

# Ethnic Population Projections for Scotland, 2001 to 2051

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**Scotland's People - Past, Present & Future**

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**The Scottish Government, Victoria Quay, Edinburgh**

Two papers published 2011 and 2012 in the *Journal of Population Research*:  
“A local analysis of ethnic group population trends and projections for the UK”  
“Ethnic population projections for the UK, 2001-2051”

Online Information on the project: <http://www.geog.leeds.ac.uk/research/projects/migrants.html>

Full details of project results are given in: Pia Wohland, Phil Rees, Paul Norman, Peter Boden and Martyna Jasinska (2010) Ethnic population projections for the UK and local areas, 2001-2051. *Working Paper 10/02*, School of Geography, University of Leeds. Online at: <http://www.geog.leeds.ac.uk/research/wpapers>

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*What happens when international migrants settle? Ethnic group population trends and projections for UK local areas*



# The Research Question

- What impact will **ethnic differences** in fertility, mortality, internal and international migration have on the size and ethnic composition of UK local populations?
- To answer the research question, we built and used **a new population projection model** to explore alternative futures.
- To drive this model:
  - We built estimates of *ethnic group fertility* using census data, birth statistics and survey tables.
  - We estimated *ethnic group mortality* (hitherto unmeasured) through modelling mortality from morbidity proxies.
  - We built a *databank of administrative variables related to international migration* for local areas in order to develop estimates for long-term immigration and emigration.
  - We constructed estimates of *internal migration* by ethnic groups from census and register migration data.

# Projection model features

**Coverage:** whole of the United Kingdom

**Groups:** all 16 ethnic groups in the 2001 Census (**estimated for Scotland**)

**Spatial units:** 352 local authorities in England with Wales, **Scotland** & Northern Ireland

**Migration:** bi-regional model to overcome small number issue of multi-regional model and isolation issue of single-region model

**Group interaction:** parallel ethnic groups except mothers can give birth to children who have different ethnicities

# Projections and assumptions

Class	Projection	Assumptions
SCENARIO PROJECTIONS	BENCH	Uses 2001 data & applies component rates using constant assumption (Benchmark projection)
	TREND	Develops trends in the key drivers for components following NPP assumptions
	UPTAP-EF	Develops trends in the key drivers for components using adapted NPP assumptions. Uses Emigration Flows
	UPTAP-ER	As UPTAP-EF but uses Emigration Rates $\times$ Origin Population
REFERENCE PROJECTIONS (also a set of projections to establish the impact of different components)	All group mortality	TREND except no ethnic mortality differences
	All group fertility	TREND except no ethnic fertility differences
	No mixing matrix	TREND except no ethnic mixing of births
	Zero migration	TREND except no migration (natural increase only)
	Zero international migration	TREND except no international migration (Fortress UK)

# Component estimates

## Component

**Ethnic mortality estimates** developed combining deaths data and proxy illness data

**Ethnic fertility estimates** developed from a combination of census, LFS and vital statistics data

**International migration estimates** based on administrative data with ethnic conversion using country of origin/ethnicity tables from the census (Trend projections use TIM estimates)

**Ethnic internal migration probabilities** developed from the census updated using Patient Register Data for 2000-1 to 2007-8

**Ethnic mixing probabilities** developed from census tables of mothers and children under one by ethnicity

# Fertility assumptions (total fertility rates)

Ethnic group	2006-11	2021 onwards	Ethnic group	2006-11	2021 onwards
White British	<b>1.90</b>	<b>1.88</b>	Indian	<b>2.10</b>	<b>1.98</b>
White Irish	<b>1.75</b>	<b>1.73</b>	Pakistani	<b>2.32</b>	<b>2.12</b>
Other White	<b>1.71</b>	<b>1.69</b>	Bangladeshi	<b>2.47</b>	<b>2.29</b>
White-Black Caribbean	<b>1.82</b>	<b>1.78</b>	Other Asian	<b>1.74</b>	<b>1.70</b>
White-Black African	<b>2.05</b>	<b>2.01</b>	Black Caribbean	<b>1.78</b>	<b>1.62</b>
White-Asian	<b>1.56</b>	<b>1.53</b>	Black African	<b>1.82</b>	<b>1.71</b>
Other Mixed	<b>1.62</b>	<b>1.58</b>	Other Black	<b>1.74</b>	<b>1.70</b>
			Chinese	<b>1.47</b>	<b>1.33</b>
All	<b>1.92</b>	<b>1.93</b>	Other	<b>1.74</b>	<b>1.70</b>

