



# Improving Fire Safety

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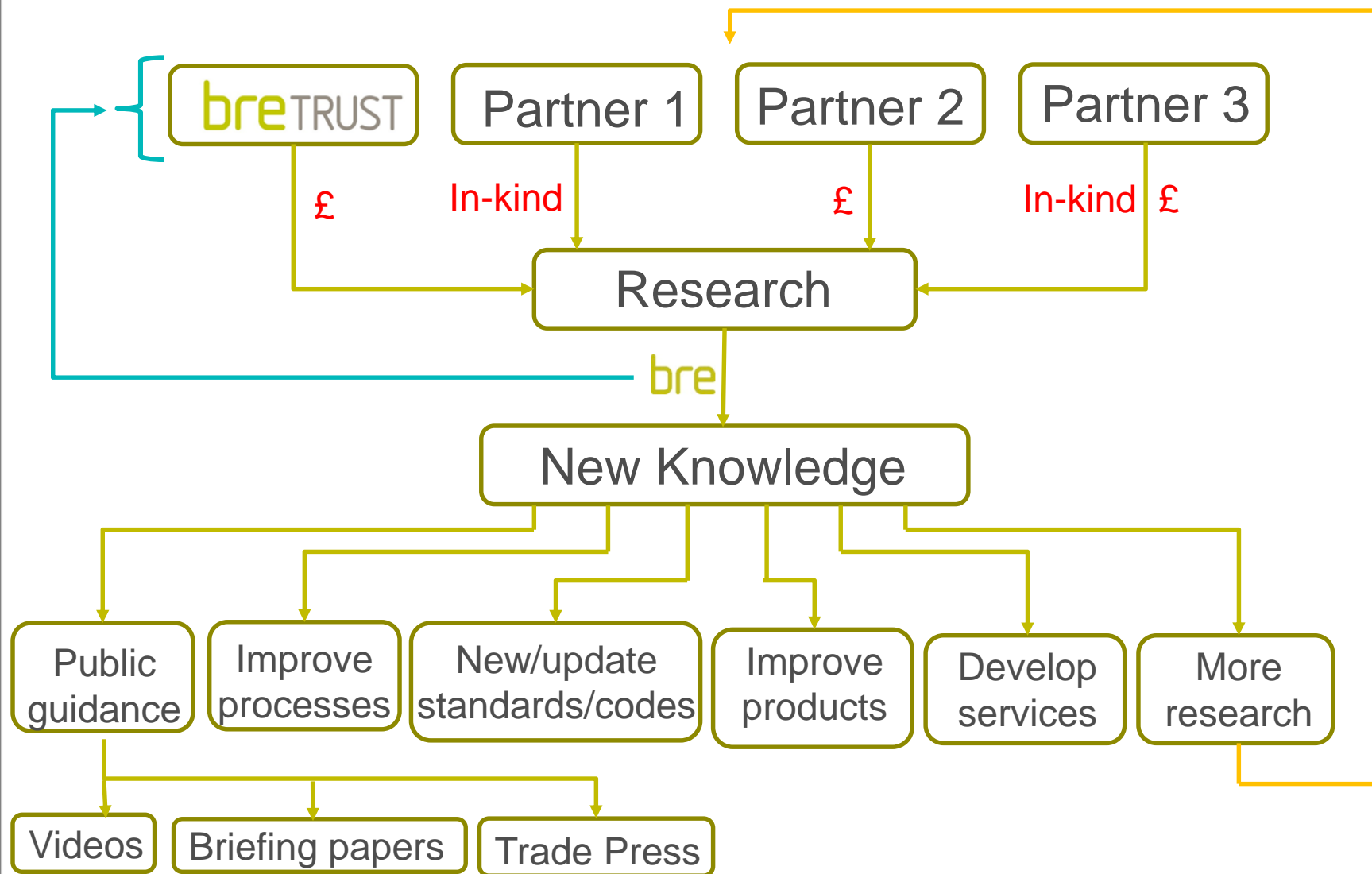
Part of the BRE Trust

## Collaborative fire research work at BRE

- Process for collaborative research with BRE Trust
- Overview of past research
  - Why? What resulted?
  - What impacts?
- Current- Causes of Fire Fatalities in Scotland
- Looking to the future
  - What research work?
  - Express your interest



## Process for collaborative research at BRE



## Past projects- False Alarms

- 2 studies identifying ways to reduce false alarm
- Utilised a fire alarm investigator that assisted Fire and Rescue Services
- Study proposed 35 recommendations to reduce false alarms
  - Adopted in codes of practice
  - Provided guidance
  - BRE service to reduce false alarms
  - Helped reduce false alarms
  - Further research (multi-sensors)

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redefining / standards



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<http://www.bregroup.com/firesafetyresearch> briefing paper and video



## Past projects- Fire Detection

- **Optical/heat** multi-sensor study:
  - 35 smoke alarms and detectors;
  - 5 false alarm tests;
  - 10 different test fires.
- Identified:
  - Smoke detectors and multi-sensors have similar performance to fire;
  - Multi-sensors demonstrated more resistance to false alarm sources;
- Impacts:
  - Manufacturers to improve products;
  - Supporting development of LPS.

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Briefing Paper

Characterising the smoke produced from modern materials and evaluating smoke detectors

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Briefing Paper

The performance of multi-sensors in fire and false alarm tests

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## Past projects- Fire Warning

- Visual Alarm Devices
- Privately funded study
  - How can LED warning devices provide effective visual warning;
  - Identified that shorter (faster) pulse durations were as effective as Xenons;
  - Briefing paper;
  - Codes updated.
- Led to another research project (in progress):
  - Comprehensively researching the warning effectiveness;
  - Investigating different colours, illumination levels, direct viewing etc.

