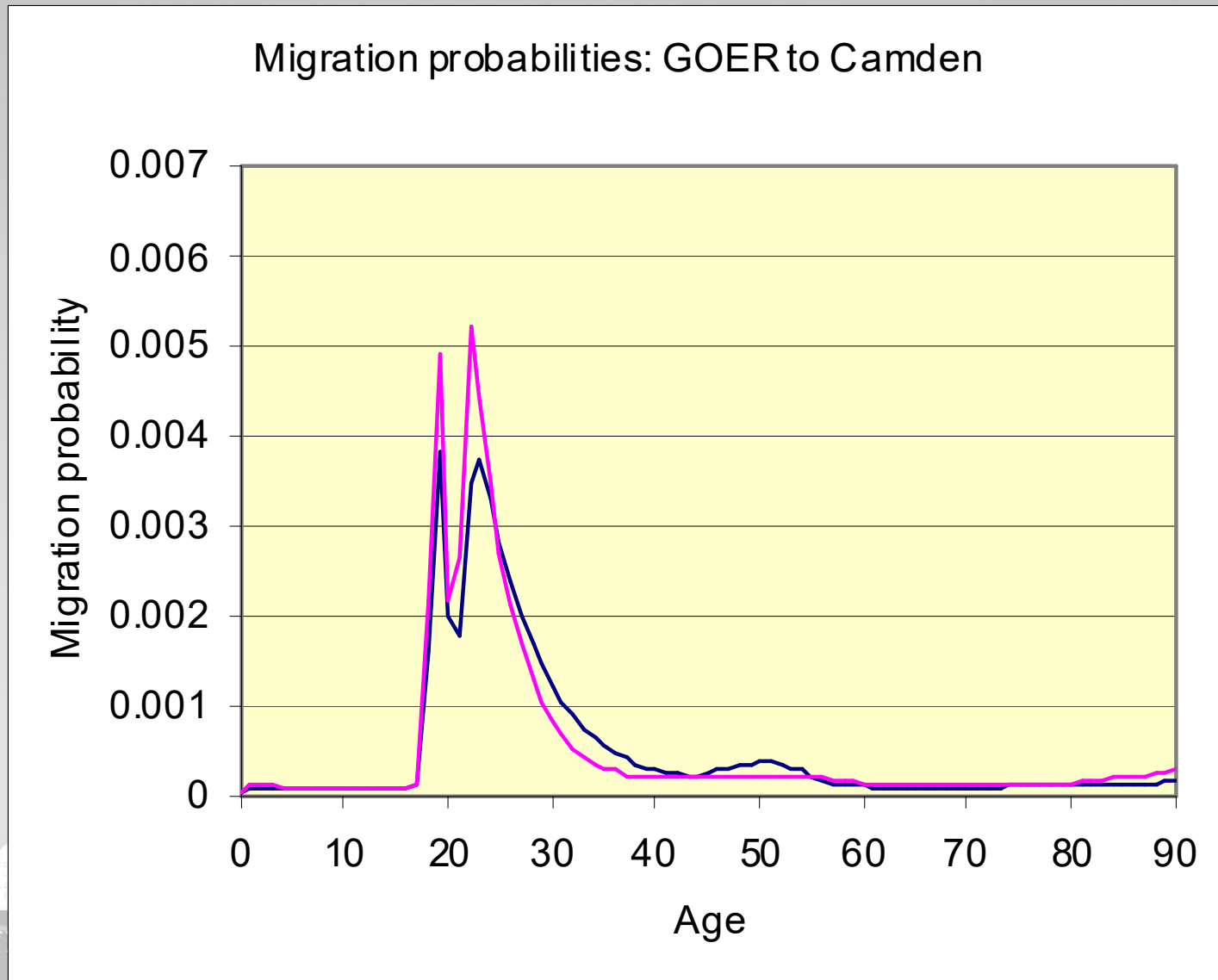 - 'Back project' ages 5 to 1 to estimate age 0 – then divide by 2

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Borough Model – 5

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Borough Model – 6

Base out-migration probabilities: Central to RoI

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Borough Model – 7

Migration probabilities: GOER to Camden

Ethnic Model

- Origins/Destinations
  - All UK – outside specific Borough
  - Overseas - inflows only

- Data 5-year age groups and gender
  - 5YA spread over SYA

- Outflows – probabilities applied after ageing-on
- Inflows – structures
- Flows constrained to output from Borough model for total population (SYA)

- Problems:
  - SCAMing
  - Was 2000-01 a typical year?
  - Small flows for some ethnic groups – especially to Outer boroughs
    - Use Borough Group data

Ward Model

- Origins/Destination
  - Inflow – rest of UK (outside ward) and Overseas
  - Outflow – rest of UK

- Data mostly 5-year age groups and gender – some smaller age groups for children
- Outflows – SYA probabilities applied after ageing-on
- Inflows – SYA structures – used to 'top up' population:
  - linked to capacity of all available homes
- Population results constrained to Borough totals

- Problems:
  - SCAMing
  - Is a single year OK for long-term use when development levels change?

