

Retrofit and health

Main focus here on people with low incomes/
in fuel poverty:

Tend to have the worst housing conditions,
therefore stand to benefit most from retrofit

-- also this is where research is concentrated

Poverty is bad for your health anyway
– but bad housing definitely makes it
worse

“Even after controlling for debt, low income, and socio-demographic factors such as education: living in a home that is cold **independently predicts both poor physical health and poor mental health.**”

(National Centre for Social Research, 2010)



Health, mental health and
housing conditions in England

Physical health

Housing conditions may cause, contribute to causing, or exacerbate many health problems

- at worst, hastening death.

- Asthma
- Chronic obstructive pulmonary disease
- Allergic rhinitis, wheeze, disturbed sleep from breathing problems (snoring, coughing) chronic bronchitis , respiratory infections (colds and flu)
- **Dementia**
- Arthritis, mobility difficulties, falls
- Heart disease, circulatory disease and stroke
- Sickle cell disease
- Skin healing (eg leg ulcers)
- Allergy issues such as eczema, upset stomach
- **Mental health problems**

Mental health – NatCen again

“Those with a common mental disorder such as depression or anxiety were more likely to experience all aspects of fuel-related poverty.

- Not being able to heat the home in winter,
 - Having a combination of fuel and other debt,
 - Having mould
 - Limiting fuel use because of cost
- all predictors of mental disorders.”

Social Health

- Stigma and isolation
- A quarter of people with a cold home reported reluctance to invite people to their home

Making it better?

Better homes, better health?

“Energy” retrofit assumed to
improve living conditions

Hope is:

- warmer, for more of the time, in more of the home
- lower bills
- ? -- lower RH
- ? -- less CDM

Does it work?

Broadly, yes – at least in terms of warmth, comfort and bills. (Not consistently though as we will see)

When conditions start out very poor, improvements are relatively straightforward to achieve

Study from Cornwall, 20 years ago

Before:

- 92% children's bedrooms were unheated
- 61% were damp
- 43% were damp and mouldy

Even with reasonably modest interventions

Improvements comprised installation of gas central heating or electric storage heaters, with a few receiving solid fuel central heating or oil-fired central heating.

Note that in this case, warming up these homes addressed damp as well as cold – not guaranteed as we will see

Children sleeping in an unheated bedroom

- 92 to 14%

Children sleeping in a damp bedroom

- 61% to 21%

Children sleeping in a damp and mouldy bedroom

- 43% to 6%

NEA study of four linked programmes 700 households (NEA: National Energy Action)



