# GENETIC LINK TO CEREBRAL PALSY MAY BE MORE COMMON THAN THOUGHT, SUGGESTS LARGE STUDY PRESENTED AT NSGC MEETING

***As Genetic Testing Expands, Studies Demonstrate the Importance of Genetic Counseling***

ATLANTA – Nov. 14, 2018 – Up to 1 in 3 people with cerebral palsy (CP) may have the condition due to an underlying genetic cause, suggests a study of more than 1,300 people with CP, which is being presented at the National Society of Genetic Counselors (NSGC) 37th Annual Conference.

Affecting about 1 in 500 infants, CP traditionally is attributed to non-genetic causes such as complications that can happen before or during the baby's birth. That is not always the case, the researchers note.

"There is growing evidence that supports a major role for genetic causes in patients affected by CP," said Claire Teigen, MS, CGC, lead author of the study and a genetic counselor with GeneDx, in Gaithersburg, Md. "CP is a blanket term that isn't helpful in understanding the underlying causes and best management options for patients, and this study helps shed light on the possible genetic connection."

Researchers reviewed exome sequencing (which looks at the protein coding region of genes) of 1,346 people with CP and identified a genetic finding in 440 (32.7 percent). When a genetic finding was identified in families undergoing trio exome sequencing – meaning the patients and both parents were included in the analysis – the majority (71.4 percent) had a "de novo" genetic variant, a new genetic change in the patient that was not inherited from either parent, while the remaining 28.6 percent inherited a genetic variant (or variants) from the mother and/or father. Researchers determined that among the group with the inherited genetic finding, the risk of the parents having another child with CP ranged from 25 to 50 percent, depending on the mode of inheritance.

Patients in the study were found to have genetic variants in one of 225 different genes tied to CP. The most common genetic cause found in patients with CP were variants in the *CTNNB1*

gene, affecting 18 (4.1 percent). Because so many individual genes are associated with CP, it is important to analyze many different genes to find answers for these patients, Teigen said.

Healthcare providers should consider genetic testing for people with CP when there isn't a clear cause of brain injury, particularly if they also have epilepsy, intellectual disability/developmental delay or microcephaly (small head), Teigen said. "Knowing the genetic cause can be very helpful in tailoring therapies, as well as understanding the chance another child could be affected," she said.

"As researchers discover more conditions with a possible genetic connection, genetic counselors help parents and families understand the pros and cons of testing and make the most informed choices possible," said Erica Ramos, MS, CGC, president of the National Society of Genetic Counselors. "Genetic testing is used not only to diagnose but to treat conditions and prevent diseases, and clearly genetic counseling is valuable for helping people consider what it may mean for them."

In other news from the meeting:

**Therapy May Reduce Autistic Traits in Boys with Genetic Disorder**

Early Hormonal Therapy (EHT) may reduce autistic traits and improve social interaction in boys with 47,XXY, a common and often undiagnosed genetic disorder also known as Klinefelter syndrome, according to a study. Many of the boys in the study were identified before birth using non-invasive prenatal testing (NIPT).

As many as 1 in 500 boys has 47,XXY, meaning they have an extra X chromosome and may benefit from testosterone injections, researchers say. Boys with 47,XXY may have autistic traits, speech and developmental delays, difficulty with peer interactions and anxiety. About 75 percent of boys with 47,XXY are undiagnosed, but as NIPT now includes screening for 47, XXY and other possible sex chromosome abnormalities, opportunities to identify boys who might benefit from EHT are improving and greater awareness of the condition overall may help undiagnosed boys as well.

“Parents of boys with autistic traits should consider having them undergo genetic testing for 47,XXY, because even in older boys, treatment is available and effective,” said Carole A. Samango-Sprouse, EdD, lead author of the study and executive director of The Focus Foundation, a nonprofit organization specializing in the research, awareness, and treatment of children with X and Y chromosomal variations, in Davidsonville, Md. “If expecting parents receive a positive NIPT result, genetic counselors can be an excellent resource for explaining the medical terminology, effective treatment, and provide support during this critical and stressful time.”

The study included 74 boys with 47,XXY, 57 (77 percent) of whom were identified prenatally as having the condition. Twenty-two (30 percent) received EHT via testosterone injections as infants, while the remainder did not. Researchers analyzed the follow-up assessments of the boys undertaken when they were between 2 and 7 years old. Of those who received EHT, 13.6 percent showed autistic traits, compared to 30.1 percent of those who did not receive the therapy. Further, those who had EHT showed significant improvement in social interaction compared to those who did not have the treatment.

