# Community Fire Risk Model

**July 2013**

South Yorkshire Fire & Rescue
WORKING FOR A SAFER SOUTH YORKSHIRE

Strategic Business Support

# Contents

# Introduction

As part of the development of our Integrated Risk Management Plan (IRMP) 2013-17 it was our vision to create a community risk model to inform our prevention work, and help us identify the people in our communities who are most at risk from fire. This will enable us to target our community fire safety activity where it will have the most impact.

Our ambition was to create a model that could build up a picture of risk from household level, which went one step further than the types of models in use by other Fire and Rescue Services we had looked at, by incorporating socio-demographic profiling within the methodology.

This document explains how we developed our new Community Risk Model and how we intend to use it, evaluate it, and develop it in the future.

# Fire Risk

If we consider risk as comprising two factors, *likelihood & impact*, the risk of having a dwelling fire can be explained as follows:-

Mrs Jones, an old aged pensioner living in her own home on the same street as a fire station, has the same *likelihood* of having a fire as her friend who lives in their own home 10 miles away from the station (assuming all other relevant risk factors are equal). This 'base' risk applies to both individuals in the same way. This is the situation before we apply any aspects of the Fire Service response.

The *impact* of the fire once it occurs however is different. The response of the Fire Service is likely to mitigate the damage caused to the property, and the likelihood of casualties as a result of the fire.

There are two ways to protect the public from fire and reduce these two key factors of risk in our communities:-

***Reduce the likelihood & stop the fire starting in the first place***

The likelihood of a fire starting is directly related to the profile of the occupant and the profile of the building, and through our prevention work we can positively impact the likelihood of a fire occurring through education & fire safety information, home visits, and by influencing improvements in building standards (Technical Fire Safety).

***Mitigate the impact after a fire has started***

This is the physical containment of the fire and protection of the occupant. Again the profile of the occupant and the building is important. Measures such as fire doors, smoke alarms, domestic sprinklers etc that may have been fitted could reduce the severity of a fire and enable the occupants to get out safely. If a fire does occur, the Fire Service responding to the incident as quickly and safely as possible to extinguish the fire and effect a rescue, also reduces the impact on life & property.

Should a fire occur; the most important factor in a house fire situation is that the occupant is made aware of the fire, calls out the fire service, and takes the appropriate actions to protect themselves.

Community Fire Safety (CFS) forms the basis of surviving a fire in the home – as well as reducing the likelihood of a fire starting in the first place. Whilst we will always strive to attend incidents as quickly and as safely as possible, it is clear that our CFS work mitigates both likelihood and impact; whereas our emergency response only mitigates impact.

We recognise that our response alone cannot prevent all fire casualties, and significant emphasis is placed on our community and technical fire safety work to prevent fires occurring in first place. Our data suggests that the amount of time spent on prevention work is having a significant positive effect. Dwelling fires and associated casualties have reduced over the past 10 years, and we have seen a steady increase in smoke alarm ownership over this period. Other variables such as the use of fire resistant material in home furnishings and the installation of fixed smoke alarm systems in new properties may also have contributed to a reduction in fire deaths and injuries.

It is for this reason that it is important to develop a risk picture down to household level, to ensure high quality CFS work is delivered in the areas of most need and where the greatest benefit will be realised.

# Risk Model Methodology

## National Research

The Fire Service Emergency Cover (FSEC) Toolkit, a predictive risk based model, was issued by the Government to all FRS in England, Scotland and Wales in 2004, to provide and support information for the development of Integrated Risk Management Plans (IRMPs). It found a significant correlation between response times and certain community socio-demographics / housing types with an increased risk (likelihood) of fire death and damage. Subsequent research has been conducted in this area and has suggested a number of different factors were good indicators of dwelling fires.

A more recent CLG study (2008)[1] looked to examine a much wider and more powerful dataset to identify the key indicators, and re-test some previously identified variables. It found that comparing Census (2001) data to instances of dwelling fires using regression analysis showed positive correlations between certain socio-demographic indicators. They found that Lone Parents with Dependents, People who had never worked and Single Adult Households, and those aged 70+ correlated highly with instances of dwelling fires, and may be more at risk than other groups. The report generally found that other age factors and ethnicity did not appear consistently in the regression models they tested to be able to draw firm conclusions. It is suggested however that age may appear in conjunction with other risk factors such as disability ('not good health'), and ethnicity along with factors such as unemployment.

The report also found a positive correlation (although not as strong) with the Indices of Multiple Deprivation (IMD). This provides a measure of deprivation for local areas based on information on Income and Employment, Health and Disability, Educations, Skills and training and Crime, amongst others.

The report acknowledged that once smaller geographies are examined the correlation diminishes, as there is a much smaller data set to work with. At local geographies such as Lower Super Output Areas (around 1500 people) the results are not as marked, particularly when trying to match individual IMD factors.

1 Analysis of fire and rescue service performance and outcomes with reference to population socio-demographics

They used the data to produce predicted rates of fires and casualties that were then compared against actual incident numbers. For South Yorkshire Census data was a more accurate predictor than IMD when correlated with our incident data.

**Our Data Analysis and correlation to Census Data**

We have been able to use more current Census data following the publication of the Census 2011 to establish if there are correlations between the instance of fire in South Yorkshire and key census variables.

Analysis of our data from 1 April 2009 to 31st December 2012 against Census 2011 data showed that of all accidental dwelling fire casualties, just over 55% were in lone person or lone parent households. The group experiencing the most injuries and fatalities in fires was lone persons *under* pensionable age. This could be explained by the fact that these groups represent the largest proportion of the population within South Yorkshire.

When we examined the ethnicity of those experiencing accidental dwelling fires we found some groups over represented in the data (ie: they accounted for a greater % of fires than the % of the population they represent in South Yorkshire).

These included groups identified from the Census as:-

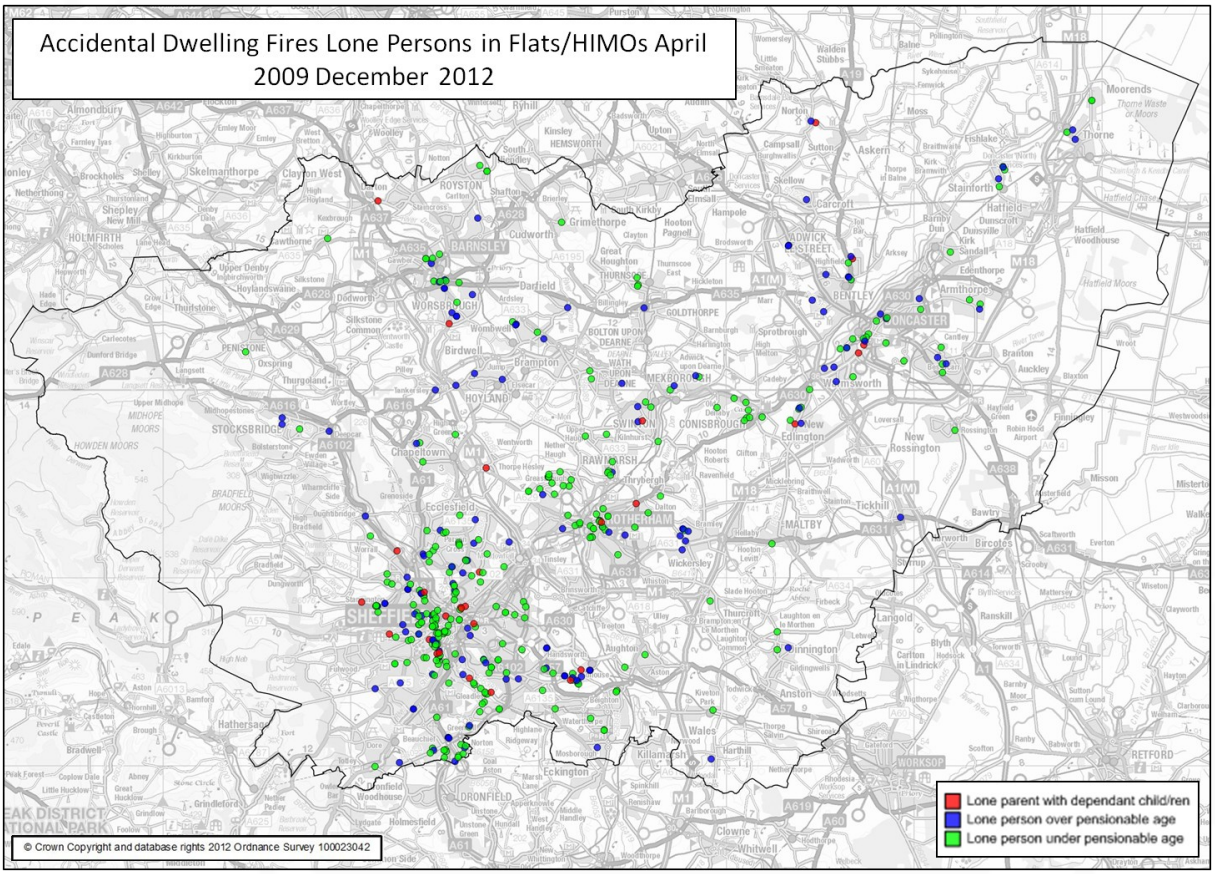
Asian or Asian British—Bangladeshi
Asian or Asian British—Indian
Black or Black British—Caribbean
Black of Black British—Other Black

When we analysed the casualties involved in these fires we found that the majority of fires in households for these ethnic groups were cooking related. For the Black/Black British groups this accounted for 77% of casualties (although the actual numbers are relatively small).

