A comparison of Health Impacts of the Warm Homes Nest Scheme and the Arbed Scheme

Sian Morrison-Rees

Research Officer, Swansea University

Background

- Fuel Poverty: The condition of being unable to afford to keep one's home adequately heated
- Wales: estimated 12% of people in fuel poverty
- The World Health Organization (2007) recommends a minimum indoor temperature of 18 degrees[1]

1. WHO. Housing, Energy and Thermal Comfort. World Health Organization 2007

ADR WALES
E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Fuel Poverty in Wales

- Welsh Government strategy to reduce the number of people in Wales living in Fuel Poverty – 'Warm Homes' energy efficiency schemes:
  - Demand-led 'Warm Homes' Nest – 2011 to present
  - Area-based 'Warm Homes' Arbed
- Schemes involve providing improvements to households most in need e.g. insulation and heating upgrades

ADR WALES
E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Project Aim

- Use existing data to evaluate impact on health of Welsh Government funded schemes designed to improve the energy efficiency of the homes of low income households

Objectives

- Identify relevant health indicators
- Make use of existing data held in the SAIL Databank
- Investigate the relative impact of Warm Homes Nest and Arbed on the health of recipients

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Research Design

Data Received

Warm Homes Nest

- 30,000 homes
- Main applicant details
- 2011 - 2017

Warm Homes Arbed

- Analysis ready dataset provided by Arbed team researchers at Cardiff University: requested and collated the intervention data from 28 Registered Social Landlords and Local Authorities[2].
- 4,968 homes
- 2010-2012

2.Poortinga W, Rodgers SE, Lyons RA, Anderson P, Tweed C, Grey C, *et al.* The health impacts of energy performance investments in low-income areas: a mixed- methods approach. *Public Health Res* 2018;6(5)
https://www.journalslibrary.nihr.ac.uk/phr/phr06050/#/abstract

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

SAIL and Data Linking

- SAIL Databank at Swansea University
- Data Linking is a technique for creating links between data sources so that anonymised information that is thought to relate to the same person, family, place or event can be connected for research purposes[3,4].

