INHERIT

Health | Equity | Environment

Retrospective Study on Energy Efficiency in the UK

George Morris, on behalf of Tim Taylor (UNEXE)

The INHERIT project (2016-2019), coordinated by EuroHealthNet,
has received funding from the European Union's Horizon 2020 research and innovation programme
under grant agreement No 667364

Background

- Based on recent work with Energy Saving Trust funded by EAGA charity
- This evaluated impact of energy efficiency in an ecological study of hospital episode statistics on cardiovascular disease, COPD and asthma.

Why examine energy efficiency in the UK?

- Potential “triple win”:
  - Health improvement anticipated (via warmer homes, reduced emissions)
  - Environmental improvement – carbon savings
  - Health equity gain as many measures targeted to social housing or to lower income groups

Methodology: Health impacts

Ecological study linking small-area, whole population data on housing energy efficiency and hospital admissions. Two streams:

=> Analysis at Lower-layer Super Output Area (LSOA) level for England.

=> Analysis of higher resolution postcode level data for one area of south west England (Devon).

HEED data (UK wide)

- Includes data on:
  - Loft insulation
  - Wall insulation
  - Glazing type
  - Draught proofing
  - Boiler replacement
  - Property age

- Count data on buildings with certain types of energy efficiency measures (used at LSOA level)

EST Home Analytics - Devon

- Similar household-level data available from the Energy Saving Trust Home Analytics (HA) Portal.
- Aggregated to postcode level

Selected initial results: Risk ratios associated with energy efficiency

Total 3 year admissions	Crude model			Fully adjusted model		
	RR	95% CI	p	RR	95% CI	p
Asthma						
Loft insulation [a]	*1.011*	*[1.010,1.011]*	*<0.001*	*1.004*	*[1.004,1.005]*	*<0.001*
Wall insulation [b]	*1.006*	*[1.003,1.008]*	*<0.001*	1.000	[0.998,1.002]	0.798
Full double/triple glazing [c]	1.001	[1.000,1.003]	0.115	0.999	[0.997,1.000]	0.128
Rate of draught proofing measures [d]	*1.005*	*[1.004,1.005]*	*<0.001*	1.000	[0.999,1.001]	0.814
Rate of boiler replacement measures [e]	*1.027*	*[1.018,1.035]*	*<0.001*	0.998	[0.994,1.002]	0.398
COPD						
Loft insulation [a]	*1.012*	*[1.011,1.013]*	*<0.001*	*1.002*	*[1.001,1.003]*	*<0.001*
Wall insulation [b]	*1.008*	*[1.005,1.011]*	*<0.001*	1.002	[0.999,1.004]	0.155
Full double/triple glazing [c]	*1.004*	*[1.002,1.007]*	*0.001*	0.999	[0.998,1.001]	0.476
Rate of draught proofing measures [d]	*1.011*	*[1.010,1.012]*	*<0.001*	*1.002*	*[1.002,1.003]*	*<0.001*
Rate of boiler replacement measures [e]	*1.038*	*[1.028,1.048]*	*<0.001*	**0.992**	**[0.987,0.996]**	**0.001**
CVD						
Loft insulation [a]	*1.010*	*[1.010,1.011]*	*<0.001*	*1.004*	*[1.003,1.004]*	*<0.001*
Wall insulation [b]	*1.004*	*[1.002,1.006]*	*<0.001*	0.999	[0.998,1.001]	0.356
Full double/triple glazing [c]	0.999	[0.998,1.000]	0.175	**0.999**	**[0.998,1.000]**	**0.011**
Rate of draught proofing measures [d]	*1.003*	*[1.003,1.004]*	*<0.001*	1.000	[1.000,1.001]	0.282
Rate of boiler replacement measures [e]	*1.028*	*[1.020,1.036]*	*<0.001*	1.000	[0.996,1.004]	0.935

Some measures positive, others negative…

Supports "sealing" hypothesis

Open question: Were these measures good or bad overall for health?

