

Summary:

What impact did the Fforestfach tyre fire have on health?

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## What was the situation?

The Fforestfach tyre fire started on the 16th of June 2011 and, despite constant attention from specialist fire crews, it continued to burn for 22 days. Many of the surrounding residential areas were exposed to the thick black smoke from the fire. The smoke was monitored both in terms of the chemicals it contained and also the areas it affected.

Smoke from tyre fires contain a number of chemicals, such as sulphur dioxide and inhalable particles (particulate matter), that might cause health problems, such as heart or breathing difficulties, especially for people who already have long-term health conditions. In general, the safety advice given out to people living near fires, including the Fforestfach fire, is that they should try and stay out of the smoke as much as possible by staying indoors and keeping doors and windows closed.

The health effects of the smoke from large fires on people living nearby is always a concern and this research was done to look at whether people living close to the Fforestfach fire contacted their GPs more often during the fire than they might have done otherwise. This is important both for the people living in the Fforestfach area and also for those living near similar fires in the future.

## What were we trying to find out?

The aim of this research was to see whether people living in the areas heavily affected by the smoke (i.e. where the amount of smoke was estimated to be moderate or high for more than a day) contacted their GPs more - for breathing or heart problems - than either people living in the same areas the previous year or in local areas less affected by the smoke.

## What did we do?

The study used advanced techniques to join up health data and environmental data to help answer the question.

The study used GP data for all people registered with a GP and living within 2.5km of the fire, where they could have been affected by smoke to different degrees. The data used was anonymous, which means we did not have access to any information that would have allowed us to identify individuals. The information we used came from the Secure Anonymised Information Linkage (SAIL) databank at Swansea University. SAIL perform a complex and highly regulated process which allows health information (e.g. appointments, new and existing health complaints) to be accessed by researchers without releasing information that would potentially identify individuals (e.g. names and addresses).

To see whether the health of local people had been affected by the smoke, this study looked at the number of contacts with GPs for breathing or heart complaints. We examined the number of contacts for the whole population and specifically for people with existing heart or breathing problems (Asthma, Chronic Obstructive Pulmonary Disease (COPD) or heart disease). The study

looked at contacts with the GPs between 16 June 2011 and 11 August 2011, and included the three-week period of the fire.

To work out who had been exposed to higher concentrations of pollutants from the smoke, this study joined the health data with information produced by the Met Office to estimate which of the local residential areas had more exposure to the smoke. We classed people as being more heavily exposed if they lived in areas where the air pollutant concentrations were estimated to have been at least “moderate” for 1 or more days during the period of the fire. International guidelines from the Committee on the Medical Effects of Air Pollutants (COMEAP) suggest that “moderate” levels are unlikely to affect most people without any health problems, but people with existing heart or breathing problems may experience symptoms and should consider limiting their activities if they start to experience symptoms.

The study used two main methods to see if the number of contacts during the fire were higher than we would have expected without the fire. The first compared contact rates (number of GP contacts per 1000 people) for the period of the fire with the rates for the same weeks the previous year.

The second method used a statistical technique known as logistic regression modelling, which assesses the likelihood of an association between living in an area that was more exposed to the smoke and contact with GP. This method also takes into account other things that might affect whether people visit their GP, such as being in hospital during the last year. For this method we compared the people living in areas more exposed to the smoke to people living in less exposed areas at the same time point; this takes into account anything else that might have been happening at the time of the fire, such as high pollen counts causing an increase in GP visits for hay fever and asthma.

## What did we find?

A large number of local residents lived in areas that were exposed to the smoke. Nearly 18,000 people were exposed to at least “moderate” levels of pollution on at least one day, with 7,300 people exposed to it for 3 or more days. Due to the weather conditions and wind directions at the time, there were another 23,000 people who lived near to the fire but were only exposed to “mild” levels of pollution, which may have been normal for that area.

Women living within 2.5km of the fire contacted their GP more often about breathing issues during the period of the fire than they did during the same weeks the previous year; similarly men with COPD also contacted their GPs at a higher rate than the previous year. The rate of contact for heart issues among men and women in the general population was not higher during the period of the fire compared to the previous year however.

There are a number of other factors that could also have been different during the summer of 2011 and we cannot assume that these increased rates of GP contact are necessarily as a result of the fire; temperatures, pollen counts and circulating viruses for example may have differed between 2010 and 2011.

The second type of statistical analysis, which compared people who lived in areas more exposed to the smoke to local residents in the areas that were less exposed, was more able to rule out the effects of some of these other factors as it looked at both groups during the summer of 2011.

This second analysis found that people with asthma who lived in areas that were more exposed to the smoke were slightly more likely to contact their GP – those living in the most exposed areas were a third more likely to contact their GP.

For the general population or people with COPD, this analysis found that living in an area that was more exposed to the smoke did not result in an increase in contact with GPs about a breathing issue. The analysis was also able to look at contact for heart issues in the general population, again finding no increase in contact.

## **Are there any limitations with this research that may influence how certain we can be about the findings?**

This study was only able to look at contacts with a GP. Health concerns which could either be dealt with at home, through a pharmacy or that required a visit to A&E would not have been detected.

We were also only able to look at GP contact for broad categories of illness; it is possible that a spike in a specific ailment would have been missed.

Similarly, because we looked across an 8 week period, a spike in the number of GP contacts over a day or two might have gone undetected; the pattern of contact did not show any clearly visible spikes but we did not look at this in more detail.

The study used broad categories for exposure to the smoke; this may have meant that health effects in those who were exposed to the smoke for a larger number of days, or who were exposed to really high levels of smoke, would have been missed.

This study was only able to look at external pollution concentrations. Those living in the local area, especially those with health conditions, were given the advice to stay indoors and away from the smoke whenever possible. Following this advice is likely to have reduced their exposure to the smoke.

# What can we conclude from this research?

Despite the limitations noted above, the findings from this research broadly support the current health advice which says that some individuals with certain long-term health conditions may be more likely to experience symptoms when exposed to higher levels of pollution, such as smoke; but the risk of significant symptoms in the general population is likely to be minimal. Here we saw that people with asthma contacted their GPs more, but there is no evidence that the general population were significantly affected once we had taken into account other factors.

The current study was conducted in the context of a real life incident where advice to stay out of the smoke was issued on a number of occasions. The lack of a significant effect of the smoke on the general population and people with COPD should be interpreted with this, and the other study limitations, in mind – the impact may have been different if the advice had not been given and people had not reduced their exposure to the smoke.

This study also found that linking health and environmental data using advanced data linkage techniques can provide useful results. A technical report, which describes the methods and findings in more detail, is also available to the public.

## Project members

Leon May, Rhian Hughes, Lloyd Evans, Kirsty Little

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