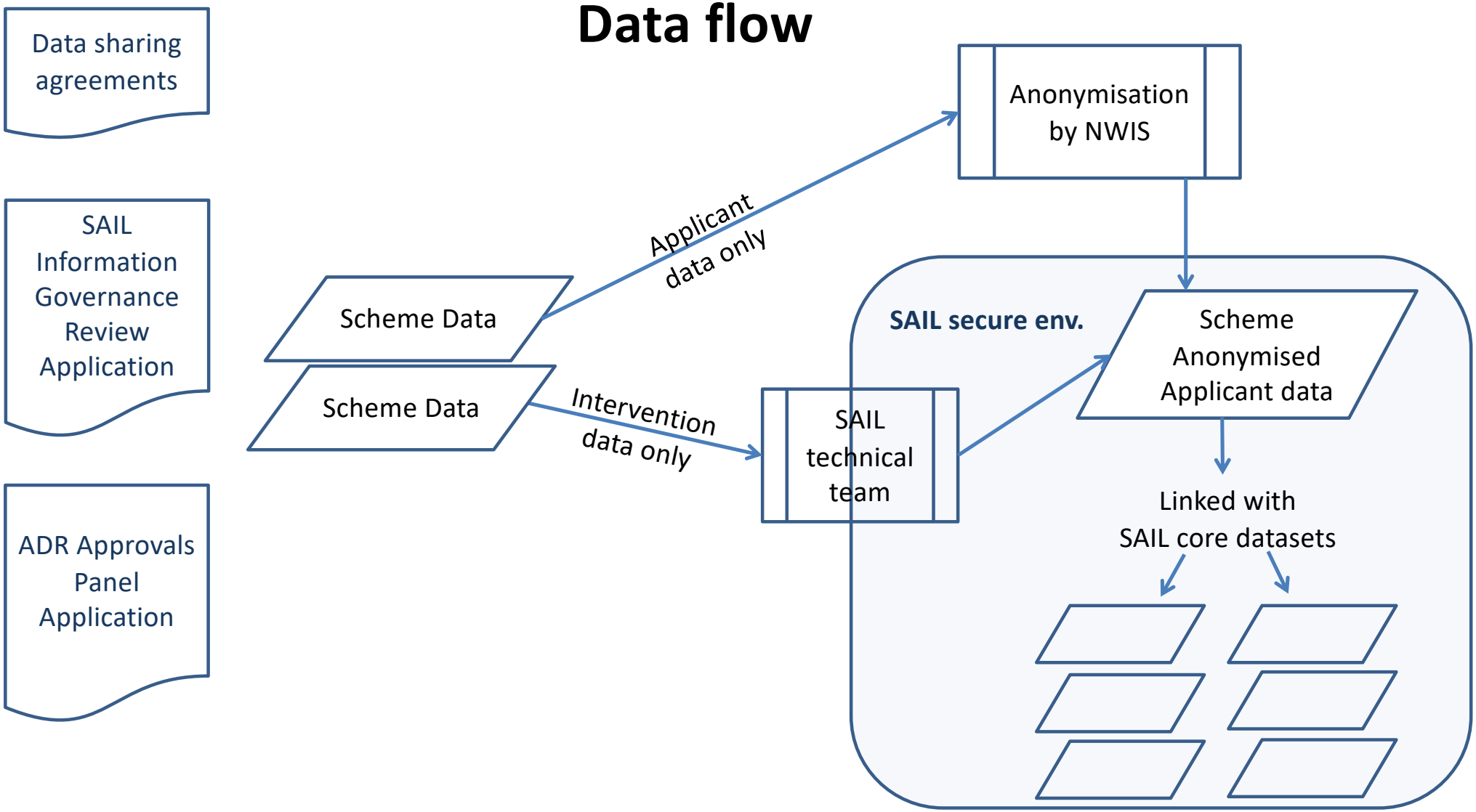
4.Lyons RA, Jones KH, John G, Brooks CJ, Verplancke JP, Ford DV, Brown G, Leake K. The SAIL databank: linking multiple health and social care datasets. BMC Med Inform Decis Mak. 2009 Jan 16;9:3. http://www.biomedcentral.com/1472-6947/9/3.

5. Lyons RA, Ford DV, Moore L, Rodgers SE. Using data linkage to measure the population health impact of non-healthcare interventions. The Lancet 2014;383:1517-1518. http://dx.doi.org/10.1016/S0140-6736(13)61750-X

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Data flow


Data sharing agreements
SAIL Information Governance Review Application
ADR Approvals Panel Application
Anonymisation by NWIS
Applicant data only
Scheme Data
Scheme Data
Intervention data only
SAIL technical team
SAIL secure env.
Scheme Anonymised Applicant data
Linked with SAIL core datasets

What datasets did we link?

- Type of intervention e.g. replacement boiler
- Date of intervention

Scheme data

- Death by age group
- Date of death

(excess winter death calculation)

Mortality

Number of prescriptions:

