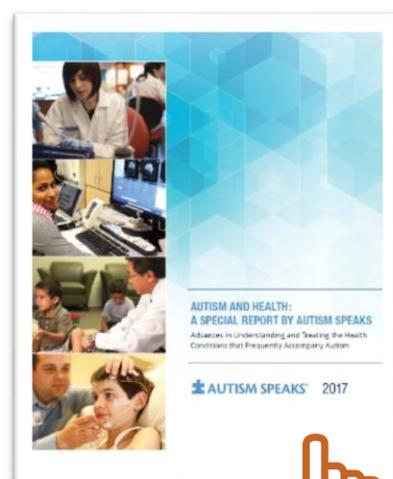




Autism & Health

About the section

We now know that for many people with ASD, it is a whole-body disorder including physical and mental health conditions that frequently accompany autism. It is common for individuals to have one or more comorbidities, which is the presence of an additional condition, disease or disorder. Comorbidities that are commonly associated with autism include seizures, gastrointestinal (GI) disorders, sleep disturbances, eating and feeding challenges, attention deficit and hyperactivity disorder (ADHD), anxiety, depression, schizophrenia and bipolar disorder. Autism itself is not a cause of premature death, rather research suggests that it relates to many of the medical and mental health conditions commonly associated with the diagnosis, many of which are treatable and/or preventable with greater understanding and support. The following are some of autism's commonly associated physical and mental health conditions. Additional information on autism and health is available through the "[Autism and Health: A Special Report by Autism Speaks](#)" (2017).



Autism and Epilepsy (Seizure Disorder)

Epilepsy affects a fifth to a third (20-33 percent) of people who have autism, compared to an estimated 1-2 percent of the general population.

Epilepsy, or seizure disorder, was the first medical condition clearly connected to autism (Gubbay, Lobasher, & Kingerlee, 1970). The autism-epilepsy overlap appears to be most common among people who also have an intellectual disability (Amiet et al., 2008). Intellectual disability, defined as an IQ score below 70 along with challenges in everyday function, affects an estimated 32 percent of those who have autism (Christensen et al., 2016).

Identifying and effectively treating epilepsy in those with autism is critically important, given the potential for brain damage and death from uncontrolled seizures. In a 2012 review of 21 studies, researchers found that epilepsy was the reported cause of deaths for 7-30 percent of people with autism (Woolfenden, Sarkozy, Ridley, Coory, & Williams, 2012). In addition, a review of studies on children with autism, epilepsy and sleep disorders suggests a vicious cycle with uncontrolled seizures affecting sleep and disrupted sleep increasing seizures (Malow, 2004). While the association between autism and epilepsy is well known, diagnosis can be challenging because seizures are not always outwardly evident, and many people with autism have difficulty recognizing and communicating their symptoms.

RECOGNIZING EPILEPSY IN SOMEONE WITH AUTISM

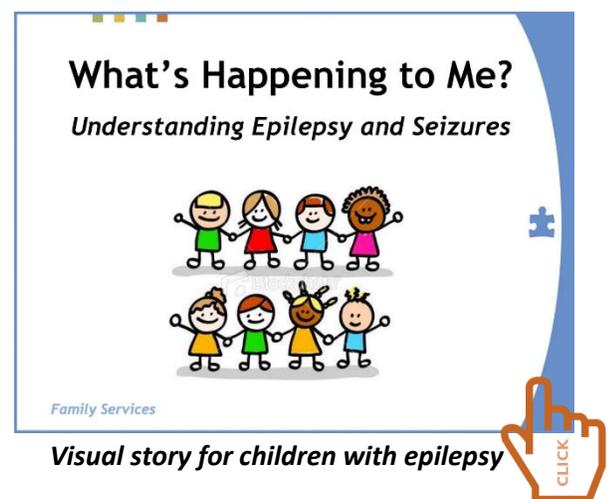
Seizures can begin at any age, though research has identified two peaks in onset among children with autism in the preschool years and again in adolescence (Rossim Posar, & Parmeggiani, 2000).

Characteristic symptoms include:

- Unexplained staring spells
- Stiffening of muscles
- Involuntary jerking of limbs

Other less-specific symptoms can include:

- Sleepiness or sleep disturbances
- Marked and unexplained irritability or aggressiveness
- Regression in normal development



Like autism, epilepsy is a spectrum disorder. Severity varies widely. In addition, experts now distinguish seizures by where they begin in the brain. This is important because it affects the choice of seizure medication, the potential benefit of epilepsy surgery, outlook and possible causes (Fisher et al., 2017).