In general - bills became easier & homes were 'easier to keep warm' – win win

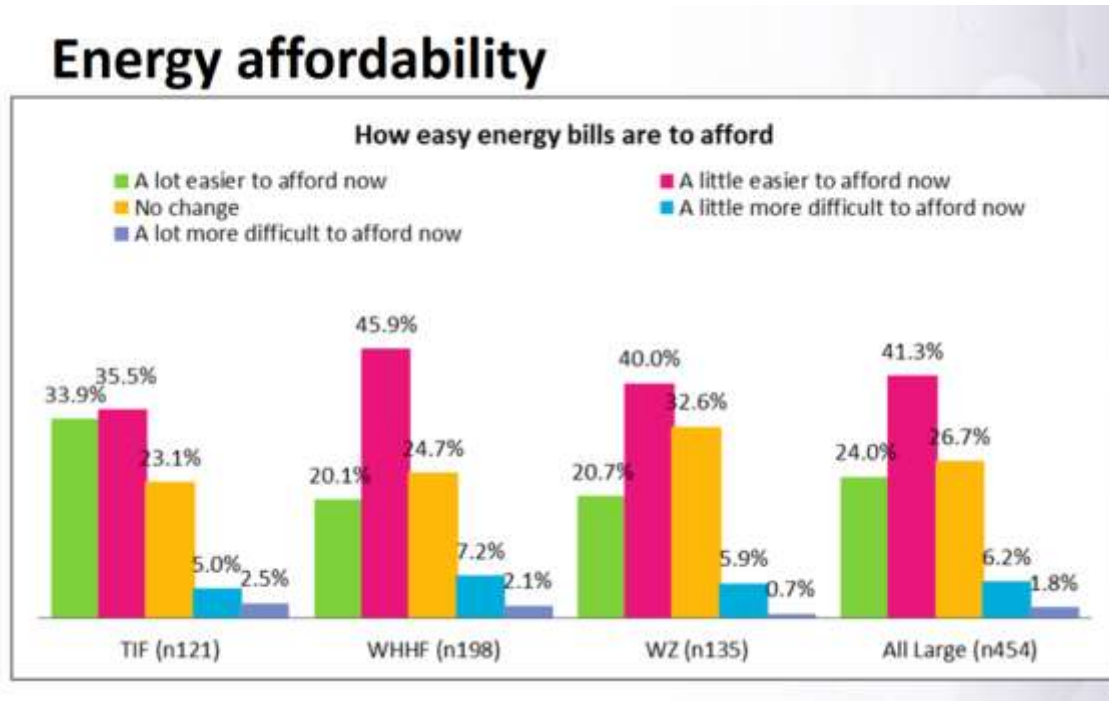
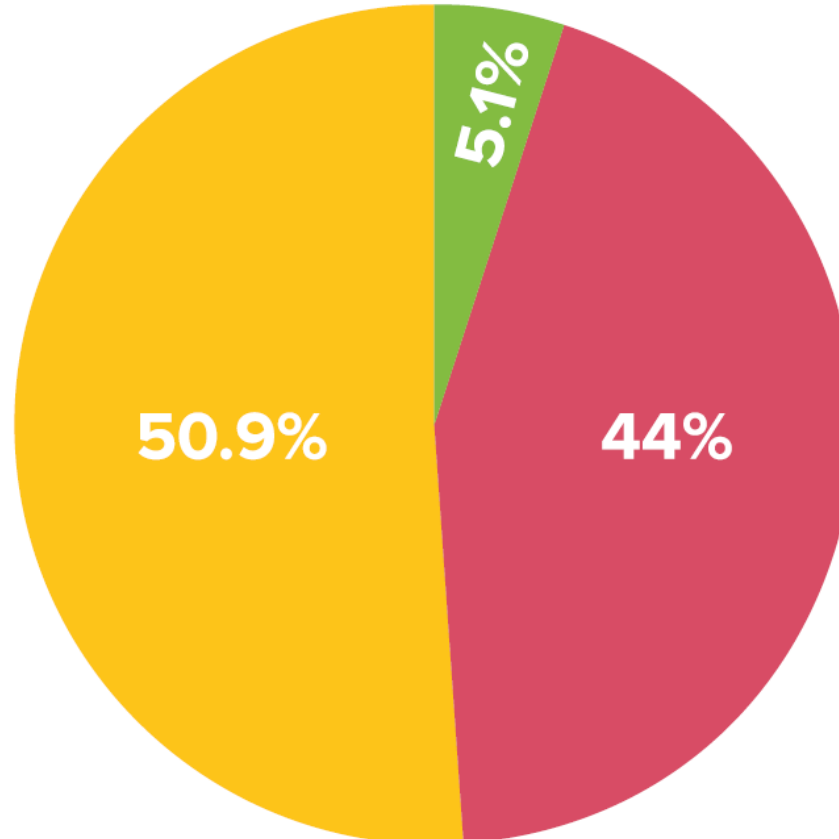


CHART 15 (Small measures)

Post-intervention: How well the house keeps the heat in (thermal retention) (n15)

 A little/a lot worse  Stayed the same  A little/lot better



(but not a wholesale transformation)

Bad causing causes bad health –
but is it reversible? And if so, are
these modest improvements
enough to make a difference

Gentoo – social landlord NE England

“Customers were telling us they were feeling better. Families reported being happier and their wellbeing had increased. Not just in one or two homes, but in home after home, street after street. We were being inundated with huge amounts of anecdotal evidence to suggest the biggest difference we had made since retrofitting the home was to the health of our customers.”