Journey to Work

- A great disappointment of the 2001 Census …

- … but SASPAC could handle it

Journey to Work

- For small areas – 'sets of random numbers'

- SCAMing at sub-borough level
  - Add in factors ie gender, occupation, mode => little consistency between tables
  - Needed to have larger areas to get broad consistency

- OK for basic inter-borough commuting patterns …
  - … once scaled to 2001 MYE populations

- TfL used data for London Transport Studies Model – 1000 zones

- Large GLA study on journey to work and qualifications – seriously reduced in scope

- Would have liked to use for small area profiling – but …

Ethnicity of Mother, Father & Infant

- For use in Borough Ethnic group projection model

- Commissioned Table C0200
  - Infants in private households with mother present
  - Ethnicity of infant
  - Age/ethnicity of mother
  - Ethnicity of father
  - Greater/Inner/Outer London

- Covered 91% of infants in PH
  - Mother not present/identified on form
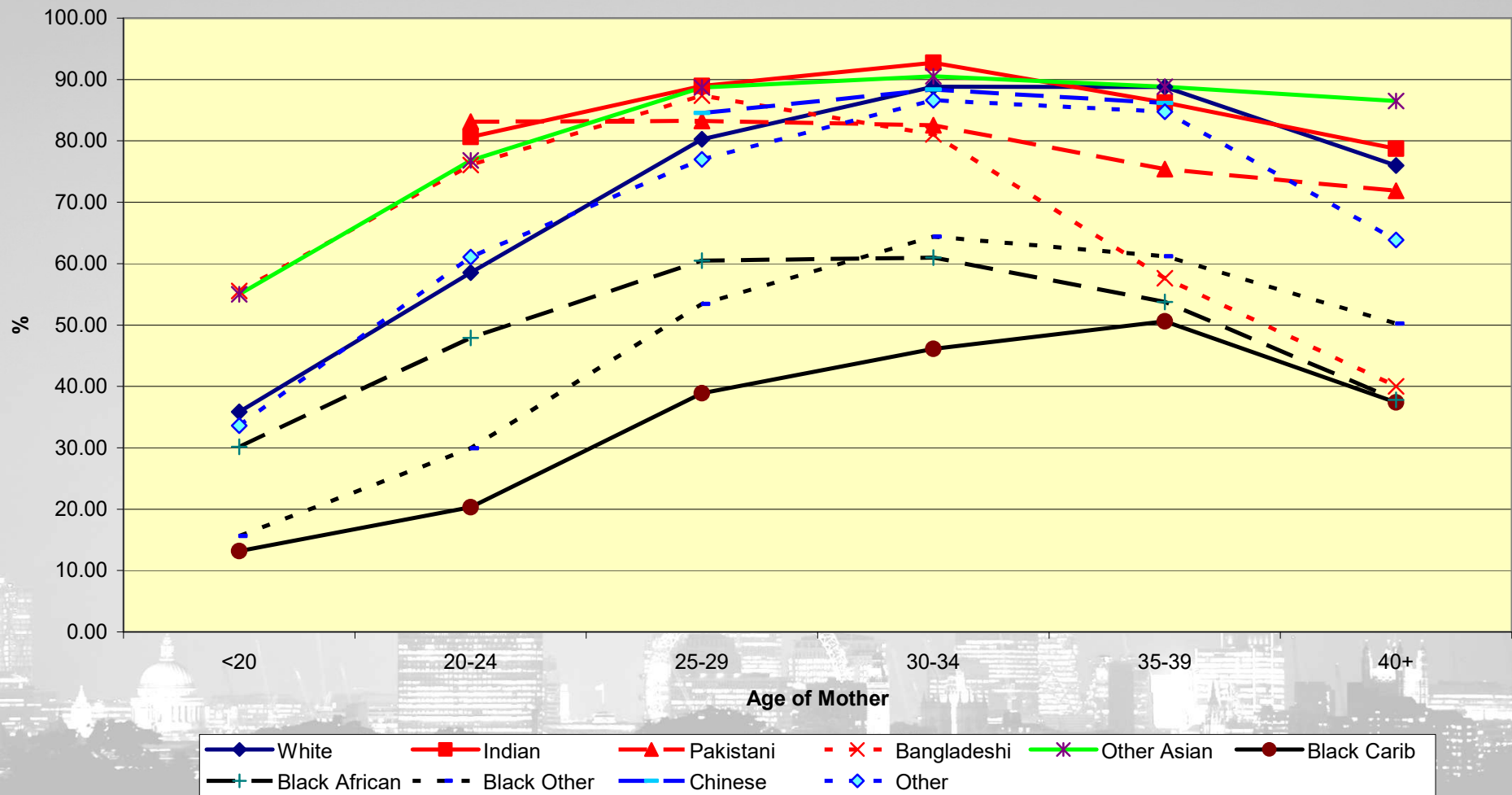 - Infant on Continuation Form

