Landfill sites and congenital anomalies – have we moved forward?

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Elliott et al (see page 81) report the findings of a spatial analysis examining the risk of congenital anomalies in relation to the density of landfill sites within 2 km of birth locations across 5×5 km grid squares in England. They observe significantly raised risks for some anomalies (cardiovascular defects, hypospadias) in areas classified with a higher density of sites destined to receive special (hazardous) waste; no significant excess risks were found for non-special (mainly domestic) waste sites. The data used for this study are similar to those used in a previous nationwide landfill study published in 2001; the current publication does not include Scotland and Wales. The main difference between the two studies is that the current study uses “landfill density” as an exposure indicator to account for residence near more than one site, whereas the 2001 study merely evaluated residence within 2 km of any site. Results are similar: in neither study does a clear pattern of excess risk emerge and the few excess risks reported are small and therefore difficult to distinguish from bias factors. The question is whether this study brings us any closer to resolving questions regarding the causality of a relationship between residence near landfills and congenital anomalies.

Exposure to hazardous chemicals from landfill sites is hard to assess. There is at present very little information about what chemical agent(s), in what quantities, and via which pathways may actually result in exposure of human populations. Further, emissions from a landfill are determined not only by the type of waste deposited, but by the age, design and management of the site and by local (hydro)geological and meteorological conditions. Sites, whether receiving special or other wastes, are likely to vary substantially in their exposure potential. Special waste sites may in fact be no more hazardous than non-special waste sites because they are subject to more stringent design and management. Elliott et al base their exposure indicator on site density, assuming that more landfills means more exposure. There is no information to validate this assumption. Further, their analysis of special waste sites classifies under “zero” density those grid squares without special sites, even though many of these must still contain other, “non-special”, landfill sites. Conversely, areas classified with zero density in the analyses of non-special waste sites may contain special waste sites. It is difficult to judge whether this exposure indicator constitutes a real improvement on the previously used, purely distance-based, ones.

Since raised risks of congenital anomalies have repeatedly, although not consistently, been reported near landfill sites, it is important to consider whether other characteristics of populations living near such sites may explain these findings. In their 2001 paper, Elliott et al reported that 80% of the British population lived within 2 km of a landfill of any type, and this raised concerns about the comparability of study and reference areas. It is of interest that the 2001 study reported higher risks near landfills for some congenital anomalies before sites opened compared with afterwards, suggesting a role of factors other than pollution from the sites. Unfortunately, the before–after analysis was not repeated in the current paper. Area-level socioeconomic deprivation was controlled for in the current paper, but it should be noted that almost all risk estimates decreased after adjustment. This gives an indication of the direction of any possible residual confounding by individual-level risk factors related to deprivation, such as diet and ethnicity.

The main source of congenital anomaly data used for this study, the National Congenital Anomaly Register, is notoriously incomplete; for cardiac anomalies and hypospadias completeness of ascertainment below 30% has been reported. This adds to uncertainties in the interpretation of results, even though it is hard to envisage that ascertainment differences would be systematically associated with the 2 km exposure zones around landfill sites on a national scale. The first European multi-site landfill study was published 10 years ago. Comments on the data were called for better exposure asessment as the only way to move closer to answering the causality question. The last decade has seen several large, regional and nationwide, studies of adverse birth outcomes covering Great Britain, northwest England, Scotland, the eastern region of Ireland, Wales, Denmark, and England and Wales. Before and after site-opening comparisons have been informative, but apart from these, exposure assessments have not significantly advanced beyond distance-based measures. The sophisticated mapping and statistical techniques used in the current study are of considerable methodological interest but have brought few new insights into causality. More promise may lie in the development of pollutant dispersion models, but these require systematic information about chemical emissions from sites. Landfill is an important issue for public health. The way to better inform both the public and professionals of its real hazard to the unborn fetus, is by improving our understanding of landfill exposures and of the causes of adverse birth outcomes.

Competing interests: None.

REFERENCES