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## **Improvement Following ADHD Treatment Sustained in Most Children**

*But Linked Problems Persist Into Adolescence — Major Follow-up Study*

Most children treated in a variety of ways for attention deficit hyperactivity disorder (ADHD) (<http://www.nimh.nih.gov/healthinformation/adhdmnu.cfm>) showed sustained improvement after three years in a major follow-up study funded by the National Institutes of Health's (NIH) National Institute of Mental Health (NIMH). Yet increased risk for behavioral problems, including delinquency and substance use, remained higher than normal.

The study followed-up children who had participated in the Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder (MTA).

Initial advantages of medication management alone or in combination with behavioral treatment over purely behavioral or routine community care waned in the years after 14 months of controlled treatment ended. However, Peter Jensen, M.D., Columbia University, and colleagues emphasized that "it would be incorrect to conclude from these results that treatment makes no difference or is not worth pursuing."

Their report is among four on the outcome of the MTA study published in the August, 2007 *Journal of the American Academy of Child and Adolescent Psychiatry (JAACAP)*.

"We were struck by the remarkable improvement in symptoms and functioning across all treatment groups," explained Jensen.

After three years, 45-71 percent of the youth in the original treatment groups were taking medication. However, continuing medication treatment was no longer associated with better outcomes by the third year.

"Our results suggest that medication can make a long-term difference for some children if it's continued with optimal intensity, and not started or added too late in a child's clinical course," added Jensen.

For the followup study, a multi-site research team evaluated, at ages 10-13, 485 children from the original MTA study (<http://www.nimh.nih.gov/childhp/mtaqa.cfm>), the first major randomized trial comparing different treatments for ADHD, published in 1999. That study found that intensive medication management alone or in combination with behavioral therapy produced better outcomes than just behavioral therapy or usual community care.

Ratings from families and teachers favored the combination treatment, which allowed for somewhat lower medication doses. Also, the careful management of medication by MTA physicians produced better outcomes than medication provided through usual community care sources.

After the 14 months of assigned treatments ended, families were free to choose from treatments available in their communities.

To understand why the initial advantage of medication wore off, the researchers examined medication use patterns that emerged after formal treatment in the study ended. They found that children who had been assigned to intensive behavioral treatment were more likely to begin taking medication, while those who had been taking medication were more likely to stop. For example, among children originally in the behavioral treatment group, the incidence of high medication use increased from 14 to 45 percent.

In a secondary analysis of the data that searched for possible explanations for the findings, in the same issue of the *JAACAP*, researchers led by James Swanson, Ph.D., University of California at Irvine, reported finding substantial individual variability in responses to medication. They identified three groups of children with different patterns of response. One group, about a third of the children, showed a gradual, moderate improvement; a second group, about half of the children, showed larger initial improvement, which was sustained through the third year; a third group, about 14 percent of the children, responded well initially, but then deteriorated as symptoms returned during the second and third years. Swanson and colleagues suggested “trial withdrawals” for some children to determine if they still need to take medications.

Another report by Swanson and colleagues in the same issue of the *JAACAP* confirmed an earlier finding from the MTA study that taking medication slowed growth. A group of 65 children with ADHD who had never taken medication grew somewhat larger — about three-fourths of an inch and 6 pounds more, on average — than a group of 88 peers who stayed on medication over the three years. Growth rates normalized for the children on medication by the third year, but they had not made up for the earlier slowing in growth.

In a fourth article, Brooke Molina, Ph.D., University of Pittsburgh, and colleagues reported that, despite treatment, the children with ADHD showed significantly higher-than-normal rates of delinquency (27.1 percent vs. 7.4 percent) and substance use (17.4 percent vs. 7.8 percent) after three years. Earlier evidence of lower substance use rates among children who had received intensive behavioral therapy had lessened by the third year. “These findings underscore the point that ADHD treatment for one year does not prevent serious problems from emerging later,” noted Molina.

The follow-up of the MTA sample will continue as the participating children go through adolescence and enter adulthood.

The following researchers participated in the studies:

Three-year Follow-up of the NIMH MTA Study. Peter S. Jensen, L. Eugene Arnold, James M. Swanson, Benedetto Vitiello, Howard B. Abikoff, Laurence L. Greenhill, Lily Hechtman, Stephen P. Hinshaw, William E. Pelham, Karen C. Wells, C. Keith Conners, Glen R. Elliott, Jeffery N. Epstein, Betsy Hoza, John S. March, Brooke S.G. Molina, Jeffrey H. Newcorn, Joanne B. Severe, Timothy Wigal, Robert D. Gibbons, Kwan Hur.

Secondary Evaluations of MTA 36-Month Outcomes: Propensity Score and Growth Mixture Model Analyses. James M. Swanson, Stephen P. Hinshaw, L. Eugene Arnold, Robert D. Gibbons, Sue Marcus, Kwan Hur, Peter S. Jensen, Benedetto Vitiello, Howard B. Abikoff, Laurence L. Greenhill, Lily Hechtman, William E. Pelham, Karen C. Wells, C. Keith Conners, John S. March, Glen R. Elliott, Jeffery N. Epstein, Kimberly Hoagwood, Betsy Hoza, Brooke S.G. Molina, Jeffrey H. Newcorn, Joanne B. Severe, Timothy Wigal, and the MTA Cooperative Group.

Effects of Stimulant Medication on Growth Rates Across 3 Years in the MTA Follow-up. James M. Swanson, Glen R. Elliott, Laurence L. Greenhill, Timothy Wigal, L. Eugene Arnold, Benedetto Vitiello,

Lily Hechtman, Jeffery Epstein, William E. Pelham, Howard B. Abikoff, Jeffrey H. Newcorn, Brooke S.G. Molina, Stephen P. Hinshaw, Karen C. Wells, Betsy Hoza, Peter S. Jensen, Robert D. Gibbons, Kwan Hur, Annamarie Stehli, Mark Davies, John S. March, C. Keith Conners, Mark Caron, Nora D. Volkow, for the MTA Collaborative Group.

Delinquent Behavior and Emerging Substance Use in the MTA at 36-Months: Prevalence, Course, and Treatment Effects. Brooke S. G. Molina, Kate Flory, Stephen P. Hinshaw, Andrew R. Greiner, L. Eugene Arnold, James M. Swanson, Lily Hechtman, Peter S. Jensen, Benedetto Vitiello, Betsy Hoza, William E. Pelham, Glen R. Elliott, Karen C. Wells, Howard B. Abikoff, Robert D. Gibbons, Sue Marcus, C. Keith Conners, Jeffery N. Epstein, Laurence L. Greenhill, John S. March, Jeffrey H. Newcorn, Joanne B. Severe, Timothy Wigal, and the MTA Cooperative Group. The Office of Special Education Programs of the U.S. Department of Education, the Office of Juvenile Justice and Delinquency Prevention of the Justice Department, and the National Institute on Drug Abuse (NIDA) also participated in funding this study.

The National Institute of Mental Health (NIMH) mission is to reduce the burden of mental and behavioral disorders through research on mind, brain, and behavior. More information is available at the NIMH website, <http://www.nimh.nih.gov>.

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