Any numbers?

Research:

Two sorts of study:

1. We improved these homes – how was people's health before and after?
2. These people are not healthy and their homes may not be great – if we improve the homes, will their health improve?

Quite a bit of research: these studies look in particular at NHS use

Improvements commonly seen – but not all were statistically significant

The cold homes in Cornwall:

70 children with asthma –

- All the children's respiratory symptoms were significantly reduced, greatest reduction was seen in night-time coughing
- They had measurably fewer days missed from school after heating was installed.

Study	<u>Carmarthen acute hosp</u>	<u>Carmarthen GP contacts</u>	<u>Gentoo Homes</u>	<u>Nottingham City Homes</u>	<u>Warm Homes Oldham</u>	<u>Charisma study</u>	<u>Effect of improved home heating on asthma (NZ)</u>	<u>Effect of insulating houses & health inequality (NZ)</u>	<u>Fuel poverty in NI</u>
<u>Intervention</u>	Various, to bring homes up to Welsh National Housing Standard.	Various, to bring homes up to Welsh National Housing Standard.	New energy efficient boilers, replace single glazing with double glazing	Installation of external wall insulation	Believed to be boilers & insulation	Ventilation in all homes, +central heating if not already present	Replace plug-in & bottle gas heaters w better, less polluting systems	“standard insulation package” (only loft insulation, draught-stripping & floor damp & draught-proofing, in v cold, damp homes.	Energy improvements including first time central heating and replacing solid fuel stoves
<u>Inpatient/emergency admissions</u>	-39% all three admission causes			-63%	-32%	-		Respiratory only: -47% NS	All health service contacts: -50%
<u>Gp appts</u>		-9% in some categories	-9%	-7%	-8%	No Change	-26%?	-27%	

Gentoo Homes

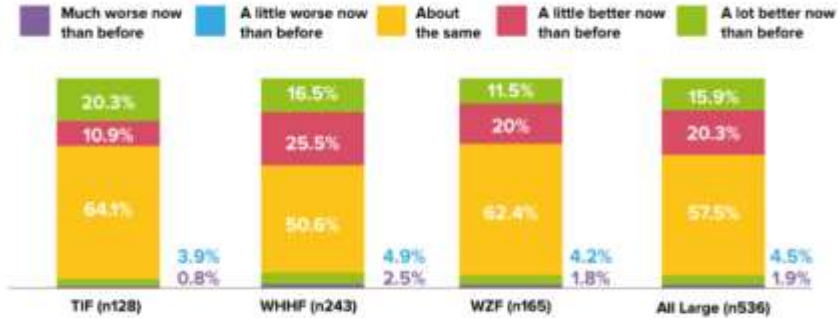
- double-glazed windows to replace single-glazed windows, and the installation of a new energy-efficient combi boiler
- 228 households
- accident/emergency department attendance halved

Always lots of caveats re methodology, lack of blinding, drop out rates etc etc etc but – encouraging overall

People say they feel better, too –
equally important!

Self-reported health - NEA

General household physical health since intervention



General household mental health since intervention



Improvement in health for around 30% of recipients

Carmarthen study

A programme to upgrade all the council stock in Carmarthenshire, to the Welsh National Homes Standard

- 30,000 residents
- over 10 years

Much bigger and longer-lasting than most studies of this kind

Measures included:

- New or upgraded heating systems
- Insulation
- New doors and windows
- New paths outside
- “Electrical package”: security lights, fire and CO alarms, extract ventilation

Residents were consulted, and able to choose other improvements eg decorative fireplaces