Data on 76% of Fathers

Chart 9: Proportion of all births where Father not present/ ethnicity unknown

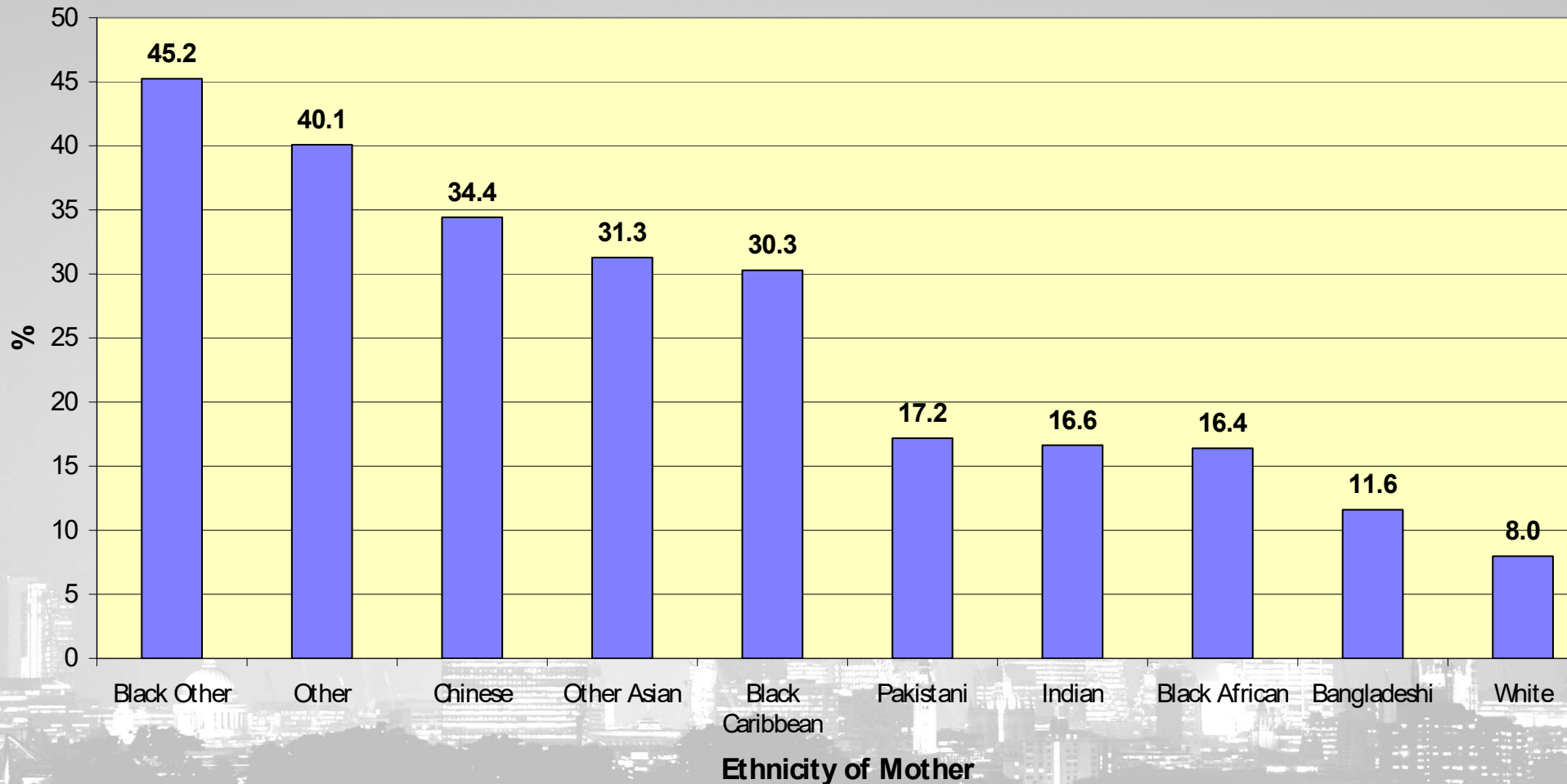**GLA**INTELLIGENCE
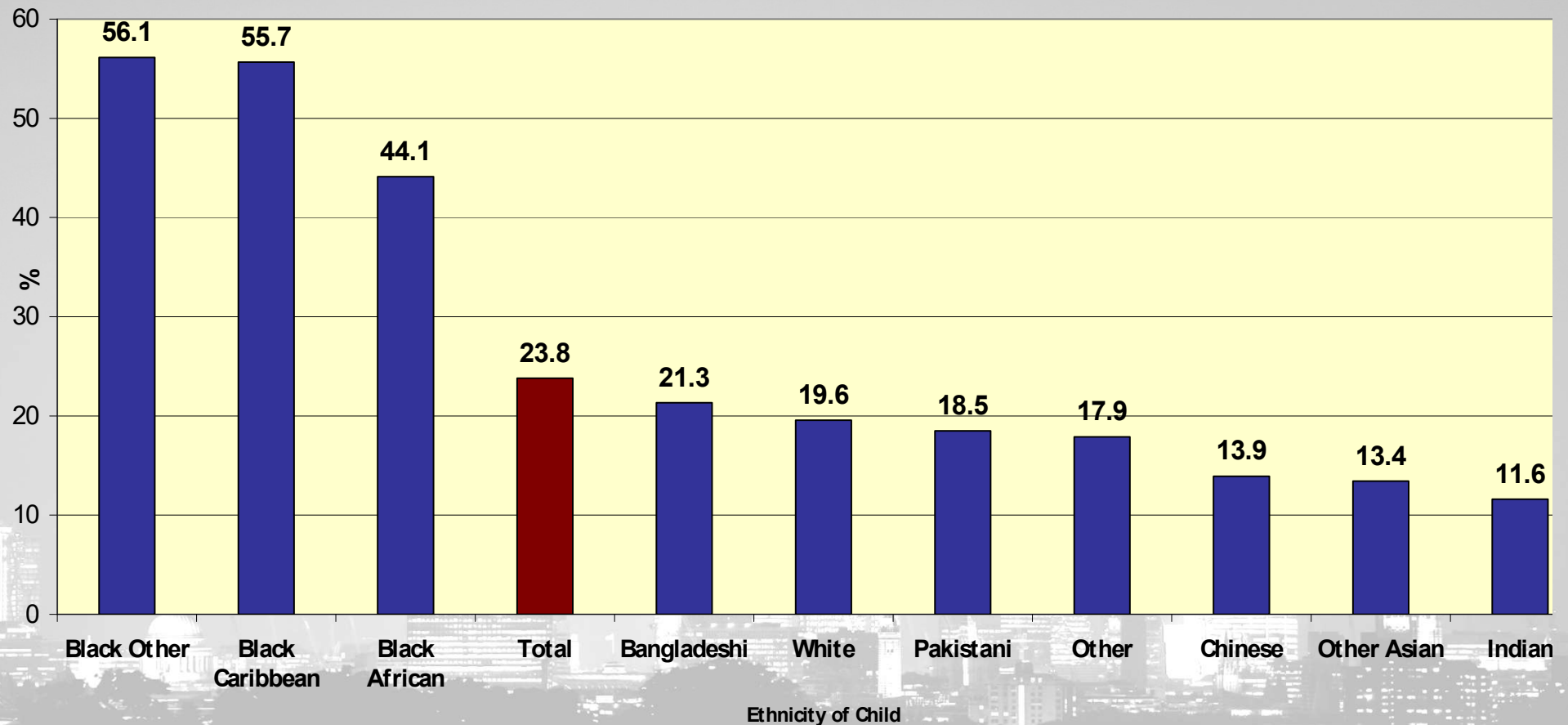
Father Present

