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# Autism Spectrum Disorder

## IS IT REALLY ON THE RISE?

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### ABSTRACT

Autism Spectrum Disorder (ASD) prevalence has increased almost fourfold from 2001 to 2010. This explosive statistic has generated controversy regarding the factors underlying this trend. One perspective is that the incidence of autism is exaggerated by factors including changing diagnostic criteria. A different viewpoint is that the trend is accurate and may be attributed to factors such as environmental toxins and increasing parental age at conception. It is imperative to educate the public on the facts, instead of focusing on constantly fluctuating statistics, in order to avoid misguided decisions fuelled by fear and misconception.

### BACKGROUND

Autism spectrum disorder (ASD) is an umbrella term that encompasses restricted repetitive patterns of behaviour and social communication impairments of varying severity.<sup>1</sup> Since the original identification of ASD by Kanner in 1943, prevalence has risen rapidly over the years. ASD prevalence increased from 1 in 250 children in 2001 to 1 in 68 children in 2010, demonstrating an almost fourfold change.<sup>2,3</sup> Although the prevalence of ASD

has been rising, the interpretation of these numbers remains a constant challenge for the scientific community.

### A MISINTERPRETATION OF NUMBERS

Many believe that the rising numbers do not depict a genuine rise in prevalence of ASD and may instead be exaggerated by two main factors: (1) changing diagnostic criteria, and (2) a new classification of developmental problems, where ASD is no longer classified under mental retardation.

Changes in diagnostic criteria are believed to play a critical role in increasing the perceived prevalence of ASD. ASD encompasses a broad range of symptoms and is not associated with any known biological markers.<sup>4</sup> Diagnostic criteria are continuously changing,<sup>5</sup> and with respect to ASD, criteria have been broadened over time.<sup>6</sup> As a result, more people meet the defined criteria for ASD. However, a number of studies have argued that this explanation justifies only part of the trend. For example, King and Bearman estimate that only 26.4% of the increased prevalence of ASD in California, United States can be attributed

to diagnostic change.<sup>7</sup> Another study shows that one third of ASD diagnoses in British Columbia, Canada resulted from transferring the classification of a non-ASD condition to the ASD category.<sup>8</sup> As the majority of the increased prevalence remains unaccounted for in these studies, factors other than changing diagnostic criteria may be involved. Increased awareness of ASD may be another factor contributing to the rising numbers of ASD cases.<sup>9</sup> As more parents become aware of ASD, there is increased demand for specialist and testing services, which may make some professionals more likely to make a diagnosis and parents more accepting of a diagnosis.<sup>2</sup> Furthermore, as parents rush to have their children tested at an earlier age, there may be a greater risk of including children who may not have autism, inflating the rate at which prevalence is rising.<sup>10</sup>

## A TRUE TREND

A contrasting view is that other factors may be involved, resulting in a genuine rise in prevalence of ASD such as increased parental age, and high levels of toxins in the environment.<sup>2</sup> Societal changes in education, marriage, and employment have led to increasing parental age over the past few decades, which may contribute to increasing cases of ASD.<sup>11,12</sup> A ten-year increase in maternal age is associated with a 38% increase in the ASD odds ratio, a measure of the association between exposure and outcome. Possible biological factors underlying this trend have been proposed, but conclusive evidence outlining a causal role is lacking.

Another factor linked to the rising prevalence of ASD is the increased levels of environmental toxins. While environmental toxins have not been directly linked to ASD in a causal manner, they are thought to induce neurodevelopmental disorders that include ASD.<sup>13</sup> These toxins affect the developing brain and therefore may play a critical role in the increased prevalence of ASD. Known neurodevelopmental toxins are found in a large range of consumer products, medications, motor fuels, and building materials. However, recent literature presents conflicting results regarding this proposed relationship. A study published in 2014 shows that the levels of many suspected toxins have flat or decreasing trends over time and are poorly correlated to ASD overall.<sup>14</sup> In contrast, in the same year, another study demonstrated that in utero exposure to toxic air pollutants may contribute to an increase in risk for ASD in the child.<sup>15</sup> With the present state of research in this field, it is neither

possible to disregard the environmental hypothesis nor to accept it as the primary contributor to the rising prevalence. Thus, it appears that the case of rising prevalence of ASD, whether real or perceived, has multiple contributing factors.

## CHANGING PUBLIC ATTITUDES

Over time, more conclusive research may reveal which side explains the factors underlying this increasing trend most comprehensively. It is important to understand that the two perspectives are likely not mutually exclusive; a genuine rising trend could appear inflated by some factors. In this scientific debate, the goal should not be to disprove one side, but instead to demonstrate the extent to which each side contributes to the increasing prevalence. Until this has been established, the most important step is to ensure that the public is well-informed and up-to-date on the established facts concerning this topic. This is critical, as in some cases, public misunderstanding about ASD combined with knowledge of its rising prevalence may result in making uninformed decisions.

One example is the controversial misconception regarding ASD and the measles, mumps, and rubella (MMR) vaccine. Although this link has been refuted in subsequent literature,<sup>17</sup> it is challenging to change negative public attitudes. More than a decade later, notorious public figures such as United States presidential candidate Donald Trump continue to imply that there is a causal relationship between vaccines and ASD.<sup>18</sup> As a result of mixed perspectives presented to the public, parents may incorrectly associate the general increase in childhood vaccination rates with the rising prevalence of ASD.<sup>19</sup> Parents relying on herd immunity jeopardize both the health of their child and international vaccination efforts to eradicate disease. This example of the vaccine controversy outlines the dangers that may result when a public misconception regarding the rising prevalence of ASD can fuel misguided actions.

## CONCLUDING REMARKS

The rising prevalence of ASD is more than a matter of contrasting opinions; its impact extends beyond the scientific community and shapes decisions affecting individual lives. Until the debate is resolved, the priority should be to focus on educating the public on established facts instead of making speculative decisions based on unsupported hypotheses. ■

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Dr. Wendy Roberts is an accomplished neuroscientist at the Hospital for Sick Children. As a full-time professor at the University of Toronto and the Co-Director of the Autism Research Unit, Dr. Roberts has conducted valuable research regarding both early identification and therapeutic intervention of autism.

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