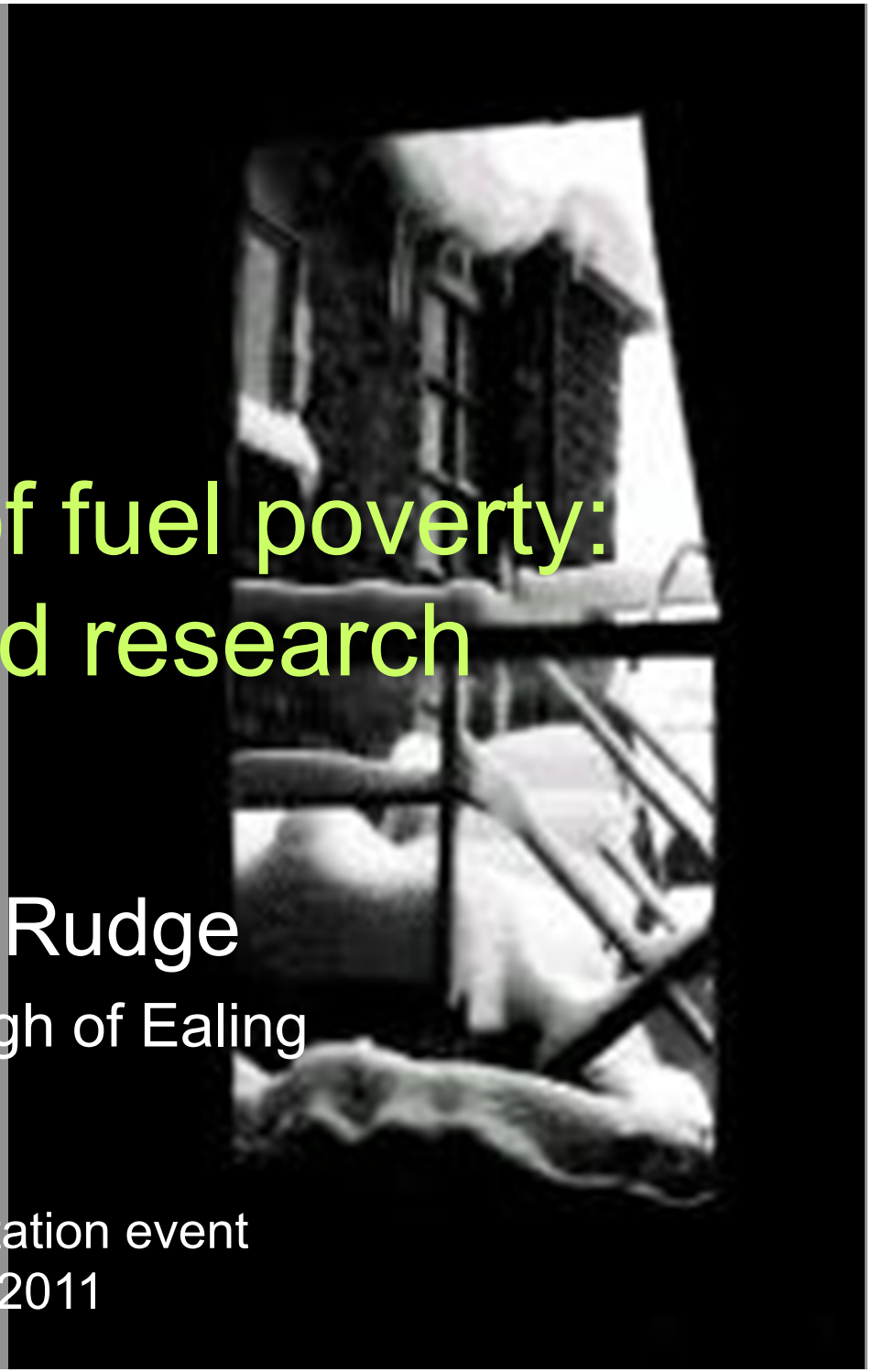
Health impact of fuel poverty: Evidence and research



Dr Janet Rudge

London Borough of Ealing

KWILLT consultation event
19 Sept 2011

Outline

- Fuel poverty: definition, scale and risk factors
- Cold-related health risks
- Research evidence of health impact
- Case studies
- Ways forward

Fuel poverty is ...

