

**WELLINE, Workshop III: 9<sup>th</sup> Feb 2010**  
***Indoor Environment and Chronic Disorders across  
the Life Course***

**Built Environment and Lifelong Health:  
Current and Future Perspectives**



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# Contents and Terms of Reference

1. Background
2. Current Approaches
3. Trends and Future Challenges

Mostly Focus on:

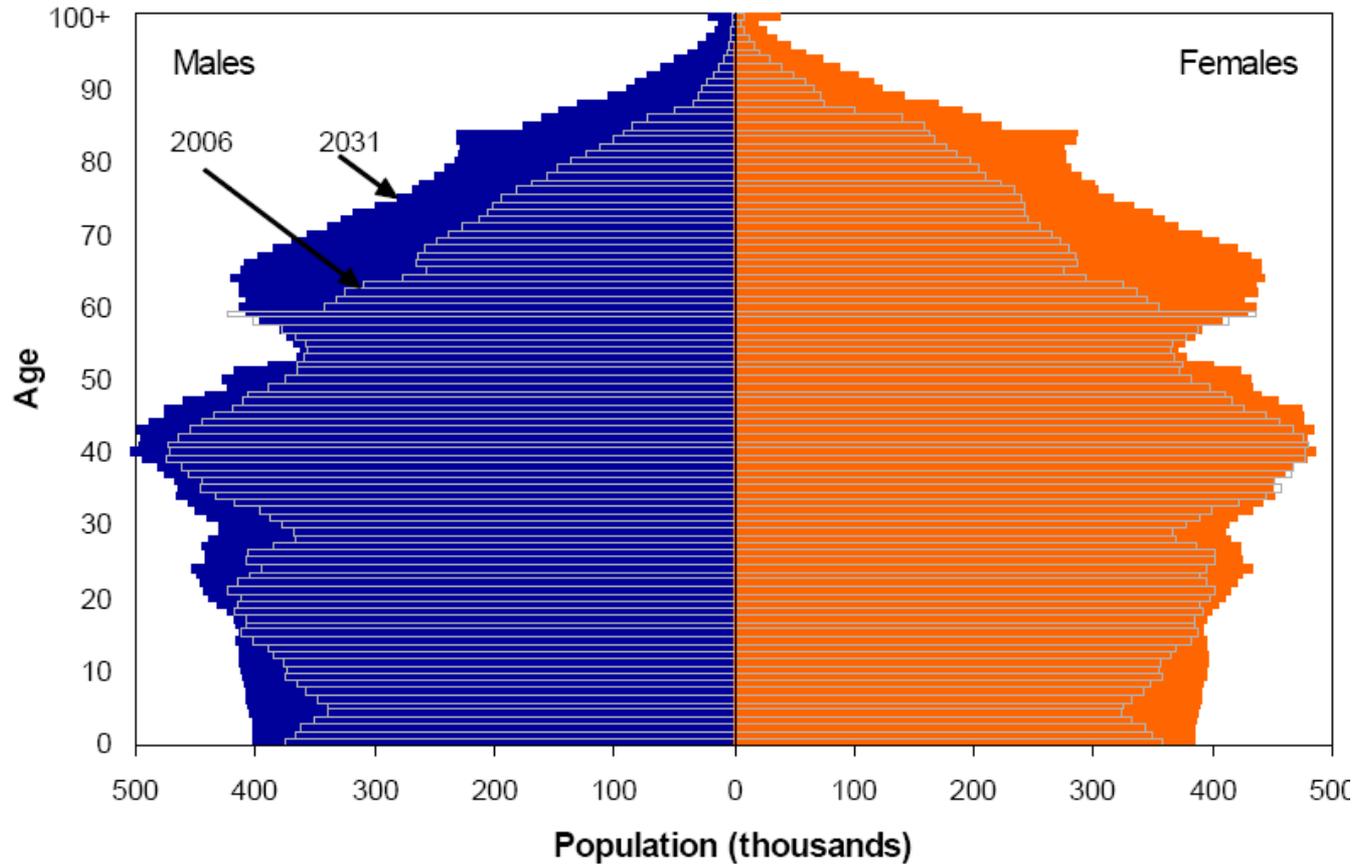
- Residential Environments
- Indoor Built Environment
- UK and/or Countries with Westernised life-style