When we examined casualties in dwelling fires the 70+ group accounted for 17.4% of all casualties. The 20 to 30 age group accounted for 16.7%, the 30-40 group 14.8% and 40 to 50 group 13.9%. Interestingly, the 80+ group accounted for 10.4% of all accidental dwelling fire casualties, compared to the 4.45% of the population they represent. They were the most over-represented group in the data. Females over 80 represented 9.6% of the total fire victims.

It is this sort of information that helps inform our understanding of our ‘at risk’ groups, and helps us target our community fire safety work, and safety messages.

The map below shows the location of accident dwelling fires in flats and Homes of Multiple Occupancy (HIMOS) involving lone person households and lone persons with dependent children. During the period they accounted for 1615 fires out of a total of 2436.




The ability to include these types of factors within a risk model have the potential to provide a powerful tool for informing our strategies for intervention and prevention. However in order to effectively target these higher risk groups, we first need to find them. The development of a predictive risk methodology to calculate dwelling fire risk will assist in identifying the areas and people we need to target our resources on.

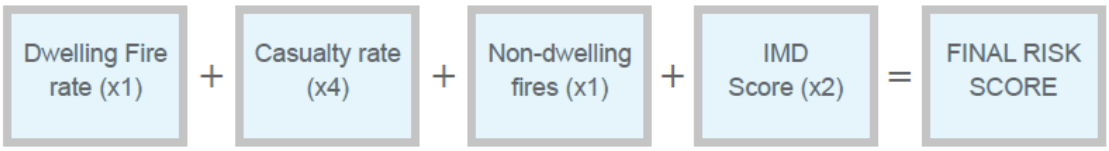
# Other FRS Models

A number of Services including Greater Manchester, Lancashire, West Yorkshire, Merseyside & Cumbria have developed their own risk models.

They use a range of variable factors and risk indicators such as dwelling fire & casualty rates & Indices of Multiple Deprivation (IMD) information at various geographies to determine risk locally.

Having reviewed and evaluated several models already in use within the sector, we identified that Lancashire and Greater Manchester's model statistically seems viable for SYFR to use as a starting point. These models determine 'base' risk, i.e.: life risk to communities from fire, excluding response provisions.

The model uses a number of key indicators to determine property fire risk, weighted towards the likelihood of casualties from dwelling fires (based on historic data) and the Index of Multiple Deprivation. The calculation is shown below:-




The final risk score is then assigned into risk bands, to determine if it is high or low risk; an example is shown below:-

| Risk Score | Risk Grading |
|---|---|
| 76 and above | Very High |
| 56 to 75 | High Risk |
| 35 to 55 | Medium Risk |
| 34 and below | Low Risk |

Appendix A shows the calculation of each factor in more detail.

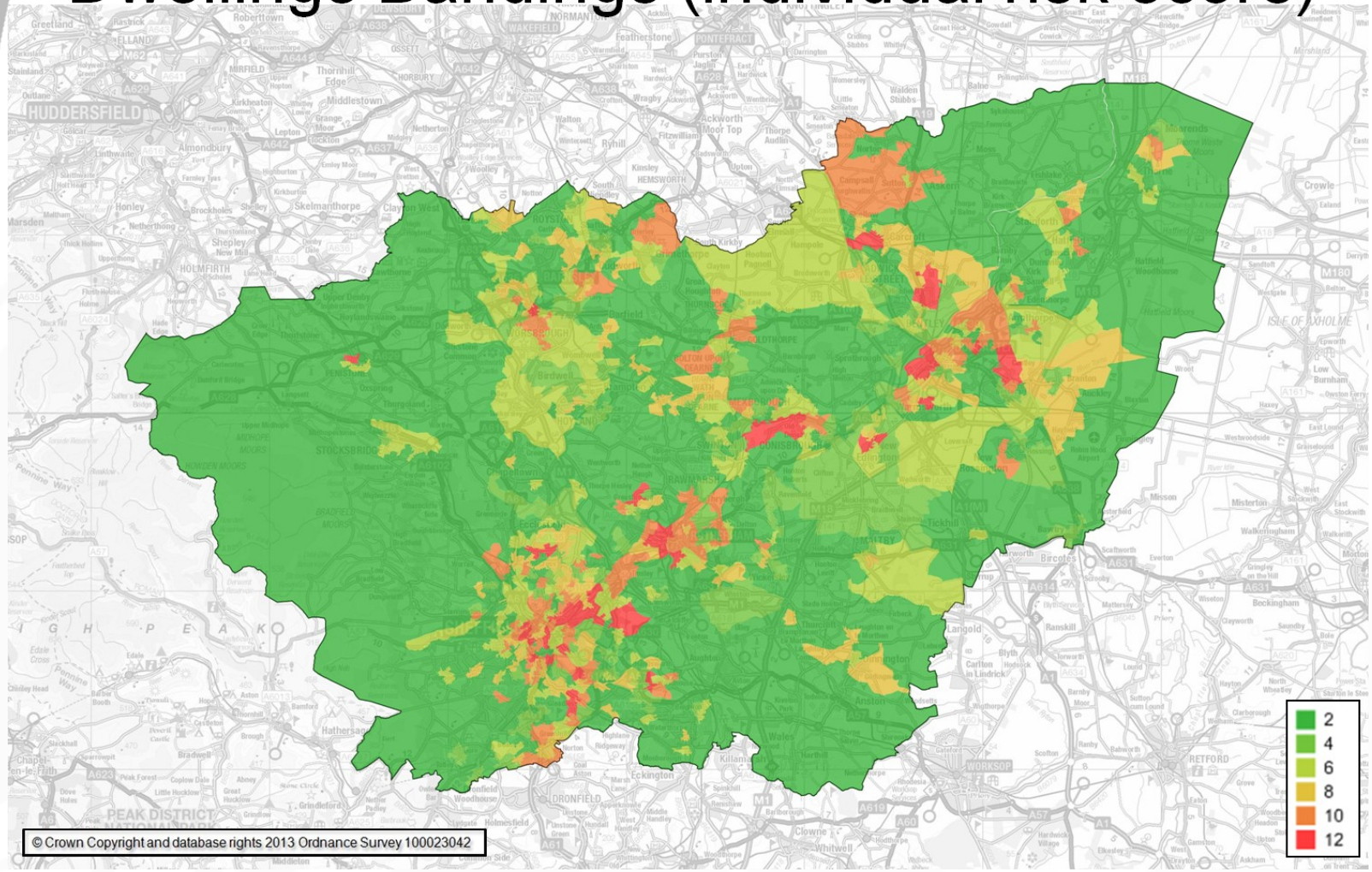
# Other FRS Models

We applied our own incident data to this model, and looked at different weightings of factors within the calculation to see if it was more relevant to our Service, and applied different techniques for assigning the four risk bands (ie: Quartiles and Standard Deviation).