VERY accurate figures on NHS use

- data linkage: could examine changes in numbers of hospital stays for **all** 30,000 residents over the **whole** 10 years
- Data system had information on exactly what had been done when, at each address

- Study focused on hospitalisations for lung conditions, heart/circulatory conditions, and home accidents (falls or burns)
- Focus on over-60s as they (we!) have around two-thirds of all hospital stays

Improved warmth appeared beneficial:

Cuts in hospital admissions by measure:

- **new windows and doors 29%**
- **wall insulation 25%**
- Smaller (not statistically significant) drop in admissions associated with **heating upgrades 9%**

Biggest difference

- **39% fewer emergency hospital admissions** for people over 60 living in improved homes where **ventilation** (and other electrical improvements) had been carried out.

...suggests it's not all about heat!

- ...would be interesting to analyse the data in the light of emergency admissions for dementia sufferers, as there is such a strong link between hospitalisation and serious deterioration in this condition.
- (there is more analysis to come from this data)

Does mental health benefit?

Study of EWI installation in social homes in Nottingham

Main residents reported positive effects on all measures of well-being six months after the installation of external wall insulation

Statistically significant improvements in

- mental well-being (improved by 5%),
- happiness (improved by 7%)
- and anxiety (reduced by 9%)

- Warm homes Oldham
- Carmarthen

- Brenda Boardman: Mental stress increases exponentially (with each added stressor) – so removing just one may have great benefit

So – when retrofit goes well,
people can be more comfortable,
save money and enjoy better
health

However:

Quite a lot of studies FAILED to show statistically significant improvements in the health parameter under investigation after energy retrofit

Generally, authors advance a plausible reason why a benefit might not have shown up: study too small, too short, etc

But the possibility remains that a lot of retrofit is failing to benefit the health of occupants

Are the assumptions correct?
Are the methods good enough?

- CONFLATION of energy saving with improved conditions. Are we doing both? (– or even either!)
- CHEAP, target driven, “single measures” – pile ‘em high, never mind the quality etc

Consequences:

- Lack of design , lack of quality control, partial, not-very-effective retrofit
- Lack of attention to indoor environment – all about the measures and the carbon ‘points’
- **Sometimes actively worsens conditions**

Arbed, Wales

Measurement of indoor conditions before and after retrofit – hooray!!

“Increases in indoor relative humidity levels were only observed in buildings that received cavity-wall insulation ... not in ... buildings with solid walls receiving insulation.”

Cavity insulation and external insulation:

There was a crucial difference in approach ... and a crucial difference in health outcome!

“Cavity wall insulation – which was installed without any additional ventilation – was linked to poorer health outcomes in this study.

External wall insulation—which was accompanied by extractor fans— was associated with better health outcomes.”

(my emphasis)

Sources:

Poortinga et al. *BMC Public Health* (2017) 17:927
DOI 10.1186/s12889-017-4028-4

BMC Public Health


RESEARCH ARTICLE

Open Access

Social and health outcomes following upgrades to a national housing standard: a multilevel analysis of a five-wave repeated cross-sectional survey

Wouter Poortinga^{1,2*}, Nikki Jones¹, Simon Lannon¹ and Huw Jenkins¹



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RESEARCH PAPER

 OPEN ACCESS 

Impacts of energy-efficiency investments on internal conditions in low-income households

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ABSTRACT

Living in cold conditions poses a risk to health, in particular to low-income, fuel-poor households. Improving the energy efficiency of the housing stock may bring multiple positive health gains through improved indoor temperatures and reduced fuel consumption. This study used a multilevel, interrupted time-series approach to evaluate a policy-led energy-performance investment programme. Long-term monitoring data were collected for intervention and control households at baseline ($n = 95$) and follow-up ($n = 86$), creating a dataset with 13,771 data points for a series of daily-averaged hydrothermal outcome variables. The study found that the

KEYWORDS

energy efficiency; housing; fuel-poor households; monitoring; public health; public policy; social; temperature measurement

Damp

Cold and damp are fellow travellers . They feed off each other.