Part 1

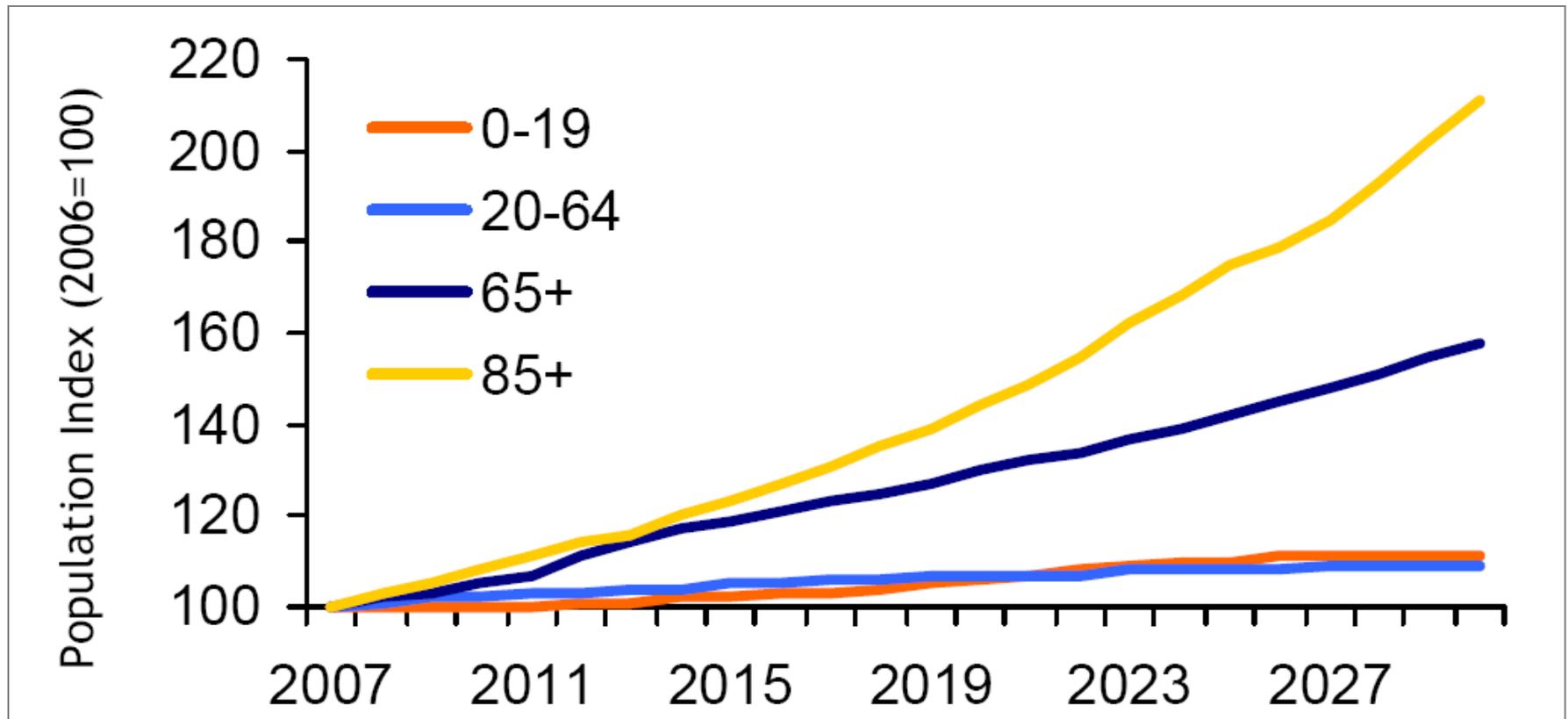
# **BACKGROUND**

## UK Population Profile

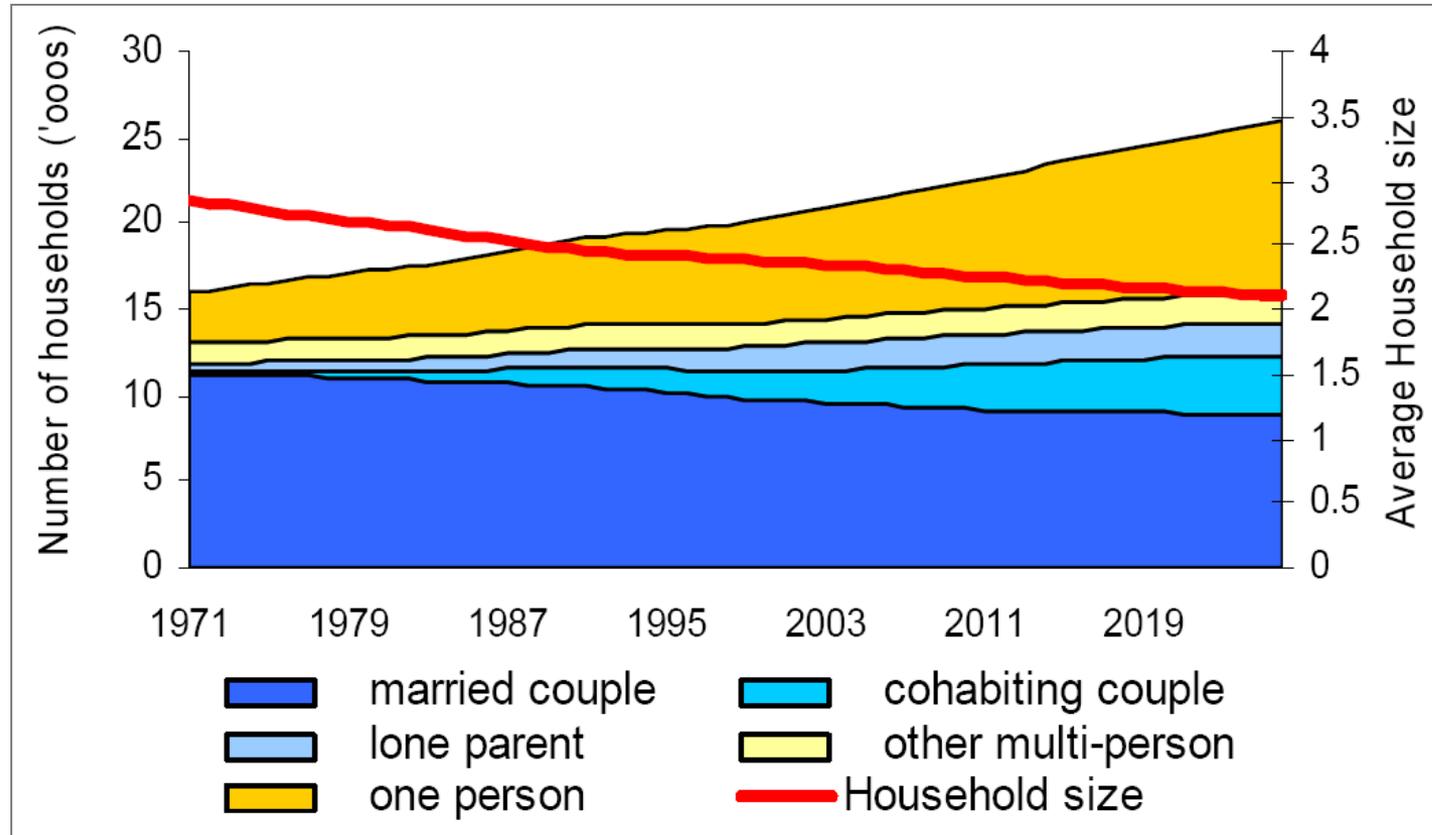
UK population pyramid, 2006 and 2031<sup>2</sup>