# Mortality assumptions (life expectancies)

Ethnic group	Men		Women		Ethnic group	Men		Women	
	2001	2046-51	2001	2046-51		2001	2046-51	2001	2046-51
White British	<b>75.9</b>	<b>84.7</b>	<b>80.5</b>	<b>86.7</b>	Indian	<b>75.5</b>	<b>84.3</b>	<b>79.3</b>	<b>86.0</b>
White Irish	<b>74.9</b>	<b>85.5</b>	<b>80.3</b>	<b>85.5</b>	Pakistani	<b>73.1</b>	<b>83.1</b>	<b>77.3</b>	<b>84.4</b>
Other White	<b>76.9</b>	<b>86.6</b>	<b>81.3</b>	<b>87.9</b>	Bangladeshi	<b>72.7</b>	<b>82.5</b>	<b>77.7</b>	<b>84.4</b>
White-Black Caribbean	<b>73.4</b>	<b>82.6</b>	<b>78.7</b>	<b>85.4</b>	Other Asian	<b>75.2</b>	<b>84.6</b>	<b>79.5</b>	<b>86.0</b>
White-Black African	<b>74.2</b>	<b>83.8</b>	<b>79.5</b>	<b>86.0</b>	Black Caribbean	<b>74.4</b>	<b>84.6</b>	<b>79.1</b>	<b>86.2</b>
White-Asian	<b>75.1</b>	<b>84.1</b>	<b>80.0</b>	<b>86.3</b>	Black African	<b>76.1</b>	<b>86.8</b>	<b>80.4</b>	<b>87.2</b>
Other Mixed	<b>74.6</b>	<b>83.8</b>	<b>79.9</b>	<b>86.2</b>	Other Black	<b>73.4</b>	<b>83.3</b>	<b>78.5</b>	<b>85.5</b>
					Chinese	<b>78.1</b>	<b>87.8</b>	<b>82.1</b>	<b>88.0</b>
All	<b>76.0</b>	<b>84.7</b>	<b>80.5</b>	<b>86.6</b>	Other	<b>76.2</b>	<b>86.3</b>	<b>81.5</b>	<b>88.0</b>

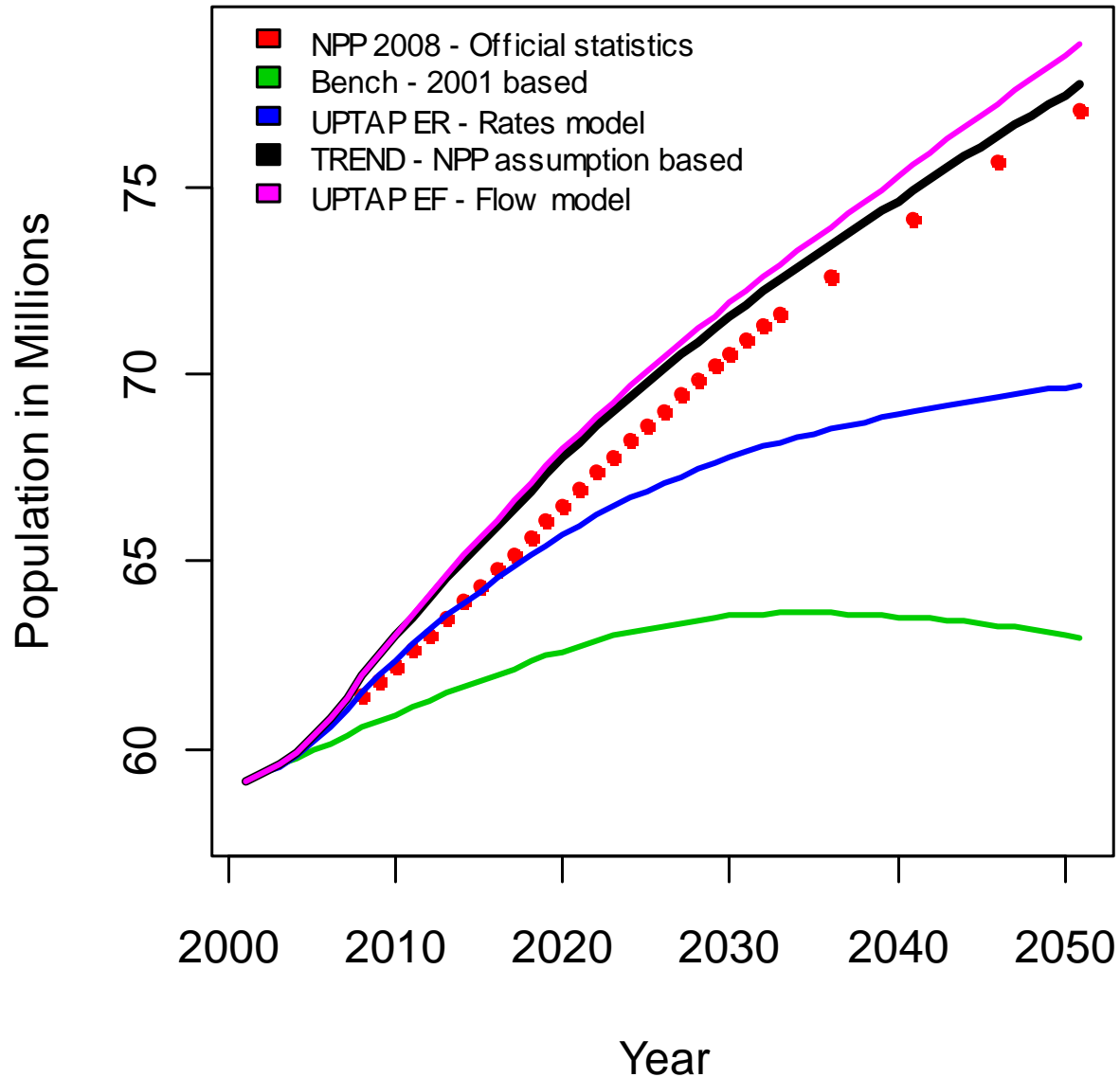
# Net international migration assumptions (1000s) [UPTAP-EF]