.... the inability to afford adequate warmth in the home *because of the energy inefficiency of the home*.

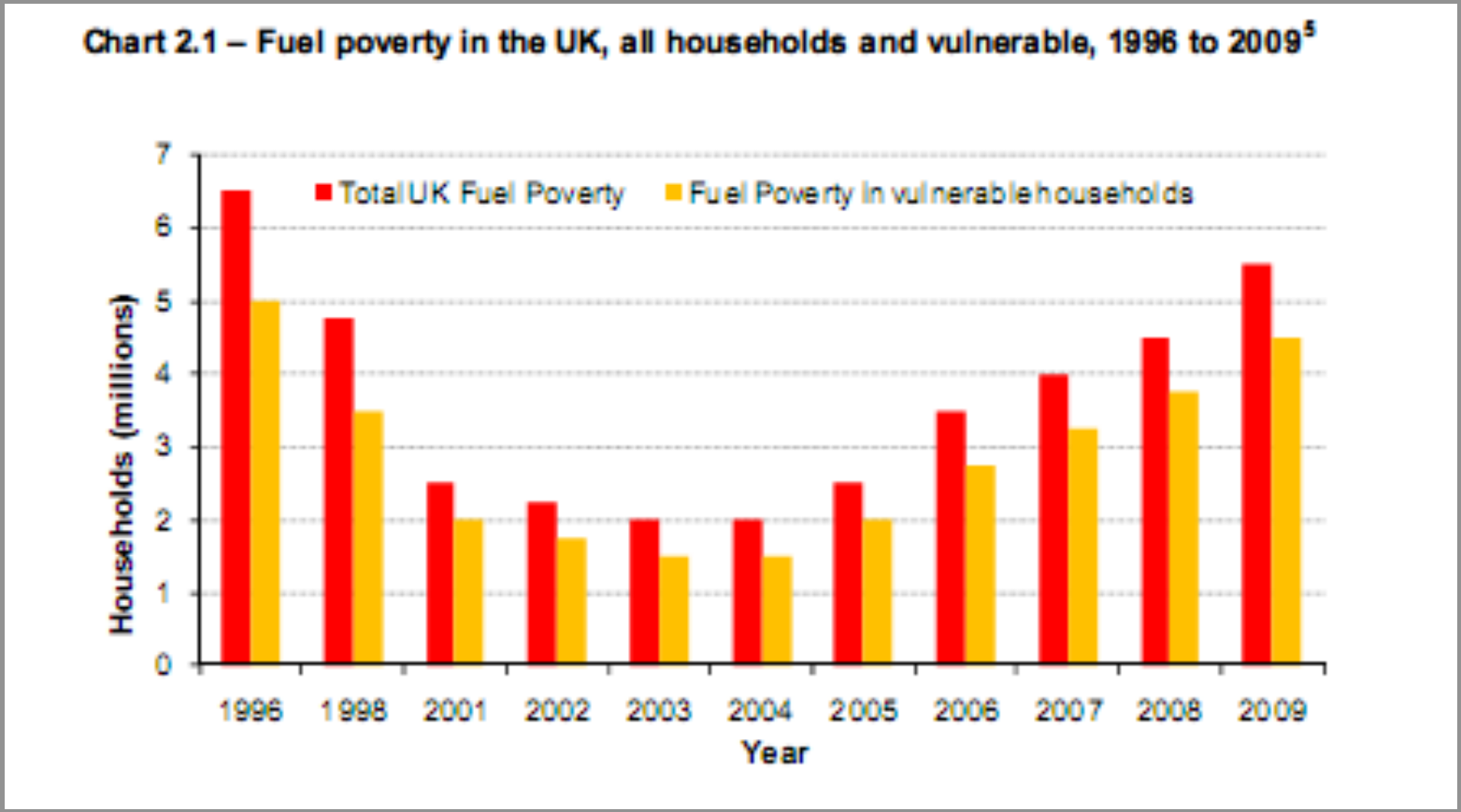
Government definition (currently under review):
Households are fuel poor if,

in order to maintain a satisfactory heating regime,

they *need to* spend more than 10% of their income on *all* household fuel use.

