Children conceived in winter have a greater risk of autism, study finds

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An examination of the birth records of the more than 7million children born in the state of California during the 1990s and early 2000s has found a clear link between the month in which a child is conceived and the risk of that child later receiving a diagnosis of autism.

Among the children included in the study, those conceived during winter had a significantly greater risk of autism, the study found. The risk of having a child with an autism spectrum disorder grew progressively throughout the fall and winter to early spring, with children conceived in March having a 16 percent greater risk of later autism diagnoses, when compared with July conceptions.

The researchers said the finding suggests that environmental factors, for example, exposure to seasonal viruses like influenza, might play a role in the greater risk they found of children conceived during the winter having autism.

The study is published online today in the journal *Epidemiology*.

"The study finding was pronounced even after adjusting for factors such as maternal education, race /ethnicity, and the child's year of conception," said lead study author Ousseny Zerbo, a fifth-year doctoral student in the graduate group in epidemiology in the Department of Public Health Sciences in the UC Davis School of Medicine.

For the study, the researchers obtained the more than 7.2 million records

for children born from January 1990 through December 2002 from the state of California Office of Vital Statistics. The researchers excluded some records because children did not survive to an age by which they typically would have been diagnosed with autism.

Other records were excluded because they were incomplete. For example, records that did not include adequate information from which to calculate the month of conception were excluded. The month of conception was calculated as the last date mothers reported having a menstrual period plus two weeks.

The total number of records finally included in the study was approximately 6.6 million, or 91 percent of all births recorded during the study period. The children were followed until their sixth birthdays to determine whether they would develop autism.

The researchers identified which children were diagnosed with autism by matching birth records with those of children receiving services from the state Department of Developmental Services (DDS). Approximately 19,000 cases of autism were identified, with autism defined as "full syndrome" autism in the DDS records.

The study found that the overall risk of having a child with autism increased from month to month during the winter through the month of March. For the study, winter was considered the months of December, January and February. Each month was compared with July, with an 8 percent higher incidence in December, increasing to 16 percent higher in March.

Earlier studies' findings about autism risk and month of conception or birth have had varied results. Some, such as ones conducted in Israel, Sweden and Denmark, have found an increased risk of autism for children born in March. Studies conducted in Canada, Japan, the United

States and the United Kingdom identified an increased risk of autism for children born in the spring. However, these studies were far smaller, most having a few hundred cases of autism, as compared with the large number of cases in California.

"Studies of seasonal variations can provide clues about some of the underlying causes of autism. Based on this study, it may be fruitful to pursue exposures that show similar seasonal patterns, such infections and mild nutritional deficiencies," said Irva Hertz-Picciotto, chief of the division of environmental and occupational health in the Department of Public Health Sciences in the UC Davis School of Medicine.

"However, it might be that conception is not the time of susceptibility. Rather, it could for instance be an exposure in the third month of pregnancy, or the second trimester, that is harmful," said Hertz-Picciotto, who also is researcher affiliated with the UC Davis MIND Institute. "If so, we might need to look for exposures occurring a few months after conceptions that are at higher risk. For example, allergens that peak in the spring and early summer."

The researchers said the study is a starting point for further inquiry. They noted that other seasonal occurrences include potential exposures to pesticides, such as those used in the home to control insects in rainy or warm months, and those used in agricultural applications.

Provided by University of California - Davis