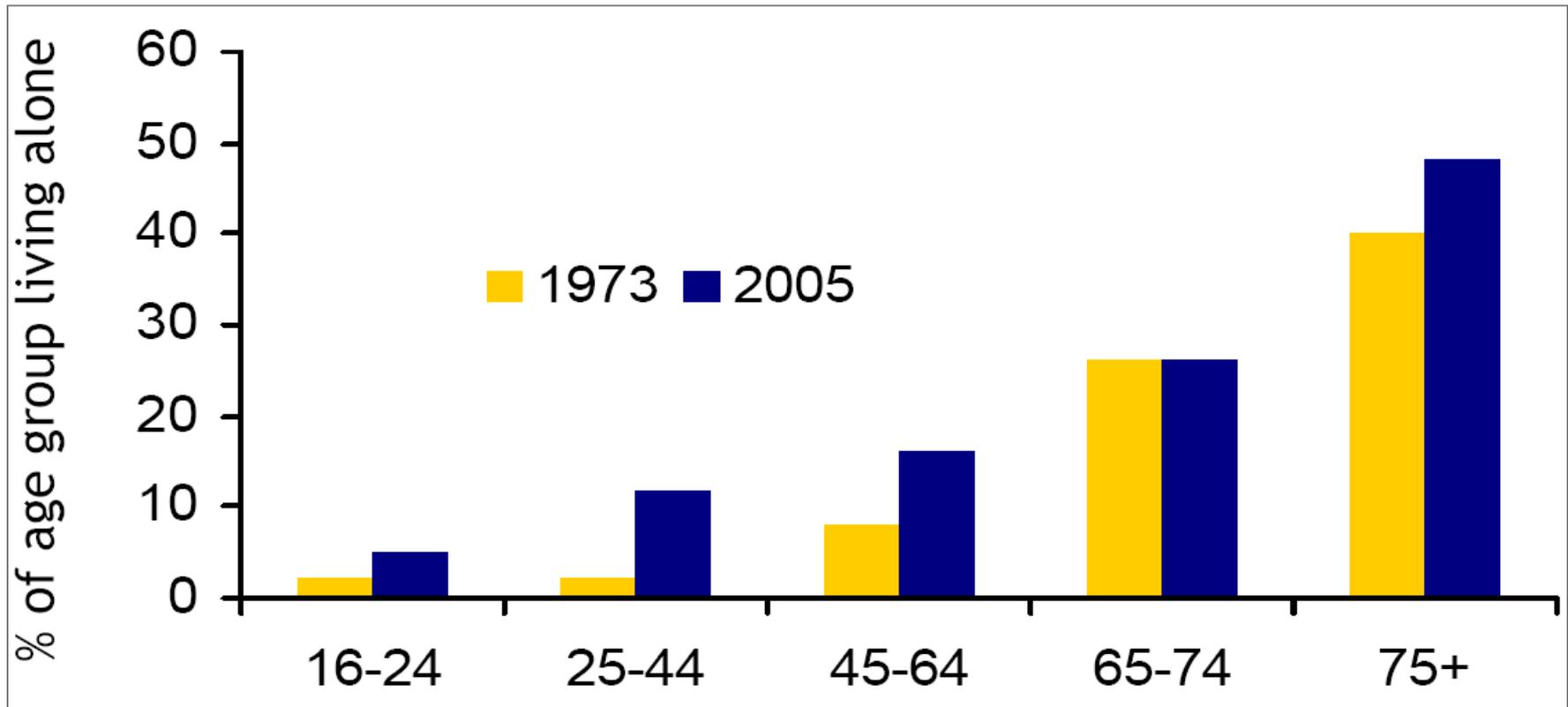
## UK Population: Growth in Age Groups



## Housing Demand: Household Size



## Housing Demand: Living Alone



# Lifelong Health and Wellbeing

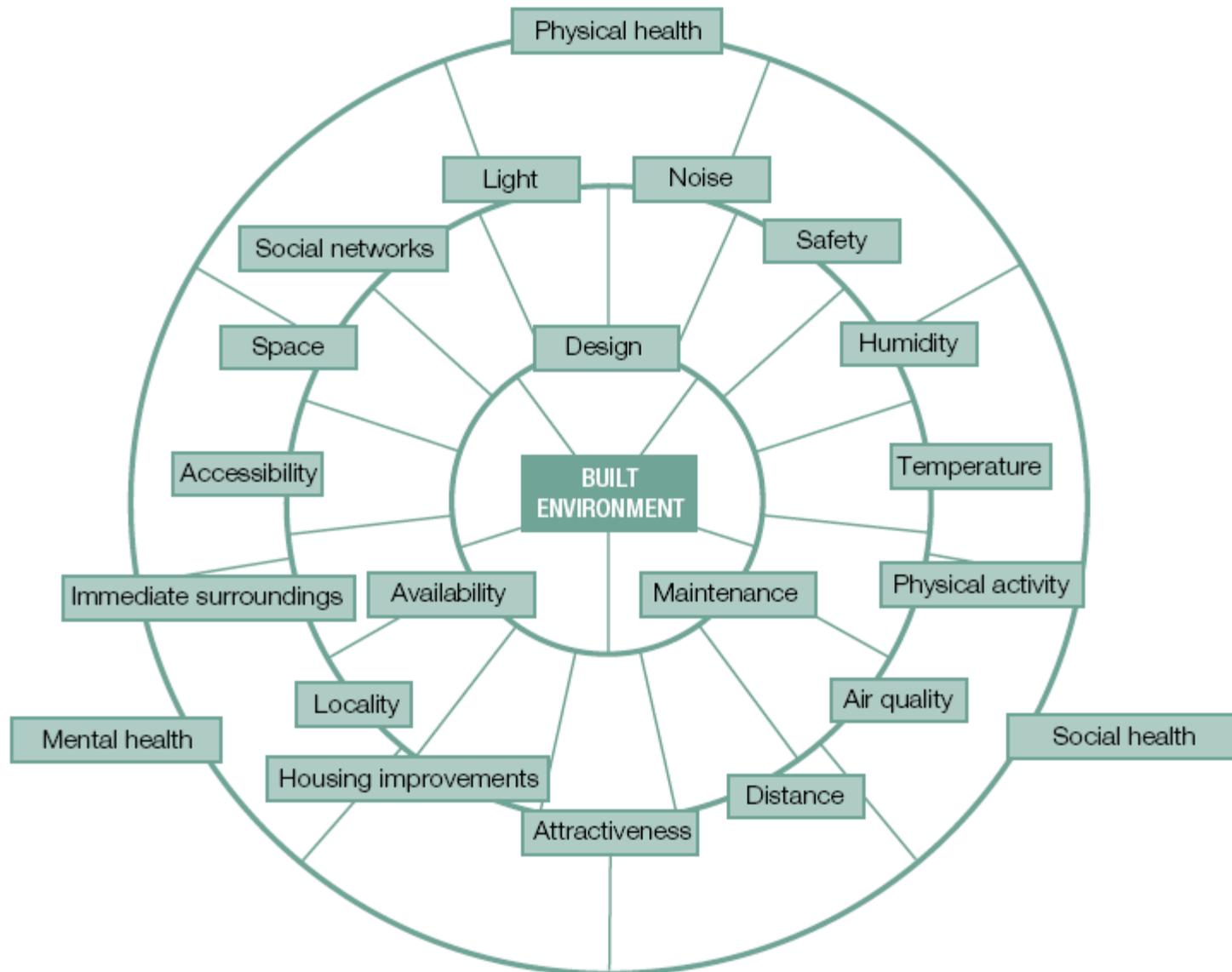
- Built Environment factors that may, over the life course, be major determinants of health and wellbeing in later life (prevention).
- Independent living: e.g. alleviate symptoms; staying longer in own dwelling.
- Factors supporting healthy life expectancy
- Older people as dynamic and key contributors to society

Currently, it is estimated that:

- over 100,000 first strokes are experienced every year in the UK; 90% of these affect people over 65.
- 42% of people over 75 will develop cataracts. Almost 50% of older people will have age-related macular degeneration.
- 55% of 60+ are deaf or hard of hearing.
- Altogether, about 70% of people in their 70s and 83 per cent of 80-year-olds have mobility problems.

