

Decrease in sunshine, increase in Rickets

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A University of Toronto student and professor have teamed up to discover that Britain's increasing cloudiness during the summer could be an important reason for the mysterious increase in Rickets among British children over the past few decades.

Hospitalizations of children due to the disabling bone disease, caused by lack of vitamin D, began dramatically increasing starting in the mid-1990s, puzzling public [health experts](#). Some have pointed to changing immigration patterns, since people with darker skin absorb less vitamin D from the sun. Others are looking at shifting diets or changes in hospital admission policies. But Haris Majeed, a Master's student in Medical Imaging at U of T's Faculty of Medicine, wondered if long-term climate variability in sea surface temperatures played a role.

With a Bachelor's in Earth Sciences, mathematics, and biology, a Master's in geophysics, and an interest in public health, Majeed was in a unique position to connect the dots between shifting climate patterns and population health. So he worked with his old thesis supervisor in the Department of Physics, Professor G.W.K. Moore, to compare Britain's [cloud cover](#) against the rise of Rickets.

"Sea surface temperatures are getting warmer over the North Atlantic, and are known to fluctuate every 60 to 80 years," says Majeed. "After the mid-1990s, North Atlantic [sea surface temperatures](#) entered a warm phase, decreasing average summer atmospheric pressures and causing more rain, and less sunshine, in the UK."

They found that median incidences of Rickets, which had been declining since the 1960s, almost doubled between 1997 and 2011, going from 0.56 cases per 100,000 British children to 1.01 cases. In the UK, health experts have determined that six hours a month of sunshine is needed to produce enough vitamin D in people's skin. But since the mid-1990s, increasing cloud cover has deprived the islands of about four hours of sunshine per month in the summer. Since the mid-1990's, the UK has received only an average of 183 hours of sunshine per summer month.

"Nobody thought of the sun," says Majeed, who is completing a Master's in Diagnostic Imaging, and hopes to work with big data in the emerging field of time series analysis. "Climatologists knew that the UK receives lower summer sunshine than other parts of the world, but no one ever thought of the effect it had on specific health implications, such as Rickets."

The results of their research were published on Nov. 17, 2017 in the *Nature* journal *Scientific Reports*.

The duo studied Britain because it has the longest record of Rickets, extending back to the 1960s.

Majeed's interest in combining two seemingly disparate factors comes from his own personal life. "My mother has rheumatoid arthritis, which led me to Rickets. Perhaps if we're able to understand this condition based on long-term climate variability, can we as scientists save at least a few children from becoming disabled."

Majeed's unusually broad academic background has taught him that physicians and scientists should collaborate more on interdisciplinary research and take a more holistic approach to disease mechanisms.

"They should step back and broaden their scope of question," he says.

"Not just focus on what we can do in terms of treatment options, although it is important, but also consider the roots. Rickets comes from lack of sun so ask what's going on with the variability in climate around us? Take a broader view of the research question, and then you can dig in."

More information: Haris Majeed et al. Impact of Multidecadal Climate Variability on United Kingdom Rickets Rates, *Scientific Reports* (2017). [DOI: 10.1038/s41598-017-16058-1](https://doi.org/10.1038/s41598-017-16058-1)

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