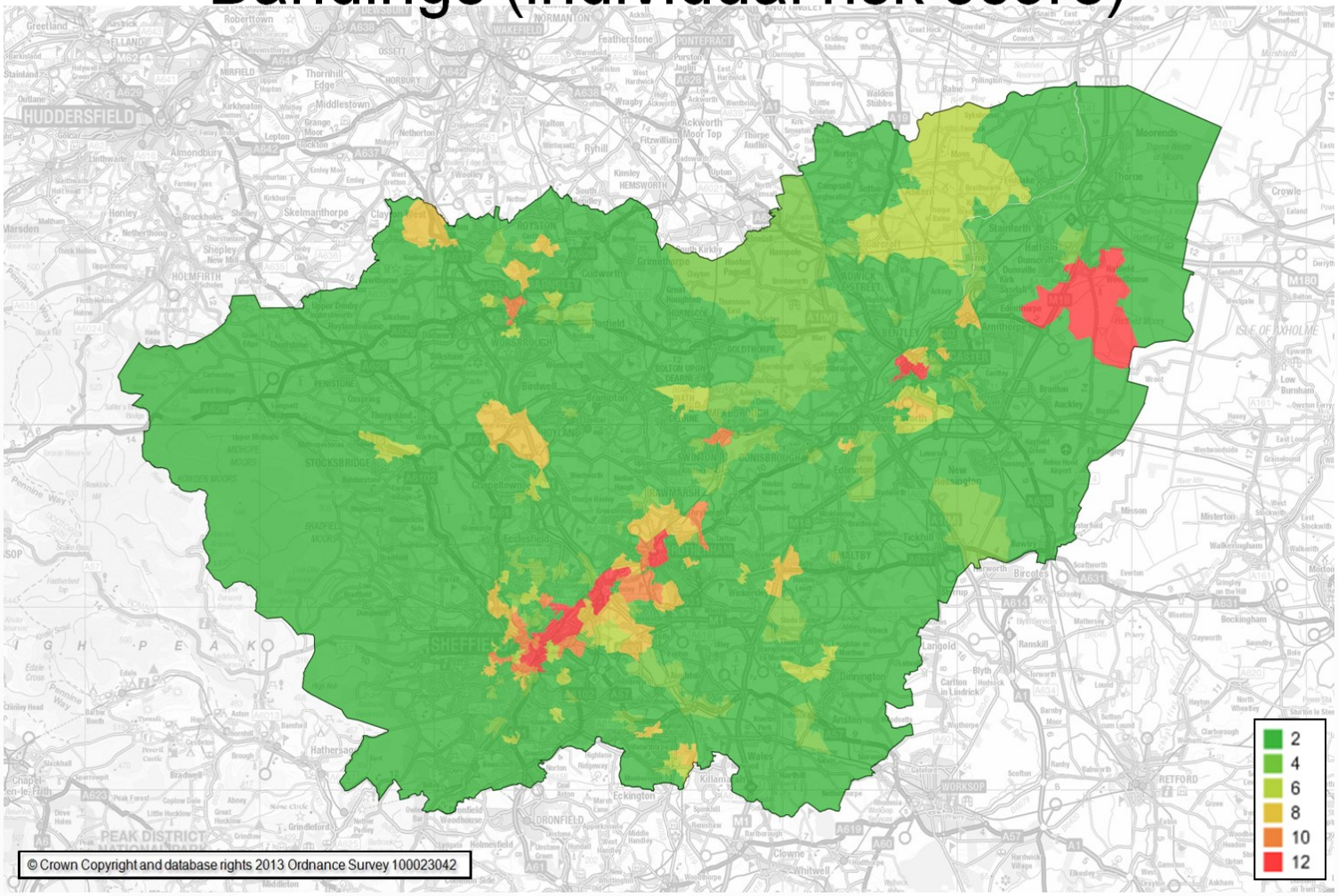
From analysis of the data, we decided that it was appropriate to include dwelling fire incidents recorded as 'False Alarm Good Intent' (FAGI) cooking related fires, as they are our 'near misses' and provide a larger data set to work with. These incidents include cooking related incidents that could have escalated to be a more serious fire. We have included precautionary checks (where a person is advised to go to hospital but may not have had any treatment) within the casualty dataset for the same reason we included false alarms. They are a 'near miss' and could have been more seriously injured.

We also re-ran the model removing Non-Domestic Property Fires, as when we looked at the risk maps separately for Dwelling Fires and Non-Domestic Properties, they presented differing risk profiles (the maps are presented on the next 2 pages). Also the prevention activity and interventions are very different for the these two types of property, and require different targeting techniques. We therefore decided that we would develop 2 models to cover the 2 different types of risk they represent.

# Dwelling Fires & Cooking related FAGI in Dwellings Bandings (individual risk score)

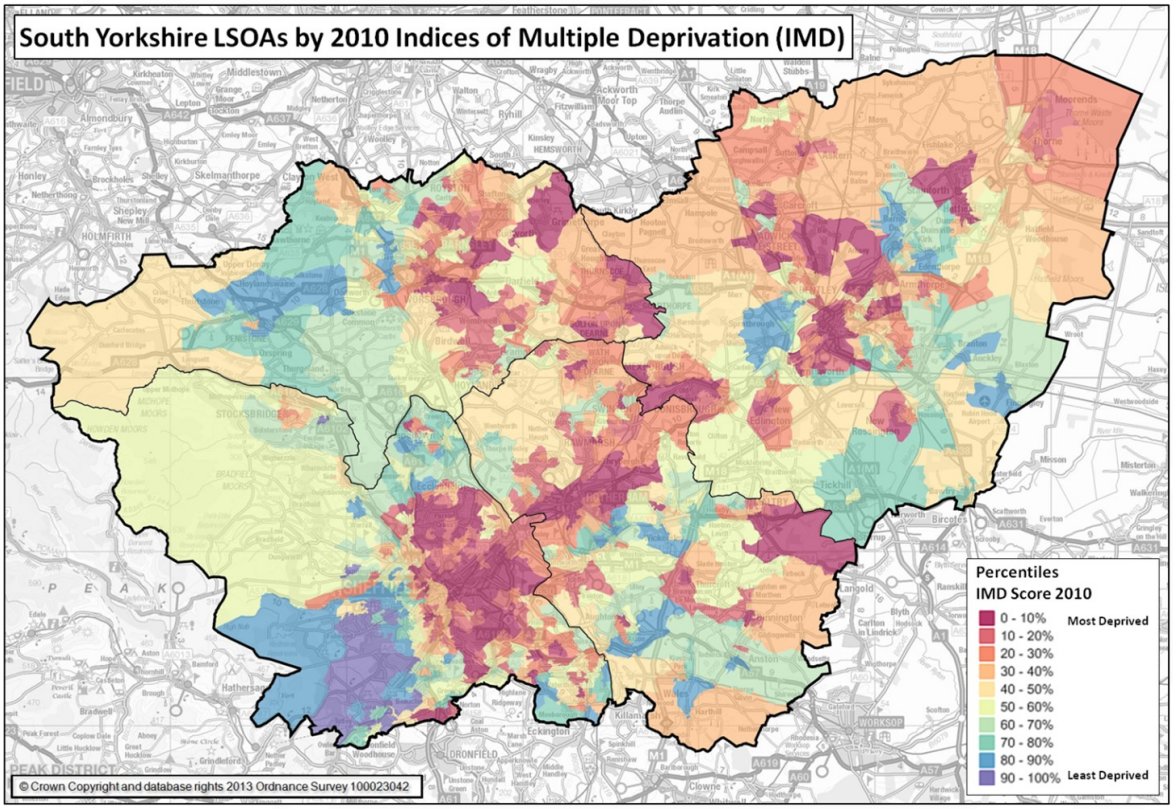


# Non Domestic Building Fires Bandings (individual risk score)



## Indices of Multiple Deprivation for England, 2010

The English IMD 2010 uses 38 separate indicators, organised across the 7 domains of Income Deprivation, Employment Deprivation, Health Deprivation and Disability, Education Skills and Training Deprivation, Barriers to Housing and Services, Living Environment Deprivation, and Crime. It is important to note that these statistics are a measure of deprivation, not affluence, and to recognise that not every person in a highly deprived area will themselves be deprived. Equally, there will be some deprived people living in the least deprived areas.




Of the local 326 local authorities in England, Doncaster is the 39th most deprived, with Barnsley 47th, Rotherham 53rd and Sheffield 56th.

We examined the relevance of IMD 2010 in our risk calculation. We considered if other more timely socio-demographic datasets were available that could be more appropriate indicators of fire risk to help identify our vulnerable groups.

By socio-demographic data we mean information that tells us something about common characteristics of groups of people. These groups may be specific age groups, for example 50-65 year olds, or single parent working families, or people suffering from a disability. Demographic profiling can create complex groups of people based on multiple characteristics, including age, sex, marital status, employment status, home ownership, spending habits etc. There are commercial products that provide socio-demographic profiles to help organisations target their services, tailored for the private and public sectors.

We had already used this type of data successfully to inform local targeting of our Home Safety Check (HSC) activity, by mapping where dwelling fires had occurred against socio-demographic types, and using this information to inform where our staff should undertake community fire safety work to reach our target groups. We had also used it to inform communications and media campaigns to get our safety messages to our target groups.