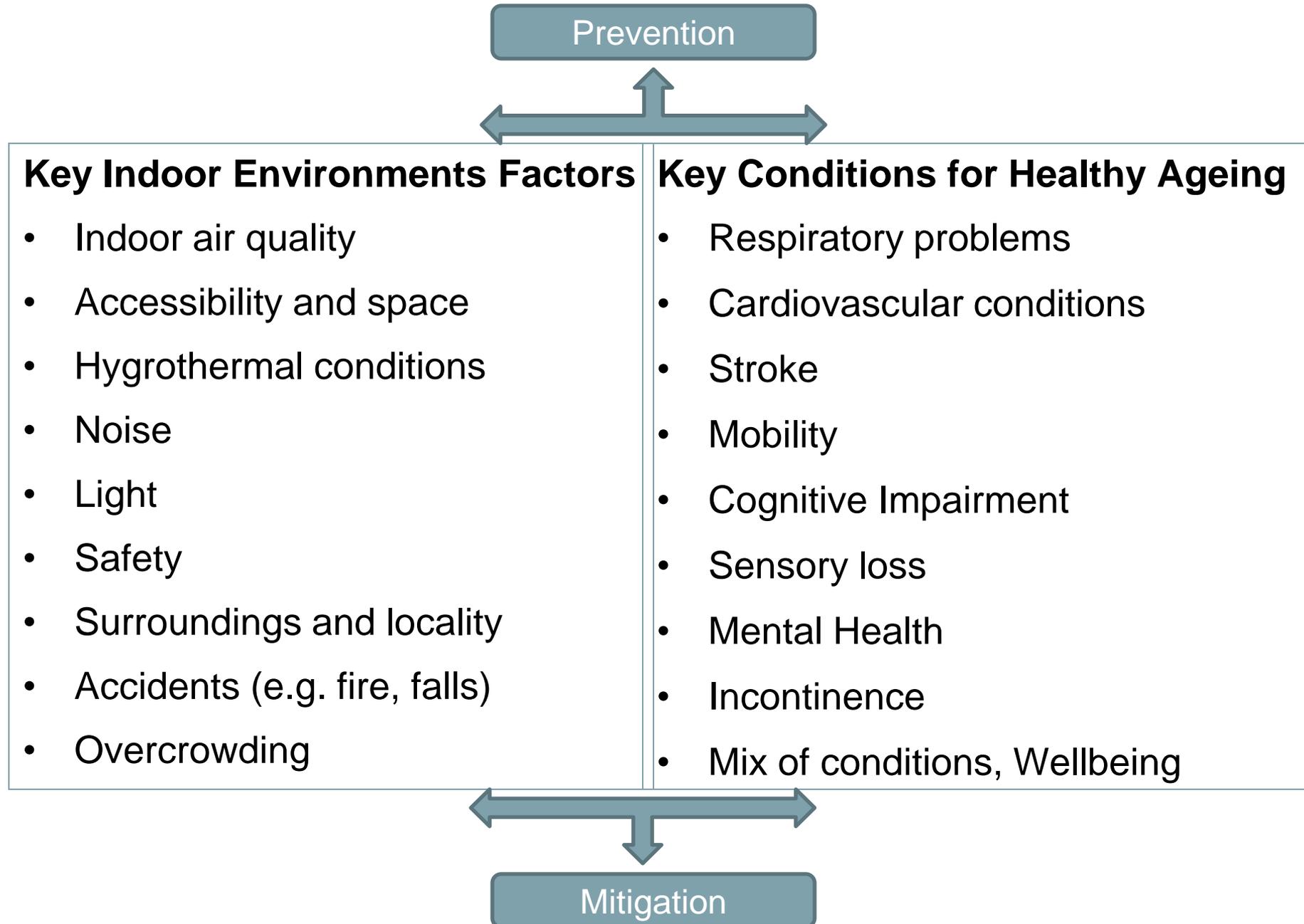
It is estimated that by 2018 there will be in the UK:

- nearly 7 million older people who cannot **walk up one flight of stairs** without resting
- 1.5 million older people who **cannot see well enough** to recognise a friend across a road
- over 4 million with major **hearing problems**
- up to a third of a million people aged 75+ **with dual sensory loss**
- a third of a million who have **difficulty bathing**
- nearly a million with **dementia**