Ethnic group	2006-11	From 2031-36	Ethnic group	2006-11	From 2031-36
White British	<b>-31</b>	<b>-25</b>	Indian	<b>17</b>	<b>14</b>
White Irish	<b>7</b>	<b>5</b>	Pakistani	<b>9</b>	<b>8</b>
Other White	<b>108</b>	<b>94</b>	Bangladeshi	<b>1</b>	<b>1</b>
White-Black Caribbean	<b>0</b>	<b>0</b>	Other Asian	<b>7</b>	<b>6</b>
White-Black African	<b>2</b>	<b>2</b>	Black Caribbean	<b>3</b>	<b>2</b>
White-Asian	<b>2</b>	<b>2</b>	Black African	<b>16</b>	<b>14</b>
Other Mixed	<b>3</b>	<b>3</b>	Other Black	<b>0</b>	<b>0</b>
			Chinese	<b>12</b>	<b>10</b>
All	<b>178</b>	<b>155</b>	Other	<b>22</b>	<b>19</b>



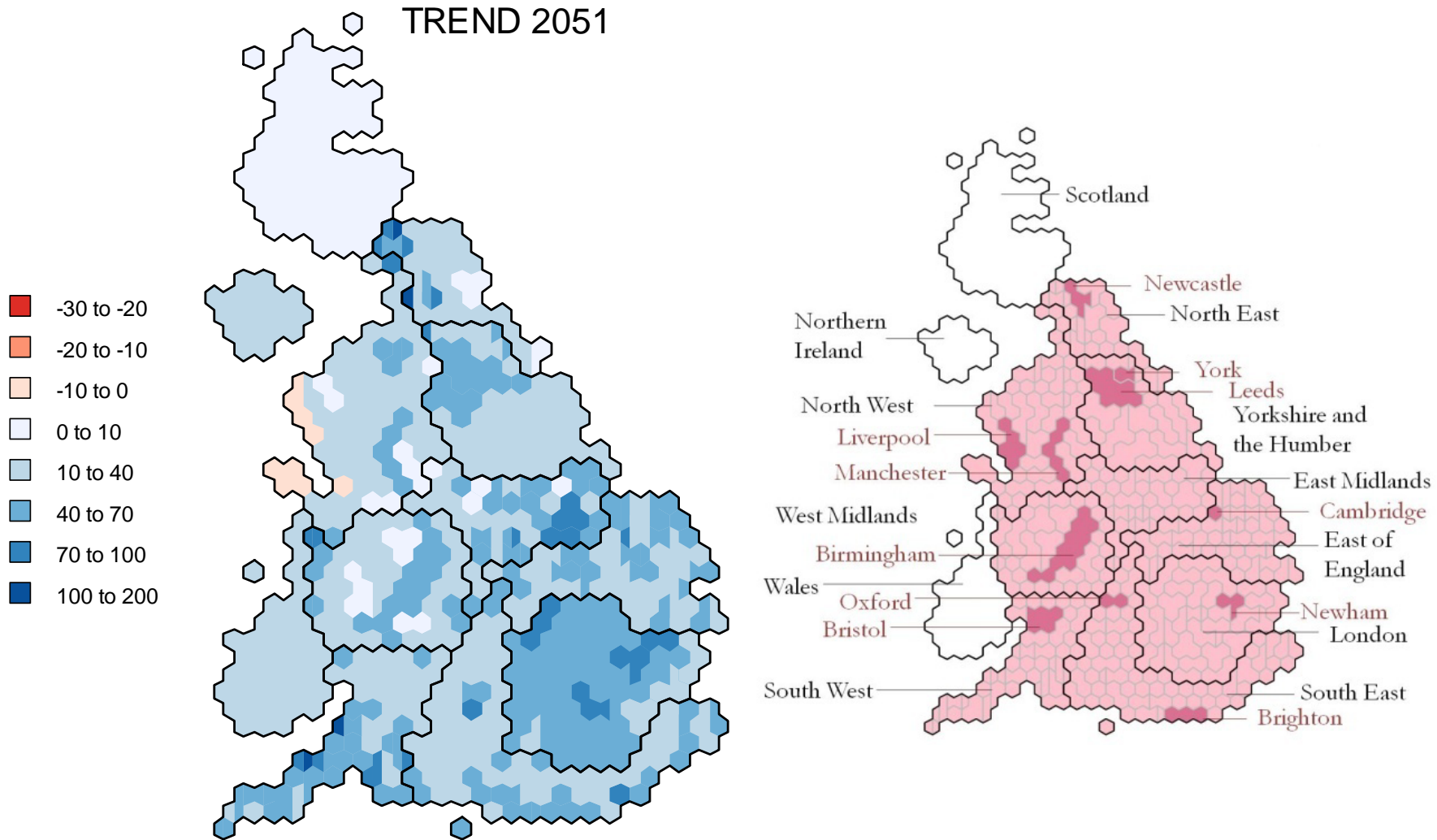
# Projection results - UK total population over 50 years