We believed that this data was a useful tool for targeting, however we had not seen this data included in a model to ascertain fire risk or use it for predictive modelling. The CLG report mentioned above did include a subjective categorisation of Mosaic types based on pre-identified 'at risk' or vulnerable groups, but did not go as far as analysing the results against actual incident data, or considering how this could be turned into a score for the purpose of creating a model. We therefore identified this as the next step.

# Mosaic Socio-demographic Data

We use a commercial demographic profiling tool called 'Experian Mosaic Public Sector' which provides a classification system at household and postcode level.

The Mosaic data contains 15 classification 'Groups', within which there are further sub' Types'. The most represented Groups within South Yorkshire are shown in the table below. The group representing the largest proportion of the population is 'residents with sufficient incomes in right-to-buy social housing'.

| Mosaic Groups | South Yorkshire Households | South Yorkshire Household percentage | District approx. proportions | | | |
|---|---|---|---|---|---|---|
| | | | Barnsley | Doncaster | Rotherham | Sheffield |
| Residents with sufficient incomes in right-to-buy social housing | 101,914 | 17.27% | 19.3% | 26.5% | 21.6% | 29.3% |
| Owner occupiers in older-style housing in ex-industrial areas | 74,599 | 12.64% | 18.9% | 21.8% | 16.2% | 40.1% |
| Middle income families living in moderate suburban semis | 66,054 | 11.19% | 10.7% | 17.5% | 18.3% | 51.3% |
| Families in low-rise social housing with high levels of benefit need | 64,681 | 10.96% | 14.4% | 18.8% | 17.8% | 46.8% |
| Lower income workers in urban terraces in often diverse areas | 51,174 | 8.67% | 22.1% | 21.3% | 15.2% | 36.5% |
| Elderly people reliant on state support | 45,544 | 7.72% | 14.6% | 20.6% | 17.0% | 45.2% |
| Young, well-educated city dwellers | 38,631 | 6.55% | 1.1% | 1.6% | 1.2% | 96.1% |
| Residents of small and mid-sized towns with strong local roots | 36,783 | 6.23% | 16.2% | 29.6% | 13.9% | 36.5% |
| Successful professionals living in suburban or semi-rural homes | 25,820 | 4.38% | 8.9% | 24.5% | 13.1% | 51.2% |
| Couples with young children in comfortable modern housing | 22,915 | 3.88% | 17.3% | 24.7% | 17.4% | 39.1% |

We matched the Mosaic Types to a 3 year data set of our accidental dwelling fire incidents using 'UPRN' Unique Property Reference Numbers to identify the Mosaic 'Types' which were experiencing the most fires. We calculated a fire rate for each type based on the instance of fire, looking at whether the type was over-represented for the percentage of the population they accounted for in South Yorkshire.

# Mosaic Socio-demographic Data

| G | Type | Type Desc. | Type No. | HouseHolds | % HH | ADF | % ADF |
|---|---|---|---|---|---|---|---|
| K | K50 | Older families in low value housing in traditional industrial areas | 50 | 67604 | 11.45 | 191 | 10.01 |
| O | O69 | Vulnerable young parents needing substantial state support | 69 | 30620 | 5.19 | 174 | 9.12 |
| O | O67 | Older tenants on low rise social housing estates where jobs are scarce | 67 | 39675 | 6.72 | 172 | 9.01 |
| I | I43 | Older town centres terraces with transient, single populations | 43 | 27192 | 4.61 | 107 | 5.61 |
| I | I44 | Low income families occupying poor quality older terraces | 44 | 25186 | 4.27 | 102 | 5.35 |
| N | N61 | Childless tenants in social housing flats with modest social needs | 61 | 11946 | 2.02 | 93 | 4.87 |
| M | M59 | People living in social accommodation designed for older people | 59 | 10281 | 1.74 | 85 | 4.45 |
| M | M57 | Old people in flats subsisting on welfare payments | 57 | 12079 | 2.05 | 84 | 4.40 |
| M | M56 | Older people living on social housing estates with limited budgets | 56 | 22047 | 3.74 | 62 | 3.25 |
| I | I42 | South Asian communities experiencing social deprivation | 42 | 8129 | 1.38 | 52 | 2.73 |
| G | G32 | Students and other transient singles in multi-let houses | 32 | 14364 | 2.43 | 51 | 2.67 |

The four districts each have a different Mosaic profile, with different groups and types making up a higher proportion of the population. For instance, 'Residents with sufficient incomes in right-to-buy social housing' is higher than the England average for South Yorkshire, but this is due to a very high number of this type residing in Barnsley, Doncaster and Rotherham - the Sheffield number is much closer to the England average. Similarly, South Yorkshire has a just below average number of 'Young, well-educated city dwellers', but only due to an above average representation of this group in Sheffield; there is a very low representation of these types in the other 3 areas.

However, the one group that is significantly above average in all 4 districts is *'Families in low-rise social housing with high levels of benefit need'* – the group with the highest dependency on social and state support, at 11.23% in Sheffield, 10.55% in Barnsley, 9.91% in Doncaster and 12.28% in Rotherham – compared to the average for England of 5.22% of the population.

**Mosaic types mapped to incident data – top 10**

When we mapped our dwelling fire incident data to the Mosaic types we were able to work out which groups accounted for the highest proportion of Accidental Dwelling Fires. In the table below, you will see that the K50 group, "older families in low value housing in traditional industrial areas" account for 10.01% of Accidental Dwelling Fires (191 fires) in South Yorkshire. The O69 group account for 9.12%, and so on.

One problem with the table above is that it doesn't adequately account for increased risk. For example, 11.45% of South Yorkshire households (67,604 properties) are in the K50 group, so it may be no surprise to find they account for over 10% of Accidental Dwelling Fires.

Therefore, we refined the data to show the households which are much more likely than others to have fires. You will see in the table below that whilst the M59 group accounts for only 1.74% of the South Yorkshire population (10,281 properties), they have 4.45% of the accidental dwelling fires (85 fires), giving an index score of 255. In other words, this group is 2.5 times more likely to have an Accidental Dwelling Fire than the average household.

| G | Type | Type Desc. | Type No. | HouseHolds | % HH | ADF | % ADF | Index | Fire Rate |
|---|---|---|---|---|---|---|---|---|---|
| N | N63 | Multicultural tenants renting flats in areas of social housing | 63 | 105 | 0.02 | 2 | 0.10 | 589.18 | 0.0190476 |
| I | I39 | Young owners and private renters in inner city terraces | 39 | 55 | 0.01 | 1 | 0.05 | 562.40 | 0.0181818 |
| I | I40 | Multi-ethnic communities in newer suburbs away from the inner city | 40 | 154 | 0.03 | 2 | 0.10 | 401.71 | 0.0129870 |
| N | N66 | Childless, low income tenants in high rise flats | 66 | 2557 | 0.43 | 22 | 1.15 | 266.13 | 0.0086038 |
| M | M59 | People living in social accommodation designed for older people | 59 | 10281 | 1.74 | 85 | 4.45 | 255.73 | 0.0082677 |
| N | N61 | Childless tenants in social housing flats with modest social needs | 61 | 11946 | 2.02 | 93 | 4.87 | 240.81 | 0.0077850 |
| G | G33 | Transient singles, poorly supported by family and neighbours | 33 | 5803 | 0.98 | 41 | 2.15 | 218.54 | 0.0070653 |
| M | M57 | Old people in flats subsisting on welfare payments | 57 | 12079 | 2.05 | 84 | 4.40 | 215.11 | 0.0069542 |
| E | E20 | Upwardly mobile South Asian families living in inter war suburbs | 20 | 610 | 0.10 | 4 | 0.21 | 202.83 | 0.0065574 |
| I | I42 | South Asian communities experiencing social deprivation | 42 | 8129 | 1.38 | 52 | 2.73 | 197.87 | 0.0063969 |
| O | O69 | Vulnerable young parents needing substantial state support | 69 | 30620 | 5.19 | 174 | 9.12 | 175.77 | 0.0056826 |

Using both these tables, we can really begin to target our Community Safety work at the households which are much more likely to have fires.

Although some of these accounted for only a small number of incidents, when we look at similarities between these types, such as Ethnicity, it indicates that there is a need to target both areas in order to reduce accidental dwelling fires. We had already noted in our incident data that the majority of fires experienced by Ethnic Minority Groups were Cooking Related Fires. The data can therefore be used together to identify appropriate targeting campaigns. The Mosaic profiles include the best ways of getting safety messages across to different groups and types that can be used to further improve success rates.