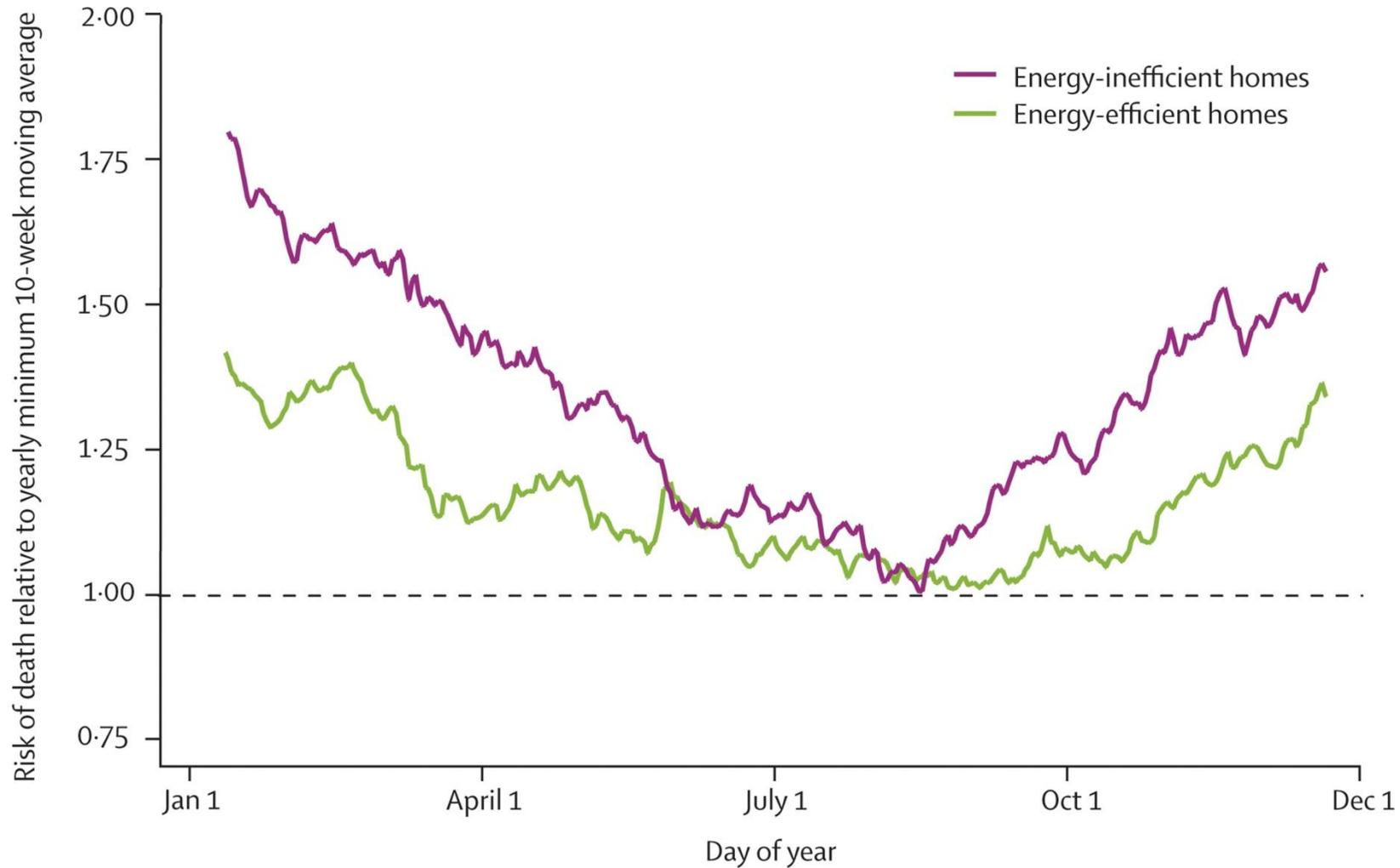
Domestic Health and Safety Hazard	Category	Risk Index
Hygrothermal conditions	A	83
Slips, trips and falls on the level		78
Particles and fibres		78
Radon		78
Environmental tobacco smoke		72
Slips, trips and falls on stairs, ramps and escalators		71
Security and the effects of crime		B
Noise	70	
House dust mites	69	
Burns and scalds	68	
Fires in buildings	67	
Carbon monoxide	66	
Fungal growth	62	
Lighting	62	
Space and crowding	62	
Lead	61	
Slips, trips and falls from windows, balconies and roofs	C	
Oxides of nitrogen		60
Toilet facilities		60
Volatile organic compounds		59
Collision/entrapment involving doors		59
Sources of infection other than toilets		58
Electrical hazards		56
Drowning		56
Collision/entrapment involving windows	D	50
Sulphur dioxide		50
Cockroaches		48
Structural collapse and falling objects		48
Explosions in buildings		48
Land contamination including landfill gas		41
Biocides		26
Collision/entrapment involving lifts and escalators		14
Electromagnetic fields	NBRA	

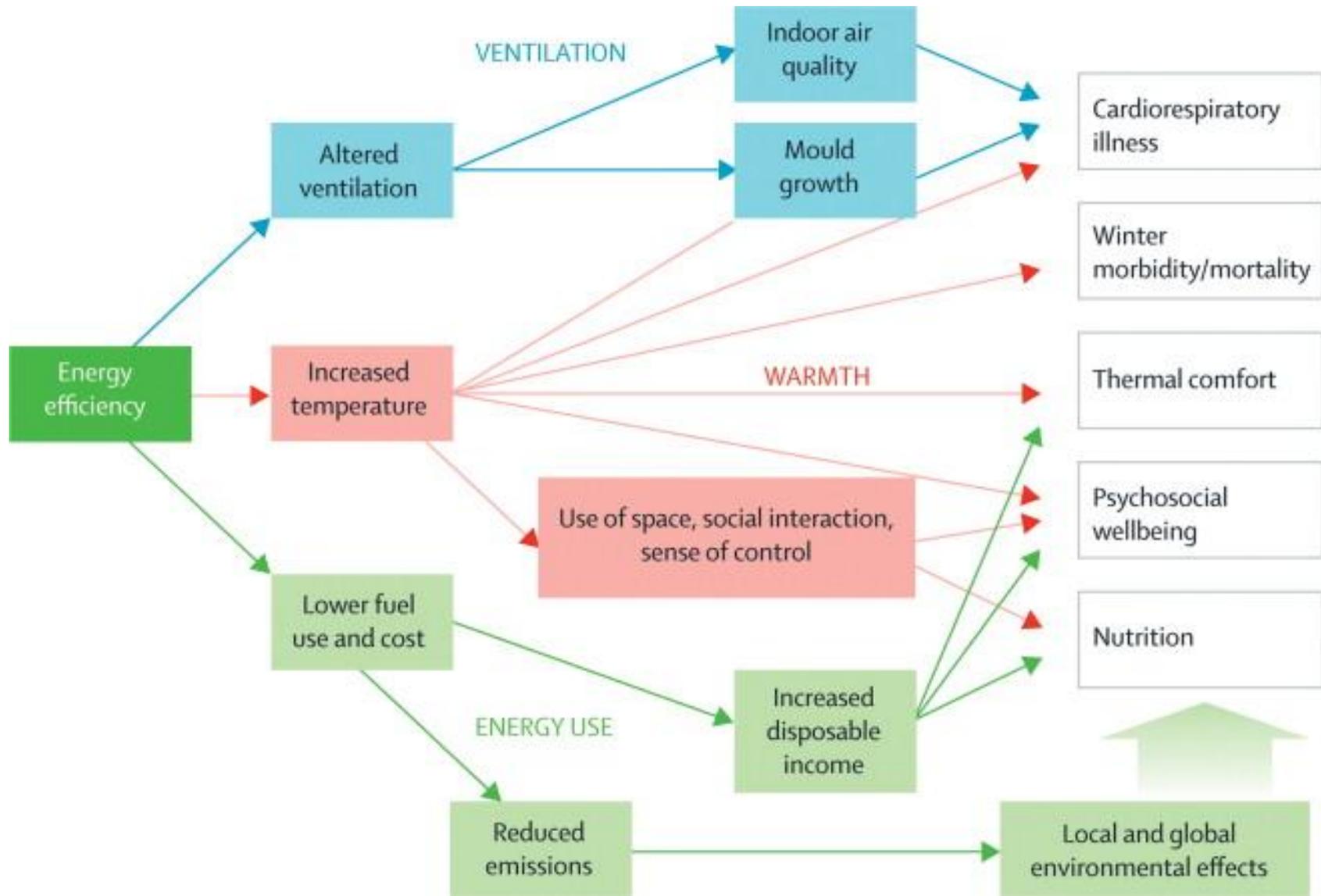
CLG, (2008), *BD 2518 Review of Health and Safety Risk Drivers*, Communities and Local Government, [www.communities.gov.uk](http://www.communities.gov.uk)