DIAGNOSING AND TREATING EPILEPSY IN THOSE AFFECTED BY AUTISM

Suspicion of seizures warrants prompt evaluation by a neurologist, who may order an electroencephalogram (EEG), which is a non-invasive process that involves placing electrodes on the head to monitor activity in the brain. By analyzing EEG patterns, the neurologist can identify seizures and other altered brain activity of concern. Often patients who have autism need EEG protocols that address their sensory and communication challenges (Katz 2015). (See the [Autism and Health Tool Kit](#) for more resources on autism-friendly EEG procedures.)

Treating epilepsy in patients who have autism follows the same principles as treatment of epilepsy in others. Typically, the physician selects an anti-epileptic drug based on several considerations such as the type and severity of seizures and their associated EEG patterns. Though anti-epileptic drugs do not cure epilepsy, in most cases they can prevent or minimize seizures. After starting a medication, the neurologist works with the patient and/or his family to monitor effectiveness and side effects. Common side effects include mild fatigue, abdominal discomfort or dizziness. To minimize side effects, the doctor may start medications at a low dose and slowly increase it. Dosage adjustments are common to find an optimal dose and maintain good control of seizures over time.

Epilepsy drugs eliminate seizures in around two-thirds of patients. More difficult-to-control seizures sometimes respond to combinations of two or more medications. When medications fail to control seizures, physicians and families can discuss other options.

Autism and Gastrointestinal Disorders

Children with autism are nearly eight times more likely to suffer from one or more chronic GI problems than are typically developing children.

Gastrointestinal (GI) disorders rank among the most common medical conditions associated with autism (Nikolov et al., 2009) and can profoundly impact quality of life.

In 2014, researchers with the MIND Institute documented that children with autism were nearly eight times more likely to suffer from one or more chronic GI problems than were other children (Chaidez, Hanson, & Hertz-Picciotto, 2014). These GI issues included

frequent abdominal pain, gaseousness, diarrhea, constipation and painful stooling. This study also linked chronic GI issues with increased severity of autism's behavioural symptoms including repetitive behaviours, social withdrawal, hyperactivity and irritability. The association between GI issues and these autism symptoms may be particularly strong among non-verbal persons who have difficulty communicating pain and distress.

AUTISM AND THE MICROBIOME

Since the late 1990s, researchers have been adding to the evidence that unhealthy changes in the intestinal tract's normal community of digestive bacteria (the microbiome) drive both behavioural and GI problems in some people on the autism spectrum. The first reported person to make this gut-brain connection was the mother of a child with autism, Ellen Bolte, who saw a parallel between her son's symptoms and infant botulism. (Bolte, 1998)

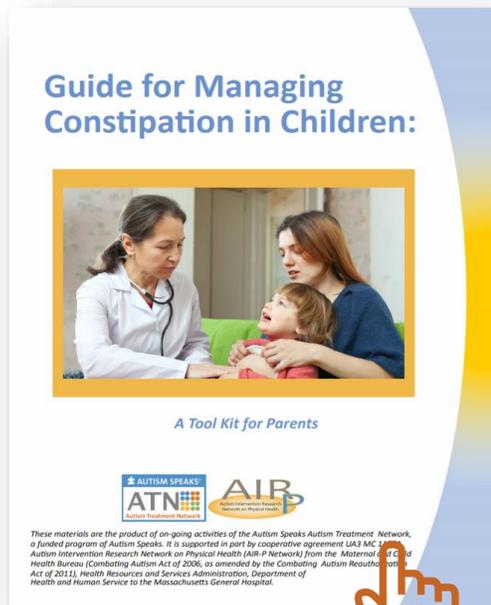
Ms. Bolte's ideas inspired the research of Sydney Finegold, an infectious disease specialist at the University of California, Los Angeles. Dr. Finegold and others showed that spikes in toxin-producing bacteria in the intestines could directly affect the brain via the vagus nerve that runs between the digestive tract and the brain (Finegold et al., 2002).

Studies of people with autism suggest that many of them have marked differences in their microbiome compared to other people. But these studies haven't been consistent in pinpointing specific differences – that is, the presence of any one particular bacterium or the absence of another.