# SYFR Community Fire Risk Model

Following analysis of the Mosaic Data we sought to use the Mosaic based fire rate within the risk model instead of IMD. Having examined the data we decided on the following formula:-

**All Dwelling Fire Rate + ( All Dwelling Fire Casualty Rate x 4) + (Mosaic Based Fire Rate x 2)**

This is the same formula as the Manchester Model, with the same weightings, replacing IMD with the Mosaic Based Fire Rate, and excluding Non-Domestic Property Fires.

The dwelling fire rate includes Cooking Related False Alarm Good Intent incidents and deliberate fires.

The dwelling fire Casualty Rate include casualties resulting from accidental and deliberate fire casualties, as well as precautionary checks.

The Mosaic Based Fire Rate is based on Accidental Dwelling Fires only. It has been calculated by using 3 years of accidental dwelling fires from 1st April 2010 to 31st March 2013.

Mosaic Household data has been attached to these incidents and a fire rate for each Mosaic 'Type' calculated per household:-

<u>number of households of each type</u>
the number of accidental dwelling fires experienced by each type

The fire rate for each Mosaic type has then been used to calculate a fire rate for each LSOA, based on the cumulative fire rate for each household within the LSOA (Sum) and also the average rate per household in each LSOA.

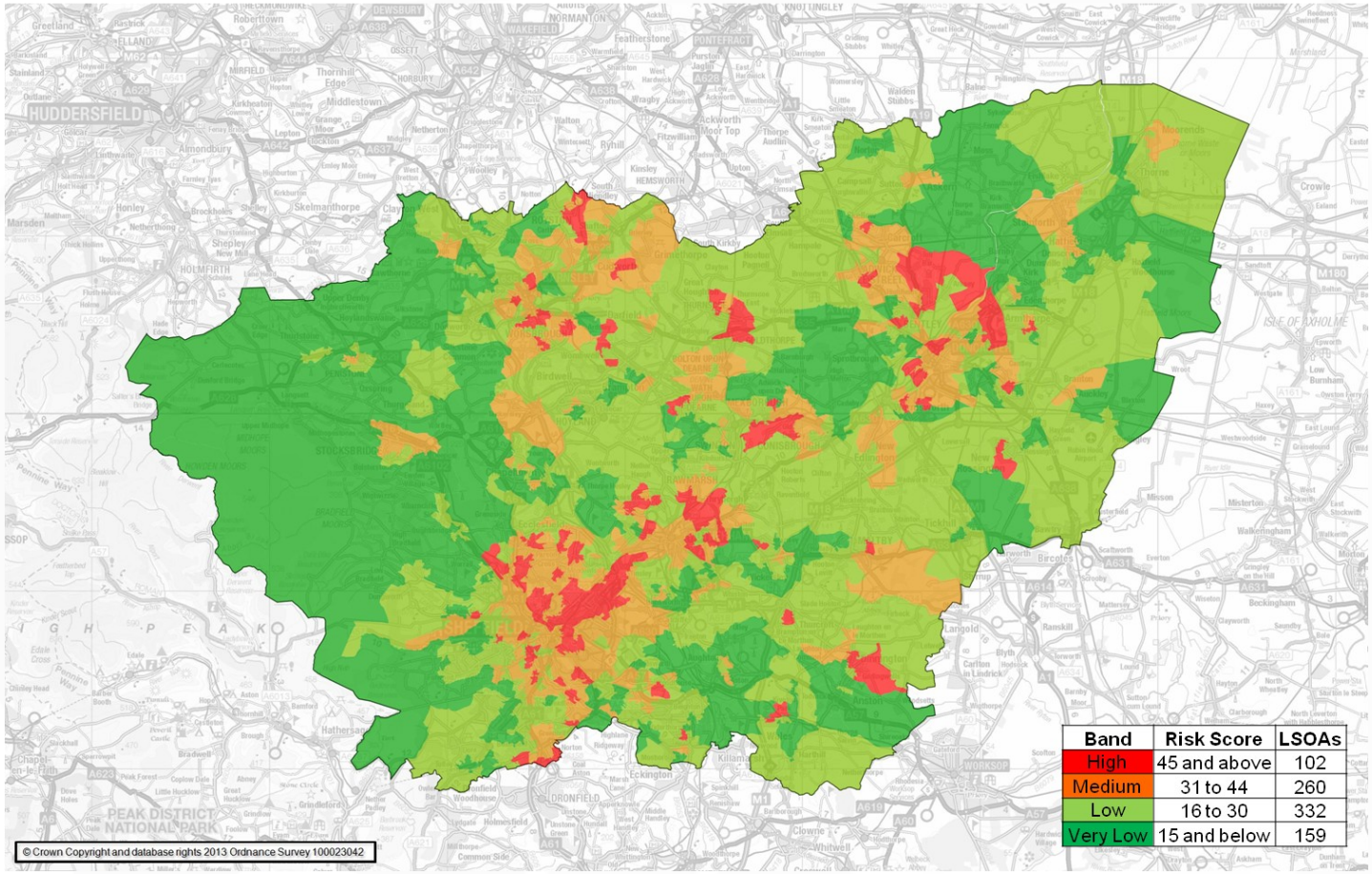
Standard Deviation have been applied to the overall risk score.

The map on the following page shows the risk map for the whole of South Yorkshire by Lower Super Output area, and the corresponding four risk bands – High, Medium, Low and Very Low.

The number of Lower Super Output areas in each band is as follows:-

| Band | Risk Score | LSOAs |
|---|---|---|
| High | 45 and above | 102 |
| Medium | 31 to 44 | 260 |
| Low | 16 to 30 | 332 |
| Very Low | 15 and below | 159 |

Standard Deviation – LSOA Fire Rate Per Household (takes into account household density)




