

## Integrated Risk Management Planning Research Report

### Report of the Chief Fire Officer

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### 1 Purpose of Report

This report informs Members about the recent publication of a Communities and Local Government report that looks at the connection between fire risk and the socio-demographic make-up of the population covered by a Fire and Rescue Service. It also discusses how this variation in risk could be used to develop future benchmarking targets for both internal and external purposes.

### 2 Recommendations

The Committee is asked to note the contents of this report

### 3 Background

The Research and Statistics Division of Fire and Resilience Directorate (FRD) carries out a lot of research, on behalf of Communities and Local Government (CLG), which is aimed at providing an evidence base upon which Fire Authorities can develop their local Integrated Risk Management Plans (IRMPs). This report informs Members about the latest research report from the FRD, which was published as part of Fire Service Circular 34/2008 in July 2008. The report runs to 131 pages and is available at:

<http://www.communities.gov.uk/publications/fire/frsperformanceanalysis>

CLG commissioned this work because previous studies have shown that dwelling fires and injuries are not uniformly spread among the population, but are more likely to occur in areas with a high proportion of people from 'at-risk' groups. It is felt that a better understanding of the relationships between various measures of disadvantage within the population and the risk from dwelling fire in these areas would enable Fire and Rescue Services (FRSs) to target Community Fire Safety (CFS) work more effectively, and therefore reduce fire casualties and possibly other unwanted outcomes such as deliberate fires and false alarms. The project's first aim was therefore to identify socio-demographic indicators of dwelling fires/ dwelling fire injuries and deaths that could be of value in targeting CFS.

In addition, the study also aimed to get an understanding of how socio-demographic measures could be used to assist FRSs in their efforts to benchmark their performance in reducing risk in their area, both internally (e.g. between stations) and externally (between FRSs).

#### **4 Fire risk model options**

The study explored the potential for various nationally available datasets to be used as the basis for developing a reliable model. The datasets explored were:

- the Indices of Multiple Deprivation (IMD);
- the Census; and
- MOSAIC<sup>1</sup>.

The study found that whilst MOSAIC was useful for developing a profile of people susceptible to fire risk, it cannot be used as the basis for predicting levels of risk. The study therefore concentrated on identifying a reliable model based on either IMD, or the Census, or a combination of both.

The study also looked at the variables from the Census data that had been explored in previous studies, some of which are currently being used in the Fire Service Emergency Cover (FSEC) software, used by most brigades (including Shropshire) as a tool to inform on their IRMP proposals. This study benefited from several more years' worth of data being available to it, than had been available to previous studies, largely due to the fact that Brigades had adopted the FSEC tool.

The findings given in the report have been split into three key areas:

- Socio-demographic fire risk factors;
- Possible improvements to FSEC; and
- Potential changes to targeting and benchmarking.

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<sup>1</sup>Mosaic UK is a people classification system that combines over 400 separate data sources and divides the UK adult population into 61 different types and eleven groups, covering the full spectrum of British and Northern Ireland society.

Each of these key areas is discussed in the following sections.

## 5 Fire Risk Factors

The research found that:

1. Dwelling fires and injuries correlate very strongly at the local authority area level. Dwelling fires and injuries have a low correlation with deaths. This reinforces the view that the number of fire deaths within FRSs is very volatile and hence difficult to assess or predict.
2. The strongest model is provided for dwelling fires, as opposed to fire deaths or injuries. This is probably due to relatively higher rate of dwelling fires than injuries or deaths, leading to fewer areas with zero incidents. However, the Census model for fire injuries is moderately reliable. Thus, it would be reasonable to use either the dwelling fire or the dwelling fire injury model for targeting CFS.
3. Models that use the Census or the Census combined with IMD, performed better (explaining 69% and 54% of the variance in dwelling fires and injuries respectively) than the model using IMD alone (which accounted for 60% and 48% of fires and injuries respectively).
4. The following list shows the factors, used in the combined Census / IMD model, ranked in order of most to least influence. All factors are associated with more fires:
  - Lone parent with dependent child(ren)
  - Never worked
  - Single adult household
  - Deprivation (as measured by the IMD score).
5. If the above factors are taken into account, then the 'Caribbean/African and other black' population, are associated with fewer fires. This indicates that it is the higher rates of deprivation/single parents amongst 'Caribbean/African and other black' that is associated with increased rates of fire amongst this section of the population, rather than ethnicity.
6. Similarly this study has developed the understanding of the role of age in fire risk. It indicates that being single, sick / disabled and deprived are factors. It is possible that being elderly is not in itself a factor. Rather it may be that the combination of being single, sick / disabled and deprived is more common amongst elderly people.