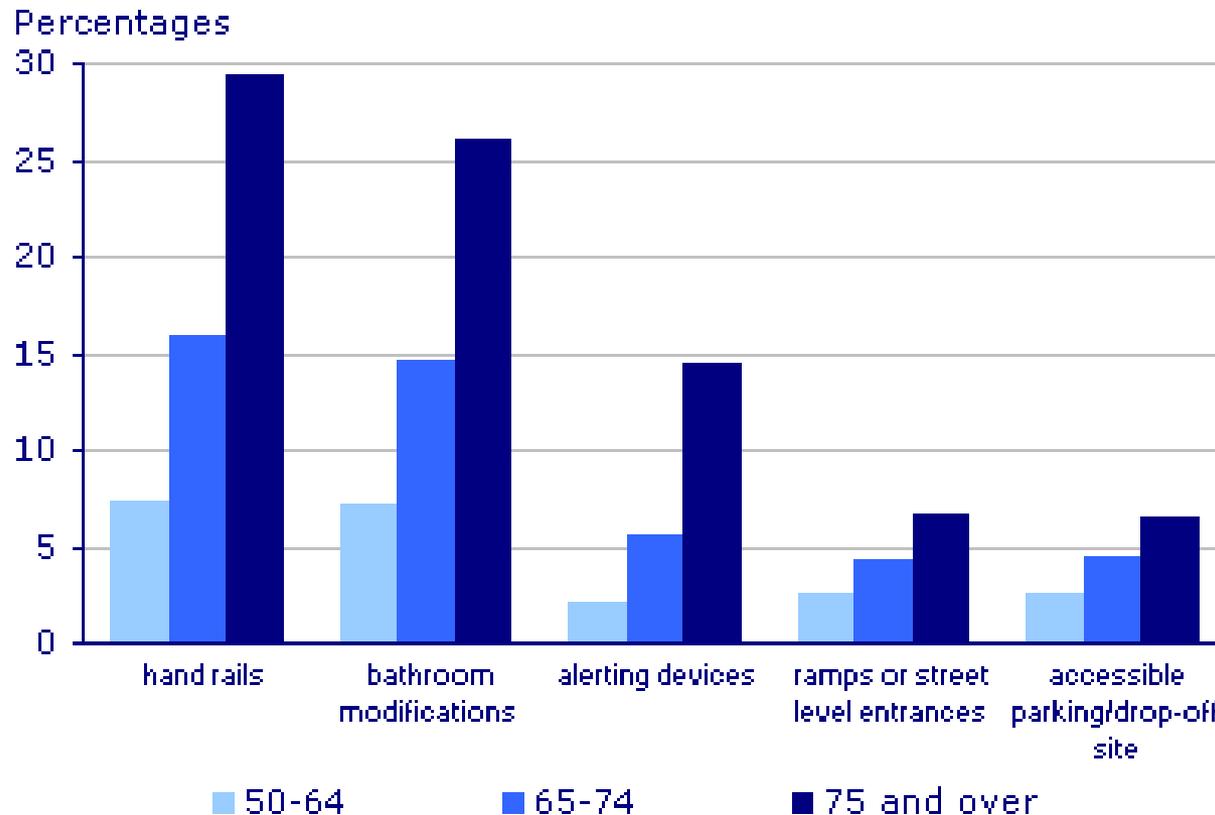
# **Housing and Health: Some Examples**

## Excess Winter Deaths and Energy Efficient Homes





## House adaptation by age of the household reference person, England, 2006



ONS, Focus on Older People, <http://www.statistics.gov.uk/cci/nugget.asp?id=1265>

# Special Needs to Inclusive Design

Special Needs	Inclusive Design
Associated with the medical model of disability	Associated with the social model of disability
Designer client. Persona of a young, fit, active, male, white adult the yardstick for good design.	People are individuals, who have different needs and requirements during their life course.
Others - older people and people with disabilities - are not 'normal' clients	Us - we all have goals / aspirations as well as problems / impairments.
They have 'special needs'.	We share 'generic needs'.
Micro-environmental approach	Macro-environmental approach
Ethos of specialisation and pragmatism	Ethos of normalisation and enablement.
Tailors the environment so that it is 'just right' for each client group.	Extends parameters of design until no one is excluded
Telling people what they need.	Asking people what they want.

## Measuring 'health impact' of inclusive design and housing interventions

- Difficult to design a placebo-controlled study
- Multi-faceted and 'tailored' interventions
- Expensive: difficult to achieve suitable sample size
- Often case-study approach
- 'Soft' definition of health: what is the NHS cost?

# Disciplinarity and Complexity

- Origins of approaches, e.g.:
  - Energy efficiency: engineering approach
  - Inclusive design: social sciences approach
  - Indoor air quality: epidemiology approach
- Whose evidence/methods?
- How is 'health and wellbeing' defined/measured?
- 'Hard' vs 'soft' definitions of health and wellbeing

Part 2

# CURRENT APPROACHES

- Building Regulations
- Housing Health and Safety Rating Scheme
- Decent Homes Programme
- Lifetime Homes
- Code for Sustainable Homes
- Repairs Grants

- A. Structure
- B. Fire safety
- C. Site, resistance to contaminants and moisture
- D. Toxic substances
- E. Sound
- F. Ventilation
- G. Hygiene
- H. Drainage and waste disposal
- J. Combustion appliances and fuel storage
- K. Falls, collision and impact
- L. Conservation of fuel and power
- M. Access to and use of buildings
- N. Glazing
- P. Electrical safety

# Housing Health and Safety Rating System

- Risk-based evaluation tool to help local authorities identify and protect against potential risks and hazards to health and safety from any deficiencies identified in dwellings.
- Into effect on 6 April 2006, replacement for the Housing Fitness Standard.
- Evaluation of both the likelihood of an occurrence that could cause harm, and the probable severity of the outcomes of such an occurrence
- Evidence-based: supported by extensive reviews of the literature and by detailed analyses of statistical data on the impact of housing conditions on health