| Band | Risk Score | LSOAs |
|---|---|---|
| High | 45 and above | 102 |
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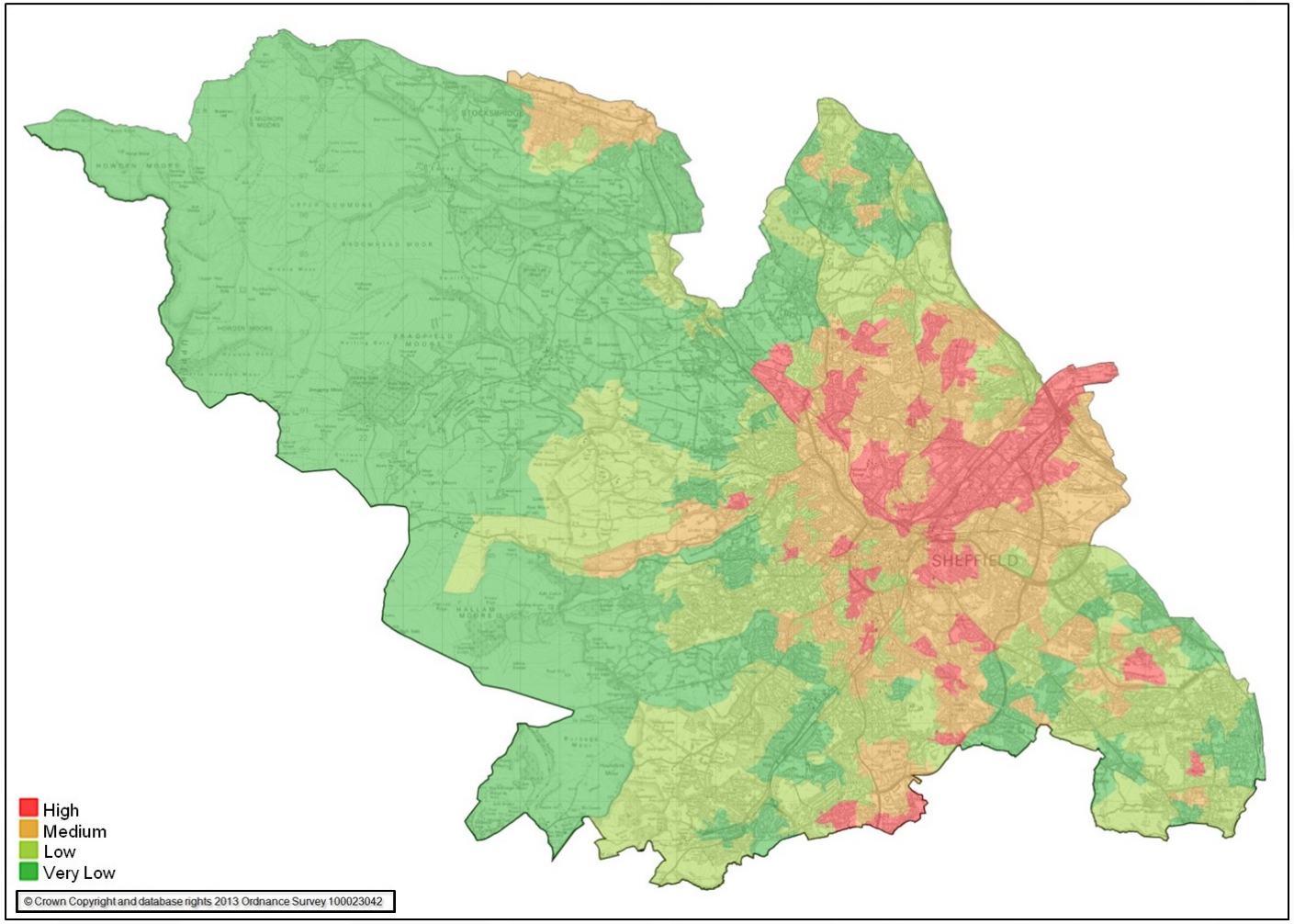
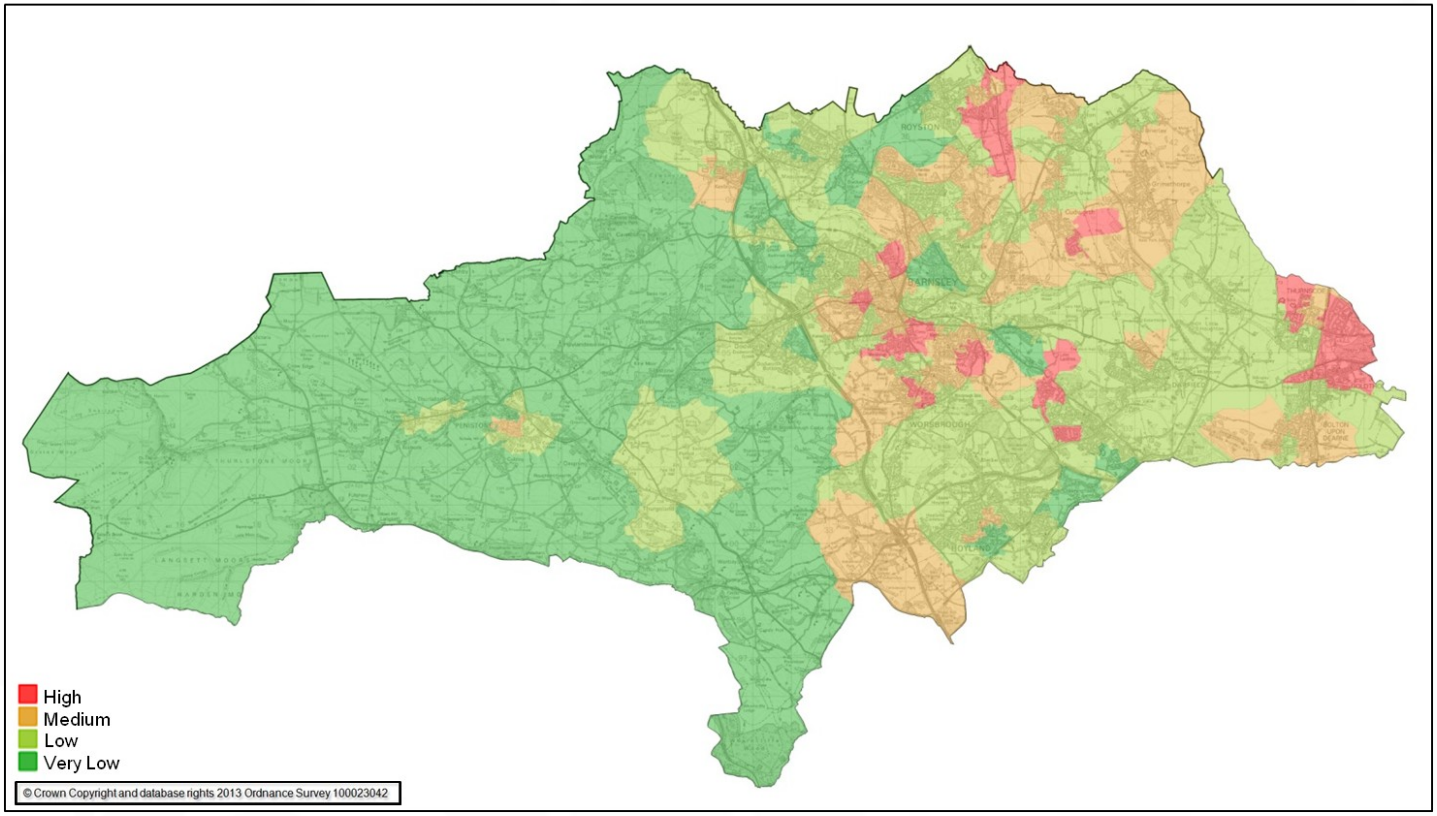
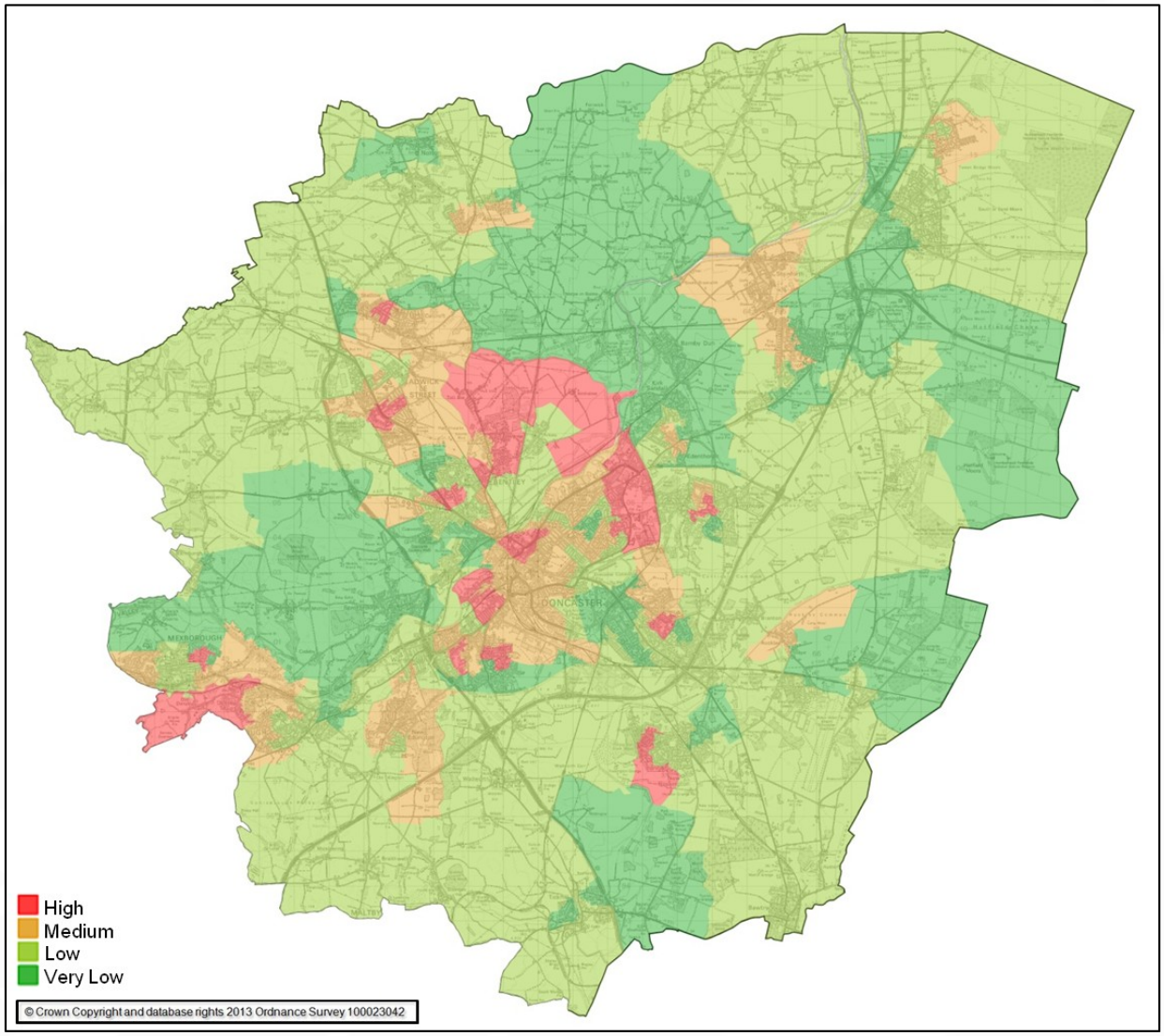
## Rate of Fire Rate per Household in LSOA - Sheffield