RECOGNIZING AND TREATING GI DISORDERS IN THOSE WITH AUTISM

In 2010, the journal *Pediatrics* published the first guidelines to help healthcare providers recognize and treat GI problems in children with autism. (Buie et al., 2012) The guidelines emphasize that a thorough evaluation for GI distress is particularly important in children who show an otherwise unexplained spike in behavioural problems. They include such specific issues as the following:

Chronic constipation: Children with autism might have more problems with constipation than other children. Difficulty with things like sitting on the toilet and eating different foods can make treating constipation challenging. Between 2006 and 2010, a national survey conducted by the U.S. Centers for Disease Control (CDC) found that children with autism were more than 3.5 times more likely to suffer chronic constipation or diarrhea than were typically developing children (Schieve et al., 2012).



Constipation refers to difficulty emptying the bowels and usually involves hard stools. Periodic constipation is normal, but chronic constipation (lasting two weeks or more) can involve considerable daily pain and lead to a number of medical complications. These include rectal fissures, hemorrhoids and prolapse of the rectum and/or lower intestines. In addition, the pain associated with passing hard stools can lead to an aversion to toileting that compounds the problem.

Difficulty communicating pain and distress makes recognizing GI distress difficult among many who have autism – particularly the nonverbal and minimally verbal and those with an intellectual disability. Telltale behaviours can include arching the back, pressing the belly and gritting teeth. GI

pain can also prompt spikes in self-soothing repetitive behaviours as well as irritability, aggression, self-injury and other challenging behavioural issues.

Common contributors to chronic constipation in patients who have autism include:

- Diets that provide insufficient fiber, which some research suggests are particularly common with gluten-free diets as well as highly restricted diets associated with sensory aversions (Miranda Lasa, Bustamante, Churruga, & Simon, 2014; Graf-Myles et al., 2013)
- Behavioural medications including risperidone (De Hert 2011)
- Sensory and/or behavioural issues that interfere with regular toileting (Dalrymple & Ruble, 1992)

Less common but potentially more serious contributors can include anatomic, neurological or metabolic problems and abnormal gut motility (a sluggish intestinal tract).

Often, the best treatment plan involves a combination of behavioural and medical interventions. Behavioural management includes dietary changes such as increasing fiber, eliminating constipating foods and managing toileting behaviours, which might include teaching a child to sit on the toilet after meals. Medications may include soluble fiber and/or laxatives such as mineral oil, magnesium hydroxide or sorbitol.

Chronic diarrhea: As with constipation, periodic bouts of diarrhea are normal, but chronic diarrhea (two weeks or more) can affect health and quality of life. Evaluation includes investigating and addressing potential medical causes such as intestinal infection, immune dysfunction, inflammatory bowel diseases (Crohn's or ulcerative colitis), irritable bowel syndrome, celiac disease (gluten intolerance), food allergies, lactose intolerance or excessive consumption of certain foods or drinks.

Though it may seem counterintuitive, diarrhea in people with autism often results from severe constipation. This occurs when hard, stuck stools cause a backup of watery contents. Eventually, the watery contents spill around the hard stool to cause sudden diarrhea. Treatment depends on the cause. For instance, dietary changes can ease diarrhea due to excessive juice, food allergies, lactose intolerance or celiac disease. Other times, medications or (rarely) surgery are warranted.

Gastroesophageal reflux disease (GERD): GERD results when the muscle between the stomach and esophagus (food pipe) is lax. This allows partially digested food and liquid mixed with stomach acid to move up out of the stomach. GERD can cause ulceration of the esophagus and predispose a person to esophageal cancer. The condition warrants medical evaluation and possibly a referral to a specialist. In evaluating for GERD, healthcare professionals often look for throat discomfort and/or feelings of "heartburn," though children sometimes experience GERD pain in atypical ways.

Importantly, nonverbal or minimally verbal people can have difficulty communicating pain and discomfort. Signs of GERD pain in a nonverbal or minimally verbal person can include an increase in repetitive and self-injurious behaviours such as head banging, as well as challenging behaviours. Other telltale behaviours can include unusual body postures, straining the neck, pushing out the jaw or tapping the throat. It can help to note if the behaviours are triggered or made worse when the person lies down (a position that worsens reflux). Additional signs can include hoarseness, chronic sore throat, cough or heartburn, dental erosions, food refusal or disturbed sleep.

