

# Does autism cluster geographically? A research note



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**abstract** We report an apparent cluster of seven cases of autism spectrum disorder in a network of a few streets in the UK. Clusters do not easily fit the dominant genetic theory of autism. Whilst this could in principle represent the effect of an environmental pathogen, we consider an alternative interpretation: that autism spectrum conditions may be so much more common than was previously thought that finding seven cases in an area of a few streets is not necessarily higher than one would expect from chance. We conclude by highlighting the need for an agewise epidemiological study of autism spectrum conditions, since this cluster is only higher than expected when compared with expected rates for under-5s rather than under-18s.

**keywords**

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The early reports of the prevalence of autism typically cited figures in the region of 4 cases in every 10,000 children (Rutter, 1978). Using a broader definition of the autistic spectrum, higher prevalence rates of 15–20 per 10,000 children have been reported (Wing and Gould, 1979). Many clinicians and scientists would nowadays accept that autism, defined by DSM-IV, may be as common as 1 per 1000 children; that Asperger syndrome may be more common, as high as 3 per 1000 children (Ehlers and Gillberg, 1993); and that pervasive developmental disorder not otherwise specified (PDD-NOS) may be even more common, possibly as high as 5 per 1000 children.

Epidemiological studies may vary slightly in their prevalence estimates, but almost all give the impression that autism spectrum conditions occur randomly in the population, showing no particular association with

social class, ethnicity etc. (Wing, 1988). On this view, autism should not be found in clusters, except by chance.

However, there are at least three reasons why non-random clusters of cases of autism might be found. The first derives from the genetic theory of autism (Bailey et al., 1995; Bolton et al., 1994; Folstein and Rutter, 1988) which argues that autism will run in families, affecting some families significantly more often than others. One version of the genetic theory also implies that because parents are carrying the genes for autism, some parents may have mild traits of autism themselves (Baron-Cohen and Hammer, 1997; Landa et al., 1992). Rather than autism occurring at random, then, the condition might be found to be more commonly associated with certain traits, occupations etc. than others. A recent study of the occupations of fathers and grandfathers of children with autism or Asperger syndrome, for example, found that among these relatives were a disproportionate number of engineers (Baron-Cohen et al., 1997). This finding was predicted on the basis that an occupation like engineering would allow parents with mild traits of autism to excel, in that the work is more object-centred than people-centred.

A second reason why clusters of cases of autism might be found, however, is if there were some environmental pathogen that was increasing the risk of autism in a particular geographical locality. Anonymous reviewers of this article suggested such examples as lead in the water, or mercury in crop sprays, but to date no specific environmental factor has been either firmly identified or even implicated in this way, as far as we are aware.

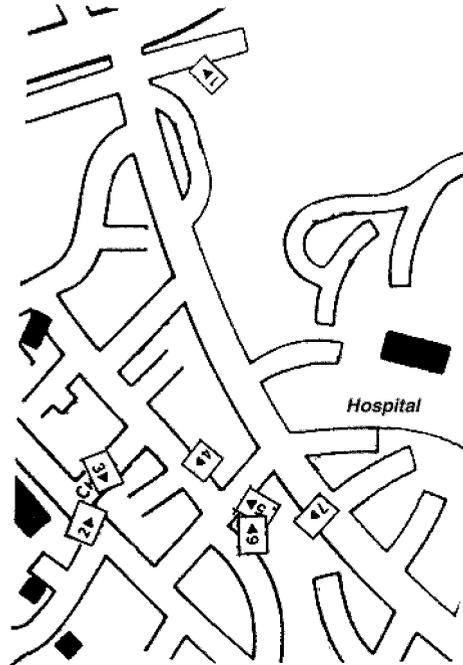
A third reason might be because a certain group of people were at raised risk for having a child with autism. One example might be the apparent increased rates of the condition in immigrant populations (Gillberg et al., 1991). Of course, this might be for genetic or other (e.g. viral?) reasons. In this brief report we document an apparent cluster of seven cases of autism spectrum conditions.

## Method

This apparent cluster of seven cases of autism spectrum disorder was brought to our attention by one of the parents of one of the children involved (co-author K.S.). The clustering appeared plausible because all of the families lived within a few streets of each other, in the Staffordshire region of the UK (see Figure 1). Table 1 gives the basic information about these seven cases. The children underwent a comprehensive multi-disciplinary assessment for a fortnight which involved observation and recording of the children's play skills, social interaction, language and

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communication within a small peer group and with adults in both free play and structured nursery activities. Diagnoses were made clinically using DSM-IV criteria, by one of the coauthors (S.C.). The children were also assessed by a team representing the major disciplines (paediatrics,



**Figure 1** Local street map of the area in Staffordshire showing apparent cluster of seven cases of autism. Street names have been removed to preserve anonymity of families

**Table 1** Details of the cluster of seven families

Case	Initials	Sex	Date of birth	Diagnosis	Residence (years)	Occupation of father
1	CO	M	21.1.93	Autism	16	Sales executive
2	PM	M	19.7.91	PDD-NOS	22	Window fitter
3	GS	M	14.9.93	Autism	15	Engineer
4	TE	M	6.12.90	Autism	22	Accountant
5 <sup>a</sup>	JS	M	25.3.93	PDD-NOS	19	HGV driver
6 <sup>a</sup>	AS	M	19.12.94	PDD-NOS	19	Factory worker
7	DP	M	16.9.93	Autism	23	Gardener

<sup>a</sup> Parents of cases 5 and 6 are brother and sister.

neurology, speech and language, social work etc.). Other assessments included tests for vision and hearing, and medical investigations such as full blood count, and tests of urea and electrolytes, serum creatinine, serum calcium, thyroid stimulating hormone, creatine kinase, urine and plasma amino acids, and urine organic acids, chromosomes, fragile X, and EEG. These procedures are currently routine in this clinic. More specific to the clustering question, the population base from which these families are drawn was also estimated.

## Results

Of the seven children, four satisfy DSM-IV criteria for autism, whilst the other three are better diagnosed as PDD-NOS. Two of the seven can be explained by genetic factors (cases 5 and 6), since the mother of case 5 and the father of case 6 are in fact brother and sister. However, the other five cases are unrelated to each other or to these two.

The area covered by the health trust has a population of around 320,000, with a population in the 1- to 5-year-old age group of about 15,000. The specific ward in Stafford in which this cluster of families lives has a population of 5372, of which 315 are under 5 years old – the age group of relevance to these cases – and 1117 are under the age of 18 years.

## Discussion

We report this apparent clustering in order to highlight that interpreting this in environmental terms might be the automatic reaction by many readers, but is not the only option. Instead, we suggest that this might still be a chance event, if autism spectrum conditions (taken together) in fact are as common as 5 per 1000 children. Finding a cluster of seven cases in a small community of streets, drawn from 315 children under 5, is clearly three times higher than one would expect, based on the under-5s figures. But it is not significantly higher than one would expect, based on the under-18s figures. On this latter computation, comparing 5 per 1000 as an expected population rate with 7 per 1117 as the actual population rate may be within expected levels. This highlights the problem that, until we have a good population study of ASC, by age group, it is unclear how to interpret such apparent clusters. Whilst we cannot rule out possible environmental risk factors for autism spectrum conditions, we should equally be wary of jumping to such a conclusion until the epidemiological data are available.

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