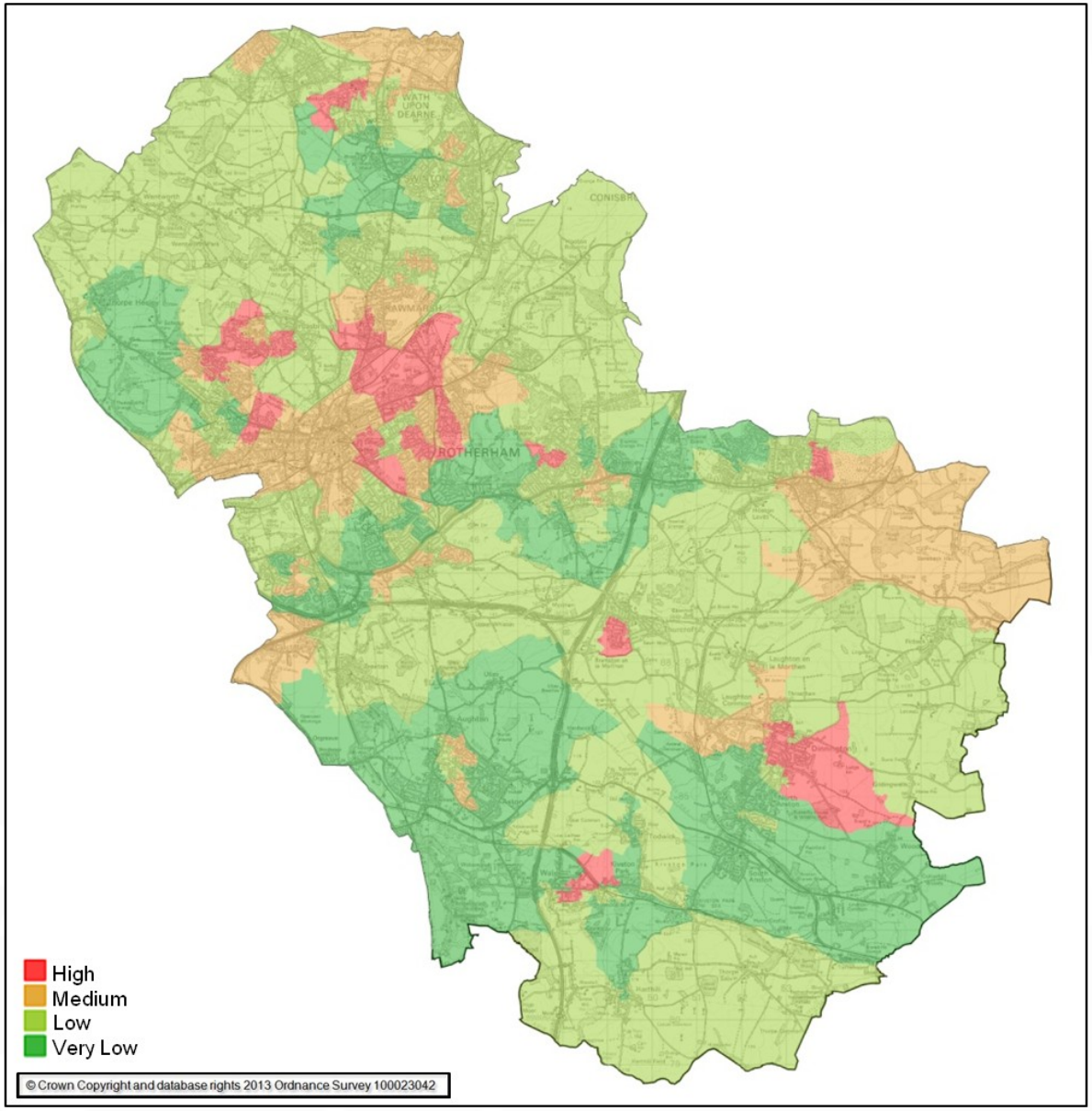
Rate of Fire Rate per Household in LSOA - Barnsley



Rate of Fire Rate per Household in LSOA - Doncaster



# Rate of Fire Rate per Household in LSOA - Rotherham



# SYFR Community Fire Risk Model

Our new risk profile will be used to target community fire safety activity, prioritising visits based on Mosaic Based Fire rate for an LSOA and also those groups who represent the largest proportion of fires.

We will overlay our Home Safety Check data to identify the properties we have already visited to further prioritise where we need to target our work. We will also examine key features and risk factors across the key types experiencing fires such as likelihood to smoke or use drugs, those in receipt of disability allowance, or those suffering from fuel poverty, that will give us more information on vulnerable groups.

We will re-evaluate the risk profile on an ongoing basis to reflect most recent data, and to determine whether our prevention work is having the desired effect in reducing fires and related casualties.

At a local level this information will be used to produce target address lists and inform communications campaigns. For example Mosaic data shows which supermarkets particular groups are more likely to shop at, so this information could be used to inform where to hold prevention events.

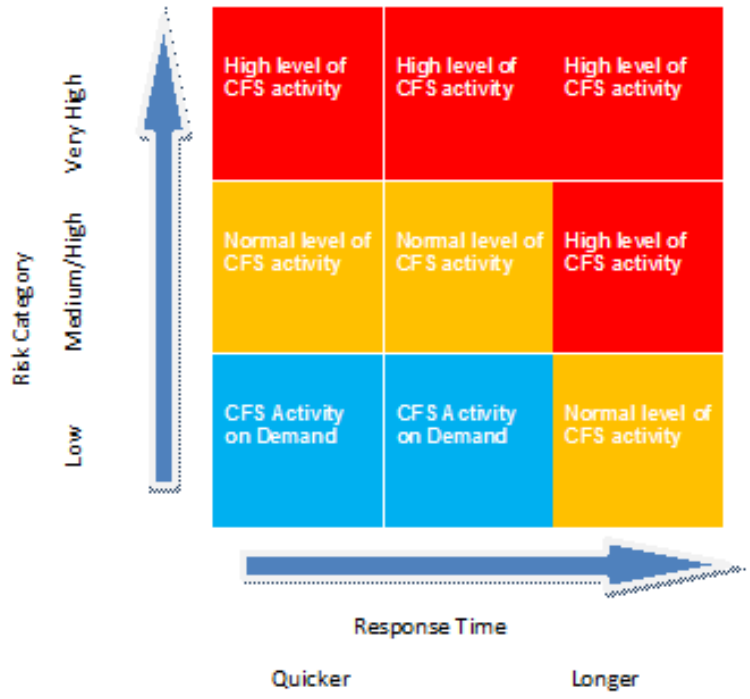
We will also take into consideration the time it takes to reach areas of the county should an incident occur. Areas with very high risk levels or longer response times will receive enhanced proactive CFS activity, as shown in the table below. This would therefore take into account more rural areas that may have above average risk levels that are covered by retained stations and therefore subject to a delay in turnout.

# Community Fire Safety Activity

Very low risk areas which already receive a quick response would receive CFS activity on demand, as required.

This information will be used in conjunction with other data and intelligence gained from partnership working and referral pathways, and the work of our vulnerable advocates, in order to target the most vulnerable and at risk people in our communities, as we acknowledge that individual risk is complex.

High risk individuals – either single or groups - will then attract an organisational response that starts with prevention (looking to reduce the likelihood of the risk), then moves through the levels of risk reduction available in terms of education, regular monitoring and physical (fixed system) interventions – and then finishes with Emergency Response.