- Yet energy retrofit has been all (mostly) about – not even energy and comfort, but about carbon
- Moisture and IAQ have been ignored by the mainstream UK programmes (hats off to Wales by the way!)

Damp, condensation and mould

Damp and condensation are particularly harmful when they cause mould growth.

- Respiratory problems: asthma, COPD, runny nose
- Allergies
- Extremely demoralising: linked to poor MH

Cold means damp, and poverty means damp

Cold surfaces (uninsulated walls and ceilings, single glazing or old/cheap double glazing) = more condensation

Walls in poor repair: saturated brickwork – more damp and more cold

People who are cold don't want to open trickle vents, let alone windows



Forest Hill mum fears for asthma-suffering son's health after 'disgusting damp'



A FOREST Hill mum is desperate to move after she claims "disgusting" damp is further damaging her chronic asthma-suffering son's health.

Victoria Nash fears for her nine-year-old son Lewis Salisbury, who she says has been in and out of hospital with his condition and requires a ground floor flat to be easily picked up by ambulances.

Spot the retrofit

... and spot the unremediated fabric moisture issues



Damp – overlooked half of energy poverty

- Making homes warmer is great, but they need to be dryer too – too often left to chance

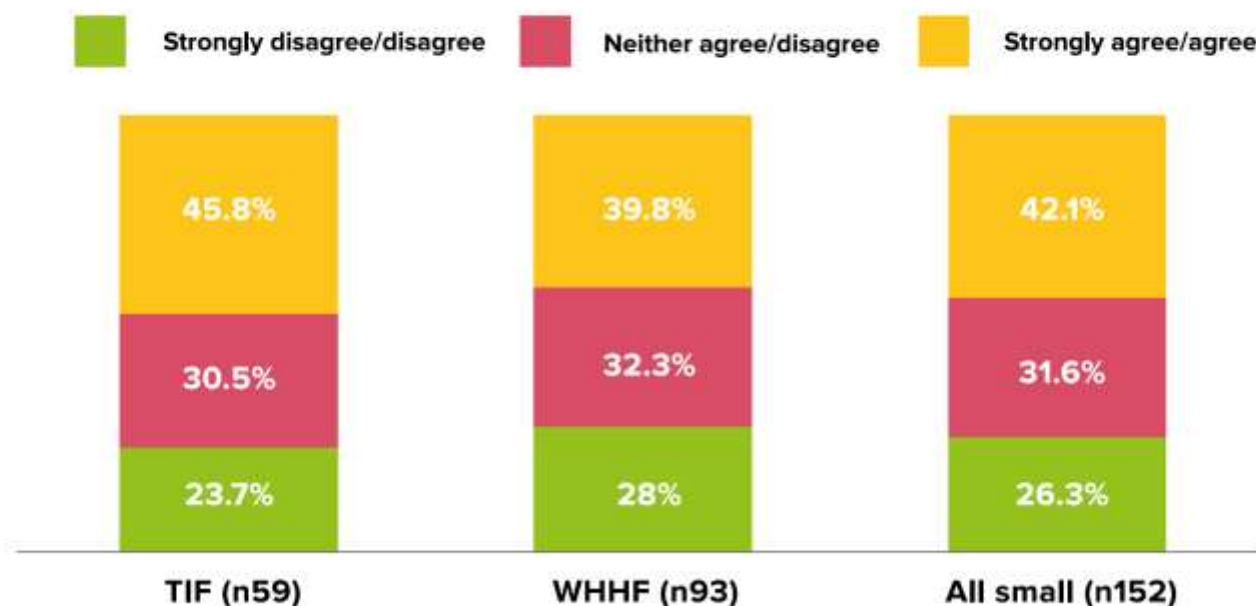
Warming the house can help...