The Community safety department is considering the implications this study has on the processes it uses for identifying those people at risk from fire in Shropshire. One of the more significant characteristics appears to be around individuals who are in some way 'single'. Whether it be:

- Single household;
- Single parent; or
- Lone pensioner etc.

This is one specific area that will need to be included within the Service's 'At Risk Strategy'. This could possibly result in changes to the Home Fire Risk Assessments, conducted by operational staff across the whole county, as well as in the work we undertake in collaboration with current and future partnerships.

This study has also demonstrated that the issues of employment, crime and disorder, health, deprivation, education, and living environment etc have significant influence on fire and fire injury rates. This justifies the importance that Shropshire Fire and Rescue Service (SFRS) places on its efforts to tackle these wider social issues, through support for the county's two Local Area Agreements. By helping to tackle these wider issues, the Service will be able to drive down the inherent risk from fire that exists in our communities.

## 6 Possible improvements to FSEC

The study produced updated and more powerful models that could replace those currently in the FSEC toolkit. FSEC contains a formula to predict the rate of casualty across a Brigade area. The 'new' Census model could replace the one within FSEC without any additional data needing to be added to it. The table below compares the factors currently used by FSEC, and those proposed by the 'new' model

Current factors	Potential new factors
Single parents Rented accommodation Long term limiting illness Elderly	Single parents Never worked Single adult household Caribbean/African and other black

FSEC is one of a number of tools Shropshire's IRMP Team uses to assess the IRMP proposals considered by the Fire Authority each year. It is not possible for the Team to make the modifications to FSEC, highlighted above; this work would have to be undertaken by the national FSEC team. The study report also gives no indication as to what impact such changes would make on the results reported by FSEC. The IRMP Team will discuss this matter with the national FSEC Team over the coming months.

## 7 Benchmarking and Targeting

Having identified the most reliable models, the study then used these to predict the rates of dwelling fire and injury and compared them with the reported rates for England as a whole, and for each individual Brigade. Their results indicated that there are large (as much as four fold) differences in the rate of dwelling fires and rate of casualties arising from differences in socio-demographic factors.

They go on to point out that a simple comparison between FRSs, based simply upon their rates of fire and casualty would not take account of the impact of their socio-demographic profiles. For example, a FRS whose predicted rate of fire casualty is twice the national average, may in fact be performing well if the reported rate is 1.5 of the national average.

They conclude that their findings support the notion of risk weighted (socio-demographic risk) targets and performance measures.

So what would be the potential impact on Shropshire's performance if the CLG decided to progress with the idea of risk weighted targets? The table below shows the predicted dwelling fire and injury rates for Shropshire, as produced by the various models, in comparison to the actual rates experienced over the period 2002 to 2004. The national average rates are also included as a benchmark indicator.

	Rate of dwelling fires (pmp*)	Rate of dwelling fire injuries (pmp*)
National average rate	932	188
IMD predicted rate for SFRS	781	152
Census predicted rate for SFRS	803	164
IMD and Census combined predicted rate for SFRS	895	127
Shropshire's actual rate for 2002-04	733	62

\* pmp – per million population

The table serves to demonstrate that, whichever method is used for setting risk weighted targets, Shropshire would continue to be seen as a good performing Service. A list of the performance tables for all Brigades in England is provided at appendix F of the CLG's report. This has been reproduced as appendix A1 and A2 to this report.