- Damp and Mould
- Excess Cold
- Excess Heat
- Asbestos
- Biocides
- Carbon Monoxide
- Lead
- Radiation
- Uncombusted fuel gas
- Structural collapse and falling elements
- Personal hygiene, sanitation and drainage
- Falls on the level
- Falls associated with stairs and steps
- Falls between levels
- Electrical hazards
- Volatile Organic Compounds
- Crowding and space
- Entry by intruders
- Lighting
- Noise
- Domestic hygiene, pests and refuse
- Food safety
- Water supply for domestic purposes
- Falls associated with baths etc
- Fire
- Hot surfaces and materials
- Collision and entrapment
- Explosions
- Ergonomics

## HHSRS: Vulnerable Age Group

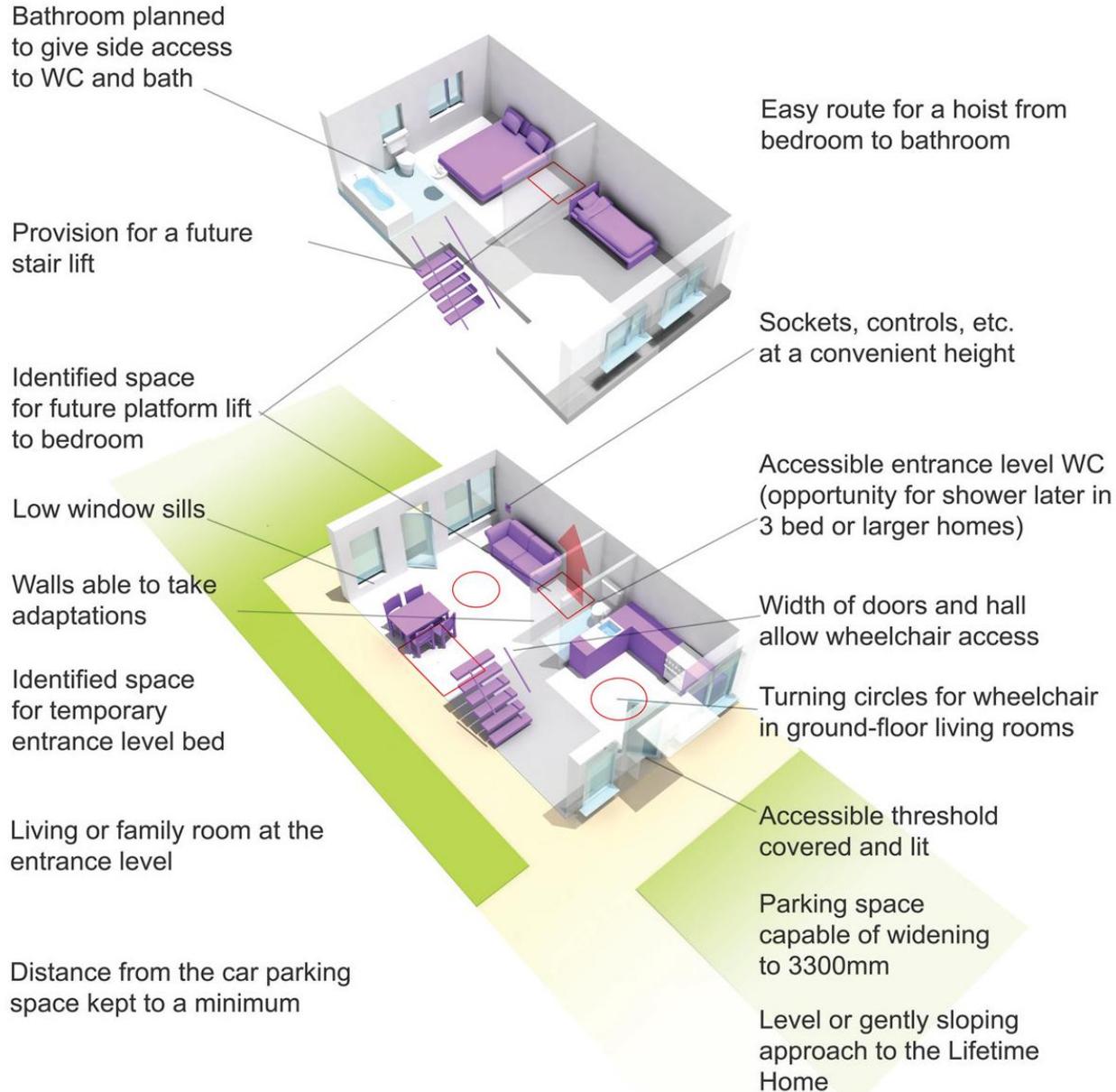
- The assessment of the dwelling does not focus on the current occupiers (if any), but based on the potential effect of any hazards on a member of the **relevant vulnerable age group**.
- E.g. for excess cold/heat, the most vulnerable age group is 65 years or over.

- The Government expects 95% of all social housing to be decent by 2010 and the remainder to be improved as fast as possible after that date.
- The Housing Health and Safety Rating System (HHSRS) came into effect on 6 April 2006 and replaces the fitness standard as the statutory element of the Decent Home Standard
- To be 'decent', a dwelling should be free of category 1 hazards, and the existence of such hazards should be a trigger for remedial action unless practical steps cannot be taken without disproportionate expense or disruption.

# Lifetime Homes

- Developed since early 1990s, based on inclusive design principles
- 16 Design Criteria that can be universally applied to new homes
- Focus on accessibility, including flexibility for future adaptations
- Wheelchair accessibility chosen as the benchmark for a good space requirement
- A number of studies on the costs and benefits of Lifetime Homes standard concluded that the additional costs range from £545 to £1615 per dwelling, depending on various factors (e.g. size of dwelling, market conditions, whether it's a modification or incorporated at the onset).  
(<http://www.lifetimehomes.org.uk/pages/costs.html>).
- All public sector funded housing in England will be built to the Lifetime Homes standard from 2011 (it is an existing requirement in Wales and Northern Ireland), with a target of 2013 for all private sector dwellings.

# Lifetime Homes: Diagram



- Since May 2008, all new homes in England need to be rated against the Code.
- Local authorities may also set sustainability-based planning conditions on housing developments in their area
- By 2016 all new homes should be Level 6 (Zero Energy)

It rates sustainability of a new home against nine categories:

- Energy
- Water
- Materials
- Surface Water
- Waste Pollution
- Health and Wellbeing
- Management
- Ecology

## Health and Wellbeing Component:

- **LifeTime Homes standards:** mandatory at Code level 6. From 2010 they will be mandatory at Code level 4 and in 2013 at Code level 3.
- **Lighting:** e.g. credits for meeting the minimum average daylight factor
- **Sound:** e.g. credits awarded for achieving higher standards of sound insulation than those in Approved Document E27 of the Building Regs
- **Outdoor accessible private space**

DCLG, 2008, *The code for sustainable homes. Setting the standard in sustainability for new homes*, [www.communities.gov.uk](http://www.communities.gov.uk)

## Existing/Private Properties: Repairs and Grants

- Warmfront
- Disabled Facilities Grants
- Help from social services
- Home Improvement Agencies
- Charities
- Equity Release
- Etc.