Father Present by Mother's Age and Ethnicity

Different Ethnicity by Mother's Age
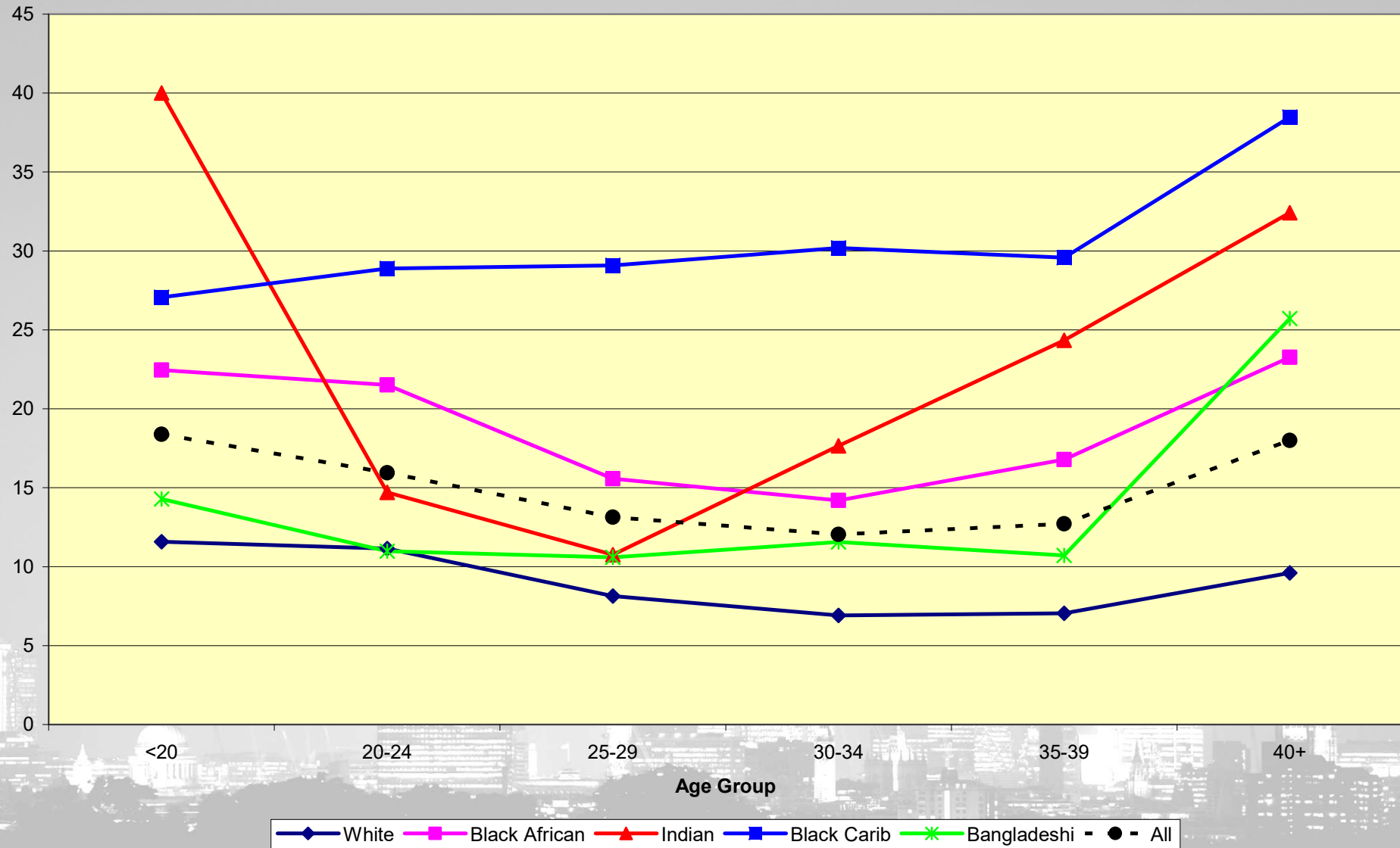
Ethnicity of Mother and Infant

Ethnicity of Child:

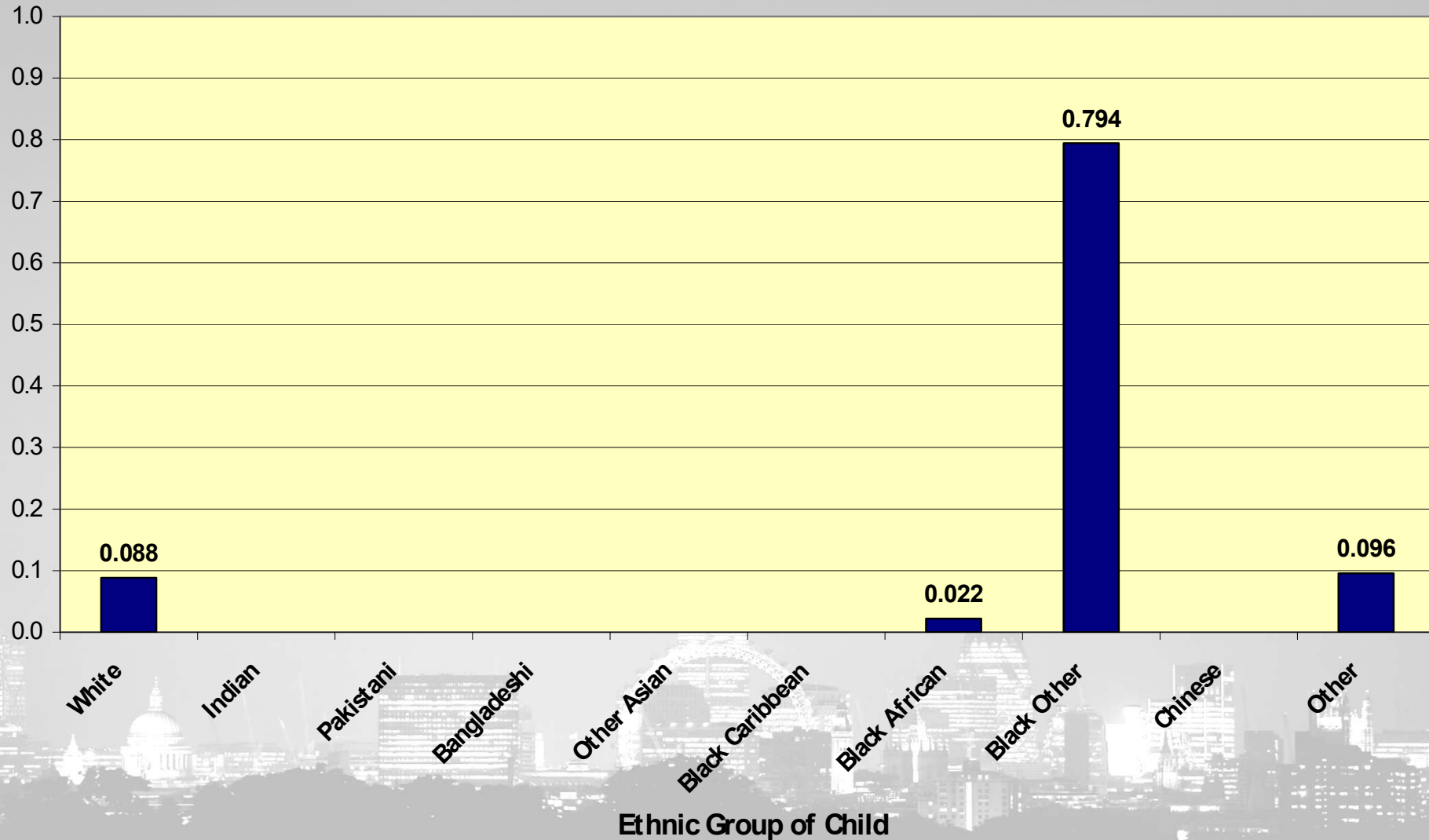| Ethnicity of Mother:	Births	Same	White	Indian	Pakistani	Ban'deshi	Other Asian	Black Caribbean	Black African	Other Black	Chinese	Other
White	57,417	92.0	-	0.1	0.1	0.1	1.6	0.1	0.4	4.0	0.0	1.5
Indian	4,610	83.4	2.9	-	2.3	0.5	8.4	0.4	0.2	0.3	0.2	1.5
Pakistani	2,287	82.8	3.6	2.8	-	0.9	7.2	0.3	0.3	0.8	0.3	1.2
Bangladeshi	2,630	88.4	3.5	1.5	1.1	-	3.0	0.0	0.2	0.3	0.1	1.8
Other Asian	2,545	68.7	14.9	2.6	1.8	1.3	-	0.5	0.9	1.7	0.0	7.6
Black Caribbean	4,481	69.7	3.2	0.5	0.1	0.1	0.7	-	5.6	18.1	0.1	1.9
Black African	7,872	83.6	2.7	0.2	0.2	0.3	0.7	1.9	-	9.8	0.0	0.6
Other Black	2,056	54.8	13.9	0.4	0.1	0.3	1.6	8.8	8.1	-	0.0	12.0
Chinese	941	65.6	6.0	0.0	0.3	0.3	6.3	0.6	0.0	0.6	-	20.3
Other	2,567	59.9	19.2	0.8	0.6	0.1	11.9	1.2	1.3	3.2	1.8	-