Members should note that several performance indicators currently used within the Service, already include an adjustment for deprivation. This adjustment is based on the IMD reported for each Authority area and therefore relates to the entry against the 'IMD predicted rate' given in the table above.

This study was limited in scope to looking at the potential impact that socio-demographic risk factors could have on target setting for dwelling fires and related injuries. Whilst it provides no evidence about how these, or any other, socio-demographic factors affect other fire specific targets (e.g. arson); this study may serve to promote discussion in this area.

## **8 Financial Implications**

There are no financial implications arising directly from this report.

## **9 Legal Comment**

There are no legal implications arising directly from this report.

## **10 Equality Impact Assessment**

This report simply informs Members about the publication of a research report produced by the CLG. As such, it reports progress against a previously agreed improvement plan and has no impact on people. It has been assessed against the Service's Brigade Order on Equality Impact Assessments (Personnel 5 Part 2) and this has shown that there are no discriminatory practices or differential impacts upon specific groups arising from this report. An Initial Equality Impact Assessment has not, therefore, been completed.

## **11 Appendices**

<b>Appendix A1</b>	Specific FRS results for Dwelling Fires
<b>Appendix A2</b>	Specific FRS results for Dwelling Fire Injuries

## **12 Background Papers**

There are no background papers associated with this report.

Implications of all of the following have been considered and, where they are significant (i.e. marked with an asterisk), the implications are detailed within the report itself.

Balanced Score Card		Integrated Risk Management Planning	*
Business Continuity Planning		Legal	
Capacity		Member Involvement	
Civil Contingencies Act		National Framework	
Comprehensive Performance Assessment		Operational Assurance	
Efficiency Savings		Retained	
Environmental		Risk and Insurance	
Financial		Staff	
Fire Control/Fire Link		Strategic Planning	
Information Communications and Technology		West Midlands Regional Management Board	
Freedom of Information / Data Protection / Environmental Information		Equality Impact Assessment	*

## Appendix A Specific FRS Results

### A.1 Dwelling fires

This table shows the IMD and Census predicted rates of dwelling fires, and also the reported rate for each FRSs.

Predicted and reported rates of dwelling fires per FRS					
National average rate = 932		IMD predicted rate of dwelling fires pmp	Census predicted rate of dwelling fires pmp	IMD and Census combined predicted rate of fires pmp	FRS reported rate of dwelling fires pmp
FRS					
50	London	1037	1078	1019	964
47	West Yorks	1165	1155	1182	949
46	West Midlands	1264	1162	1202	1310
45	Tyne & Wear	1302	1370	1417	1861
44	South Yorks	1209	1043	1028	1038
43	Merseyside	1485	1813	1969	1723
42	Manchester	1258	1436	1517	1737
39	Wiltshire	598	607	490	693
38	West Sussex	577	647	760	760
37	Warwickshire	909	649	681	350
36	Surrey	424	505	692	622
35	Suffolk	688	595	870	594
34	Staffordshire	886	844	678	707
33	Somerset	713	705	964	644
32	Shropshire	781	803	895	733



Predicted and reported rates of dwelling fires per FRS

National average rate = 932		IMD predicted rate of dwelling fires pmp	Census predicted rate of dwelling fires pmp	IMD and Census combined predicted rate of fires pmp	FRS reported rate of dwelling fires pmp
FRS					
31	Oxfordshire	537	606	1507	640
30	Nottinghamshire	1087	1048	1417	963
29	Northumberland	929	846	766	876
28	Northants	720	806	733	894
27	North Yorks	656	649	782	607
26	Norfolk	620	643	739	603
25	Lincolnshire	762	695	648	663
24	Leicestershire	772	790	769	643
23	Lancashire	1005	1200	1126	1393
22	Kent	733	794	765	649
21	Isle of Wight	901	922	912	829
20	Humberside	1079	960	912	1074
19	Hertfordshire	537	655	645	664
18	Hereford/Worc	686	647	442	659
17	Hampshire	635	760	757	646
16	Gloucestershire	634	651	614	763
15	Essex	710	739	670	450
14	East Sussex	865	924	1044	1198
13	Durham	1136	1184	1043	936
12	Dorset	728	693	775	671
11	Devon	867	872	868	848