## Scenario projections

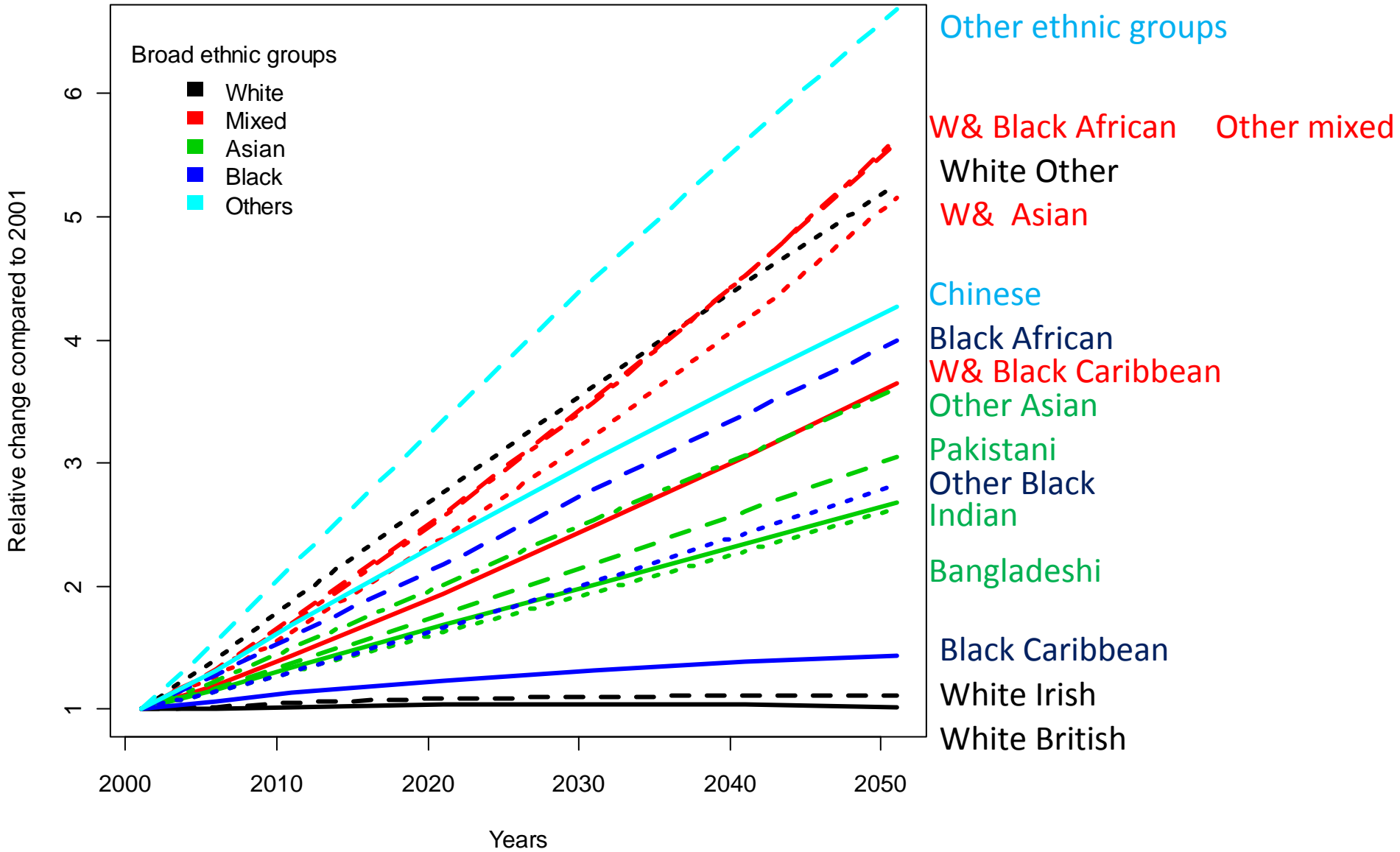


# Local area level

