

# Descent from ancient plough-using societies linked to higher male cancer risk

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The ratio of male cancer risk to female risk is significantly higher in populations descended from societies that adopted the plough during the Neolithic period, according to intriguing University of Otago research.

Otago Economics Professor David Fielding analysed international data on cancer incidence for the 20 main non-sex-specific types of the disease and found that the overall risk was higher for males, as is generally thought.

However, the size of these [sex differences](#) in [cancer risk](#) showed substantial international variation. Pursuing the hypothesis that there could be an underlying evolutionary element behind this phenomenon, he then examined anthropological data on the agricultural practices of the ancestor societies of modern populations.

This further analysis revealed a significantly higher sex differential in cancer risk in countries where most of the population are descended from plough-using societies.

Professor Fielding says the effect remained even after controlling for socio-economic factors, including sex differences in epidemiological factors that are associated with higher cancer risk.

"All this suggests that a substantial portion of the higher male cancer risk may be a consequence of something that occurred during biological evolution," he says.

"One plausible evolutionary mechanism is that plough agriculture, which is more taxing than activities such as hoeing, created an economic environment which favoured those males who possessed greater upper-body strength."

In plough societies then, males with genetic predispositions for higher testosterone levels would be able to out-compete other men by developing and maintaining stronger physiques.

The downside for their descendants is that raised testosterone is known to be linked to a higher risk of many types of cancer, including cancers of the bladder, kidney, liver, lung, and pancreas, he says.

"Countries where males and females were generally descended from non-plough societies would then have a smaller difference in cancer rates between the sexes, because there was less selective pressure in those societies towards higher testosterone males."

Professor Fielding likens this human evolutionary process, if it did indeed take place, to the spread of a gene mutation in Neolithic dairy farming peoples that extended lactose tolerance beyond childhood.

The study appears in the March issue of the Oxford University Press journal *Social Forces*.

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