- All prescribing
- Respiratory conditions
- Infections

Primary Care

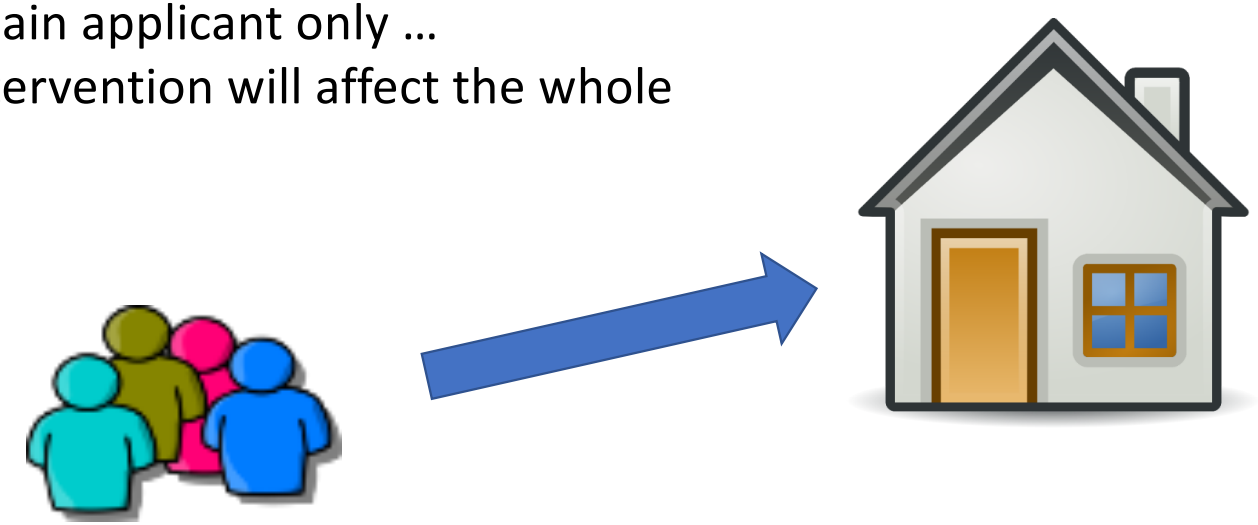
Emergency admissions:

- Circulatory diseases
- Respiratory diseases
- Mental health conditions

Hospital

Who received the intervention?

- Details of main applicant only …
- … but an intervention will affect the whole household



ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Inclusion criteria

- Resident at a property receiving an intervention
- Household size of 10 or less
- Lived at the property for the minimum of the ‘winter before’ and the ‘winter after’
- Registered with a GP with data available in SAIL for the 2 winter periods

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Analysis and design

- ‘difference in difference’ analysis:
  - Compared changes in health events winter before and winter after measure installed with a control group

- For whether people had an event in the first place
  - binary logistic regression models
- For those that had a health event recorded, whether their medical history become more or less eventful
  - truncated Poisson regression models

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Control groups

- Nest
  - Created a group who have not yet received the intervention but who went on to receive it later
  - Intervention and control group for each year

- Arbed
  - All homes located in the 10% most deprived areas
  - (created by Arbed team)

ADR WALES
E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Groups Analysed

- Arbed (2011)
  - 70% received the intervention in 2011
- Nest 2011
  - Homes receiving their intervention in 2011 in order to make a direct comparison
- All Nest
  - All homes from 2011-2017 included

ADR WALES
E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Sample sizes

- **Nest**
  - Intervention 33,595
  - Control 29,734
- **Nest (2011)**
  - Intervention 2,342
  - Control 4,419
- **Arbed (2011)**
  - Intervention 7,113
  - Control 192,546

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Sample Characteristics

- All ages included
- Nest recipients were significantly older than Arbed (44 years vs 35 years)
- Significantly higher proportion over 60 years old (33% vs 16%)
- Previous work demonstrated that the health effects of an intervention did not vary significantly with age

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Outcome measures

- GP Respiratory Events
- GP Asthma Events
- Prescribing for Asthma
- Prescribing for Infection
- Hospital emergency medical admissions (Not analysed due to small numbers of EMA's)

