New research looks at type 1 diabetes and changes in the environment

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Studies have shown a rapid increase in new cases of type 1 diabetes worldwide. However, scientists and researchers have struggled to identify a direct cause. Many have questioned if changes in the

environment or lifestyle have impacted the disease. In a newly released review paper published in The *Lancet Diabetes & Endocrinology*, faculty from the Colorado School of Public Health at the Anschutz Medical Campus examined whether any environmental exposures can explain why type 1 diabetes is on the rise.

"The incidence of type 1 diabetes has increased 3 percent per year over the past three decades. This increase is too rapid to be due to genetic factors, suggesting that environmental factors may play a role," said Jill Norris, MPH, Ph.D., professor and chair of epidemiology at the Colorado School of Public Health and lead author of the paper.

Identifying environmental factors associated with type 1 diabetes that influence its incidence can inform future preventive trials and searches for other environmental risk factors. In this paper, researchers reviewed the literature on environmental factors like air pollution, diet, childhood obesity, the duration of breastfeeding, the introduction of cow's milk, infections, and many others that showcase an impact on type 1 diabetes.

The researchers then looked at prevalence of an exposure over time while varying its annual increase under simulated scenarios. Using the simulated data, the research showed that if a single factor were to explain the changes in the incidence of type 1 diabetes over the past few decades, it would have to be very strongly associated with the risk of type 1 diabetes.

The simulated scenarios showed that an environmental factor that increased at a constant rate from nearly absent in the population to nearly ubiquitous would have to confer a relative risk of 5 to explain an approximately 3 percent annual increase in the incidence of type 1 diabetes. However, most of the environmental factors reviewed had a relative risk of less than 2.

"While several factors have been associated with type 1 diabetes, none of the associations are of a magnitude that can explain the rapid increase in incidence alone," Norris said. "Moreover, evidence of the changing prevalence of these same exposures over time is not convincing nor consistent."

The paper explains that more research is required, and it is possible that multiple factors simultaneously may account for the increase in type 1 diabetes cases. Other factors are that the magnitude of observed associations may have been underestimated due to exposure measurement error or mismodeling of complex exposure-time-response relationships.

The study concludes that the identification of environmental factors influencing type 1 diabetes risk and increased understanding of the etiology at the individual level, regardless of the ability to explain the changing incidence at the population level, is important because of the implications for prevention.

More information: Jill M Norris et al, Type 1 diabetes—early life origins and changing epidemiology, *The Lancet Diabetes & Endocrinology* (2020). DOI: 10.1016/S2213-8587(19)30412-7

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