Source: Sharpe et al (in prep)

Costs and benefits

Investment costs -

O and M -

Externalities from energy use reduction +

Energy savings +

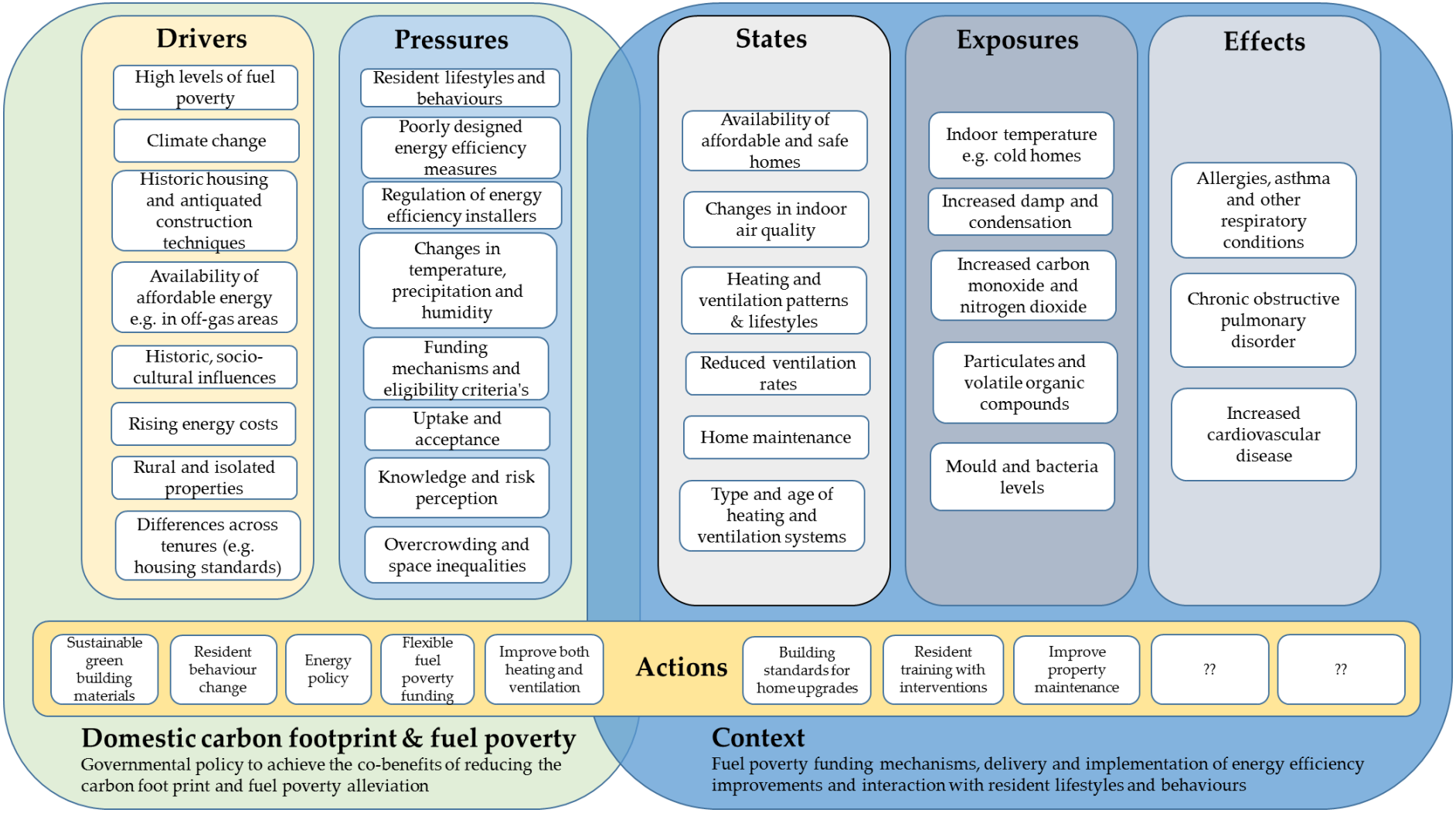
Health impacts +/-

Carbon benefits +

Do the costs outweigh the benefits?

Watch this space….

Ultimately whole house solutions needed to ensure “triple wins”



Source: Sharpe et al (2018)

Take home messages

- Energy efficiency measures *might* lead to triple wins if they were appropriately designed to avoid sealing and other risks.
- In terms of interventions in the recent past, the picture is not clear.
- Caution – this analysis based on ecological study.

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Thanks for listening

Thanks also to Richard Sharpe, Ben Wheeler, Ian Hutchcroft and other members of the team.