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Infection Prescribing

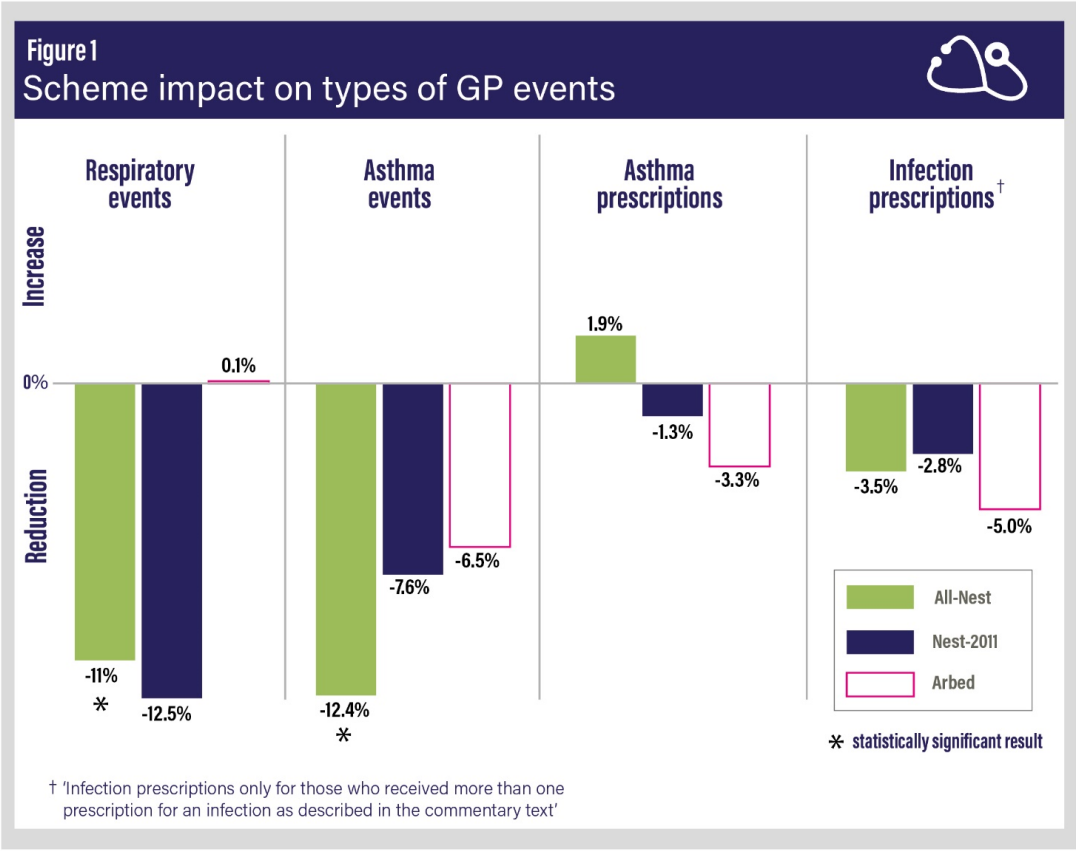
- Previous work suggested small but non-significant reduction
- Data contained high proportion of people with one prescription only (60% in each group).
- Tested for any change in that proportion – none found
- We therefore theorised that the suggested impact was due to changes for those individuals requiring more than one prescription (repeated or more severe infections) .
- Repeated analysis for infection prescribing for those with 2 or more prescriptions

