

# How pollution may be changing the ratio of girls to boys

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Image: Wikimedia Commons

(Medical Xpress)—More girls than boys are being born in some parts of central Scotland and in some years – and industrial pollution could be the cause.

Researchers from the University of Stirling have been looking at the issue of "skewed birth" ratios in the central belt.

They found "significantly lower [sex ratio](#) values for populations where [industrial air pollution](#) is highest - that is in Eastern Central Scotland".

They admit more research is needed, but say care should be taken when planning large industrial developments which could have an effect on hormone levels of the local population.

The scientists focused on "endocrine disruptor [pollution](#)" – these are chemicals or pollution that, at certain and sometimes very low doses, can interfere with the endocrine (or hormone system) in human beings.

The study - which also involved the University of Glasgow - is published in the *International Journal of Occupational and Environmental Health*.

Dr Ewan McDonald, the principal investigator, said: "The reproductive health of populations is often difficult to measure, particularly before pregnancy and at the early stages. There is strong evidence that during early pregnancy loss, male foetuses are lost more often.

"The sex ratio, particularly declines in male births, can therefore be a sentinel marker for changes in reproductive health or fertility amongst human populations.

"Our analysis on sex ratio was extensive: over time, regions, neighbourhoods and socio-economic groups across Scotland.

"The results indicate that endocrine disruptor pollution in Central Scotland may contribute to the national decline in the proportion of [male births](#).

"Detailed assessments of population reproductive health and potential environmental contaminants have been undertaken in Scandinavia and America and are now also required in the UK and other countries."

Professor Andrew Watterson, who also involved in the study, said: "The study raises important questions about our knowledge of what may impact on human [reproductive health](#) and how we then shape public health policy.

"We run faster and faster introducing new products and processes. Yet

we do not properly understand how they may affect us.

"We lack full toxicity data sets on many chemicals in our environment but proposed Scottish and English developments for example may introduce more endocrine disruptors. Great care is needed in approving and regulating such developments when we lack the necessary information to assess their risks adequately."

In parts of the central belt of Scotland, the number of boys born has declined at various times. Scientists looked at socio-economic factors and pollution as possible causes and tried to take account of a range of other factors that might explain the findings.

The study used data on historical Scottish trends in birth ratios and also mapping with geographical information systems of both social deprivation. It also looked at air emissions.

The analysis was confined to a central region of Scotland consisting of six areas (Falkirk, South Lanarkshire, North Lanarkshire, Stirling, Fife, Clackmannanshire) covering 1640 zones. Central Scotland is the most industrial area in the country with historically high levels of pollution from old industries, but also with rural areas with low pollution.

The scientists found that socio-economic factors did not appear to be a cause of the sex ratio change, but there appeared to be an association between these changed ratios and pollutants, especially "endocrine disruptors".

They say historical regional trends in Scotland (from 1973) do show significantly lower sex ratio values for populations where industrial air pollution is highest - that is in Eastern Central Scotland.

The researchers say this is consistent with small studies in heavily

industrialised parts of Canada and elsewhere in the world. They could not say for certain if this explained why there have been fewer boys than girls born in certain areas and in certain years. "Random variation" can sometimes explain such patterns, but the researchers do not feel this was the case in central Scotland.

For several years, there has been global speculation about historical changes at various times in the ratio – downwards - of births of boys to girls. In some countries this has been due to significant medical and technological interventions.

But such interventions are illegal in the UK. Other explanations have been that 'lower' socio-economic status or demographic factors or pollution may cause these changes.

"We know certain chemicals, endocrine disruptors for example, can in lab tests affect birth ratios," say the Stirling team.

**More information:** The study is available online:  
[www.stir.ac.uk/media/wwwstirac ... news/documents/Sscan%20from%2014060911100.pdf](http://www.stir.ac.uk/media/wwwstirac...news/documents/Sscan%20from%2014060911100.pdf)

Provided by University of Stirling

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