Methods

- Population at risk - baseline
  - Urban population at risk (location and floor level)
  - Regional distribution
- Population at risk – future
  - Population growth
  - Climate change uplift in extreme rainfall intensity
  - 'Exposure:hazard response ratio'

Methods

- Socio-economic distribution of risk
  - Baseline and climate change
  - National – IMD, health, occupation
  - Local – housing, demographic, socio-economic and health measures

Methods

- Documentary research
- Interviews with key stakeholders
  - Central, national and local government
  - Regulators
  - Insurers
  - Third sector

Results – Population at risk
(1-in-200 year)

- **Now:** 45M * location (5%) * street level (87%)

  = 2.0 million

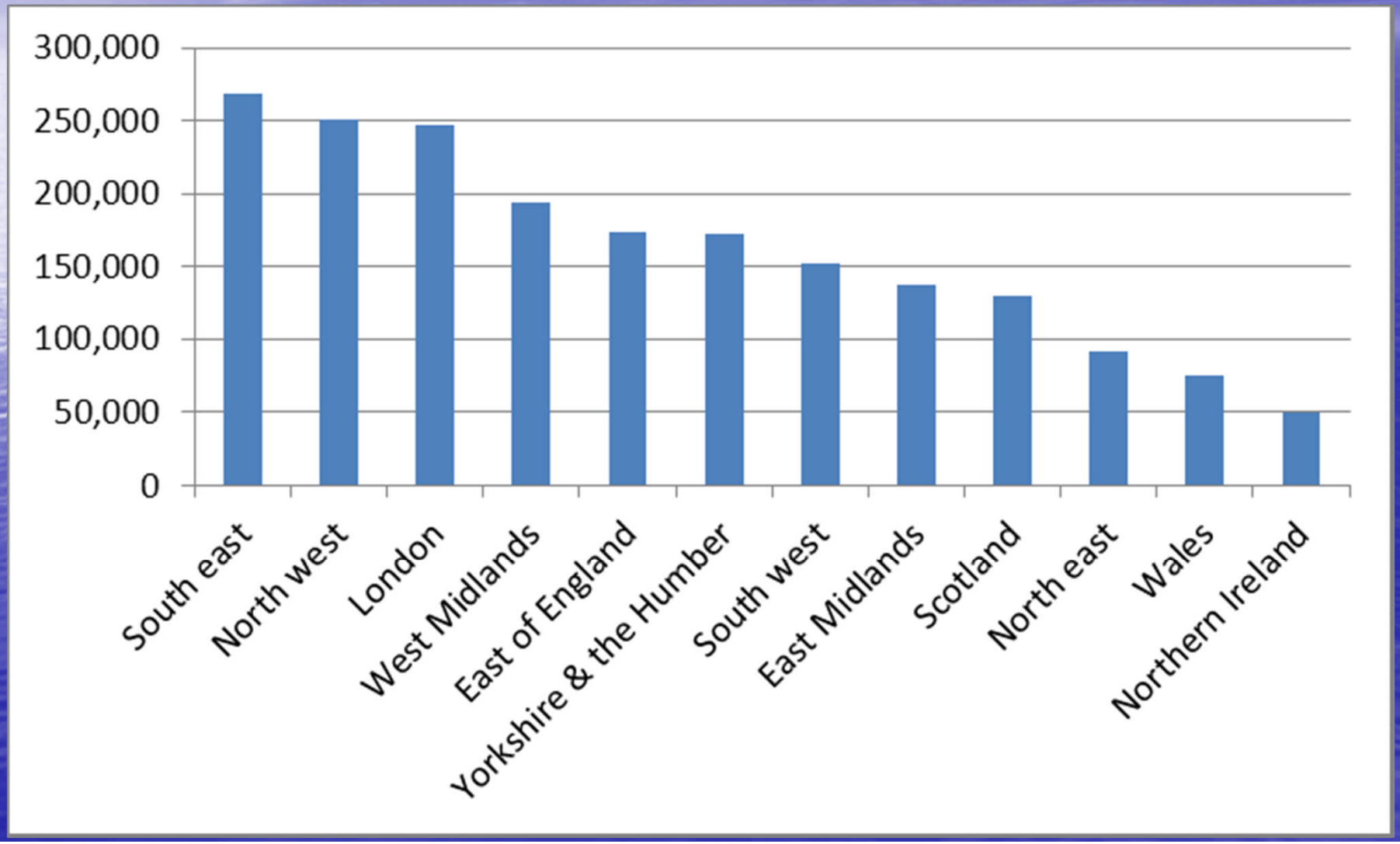
- **2050:** 2M plus:
  - pop growth (45%)
  - uplift in rainfall intensity (12%)
  - exposure:hazard response ratio (1.3)