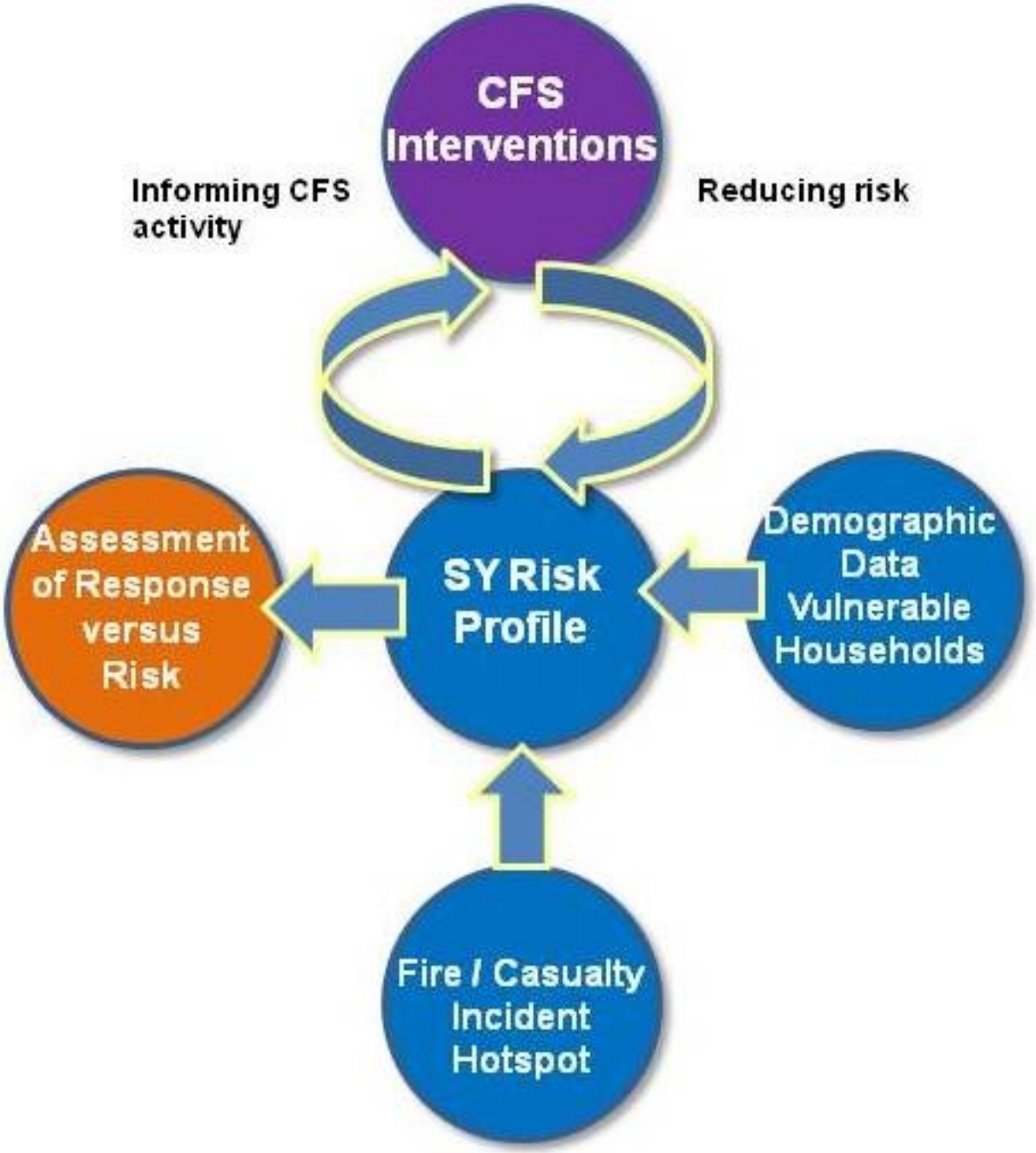
# Future Development of the Risk Model

A feedback loop will be created that will enable us to alter the risk rating for a property based on the prevention work we have undertaken, as expressed in the figure on page 28. This will be informed by the Home Safety Check (HSC), and vulnerable persons data held within our CFS Database called 'CFRMIS', combined with our professional judgement.

The Mosaic data is a rich source for targeting prevention activity. For instance data from the British Crime Survey indicates the likelihood of burnt out vehicles in an area, and the likely use of fireworks in displays at home. We will analyse the underlying datasets to see what other prevention activities we can use it for.

We are proposing to use the Risk Model to target our CFS activity over the next 3 years, and undertake an annual review to determine if we have reduced risk levels through our intervention work. It is our intention to prove the concept of this innovative model, as it is new and has not been attempted before. Once we have demonstrated that it is robust and fit for purpose we may consider how we could align our Response Standards to this model, so that our response is appropriate to the risk in our communities.

We will still strive to attend all life-threatening incidents as quickly as possible, however accepting that fire cover must be proportionate and relevant to the risks in South Yorkshire. It may be appropriate where we have not been able to reduce risk sufficiently that this is used to inform future appliance locations.


CFS Interventions
Informing CFS activity
Reducing risk
Assessment of Response versus Risk
SY Risk Profile
Demographic Data Vulnerable Households
Fire / Casualty Incident Hotspot

# External Verification

An independent review and validation of our approach and methodology was conducted by RiskTech Solutions, who have undertaken similar pieces of work for other FRSs such as Greater Manchester and Merseyside.

They commented in their report that **"The introduction of Mosaic data to introduce a local correlation of fire risk with household types is likely to allow an improved prediction of future risk than the previous IMD Data"**

They made some recommendations for implementation and future development of the model which will be taken forward.

# Timescales

We are proposing a 2 phase approach to introducing the new model as follows:-

**Phase 1 – IRMP 2013-17**

- Introduce the Community Fire Risk Model as discussed in this document to inform Community Fire Safety Targeting.
- Develop the 'feedback loop' to incorporate HSC data within the model. Carry out an annual review to incorporate latest Mosaic updates and incident data.
- Demonstrate how risk levels have changed over time by geography (LSOAs) and high risk groups of people within the Community.

**Phase 2 – IRMP 2017 onwards**

- Consider how this model (and the non-domestic risk model) can be used to determine organisational and operational response
- Combine this with our predictive modelling activity, which identifies how changes to fire cover will potentially affect risk of fire & injury.

# Appendix A

| Dwelling Fire Rate (per LSOA) | | | |
|---|---|---|---|
| Calculation | Description | Banding | Risk Score |
| Number of dwelling fires / Number of dwellings (Yearly Average) | Annual rate of fire per 'n' dwelling greater than 1 in 200 | Greater than 0.005 | 12 |
| | Annual rate of fire per 'n' dwelling between 1 in 200 and 1 in 300 | 0.005 to 0.003334 | 10 |
| | Annual rate of fire per 'n' dwelling between 1 in 300 and 1 in 400 | 0.003333 to 0.0026 | 8 |
| | Annual rate of fire per 'n' dwelling between 1 in 400 and 1 in 600 | 0.0025 to 0.001667 | 6 |
| | Annual rate of fire per 'n' dwelling between 1 in 600 and 1 in 800 | 0.001666 to 0.00125 | 4 |
| | Annual rate of fire per 'n' dwelling less than 1 in 800 | less than 0.00125 | 2 |

| Dwelling Fire Casualty Rate (per LSOA) | | | |
|---|---|---|---|
| Calculation | Description | Banding | Risk Score |
| Number of Casualties / Fatalities / Number of residents (Yearly Averaged) | Annual rate of fire casualty per 'n' residents greater than 1 in 1000 | Greater than 0.001 | 12 |
| | Annual rate of fire casualty per 'n' residents between 1 in 1000 and 1 in 1500 | 0.001 to 0.0006668 | 10 |
| | Annual rate of fire casualty per 'n' residents between 1 in 1500 and 1 in 2000 | 0.0006667 to 0.0005 | 8 |
| | Annual rate of fire casualty per 'n' residents between 1 in 2000 and 1 in 3500 | 0.0005 to 0.0002858 | 6 |
| | Annual rate of fire casualty per 'n' residents between 1 in 3500 and 1 in 5000 | 0.0002857 to 0.0002 | 4 |
| | Annual rate of fire casualty per 'n' residents less than 1 in 5000 | less than 0.0002 | 2 |

| FDR1 Non-Dwelling Fire Rate (per LSOA) | | | |
|---|---|---|---|
| Calculation | Description | Risk Score | 3 Year Dataset |
| Frequency of FDR1 fires occurring in buildings other than dwellings<br><br>(3 year period) | Number of FDR1 fires in buildings other than dwellings; 9 or more | 12 | 9 or more |
| | Number of FDR1 fires in buildings other than dwellings; less than 9 | 10 | Less than 9 |
| | Number of FDR1 fires in buildings other than dwellings; less than 6 | 8 | Less than 6 |
| | Number of FDR1 fires in buildings other than dwellings; less than 4 | 6 | Less than 4 |
| | Number of FDR1 fires in buildings other than dwellings; less than 3 | 4 | Less than 3 |
| | Number of FDR1 fires in buildings other than dwellings; less than 1.99 | 2 | 1.99 or Less |

| SY IMD 10 Banding | |
|---|---|
| **Banding** | **Risk Score** |
| >45.26 | 12 |
| 38.06 to 45.25 | 10 |
| 31.71 to 38.05 | 8 |
| 22.56 to 31.70 | 6 |
| 16.35 to 22.55 | 4 |
| <16.35 | 2 |