Treatment involves a series of three testosterone injections between 4 and 9 months of age, and to date there have been no reported complications, said Samango-Sprouse. The boys also typically receive this hormone therapy later during pubertal development.

**Mammography Screening Information Can Identify Those at Risk for a Common Hereditary Cancer Syndrome**

Using family history information collected at the time of mammography can help identify women at risk for Lynch syndrome, the most common cause of hereditary colon and endometrial cancer. A study of more than 40,000 women was the first to evaluate Lynch syndrome risk among women undergoing mammography.

Data suggest that women with Lynch syndrome may have an increased chance of developing breast cancer over their lifetime. However, there rarely are routine methods for determining who is at risk for Lynch syndrome. While Lynch syndrome occurs in men and women, researchers turned to mammography screening because it is a convenient way to capture information about

a large group of people who are already being asked about their personal and family history of cancer.

“Finding optimal ways to screen for hereditary cancer syndromes such as Lynch syndrome is important because those at risk can then be referred for genetic counseling or genetic testing,” said Allison F. Schartman, MS, CGC, lead author of the study and a genetic counselor at IU Health Department of Maternal Fetal Medicine, Indianapolis. “Those who ultimately test positive for the syndrome can be watched closely to ideally prevent cancer or identify it at the earliest and most treatable stages.”

During an eight-month period, researchers reviewed the mammography records of 40,277 women seen at 13 different St. Vincent Ascension sites across the state of Indiana, and developed a new screening algorithm to identify those at risk for Lynch syndrome. Overall, 376 (0.93 percent) were found to be at risk for Lynch syndrome and received letters letting them know they might benefit from genetic counseling and testing to determine if they had a hereditary cancer syndrome. Seventeen (4.5 percent) previously had genetic counseling or testing and 4 (1.1 percent) previously had been identified as having pathogenic (disease-causing) genetic variants, two of which were associated with Lynch syndrome. Of the remaining 359 women, 13 (3.6 percent) had genetic counseling after receiving the risk notification letter and 3 (0.84 percent) were found to have a pathogenic genetic variant, with one woman testing positive for Lynch syndrome.

To address the low response rate, the researchers made changes to the letter to further clarify the meaning of the findings and provide more detail about genetic testing, and the benefits of genetic counseling to help guide the women identified as at risk regarding the next steps. Researchers are conducting an assessment to determine if these changes have improved the response rate to the letter. However, these data show that collecting family history can be a valuable step to identify cancer risks beyond the organ targeted at the time of surveillance.

**Men with Prostate Cancer Benefit from Genetic Counseling**

Genetic counselors can help men with advanced prostate cancer learn more about the possible genetic component of their cancer and how that information might affect men and women in their family. Men with a hereditary cause for their prostate cancer may be at risk for other

cancers such as breast and pancreatic cancers. Their relatives may be at risk for those and other cancers, such as ovarian cancer.

National Comprehensive Cancer Network prostate cancer guidelines recommend men with advanced prostate cancer consider genetic counseling and testing because up to 12 percent have a hereditary cancer risk. Researchers interviewed 25 men with metastatic prostate cancer who had been referred to genetic counseling (10 were interviewed before they had counseling and 15 afterward). Those who had completed genetic counseling said they felt the genetic counselor was the best person to provide that information.

“Those in the study who were aware of the hereditary connection often mentioned the impact of genetic information for their male relatives and highlighted other factors they wanted to learn about, such as cost,” said Samantha Greenberg, MS, MPH, CGC, lead author of the study and a genetic counselor at Huntsman Cancer Institute, Salt Lake City. “They appreciated learning about their personal cancer risks, cancer risks for their relatives and understanding their options.”

***Note to editors****: Media interested in viewing study abstracts and/or attending sessions at the NSGC Annual Education Conference in Atlanta can contact Devon Herzoff at 312-558-1770 or dherzoff@pcipr.com.*

**About the National Society of Genetic Counselors**

NSGC is the leading voice, authority and advocate for the genetic counseling profession, representing more than 3,900 healthcare professionals. The organization is committed to ensuring that the public has access to quality genetic services. For more information, visit www.nsgc.org.

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