  300k climate change

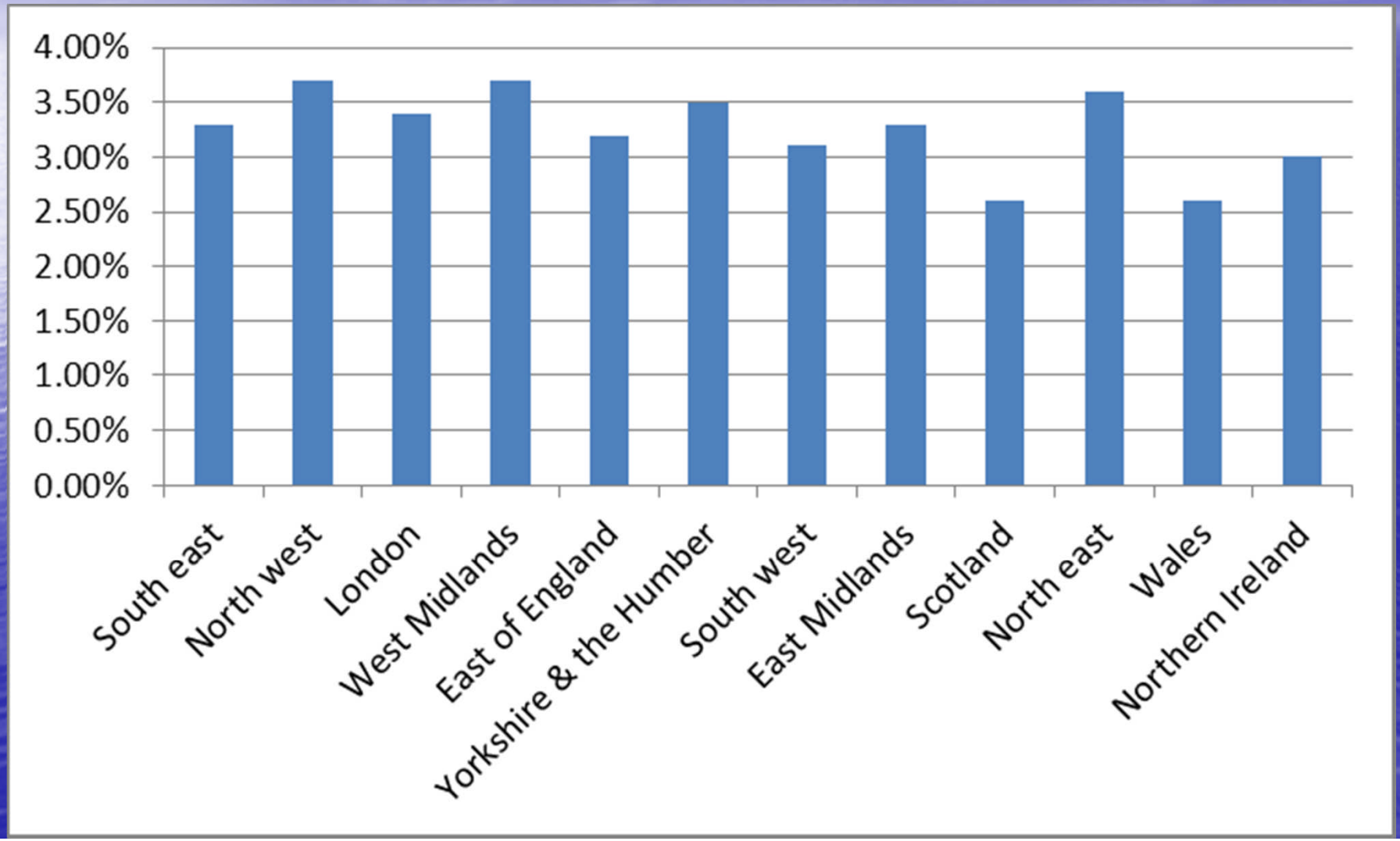
  900k population growth

  = 3.2 million

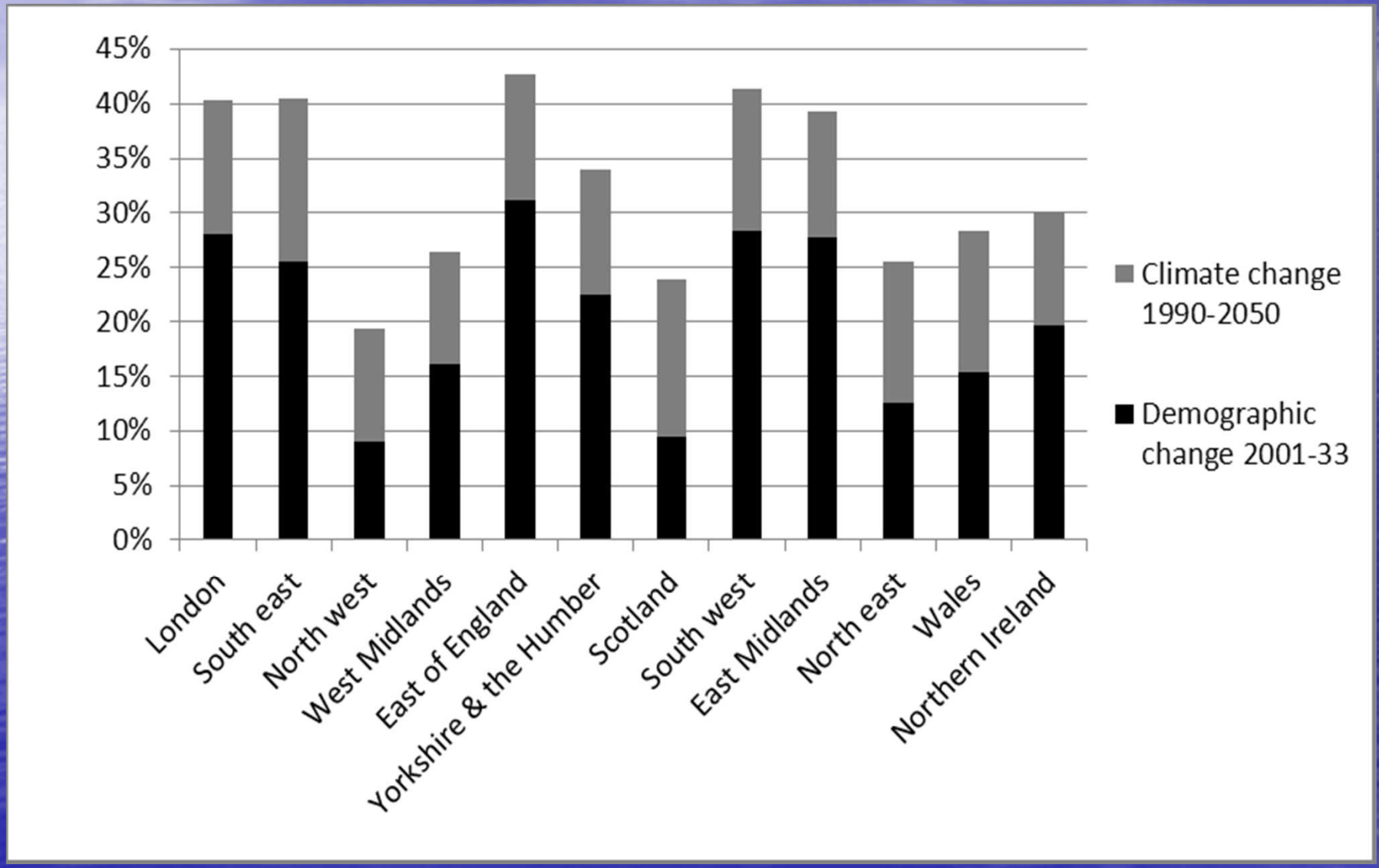
Population at risk by region - baseline
(2001 population)



% of population at risk by region - baseline
(2001 population)