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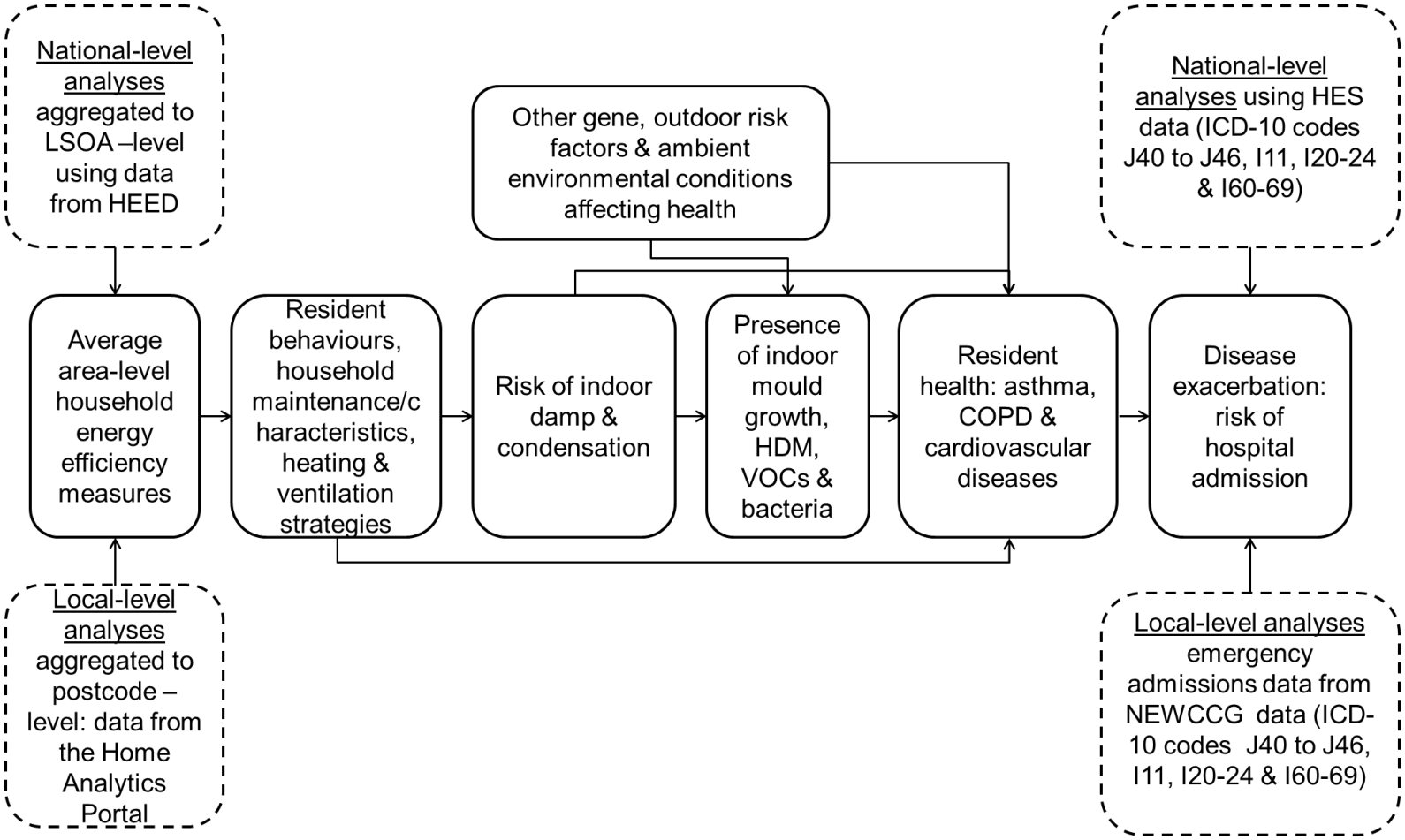
Possible extension…

- Net zero energy retrofit in Social Housing – Energiesprong UK
- Aims to retrofit social housing to a net zero energy standard (for example through insulation, renewable electricity and heat generation).
- It is a “whole house” aiming to deliver fully integrated net zero energy refurbishment packages, supported by long-term performance guarantees aiming to make the solution commercially financeable.

Conceptual model



Hospital admissions data

- Emergency (i.e. unplanned) inpatient admissions relating to the following outcomes were included in both analyses:
  - Asthma (ICD-10 codes J45 & J46)
  - Emphysema & chronic bronchitis, Chronic Obstructive Pulmonary Disease (COPD, ICD-10 J40-J44)
  - Cardiovascular Disease (CVD), comprising hypertensive heart disease (I11), acute stroke (I60-69) & ischemic heart disease (excluding chronic) (I20-24)