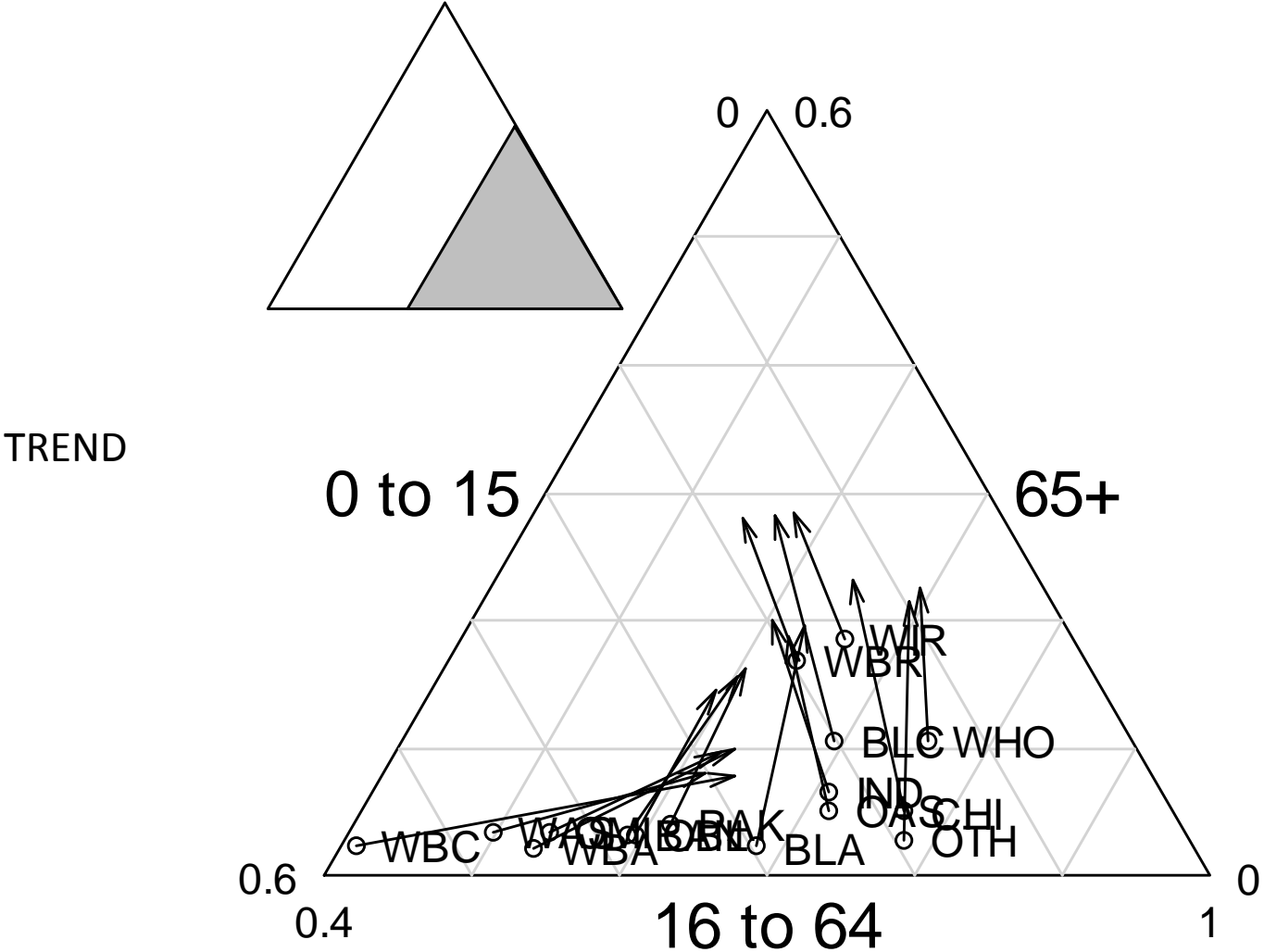
## Population change in % compared to 2001