The long term solution is '**affordable warmth**', provided by energy efficient homes and heating systems (need capital investment) ,
cheap fuel - and decent income levels

A growing problem



From: Annual Report on Fuel Poverty Statistics 2011, DECC

Fuel poverty risk factors

- Building energy inefficiency
- Income
- Living alone
- Age
- Tenure
- Under-occupation
- Location

Older people as a vulnerable group

- often unable to afford sufficient heating
- most likely to live in hard-to-heat housing
- vulnerable to health effects of cold living conditions
- attitudes and behavioural issues
- high numbers of excess winter deaths among over 65 year-olds in UK – 93% of total

Cold-related health effects

Benchmark indoor temperatures to avoid health risk::

- 18°- 24°C - no risk to healthy, sedentary people
- <16°C - increased respiratory risk
- <12°C - cardiovascular risk

Fluctuating temperatures cause *cold stress* but
a warm home gives better protection for going out into cold

Asthma attacks can be cold-induced

Prolonged cold can cause hypothermia

Mould growth (from condensation in cold conditions) produces allergens associated with respiratory ailments

Excess winter deaths

- Number of deaths occurring in winter in excess of the average for the rest of the year
- More in UK than in other similar, or colder, climates
- 20,000 - 45,000 annually, among > 65 year olds
- Main causes respiratory and cardiovascular diseases
- Greater proportional effect of winter on respiratory disease
- Very small proportion due to hypothermia or influenza
- Cold-related deaths are *not* expected deaths brought forward
- Relative temperature changes may be important?

Research evidence: epidemiological

- 2/3 explained by direct effect of exposure to cold – partly due to increased stress on circulatory system
- Possibly half of these (30% of total) attributable to indoor cold
- Increased BP associated with lower living room temperature
- In England, excess winter mortality found to be
  - associated with outdoor temperature & lack of central heating
  - associated with low indoor temperatures, older buildings & thermal efficiency
  - 50–60% cold-related (ie cardiovascular and respiratory disease)
- In Siberia, warm clothing and warm indoor temperatures prevented increased cardiovascular mortality as outside temperatures fell to -48º C

Rudge, J., (2011) Indoor cold and mortality. In: WHO (2011). *Environmental Burden of Disease Associated with Inadequate Housing*. Braubach et al., (Eds.), WHO Regional Office for Europe, Copenhagen, pp 80-94.

Research evidence: interventions

Watcombe Housing Study (SW England)

- housing upgrades led to warmer, drier houses
- increased whole-house comfort , improved self-reported well-being

Warm Front Study (England)

- Government's energy efficiency programme (insulation / heating)
- improved thermal comfort, psycho-social benefits

Housing, Insulation and Health Study (NZ)

- insulation in homes of patients with respiratory conditions achieved warmer, drier homes
- significantly improved self-reported health, fewer GP visits and hospital admissions

Clear evidence?

- Comparison of studies difficult due to variations in design, measurements, sample housing and populations and selected interventions
- Concrete evidence of health improvements following housing interventions is elusive
- Sufficient grounds for interventions to benefit health
- Benefits may emerge only in long term
- Housing conditions not only answer
- Clearer effects where interventions targeted towards poor homes and vulnerable residents, especially for respiratory conditions

Index of Fuel Poverty Risk (FPR)

A small area index score - product of known (unweighted) factors:

Factor	Indicator *(% of total households / dwellings per ED)*	Data source
Low income	*households in receipt of Council Tax Benefit (anonymised)*	Local authority
Age	*households with 1+ pensioner(s)*	1991 Census
Under-occupation	*one or two person households in dwellings with >4 or >5 rooms , respectively*	1991 Census
Low energy efficiency	*dwellings with low energy rating (<1991 national average), based on house type, tenure, building age*	Physical street by street survey, Census, local authority

Published in Rudge J and Gilchrist R (2007) Measuring the impact of temperatures in dwellings: investigating excess winter morbidity and cold homes in the London Borough of Newham. *Energy and Buildings* **39:** 847–858