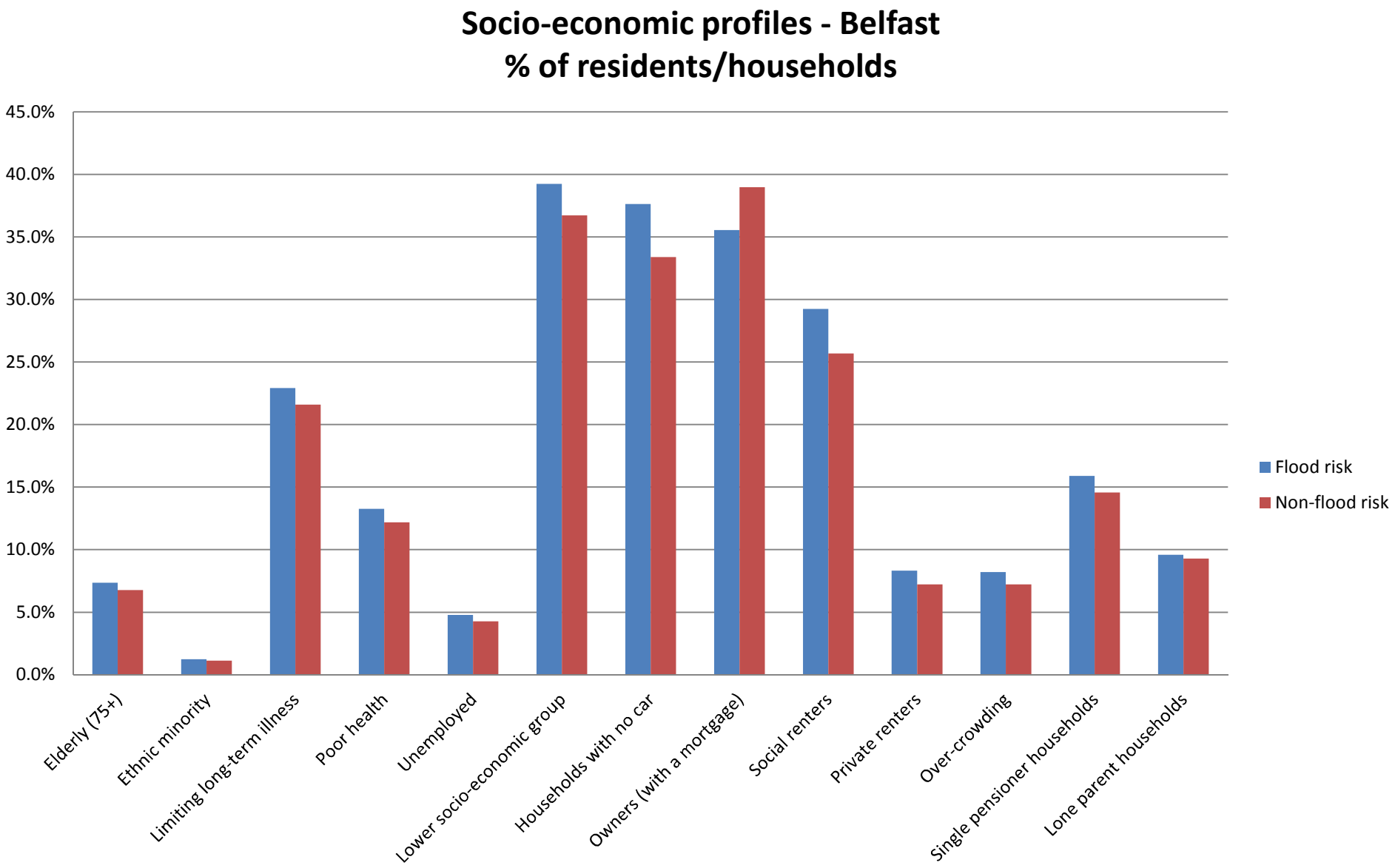


Components of change in risk by region



Results – socio-economic distribution of risk - national

Socio-economic indicator	Intensity of wettest day		
	High >23.0mm	**Medium** 17-23mm	**Low** <17.0mm
Index of Multiple Deprivation			
Baseline	29.6	28.0	27.3
2050s	27.5	28.9	24.9
Poor Health (%)			
Baseline	10.5	10.3	9.2
2050s	10.7	9.7	8.6
*Low occupational status (%)**			
Baseline	13.1	14.7	13.8
2050s	13.3	14.9	14.6


Socio-economic profiles - Belfast
% of residents/households
45.0%
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
Elderly (75+)
Ethnic minority
Limiting long-term illness
Poor health
Unemployed
Lower socio-economic group
Households with no car
Owners (with a mortgage)
Social renters
Private renters
Over-crowding
Single pensioner households
Lone parent households
Flood risk
Non-flood risk

Results – socio-economic distribution of risk - local

- Small but remarkably consistent over-representation of potentially vulnerable groups in areas at risk (greatest in Belfast)
- Likely to be linked to more affluent housing in elevated areas

Level of certainty in surface water flood risk appraisal (Low, Moderate, High)

	Current	Future
Hazard	Low	Moderate
Exposure	Moderate	Low
Vulnerability	Moderate	Low

Vulnerability and future risk

- Population ageing
- Insurance withdrawal/higher premiums?
- Flood risk areas blighted?
- Developed for social housing?

Conclusions

- More emphasis in flood risk appraisal required on:
  - Population
  - Population growth
  - Demographic change
- More research required on
  - Extreme rainfall under climate change
  - Surface water flooding modelling
  - Population change in flood risk areas
  - Social vulnerability to flooding