## Other Guidance and Initiatives

- LifeTime Neighbourhoods
- Secured by Design
- Health Impact Assessment
- Research/Guidance for specific conditions:
  - Sight Loss
  - Dementia
  - Etc.
- Telecare and Smart Homes
- Etc.

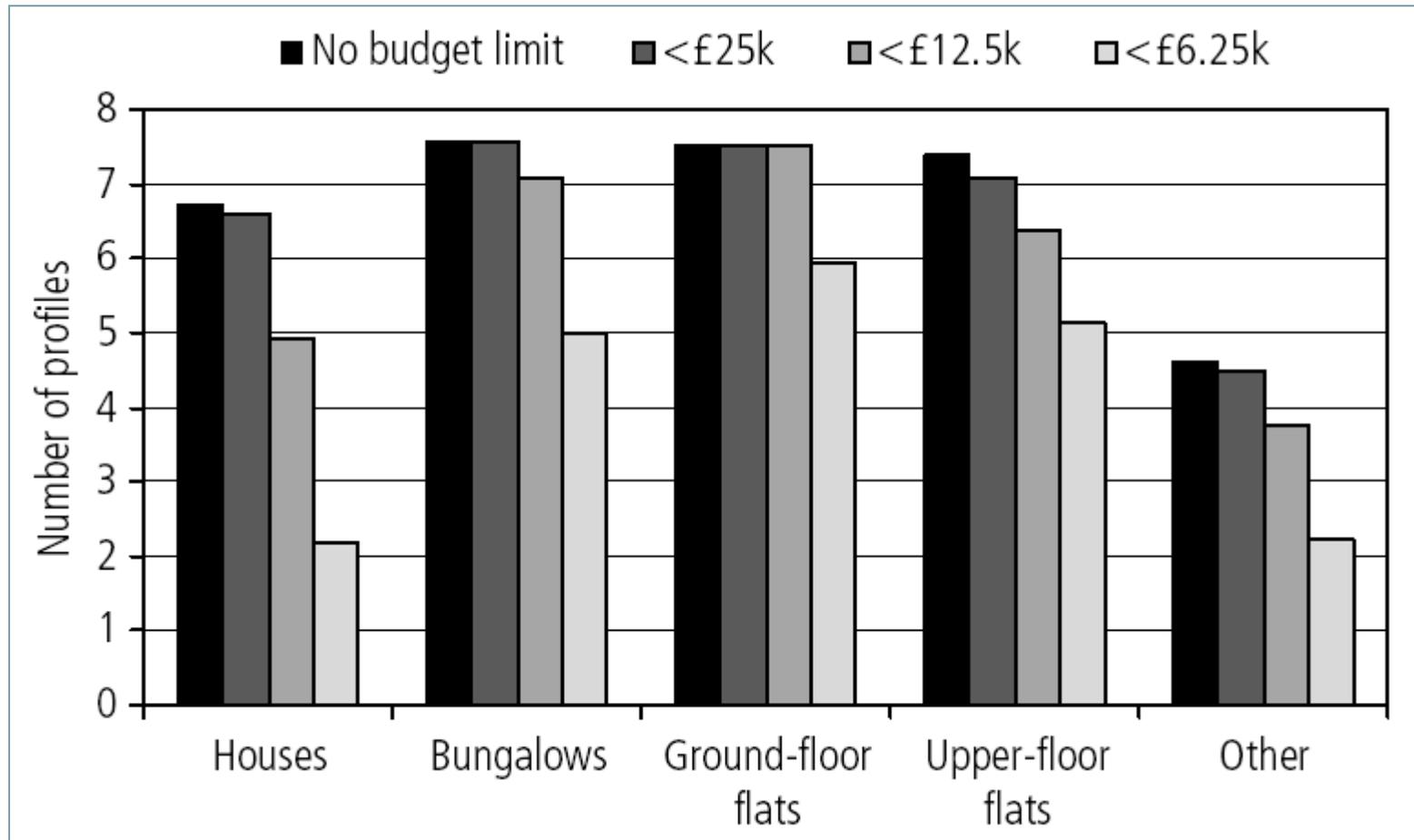
Part 3

# TRENDS AND FUTURE CHALLENGES

## The Future: Some Trends and Challenges

- Existing Dwellings: the real challenge
- Climate Change:
  - Mitigation (e.g. Great British Refurb)
  - Adaptation (e.g. Heat Waves)
  - Equality
- Telecare and Smart Homes
- Extending Lifetime Homes Principles: Balance Between Universal and Special Needs Design

## Average Number of Mobility Profiles Achieved at Different Cost Limits by Type of Property



Goodacre et al, (2007), *Enabling Older People to Stay at Home: How Adaptable Are Existing Properties?*, British Journal of Occupational Therapy.

# Climate Change

- Mitigation: Great British Refurbishment
  - Biggest engineering challenge of the century
  - Inequalities (e.g. who pays?)
  - IAQ, Benefits vs Negative Outcomes: controversial
  - Behavioural assumptions, takeback factor
- Adaptation:
  - Heat Waves
  - Flooding
  - Etc.

# TeleCare, Assistive Technologies, Smart Homes

- Telecare may mean further demand for housing adaptations
- Great potential for supporting independent living
- Will they substitute the 'human face'?
- Will smart homes take away control and stimulus?
- Cochrane review on smart home technologies (2009): no study met inclusion criteria
  - Inclusion: randomised controlled trials (RCTs), quasi-experimental studies, controlled before and after studies (CBAs) and interrupted time series analyses (ITS).
  - The included interventions: social alarms, electronic assistive devices, telecare social alert platforms, environmental control systems, automated home and 'ubiquitous homes'.

## Universal Design, Macro-Approach and Other Models

- Lifetime Homes
- Sheltered Housing
- Extra Care Housing
- Residential Care Homes
- Nursing Homes
- Dementia-Adapted Housing
- Etc.

## Conclusions: Challenges and Opportunities

- Lack of, and Approaches to: Evidence
- Joined Up Thinking (incl. outdoor built environment)
- Great British Refurb.: Challenge/Opportunity?
- Engaging Built Environment Professionals (market/costs; disciplinarity)
- Right balance: universal design vs. over-design
- Technological ‘fixes’: not necessarily silver bullet
- Costs and Equality

# Thank You

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