Excess Winter Morbidity Ratio (EWMbR)

$$\frac{\text{no. of winter episodes } *}{\text{average no. episodes for previous and following seasons } **}$$

*Winter = December – March; ** Autumn = August – November; Summer = April – July

Measured EWMbR (for LB Newham) for:

- emergency hospital episodes (1993-1996)
- all respiratory diagnosis
- population >65 years old
- enumeration district (ED)

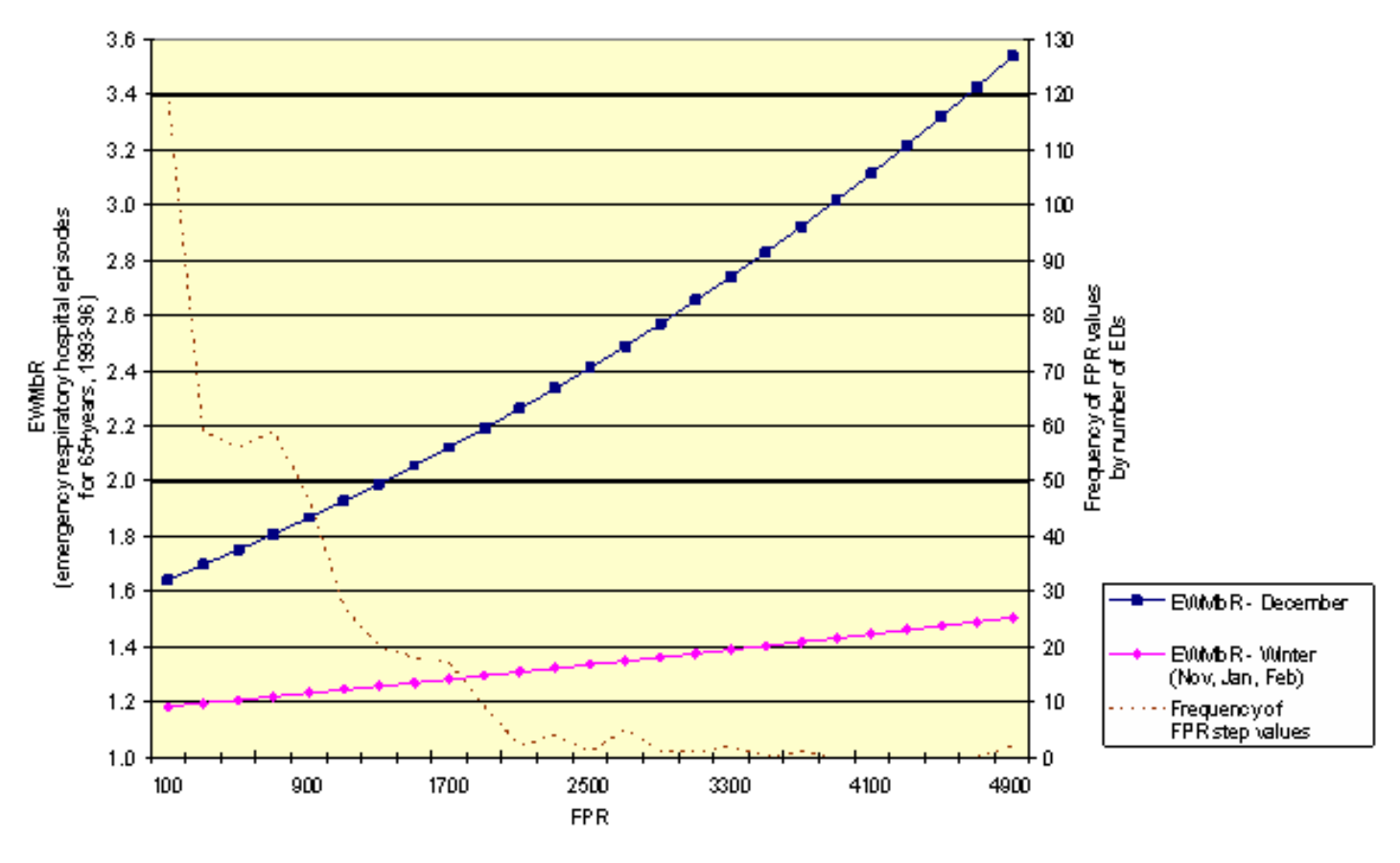
diagnosis	EWMbR all ages	EWMbR >64 yrs
all-cause	0.96	1.05
cardiovascular	1.05	1.08
respiratory	1.12	1.36