# Ethnic group growth TREND



Changing age structure of UK ethnic groups, 2001-2051



### Scotland's population, 2001-2051, ethnic groups by age (1000s) and time series (2011 =100)

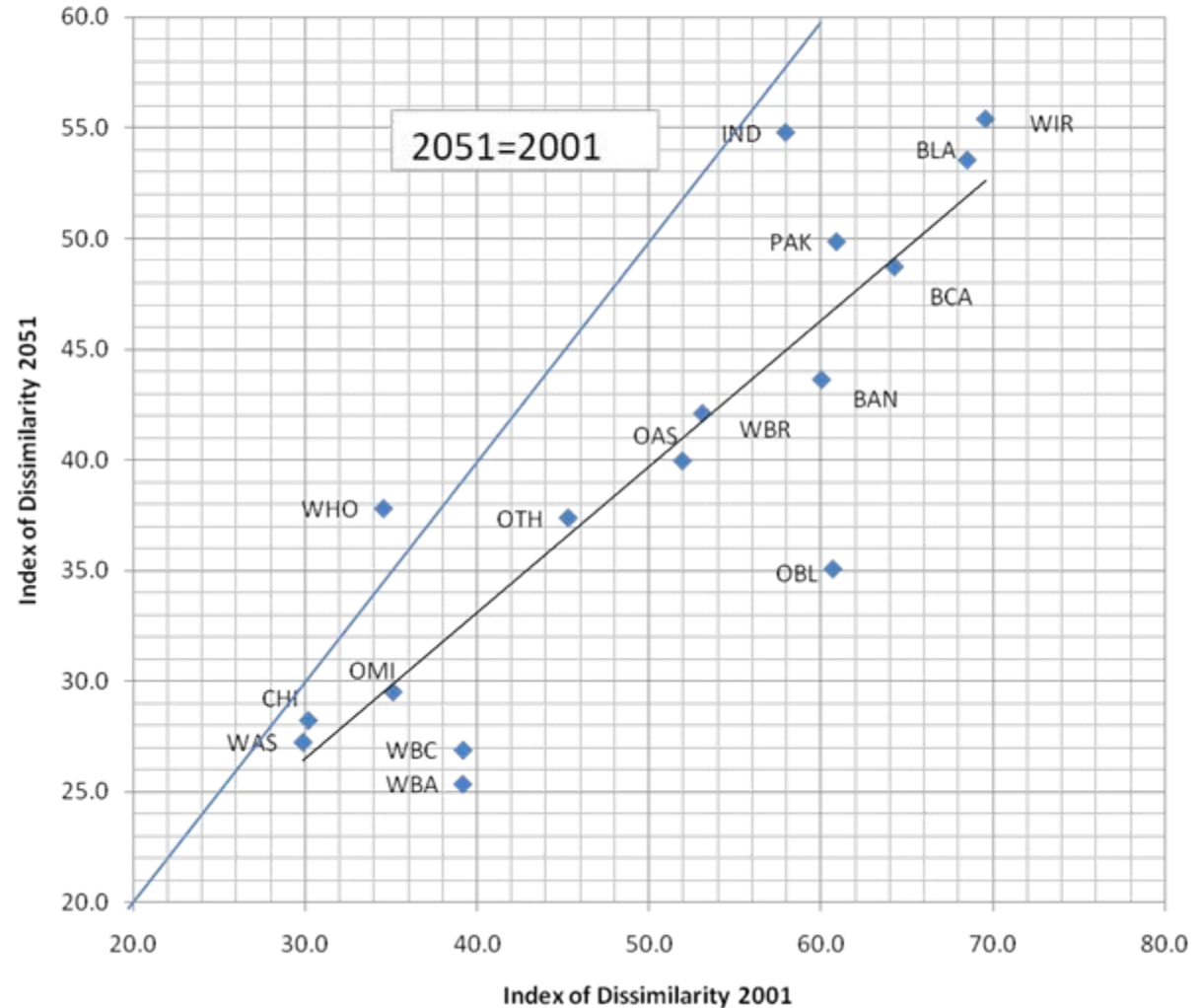
Age group	Ethnic group	2001	2011	2031	2051	2001	2011	2031	2051
0-15	WHITE	941	853	819	768	110	100	96	90
	MIXED	4	16	25	29	25	100	160	181
	ASIAN	16	17	23	27	94	100	131	157
	BLACK	3	3	4	4	98	100	136	166
	OTHER	7	7	12	13	89	100	160	180
	ALL GROUPS	970	896	883	842	108	100	99	94
16-64	WHITE	3,219	3,314	3,079	2,935	97	100	93	89
	MIXED	8	12	29	45	69	100	243	379
	ASIAN	36	50	71	85	73	100	143	170
	BLACK	5	7	10	12	73	100	137	163
	OTHER	18	44	81	98	41	100	185	222
	ALL GROUPS	3,287	3,427	3,270	3,175	96	100	95	93
65+	WHITE	803	967	1446	1516	83	100	150	157
	MIXED	0	1	2	6	71	100	354	900
	ASIAN	2	4	12	26	56	100	298	660
	BLACK	0	0	2	4	65	100	384	806
	OTHER	1	2	9	33	61	100	486	1729
	ALL GROUPS	807	974	1,471	1,585	83	100	151	163