Black Caribbean Mothers 30-34: Known and Potential Fathers
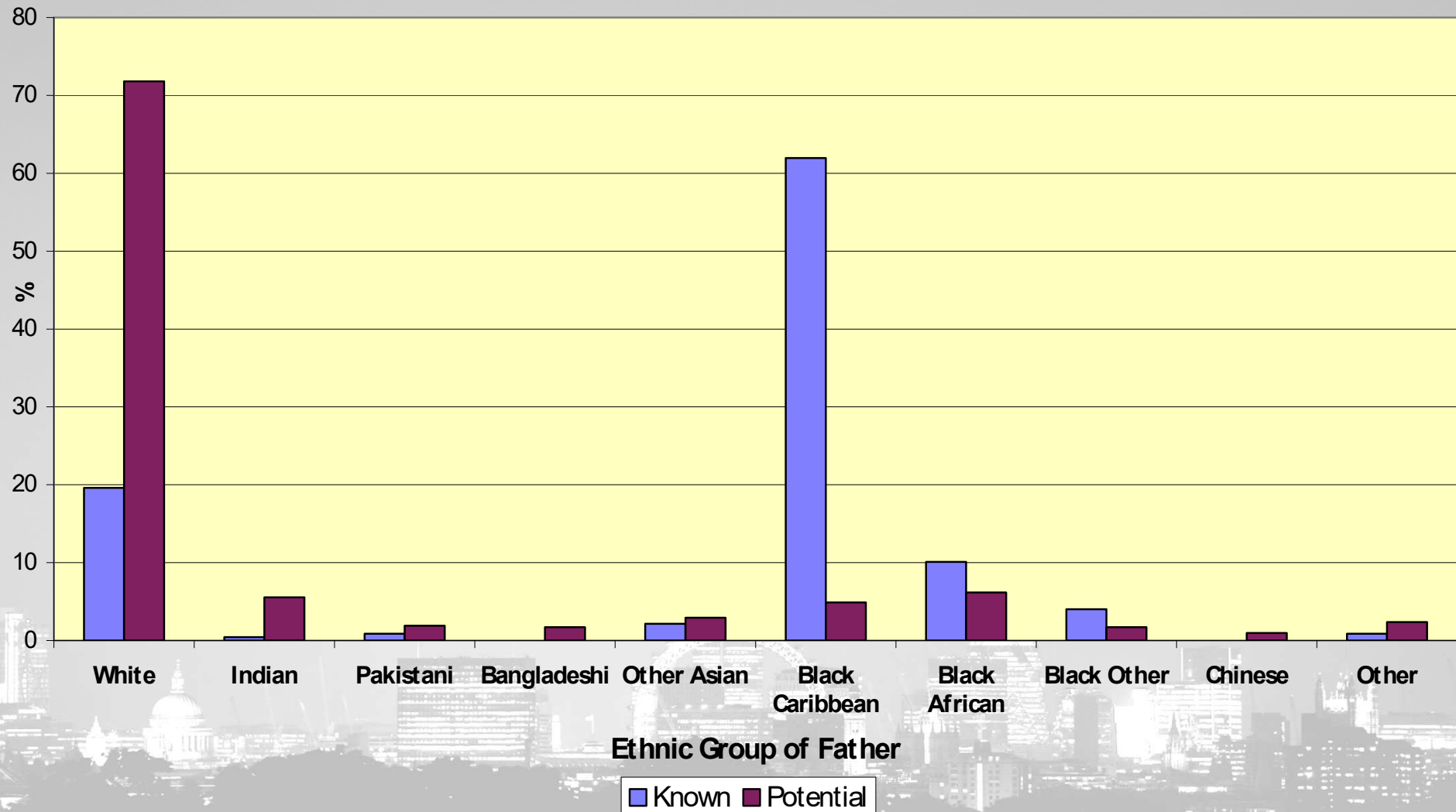
Black Caribbean Mothers 30-34: Potential Fathers – 'Relative Risk'