Helpful behavioural modifications include elevating the head during sleep, avoiding food near bedtime, eating smaller meals and avoiding foods that tend to trigger symptoms. GERD-easing medications include antacids, histamine-2 blockers and proton-pump inhibitors. Severe and chronic GERD warrants specialized tests to identify acid levels and tissue damage in the esophagus.

CASEIN- AND GLUTEN-FREE DIETS

Many parents of children who have autism report that behaviour improves when their children eat a diet free of the proteins gluten and casein (Pillsbury Hopf, Madren, & Santianni, 2016). Gluten is found primarily in wheat, barley and rye; casein, in milk products.

A review of published studies found little evidence that a casein- and gluten-free diet reduces autism symptoms (Mulloy et al., 2010). Subsequently, researchers with the University of Rochester Medical Center conducted a clinical trial that switched children with autism between a diet that included gluten and casein and a diet free of them – using look-alike, taste-alike foods (Hyman et al., 2016). Neither the participating children, their parents nor the researchers knew who was getting which food when, until after the two segments of the study were completed. Analysis of daily diaries showed no significant change in the children’s behaviour. However, the researchers say it’s possible that a small subset of people with autism do benefit from a gluten- and casein-free diet – a subset too small to pick up with modestly sized clinical studies.

PROBIOTICS

Probiotics are so-called “good,” or healthful, bacteria, traditionally found in cultured food products such as yogurt and kefir in the European tradition and kombucha and kimchi in Asia.

The study of probiotics for autism is in its early stages, with a small handful of human studies now underway. Much of this research is based on the promising results of studies with mice bred to display autism-like symptoms such as social avoidance and repetitive behaviors (Hsiao et al., 2013; Critchfield, van Hemert, Ash, Mulder, & Ashwood, 2011; Breece et al., 2013). Research does not yet support the indiscriminate use of probiotics in treating autism symptoms, however, there is preliminary evidence to suggest that there is an imbalance of bacteria in a subgroup of individuals with autism. This is promising for the use of probiotics, or “good” bacteria, in helping to bring equilibrium and health and address the GI distress associated with autism spectrum disorder.

Autism and Disrupted Sleep

Over half of children with autism – and possibly as many as four in five – have one or more chronic sleep problems.

Many people affected by autism suffer from sleep disturbances. Most studies have focused on children. These studies consistently found that over half of children with autism – and possibly as many as four in five – have one or more chronic sleep problems (Cortesi, Giannotti, Ivanenko, & Johnson, 2010; Krakowiak, Goodlin-Jones, Hertz-Picciotto, Croen, & Hansen, 2008). These problems include difficulty falling asleep, frequent and prolonged waking during the night and extremely early rising.

Sleep issues in those who have autism go hand in hand with daytime behavioural challenges, including spikes in repetitive behaviours, communication difficulties, hyperactivity, irritability, aggression and inattention – all of which can interfere with learning and decrease overall quality of life (Mazurek, 2016).

Sleep issues in those who have autism go hand in hand with daytime behavioural challenges that interfere with learning and decrease overall quality of life.

Anecdotally, many parents of “poor sleepers” with autism report not being able to sleep themselves for fear that their children will leave their rooms or even their homes in the night. Wandering from safety, or “elopement,” is a common and life-threatening problem affecting nearly half of children with autism older than age (Anderson et al., 2012). Along these lines, a 2006 study found “significant” levels of chronic stress in 90 percent of parents of “problem sleepers” with autism, compared to 65 percent of parents of “non-problem sleepers” with autism (Doo & Wing, 2006).

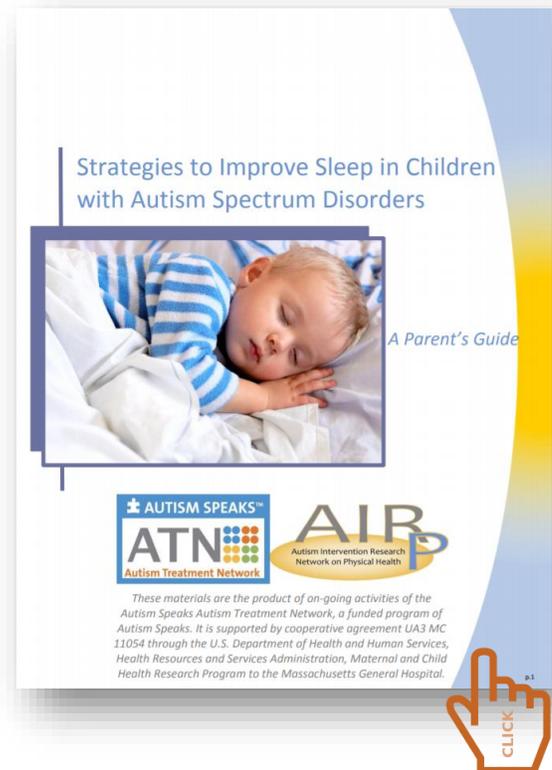
Genetic studies show that people with autism are twice as likely to have mutations in genes that regulate the body’s sleep-wake cycle (circadian rhythm).