## Scotland's population, 2001-2051, ethnic group composition by age (%)

Age group	Ethnic group	2001	2011	2031	2051
0-15	WHITE	97.0	95.2	92.8	91.3
	MIXED	0.4	1.8	2.9	3.4
	ASIAN	1.7	1.9	2.6	3.3
	BLACK	0.3	0.3	0.4	0.5
	OTHER	0.7	0.8	1.3	1.6
	ALL GROUPS	100.0	100.0	100.0	100.0
	16-64	WHITE	97.9	96.7	94.1
MIXED		0.3	0.3	0.9	1.4
ASIAN		1.1	1.5	2.2	2.7
BLACK		0.2	0.2	0.3	0.4
OTHER		0.6	1.3	2.5	3.1
ALL GROUPS		100.0	100.0	100.0	100.0
65+		WHITE	99.5	99.3	98.3
	MIXED	0.1	0.1	0.2	0.4
	ASIAN	0.3	0.4	0.8	1.7
	BLACK	0.0	0.0	0.1	0.2
	OTHER	0.1	0.2	0.6	2.1
	ALL GROUPS	100.0	100.0	100.0	100.0

# Indexes of Dissimilarity for ethnic groups: 2001 versus 2051 UPTAP-ER projection

Group		Change 2051- 2001
White	British WBR	-11
	Irish WIR	-14
	Other White OWH	3
Mixed	W & BI Caribbean WBC	-12
	W & BI African WBA	-14
	White & Asian WAS	-3
	Other Mixed OMI	-6
Asian or Asian British	Indian IND	-3
	Pakistani PAK	-11
	Bangladeshi BAN	-16
	Other Asian OAS	-12
Black or Black British	Black Caribbean BCA	-16
	Black African BAF	-15
	Other Black OBL	-26
Chinese or Other	Chinese CHI	-2
	Other Ethnic Group OET	-8



Relationship:

$$IoD^{2051} = 0.66 IoD^{2001} + 8.7$$

Average reduction = 1%  
per year

## Findings: ethnic re-distribution

- Ethnic minorities will experience **favourable shifts from more to less deprived local authorities.**
- Ethnic minorities will shift to LAs with **lower ethnic minority concentrations.**
- Ethnic groups will be **significantly less segregated** from the rest of the population at LA scale.
- The UK in 2051 will be **a more diverse society** than in 2001 and this **diversity will have spread** to many more part of the country beyond the big cities where ethnic minorities are concentrated today.