Ethnic Group of Potential Fathers

White	Indian	Pakistani	Bangladeshi	Other Asian	Black Caribbean	Black African	Black Other	Chinese	Other
0.27	0.08	0.46		0.74	12.65	1.64	2.37		0.36

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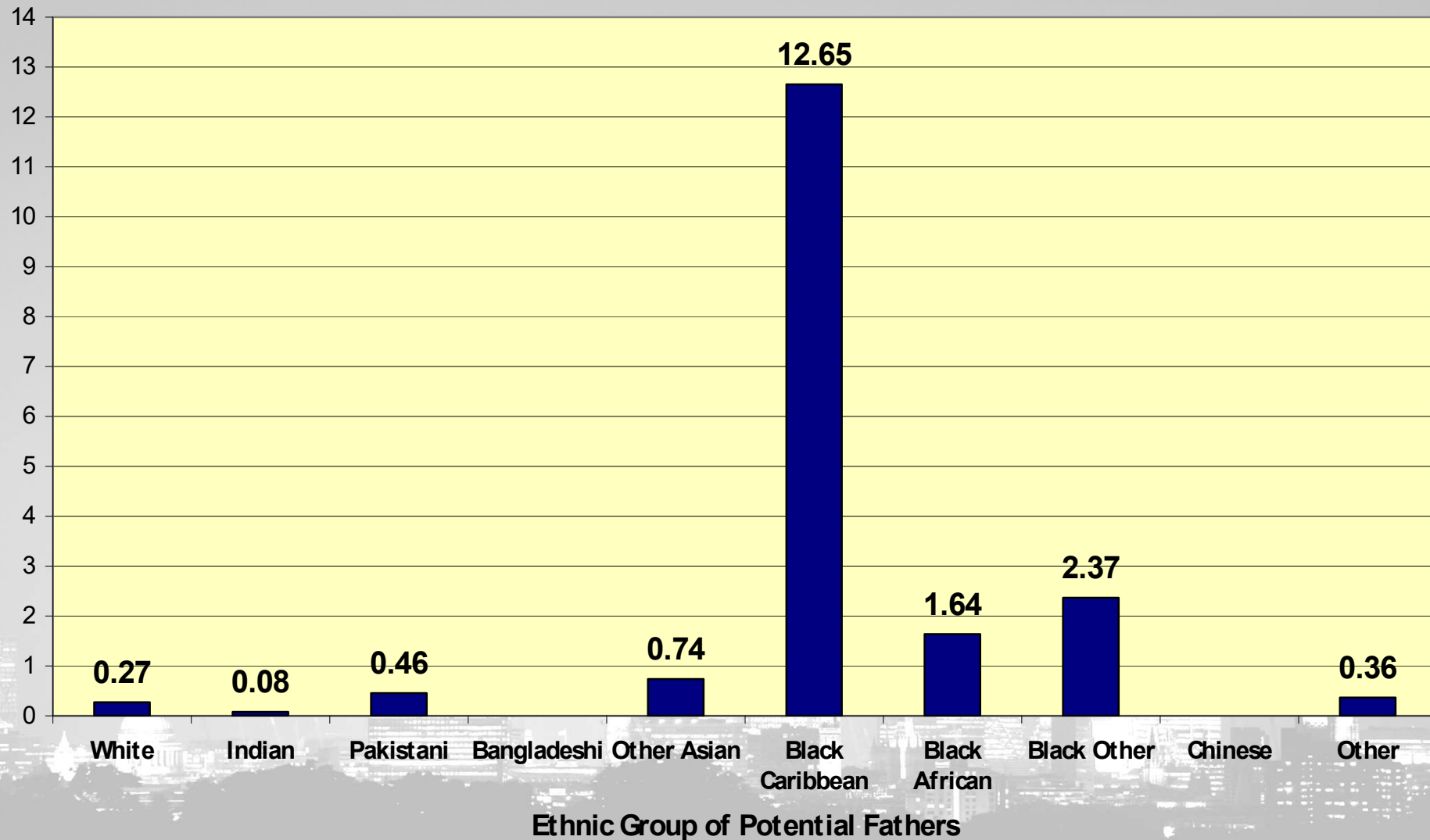
What about 2011?

- No SCAMing!

- No Usual Address => Address Where Staying

- More ethnic groups
  - Will extend GLA ethnic model to up to 18 groups

- Home Address ⇔ Second Address

- Second Address (for work) ⇔ Workplace

- Short-term Migrant Commuting

- 6 persons to a form

If you want to know any more:

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