ADR WALES

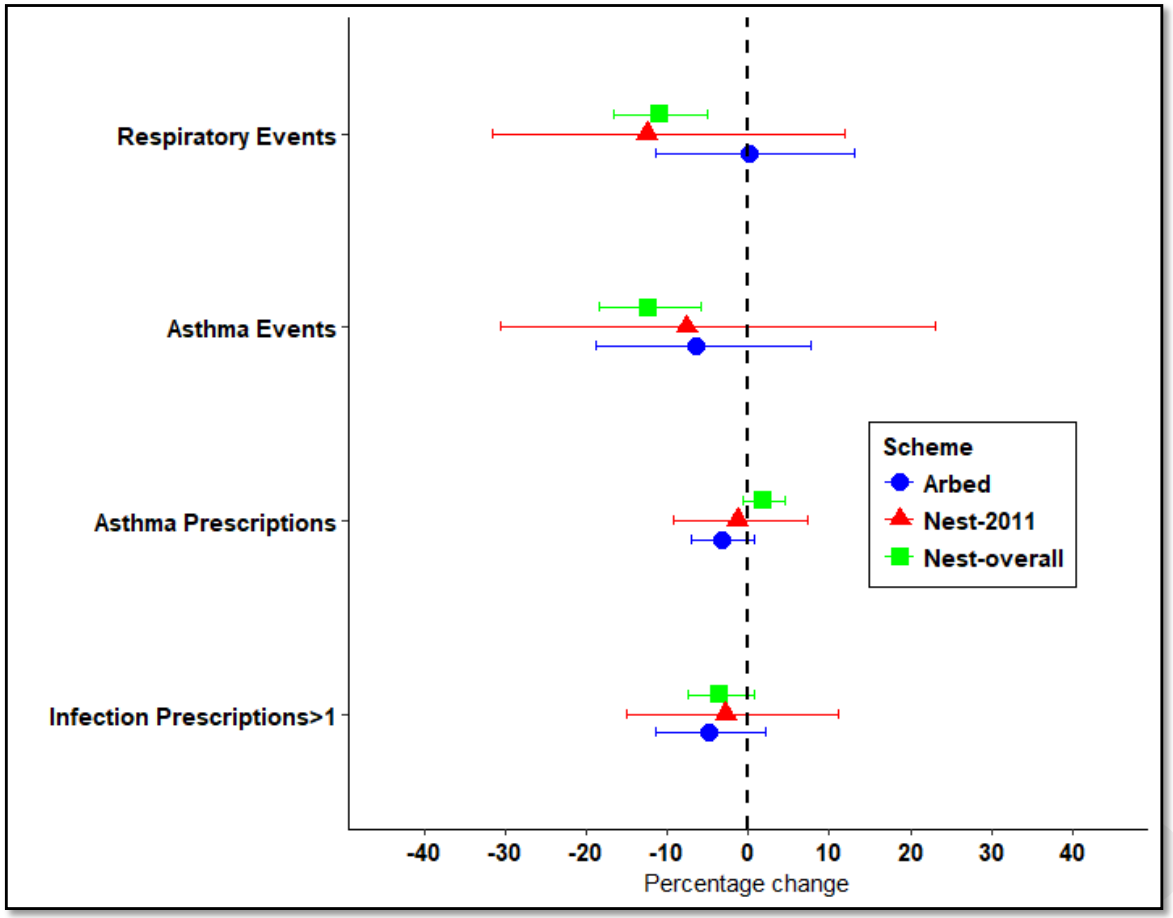
E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Findings

Estimates of the scheme impact on recipients who experienced one or more health events



Estimates of the scheme impact on recipients who experienced one or more health events



Quality information

- 79% of the Warm Homes Nest data and 86% of Warm Homes Arbed data being linked to health data sets.
- Resident information based upon GP registrations.
- Cannot ascertain if intervention was utilised to improve living conditions e.g. did lower cost of heating = choice to heat house better

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Summary of Results

- The study showed there was no impact from either scheme on whether recipients experienced a health condition in the first place.
- For those that did experience a health event ……

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Summary of Results

Respiratory Health

- The consistent pattern in reductions across schemes, whilst not always reaching statistical significance, suggests both schemes improve respiratory health.
- This impact appears to be greater among recipients of the demand-led scheme, Nest.
- There was no significant effect of either scheme on the average number of GP prescriptions for Asthma.
- This is expected because most prescribing for asthma is preventative and would likely be continued regardless of the number of acute episodes.

ADR WALES
E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Summary of Results

Infection Prescribing

- Possibly due to small numbers, none of these findings reached the level of statistical significance.
- However, the consistent pattern across schemes suggests a positive effect on prescribing for infection for individuals with more severe or repeated infections.
- We recommend further investigation into this once additional data becomes available

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

Current Work

Current and future work

- Widen the follow up time to compare health records for two years before and after installation;
- Report analysis relating to additional health conditions e.g. mental health;
- If possible, report analysis relating to the impact of the Warm Homes schemes on educational attainment.

ADR WALES

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UK Research and Innovation

ADR WALES

Any questions?

Sian Morrison-Rees/ Swansea University/
S.Morrison-Rees@swansea.ac.uk

Find us at adruk.org or on
Twitter @ADR_Wales