# Multipliers for 16 Ethnic Groups, UK, 2001-2051

Ethnic group	Population (100,000)		Multipliers					Combined Multiplier
	2001	TREND 2051	International migration ( $M_n$ )	Internal migration ( $M_i$ )	Below/Above replacement fertility ( $M_r$ )	Declining mortality ( $M_d$ )	Momentum ( $M_m$ )	
All	591	758	1.242	0.999	0.909	1.097	1.036	1.28
White British	515	510	1.008	1.002	0.914	1.100	0.976	0.99
White Irish	15	15	1.278	1.020	0.877	1.128	0.824	1.06
White Other	15	75	6.165	0.990	0.943	1.179	0.757	5.14
Mixed White & B C'bean	2	9	1.122	1.000	0.881	1.023	3.466	3.51
Mixed White & B African	1	4	1.841	1.019	0.886	1.034	3.135	5.38
Mixed White and Asian	2	10	1.688	1.006	0.871	1.027	3.216	4.88
Mixed Other	2	9	1.963	0.986	0.873	1.031	3.113	5.42
Indian	11	28	1.962	0.978	0.907	1.086	1.397	2.64
Pakistani	8	23	1.563	0.981	0.847	1.053	2.226	3.05
Bangladeshi	3	8	1.255	0.955	0.796	1.051	2.617	2.62
Other Asian	3	9	2.597	0.993	0.918	1.096	1.402	3.64
B C'Bean	6	8	1.376	0.943	0.912	1.128	1.070	1.43
B African	5	20	2.581	0.941	0.899	1.087	1.688	4.01
Black Other	1	3	1.417	0.939	0.881	1.059	2.227	2.77
Chinese	3	11	3.871	0.996	0.936	1.129	1.035	4.22
Other Ethnic Group	2	16	6.665	1.000	0.941	1.169	0.893	6.55
<b>Formula</b>			$P_s/P_n$	$P_n/P_i$	$P_i/P_r$	$P_r/P_m$	$P_m/P_o$	$M_n M_i M_r M_d M_m$

Multipliers below 1

Multipliers 1 or above



Lowest multiplier in an ethnic group

Highest multiplier in an ethnic group

# Findings: ethnic changes in Scotland

- Our projections (TREND) show **large differences** in the potential growth of different ethnic groups for 2011-2051:
  - White: increase of 2%
  - Mixed groups : increase of 181%
  - Asian groups : increase of 95%
  - Black groups: increase of 93%
  - Other groups: increase of 132%
- The **ethnic composition** of the population **will change**:
  - White: from 96.9% to 94.1%
  - Mixed groups : from 0.5% to 1.4%
  - Asian groups : from 1.3% to 2.5%
  - Black groups : from 0.2% to 0.4%
  - Other groups: from 1.0% to 2.6%
- All ethnic groups will experience significant **population ageing**
  - **Using the Old Age Dependency Ratio =  $100 \times (\text{Pop aged 65+}/\text{Pop aged 16-64})$**
  - White: from 29% to 52%
  - Mixed groups : from 6% to 14%
  - Asian groups : from 6% to 31%
  - Black groups : from 6% to 32%
  - Other groups: from 6% to 33%

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## Welcome to the ETHPOP Database

The ETHPOP Database makes ethnic population projection on local area level available to interested users.

### Important news

- We performed a major update on all our projections by improving assumptions on internal migration, mortality in older ages and fertility schedules in the youngest and oldest ages for women in the fertile age range. (28.9.2011)
- We made two more projections available one assuming constant demographic intensities since 2001 (BENCH) and another excluding international migration and with that simulating natural increase (28.9.2011)
- We now also supply component data for all four available projections. (28.9.2011)

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The ETHPOP Database is part of the ESRC funded project

**Ethnic group population trends and projections for UK local areas: dissemination of innovative data inputs, model outputs, documentation and skills**

1 October 2010 to 30 September 2011, ESRC Research Award RES-165-25-0162