

# Incidences of deliberate fire in West Yorkshire: Spatio-temporal patterns and influences on trends

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## Summary and rationale

- The study investigates the spatio-temporal patterns of arson in West Yorkshire, England, utilising spatial statistical tools
- The aim of this project was to investigate the relationship between rates of arson and socio- demographics factors of the population and to provide an updated case study of spatio-temporal patterns of arson in England
- In 2012/2013, deliberate fires accounted for 62% of the total number of fires attended by West Yorkshire Fire and Rescue Service; 17% higher than in the UK on average.
- Arson damaged properties can induce feelings of vulnerability and produce a fear of crime. There are few existing empirical studies which examine spatio-temporal patterns at low levels of aggregation, especially within a UK context.

## Methods

Spatial autocorrelation

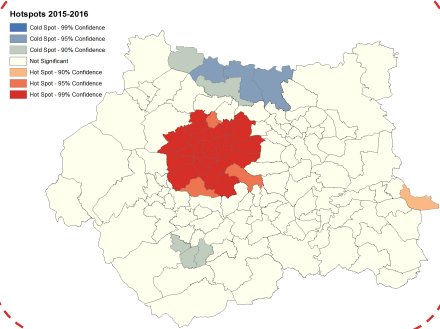
Hotspot analysis

Cluster and outlier analysis

Regression analysis

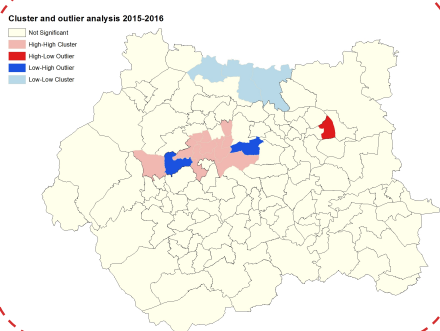
## Results

### Hotspot analysis



- Hotspots shift between 2008 and 2016
- In 2008, hotspots were spread across both central Leeds and Bradford
  - By 2016, hotspots were focused in Bradford wards

### Cluster and outlier analysis



- High-high clusters were concentrated around Leeds and Bradford until 2013
- By 2016, 13/14 wards with a high-high cluster were in Bradford

### Regression analysis

There was not a significant relationship between rates of socially rented properties and education contrary to the evidence from the literature

### Spatial Autocorrelation

Every year between 2008 and 2016, the patterns of deliberate fire rates are clustered

## Key findings



The mean age, the rate of households deprived in at least four dimensions and the rate of people long-term unemployed are all significantly correlated with the rate of deliberate fires



The variable which has the largest impact on the rate of deliberate fire is the rate of households deprived in at least four dimensions

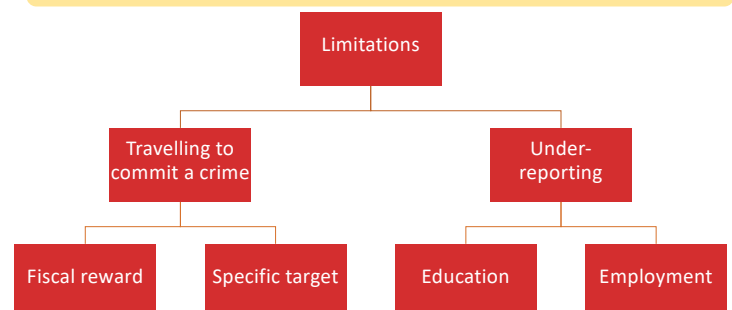


The wards most severely affected by incidences of deliberate fire are the most deprived wards of Bradford.



Bolton and Undercliffe (Bradford), Killingbeck and Seacroft (Leeds) and City (Bradford) have the strongest relationship between fire rates and the underlying demographic factors analysed

## Potential issues



## Further work

Future work includes the application of the methods utilised to other counties within England to allow comparison between regions and test whether certain socio-economic variables consistently have a relationship with the rate of deliberate fires.