People less reluctant to ventilate,
and surfaces may be warmer.

Although there may be a general trend towards drier conditions, it is not unequivocal. At all.

CHART 16 (Small measures)

Post-intervention: Home has less damp and/or condensation



Suggests:

Much better to install proper ventilation as well (you can certainly have damp without cold, and that isn't healthy either)

(Carmarthen results back this)

Also about quality control and
design

Cavity insulation failure



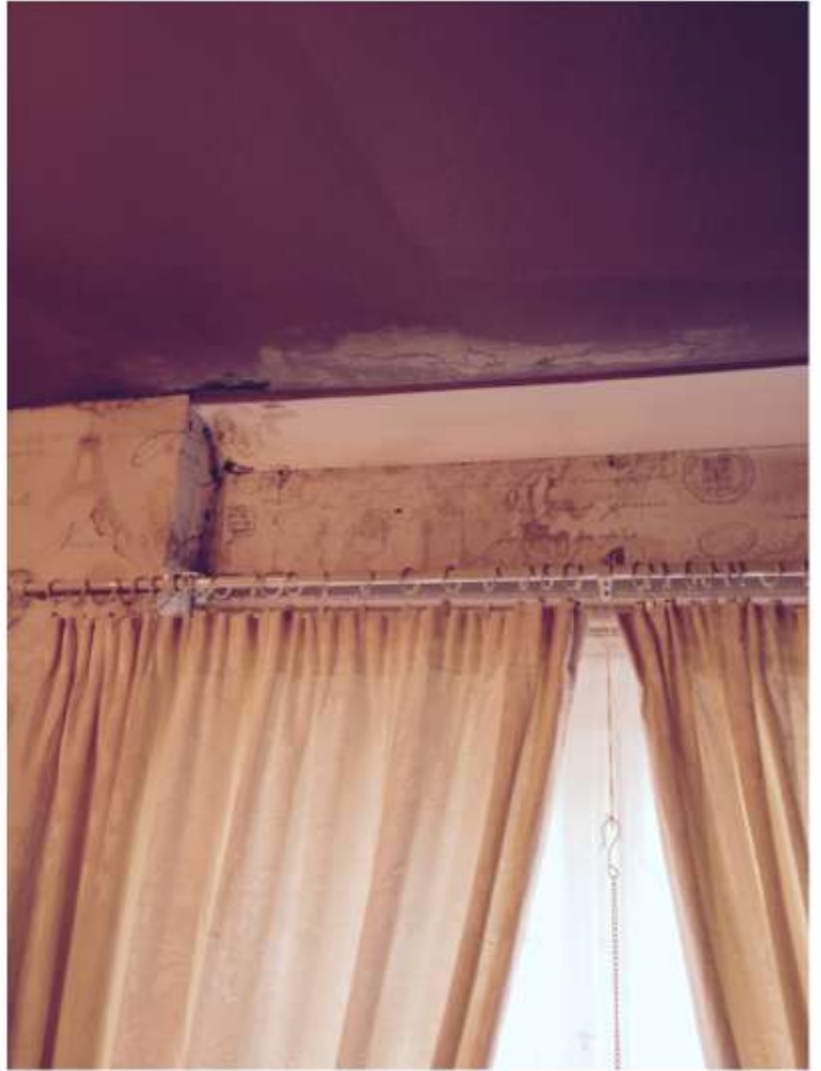
From BBC Wales website



Inappropriate cavity wall insulation in homes has become "a scandal", a Welsh MP has said.

External wall insulation





- One resident with severe asthma has been **hospitalised** by these problems, with **mushrooms and black mould covering walls, sofas, stereos** etc. The hospital has recommended she **doesn't go back to the house** until the problems are fixed, and she is currently believed to be living with a relative.

No point in saving the planet if we kill everyone in the process

Luckily we know how to do it properly

Deep retrofit – actually requires proper ventilation

Other issues ... for another day!