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### Briefing Paper

#### Visual alarm devices – their effectiveness in warning of fire

A study of the effectiveness of Xenon and LED flashing visual alarm devices in attracting the attention of people at risk from a fire.

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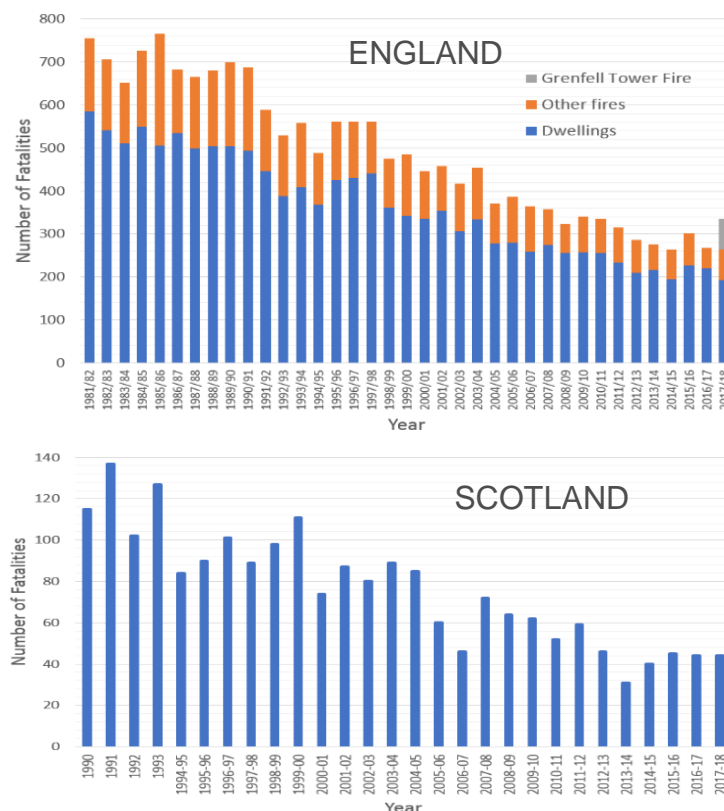
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## Current project- Introduction

- Decrease in fire fatalities in UK.
  - Increased use of smoke alarms;
  - Furniture and Furnishings Regulations 1988 (as amended);
  - Preventive measures such as Home Fire Risk Checks (HFRC).
- *Aim of research work was to:*
  - *Identify conditions under which fire fatalities and serious fire injuries (near misses) occur in Scotland,*
  - *Using this data propose ways in which these could be reduced.*



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## The research programme

- A phase research programme was agreed to review data (19,645 incidents) over the period April 2013 to March 2017:
  - First phase- to review SFRS accidental dwelling fire (ADF) fatalities data (126) from the Incident Recording System (IRS) database and the serious injuries data (147);
  - Second phase- to review Fatal Fire Investigation reports.



Incident Recording System – Questions and Lists

Version 1.6 – (XML Schemas v1-0p)



*Question 9.24 – What is your understanding of the severity of the injury?*

Code	Severity of (non-fatal) injury	Includes
1	Victim went to hospital, injuries appear to be Serious	Serious
2	Victim went to hospital, injuries appear to be Slight	Slight
3	First aid given at scene	
4	Precautionary check recommended	



## Methodology

- 38 key questions from IRS were reviewed including:
  - Type of property;
  - Detail around the fire discovery;
  - Alarm systems present;
  - Cause of fire;
  - Ignition source;
  - Impairments;
  - Movement of victim during the fire;
  - Cause of fatality.

## Analysis- brief summary

- Fatalities are more likely in vulnerable people that:
  - are aged 60 or above are involved;
  - are falling asleep or asleep;
  - have an underlying medical condition;
  - smoke;
  - have excessive and dangerous storage;
  - have a physical mobility;
  - live alone;
  - are suspected to have impairments due to drugs or alcohol.
- Smoke detection alone is not effective to protect vulnerable people.
- More interactive solutions proposed



## Recommendations

Fourteen recommendations proposed, including:

- warnings from smoke alarms to smartphones;
- increase the sensitivity of smoke alarms at night;
- link domestic premises to an ARC (high risk);
- extend the LPS 1655 watermist system to provide greater personal protection;
- use video analytics technology for zone monitoring to enhance security, fire detection and safety as well as informing FRSs;
- research the underlying causes of electrical fires and any signatures they may give off prior to a fire being present;

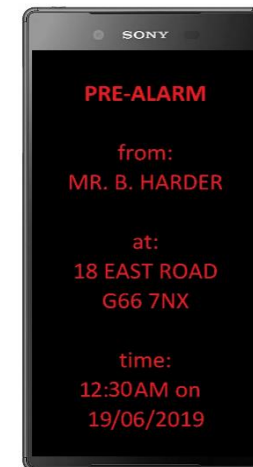


Photo courtesy of Surefire Services

## Next steps

- Briefing paper was published in Dec. 2019 (link below);
- Review 126 Fire Investigation reports of fatalities to focus on finer details;
- Identify practical measures that may help;
- Assess the potential effectiveness of proposed recommendations in each case.

### Briefing paper

The causes of fire fatalities and serious fire injuries in Scotland and potential solutions to reduce them-  
Phase 1: IRS review

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## Future projects

Seeking collaboration for a number of proposed research projects including:

- Heat alarms in domestic kitchens;
- Dangers of Carbon Monoxide (CO) in the home;
- Optimum smoke and CO detector spacings in commercial;
- Capabilities of more complex multi-sensor technologies;
- Causes of fire fatalities and ways to reduce them (internationally);
- Investigating the mechanisms/signature characteristics of white goods appliances catching fire.

Please let us know if you are interested in participating in any of these.



# Thank you

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