Largest-ever study of parental age and autism finds increased risk with teen moms

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Quinn, an autistic boy, and the line of toys he made before falling asleep. Repeatedly stacking or lining up objects is a behavior commonly associated with autism. Credit: Wikipedia.

The largest-ever multinational study of parental age and autism risk, funded by Autism Speaks, found increased autism rates among the children of teen moms and among children whose parents have relatively large gaps between their ages. The study also confirmed that older

parents are at higher risk of having children with autism. The analysis included more than 5.7 million children in five countries.

The study was published today in the journal *Molecular Psychiatry*.

"Though we've seen research on autism and parental age before, this study is like no other," says co-author Michael Rosanoff, Autism Speaks' director of public health research. "By linking national health registries across five countries, we created the world's largest data set for research into autism's risk factors. The size allowed us to look at the relationship between parents' age and autism at a much higher resolution - under a microscope, if you will."

"Although parental age is a risk factor for autism," adds co-author Sven Sandin, "it is important to remember that, overall, the majority of children born to older or younger parents will develop normally." Dr. Sandin, a medical epidemiologist, is affiliated with the Icahn School of Medicine at Mount Sinai, in New York, and Sweden's Karolinska Institutet.

The study builds on the broader research of the International Collaboration for Autism Registry Epidemiology (iCARE). Autism Speaks, the world's leading autism science and advocacy organization, is a major supporter of iCARE, with its goal of better understanding the factors that predispose or protect against autism.

Though previous studies identified a link between advancing parental age and autism risk, many aspects of the association remained unclear. For example, some studies found increased risk with older dads but not moms.

The goal of the new study was to determine whether advancing maternal or paternal ages independently increase autism risk, and to what extent

each might do so.

The study looked at autism rates among 5,766,794 children—including more than 30,000 with autism—in Denmark, Israel, Norway, Sweden and Western Australia. The children were born between 1985 and 2004, and the researchers followed up on their development until 2009, checking national health records for autism diagnoses.

Researchers identified and controlled for other age-related influences that might affect autism risk. When separating the influence of mother's versus father's age, they also adjusted for the potential influence of the other parent's age.

"After finding that paternal age, maternal age and parental-age gaps all influence autism risk independently, we calculated which aspect was most important," Dr. Sandin adds. "It turned out to be parental age, though age gaps also contribute significantly."

Key findings:

- Autism rates were 66 percent higher among children born to dads over 50 years of age than among those born to dads in their 20s. Autism rates were 28 percent higher when dads were in their 40s versus 20s.
- Autism rates were 15 percent higher in children born to mothers in their 40s, compared to those born to moms in their 20s.
- Autism rates were 18 percent higher among children born to teen moms than among those born to moms in their 20s.
- Autism rates rose still higher when both parents were older, in line with what one would expect if each parent's age contributed to risk.
- Autism rates also rose with widening gaps between two parents' ages. These rates were highest when dads were between 35 and

> 44 and their partners were 10 or more years younger. Conversely, rates were high when moms were in their 30s and their partners were 10 or more years younger.

The higher risk associated with fathers over 50 is consistent with the idea that genetic mutations in sperm increase with a man's age and that these mutations can contribute to the development of autism spectrum disorders (ASD). By contrast, the risk factors associated with a mother's age remain unexplained, as do those associated with a wide gap between a mother and father's age.

"These results suggest that multiple mechanisms are contributing to the association between parental age and ASD risk," the authors conclude.

"When we first reported that the older age of fathers increases risk for autism, we suggested that mutations might be the cause. Genetic research later showed that this hypothesis was correct," notes co-author Abraham Reichenberg, a neuropsychologist and epidemiologist with the Icahn School of Medicine at Mount Sinai, in New York City. "In this study, we show for the first time that autism risk is associated with disparately aged parents. Future research should look into this to understand the mechanisms."

Provided by Autism Speaks