Predicted and reported rates of dwelling fires per FRS

National average rate = 932		IMD predicted rate of dwelling fires pmp	Census predicted rate of dwelling fires pmp	IMD and Census combined predicted rate of fires pmp	FRS reported rate of dwelling fires pmp
FRS					
10	Derbyshire	916	784	812	674
9	Cumbria	919	790	884	1034
8	Cornwall	933	824	747	689
7	Cleveland	1316	1355	1400	1422
6	Cheshire	799	883	864	869
5	Cambridgeshire	659	710	621	769
4	Buckinghamshire	530	631	576	692
3	Berkshire	560	632	638	687
2	Bedfordshire	731	784	865	695
1	Avon	775	874	967	668

## A.2 Dwelling fire injuries

This table shows the IMD and Census predicted rates of dwelling fire injuries, with the reported rate for all FRSs.

Predicted and reported rates of dwelling fire injuries per FRS					
National average rate = 188		IMD predicted rate of dwelling fire injuries pmp	Census predicted rate of dwelling fire injuries pmp	IMD and Census combined predicted rate of injuries pmp	FRS reported rate of dwelling fire injuries
FRS					
50	London	215	206	191	185
47	West Yorks	246	251	275	218
46	West Midlands	271	262	261	187
45	Tyne & Wear	280	284	294	280
44	South Yorks	257	212	227	204
43	Merseyside	325	403	440	377
42	Manchester	269	313	358	550
39	Wiltshire	107	119	129	121
38	West Sussex	102	128	138	153
37	Warwickshire	124	120	118	70
36	Surrey	65	79	77	140
35	Suffolk	129	110	94	118
34	Staffordshire	178	164	169	126
33	Somerset	135	134	153	80
32	Shropshire	152	164	127	62
31	Oxfordshire	92	115	117	141
30	Nottinghamshire	227	228	224	254

Predicted and reported rates of dwelling fire injuries per FRS

National average rate = 188		IMD predicted rate of dwelling fire injuries pmp	Census predicted rate of dwelling fire injuries pmp	IMD and Census combined predicted rate of injuries pmp	FRS reported rate of dwelling fire injuries
FRS					
29	Northumberland	188	151	137	174
28	Northants	137	176	150	163
27	North Yorks	122	122	130	132
26	Norfolk	154	112	134	151
25	Lincolnshire	159	128	120	157
24	Leicestershire	150	164	143	106
23	Lancashire	207	255	249	316
22	Kent	140	170	141	78
21	Isle of Wight	182	190	154	188
20	Humberside	225	221	183	243
19	Hertfordshire	92	130	117	131
18	Hereford/Worc	129	122	119	90
17	Hampshire	116	160	159	132
16	Gloucestershire	116	125	102	104
15	Essex	135	151	127	106
14	East Sussex	173	179	209	199
13	Durham	239	227	209	191
12	Dorset	139	129	159	131
11	Devon	173	173	176	191
10	Derbyshire	185	154	164	124
9	Cumbria	186	143	171	150

Predicted and reported rates of dwelling fire injuries per FRS

National average rate = 188		IMD predicted rate of dwelling fire injuries pmp	Census predicted rate of dwelling fire injuries pmp	IMD and Census combined predicted rate of injuries pmp	FRS reported rate of dwelling fire injuries
FRS					
8	Cornwall	189	147	152	146
7	Cleveland	283	298	269	252
6	Cheshire	157	172	173	173
5	Cambridgeshire	122	137	112	163
4	Buckinghamshire	90	124	94	123
3	Berkshire	98	115	106	89
2	Bedfordshire	140	152	153	71
1	Avon	151	183	210	94