Summary of the 2020 (delayed until 2022) Imperial College London Study

Small Area Health Statistics Unit Study into health risks in the area exposed to the plume from the October 2000 chemical fire at CSG in Sandhurst, Gloucestershire: a follow up study from 2001 to 2020 (by Imperial College London, 2022)

Small area statistic studies

Small area statistic studies aim to compare a given area's population (the study area) with another similar population (e.g. the South-West). This is to understand if an outcome, like an admission to hospital, is seen in the study population more or less often than we would expect.

In these studies, findings may be described as 'statistically significant'. This means that we can be more confident that the results are not due to random chance, and that there is a real difference between the study population and the one we are comparing it to. For example if a study finds that the number of admissions to hospital in a study area is statistically significantly higher than the area we are comparing to, we can say that this difference might have occurred by chance but that this is not very likely and so something else other than chance might explain the higher admissions.

Some outcomes are already more likely to be seen in some groups of people. For example, the older people become, the more likely they are to have a heart condition or develop cancer. It is also true that people from areas with certain factors such as poorer access to services, lower employment or higher crime rates are more likely to experience some outcomes such as higher possibility of some diseases and dying at younger ages. Such areas are often described as areas of high deprivation. In small area statistic studies, results are typically 'adjusted' to take account of factors like deprivation and age. So if we are studying an area where more older people live than the area we are comparing to, and we notice that hospital admissions are significantly higher, adjusting for age in this example might show that there is no difference once we have taken account of the ages of the people in our study area.

Unfortunately, these types of studies do not identify what is causing any differences to occur, only that that variation exists. So where admissions to hospital are statistically significantly higher, even after we have taken account (adjusted) for age and deprivation, then we can say the result is unlikely to be due to random chance but we cannot say for sure what the cause might be. However, sometimes is then possible to think of and test other explanations but this is not always the case and there are times we cannot explain why differences occur.

Results of the 2010 Study

The original study looked to answer three questions:

- Is there any evidence of excess deaths in the area?

- Is there any evidence of excess Cancer registrations in the area?
- Is there any evidence of increased admissions to hospital due to respiratory conditions in the area?

The 10-year follow up study found that:

- there were no statistically significant increases in recorded cancer diagnoses in the six years following the fire;
- there was no clear evidence of excess risk of mortality (death) over the period 2001-2006;
- there was a statistically significant excess of respiratory admissions (related to breathing or lung diseases) compared to the South-West average between 2001-2005. This study did not consider certain factors which can influence respiratory admissions, such as smoking prevalence or occupation, in the area.

Results of the 2020 (delayed until 2022) study

To ensure that the 20-year study was able to be compared to the original study, a very similar approach was undertaken by Imperial College London. Unlike in 2010, it was possible in this study to use newer data on estimated numbers of people smoking (smoking prevalence) to help consider this in the analysis. Some of the boundaries of the small areas being studied had changed slightly over the 10 years.

Results

Cancer registrations

The number of registrations of all cancers and common cancers combined (Lung/Breast/Prostate/Colorectal and Leukaemia) up until 2017 were not higher than expected in the study area.

All-cause mortality

Based on all causes of death, there was some evidence of more deaths than expected in the period between 2011 and 2015, but not in any of the other 5-year time periods considered.

When looking at very small areas, like in this study, there can be various reasons for seeing more deaths than we would expect to see. In response to the ICL study Gloucestershire County Council has looked at the causes of death in this time-period to understand this result better. The areas where excess deaths have occurred most consistently over the study period is seen in an area with an older person's care home, which opened after the incident occurred. Care homes can cause an area to have a higher number of deaths, as deaths that would have happened across the county happen in a small geographical area.

Admissions due to respiratory conditions

For all periods after the incident there was a significantly raised risk of admissions due to respiratory conditions, even when smoking prevalence in the area was considered. It is important to note that there was also an increased risk of admissions due to respiratory conditions in the area prior to the fire occurring (between 1991-1995). This is consistent with the findings of the original report done by ICL. Respiratory admissions can be due to a variety of causes including exacerbation or sudden worsening of chronic conditions like asthma or COPD (chronic obstructive pulmonary disease) or due to other conditions including chest infections and viruses. It is not possible from this study to explain why there was an increased risk of respiratory admissions in this area both before and after the fire.

Limitations of the study

As with other small area studies, there are several limitations to this study. As the study is based on the current population, it does not consider migration in and out of the area over the last 22 years since the fire occurred. Therefore, the population included in the study were not necessarily living there at the time of the incident.

Although adjustment for smoking was carried out on more recent data, it is not available for periods prior to the incident and so making clear comparisons before and after the events is more difficult.

Conclusion

Based on this study, there is no clear evidence of excess cancer registrations or deaths from all causes in the area as a result of the incident in 2000. There is some evidence of higher-than-expected admissions for respiratory conditions in the area, however this was observed prior to the incident and this study is unable to establish clear evidence that this was as a result of the incident.

Unfortunately, in this type of study there are various limitations. As such, even when there is a statistically significant increase in a particular outcome, it is not possible to demonstrate that this was caused by a specific exposure or incident.

A full version of the report is available on request.