A correlation between obesity and income has only developed in the past 30 years

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It is well known that poorer Americans are more likely to be obese or suffer from diabetes; there is a strong negative correlation between household income and both obesity and diabetes. This negative

correlation, however, has only developed in the past 30 years, according to researchers in Tennessee and London. Since 1990, the rise of obesity and diabetes was fastest among the poorest U.S. regions, says Alexander Bentley of the University of Tennessee in the US. The timing also fits with the generations exposed to high fructose corn syrup in foodstuffs and drinks, says Bentley, who is the lead author of a study in the journal *Palgrave Communications*.

Experts describe the unprecedented rise in obesity in recent history as the most rapid change ever seen in human physiology. Only a century ago, obesity was a phenomenon almost unknown to citizens of the US and other developed countries.

In this study, Bentley and his colleagues analyzed data made available by the Centre of Disease Control and Prevention about obesity levels, leisure activities, income rates and incidences of diabetes. In most cases, this data was compiled for around 3000 US counties. The researchers also drew on data collected by the Food Access Research Atlas project. These documented a person's access to vehicles and proximity to supermarkets and large grocery stores where they could buy affordable and nutritious food.

The analysis shows that in 1990, when population-scale obesity rates in the US were about a third of what they are today, there was no link between income and obesity or diabetes. By 2015, there was a strong likelihood that obesity or diabetes would be typical in lower income households. In states like Alabama, Mississippi and West Virginia, where the average household income was below 45,000 US dollars a year, 35 per cent of people were obese. In more affluent states such as Colorado, Massachusetts or California, where households earned on average 65 000 US dollars a year, one in four citizens was obese.

"The data point to a developing trend that was not present in 1990. This

negative correlation has evolved steadily over recent decades," explains Bentley. "By 2015 the situation was such that members of lower income households had a much greater chance of suffering from obesity and diabetes."

Bentley and his colleagues speculate that the oversupply and ready access to foodstuffs containing high fructose corn syrup may be driving obesity levels. In the past, people's diets contained very little sugar and no refined carbohydrates. Overall sugar consumption in the American diet has risen gradually in the 20th century, from 12 per cent of US food energy in 1909 to 19 per cent by the year 2000.

"The timing is suggestive, with the generations of young Americans consuming high fructose corn syrup in foodstuffs predicting a similar increase in obesity as they became adults," Bentley notes.

High fructose corn syrup has been used in US foodstuffs since 1970. By the year 2000, each person in the US consumed on average around 27 kilograms (60 pounds) of it per year, which is about half of their annual total sugar intake. Corn syrup is the main sweetener in soft drinks. In 2016 the average US household spent 7 per cent and low income households spent 9 per of their income on soft drinks.

More information: R. Alexander Bentley et al, Recent origin and evolution of obesity-income correlation across the United States, *Palgrave Communications* (2018). DOI: 10.1057/s41599-018-0201-x

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