Results

Excess winter morbidity plotted against step values of Fuel Poverty Risk Index,

according to 'best fit' model comparing excess in December with other 'winter' months

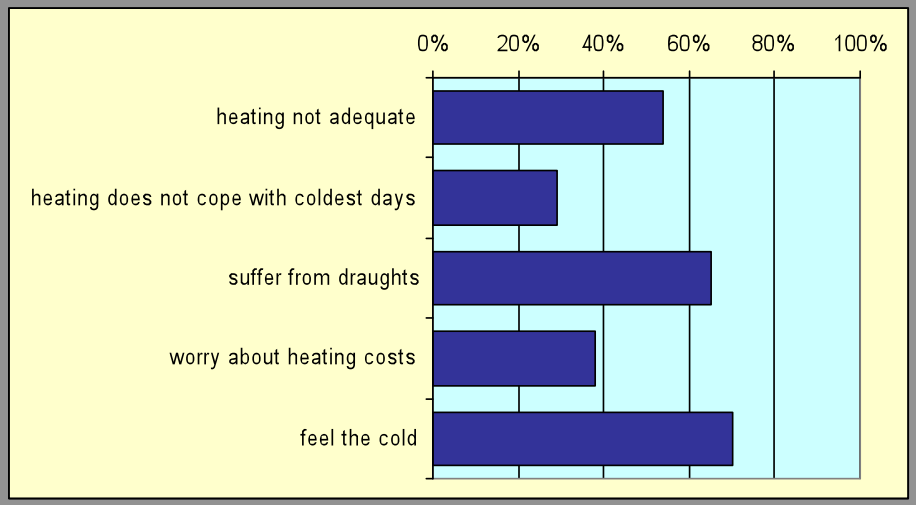
and showing frequency of step values for *FPR*



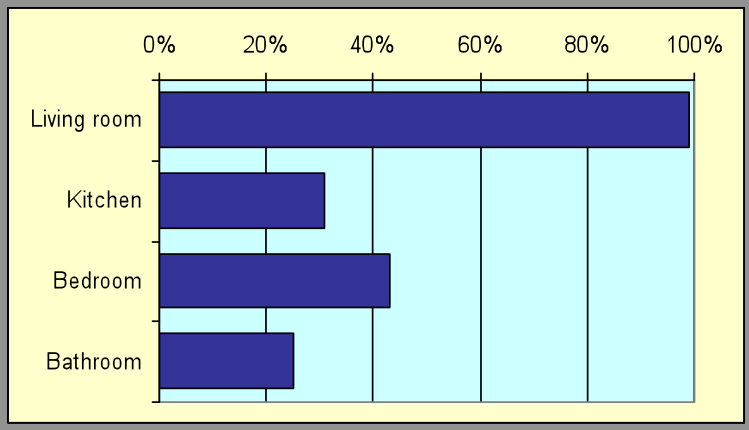
Lambeth central heating study

Before CH installation:

Heating perceptions



Rooms heated



Among those who initially accepted CH offer, more
felt the cold, worried about heating costs
reported more chronic illness / conditions affected by cold , eg arthritis

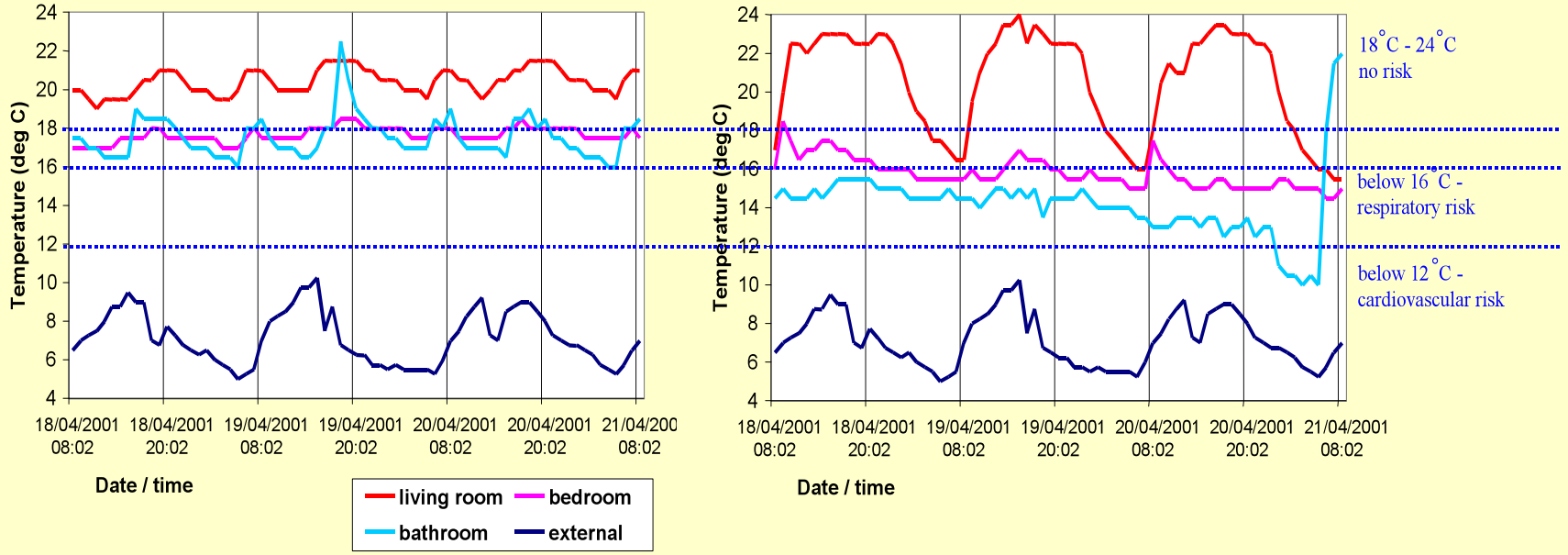
Published in Rudge, J. & Winder, R. (2002). Central heating installation for older, low income households: what difference does it make? *Indoor Air 2002: Proceedings of 9th International Conference on Indoor Air Quality and Climate*, Vol. 4, H Levin, ed., Indoor Air 2002, Santa Cruz, California, 2002, pp.1078-83.

Temperature profiles

Indoor temperatures analysed against thresholds for health:

Typical home with CH

Typical home without CH



Average *whole house* temperatures similar, before and after installation

Uptake of interventions

Reasons for refusing CH installation:

- upheaval
- reduced space
- prefer cooler temperatures / CH causes stuffiness
- CH is unhealthy - especially for respiratory conditions
- higher fuel bills / rent rise implications
- like look of real gas fire
- illness
- ‘too old to change now’ / fear of new system
- **do those most in need refuse?**

Criteria for health

Actual experience:

- which rooms occupied *and* when
- *range* of temperatures rather than *'whole house mean'*

Vulnerable situations:

- bathroom temperatures should be warmer than others
- getting out of bed at night

Vulnerable times of day:

- rapid temperature change - at bedtime
- early morning (blood pressure changes)

Health assessment problems

Study design

- health effects of housing interventions prone to confounding
- necessary flexibility of methodology precluded RCT
- sample size, time scale

Responses

- impaired temperature perception can affect comfort responses
- self-reported health service use depends on memory
- psychosocial factors may influence answers

Relating temperature to outcomes

- chronically ill may run warmer homes
- health service provision depends on availability rather than need

Ways forward

Research

- Limit interventions investigated
- allow long term followup where possible
- target those who are likely to benefit most

Policy

- Promote **affordable warmth** rather than label the fuel poor
- Energy efficiency agreed as environmental necessity - needs greater promotion as a universal aspiration
- One stop shop for help with energy efficiency measures and advice

Some practical actions for health promotion

- Healthy Outlook®: Met Office cold weather forecast alert service to COPD patients
- Awareness training for hospital discharge staff (with available practical remedies) – to help avoid revolving door syndrome
- Single Assessment Process in health and social care should include identification of potential fuel poverty