WHAT CAUSES AUTISM-RELATED SLEEP PROBLEMS?

Research suggests that the causes of disrupted sleep in people with autism go beyond the poor “sleep hygiene” habits that cause poor sleep in the general population (Johnson & Malow, 2008). Studies have identified a number of potentially biological causes, which likely vary – and sometimes overlap – in different people.

For example:

- Genetic studies show that people with autism are twice as likely as other people to have mutations in genes that regulate the body's sleep-wake cycle (circadian rhythm) (Yang et al., 2015).
- Up to a third of people with autism also have epilepsy, or seizure disorder. Seizures and sleep can worsen each other – undetected nighttime seizures disrupting sleep brain patterns and insufficient sleep worsening seizure control (Accardo & Malow, 2015).
- Studies suggest that up to 40 percent of children and teens with autism struggle with one or more anxiety disorders (Vasa et al., 2016; White, Oswald, Ollendick, & Scahill, 2009). Anxiety can interfere with the ability to fall asleep and stay asleep. It can also set up a worsening cycle with insufficient sleep worsening the anxiety and depression.
- One study suggests that, in addition to spending less time asleep, children with autism spend relatively less time in the rapid eye movement (REM) stage of sleep than do other children. On average, the children with autism spent around 15 percent of their sleep time in REM versus 23 percent for the other children (Buckley et al., 2010). Associated with dreaming, REM appears to play a particularly important role in learning, memory and brain development. The finding has prompted scientists to look more broadly at autism-related changes in the neuro-transmitters (brain-signaling molecules) that help control sleep.
- Some studies have suggested that the brains of people with autism produce lower levels of melatonin, the so-called sleep hormone (Nir et al., 1995; Kulman et al., 2000; Tordjman, Anderson, Pichard, Charbuy, & Touitou, 2005; Melke et al., 2008) However, a recent study found little difference in melatonin levels between children who had autism when compared to those who did not. The finding suggests that autism-related sleep difficulties are not solely driven by biological differences (Goldman et al, 2017).



Autism and Feeding & Eating Issues

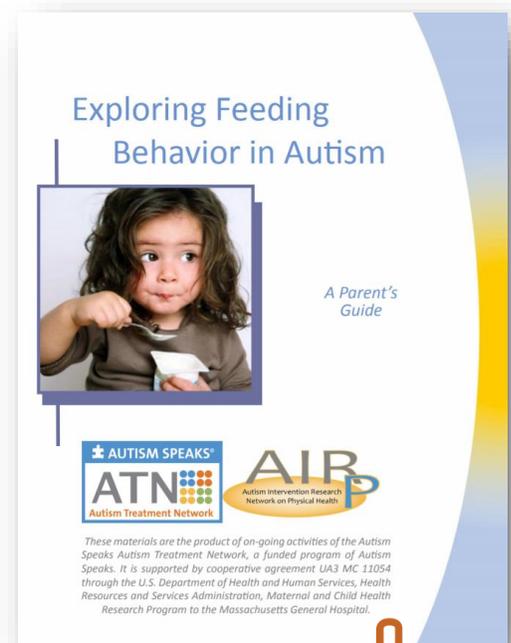
Leo Kanner, the doctor credited with identifying autism in the 1940s, included feeding problems as a defining feature.

A recent review of diagnostic records found that an estimated 70 percent of children on the autism spectrum have feeding and/or eating problems; 36 percent of these individuals had problems classified as “severe” (Romero et al., 2016). Eating and feeding challenges have long been reported by both caregivers and researchers. Leo Kanner, the doctor credited with first describing autism in the 1940s, included feeding problems as a defining feature (Kanner, 1943).

A helpful point on the terminology: The term **feeding disorder** describes problems with eating enough or the right type of food. Among children with autism, this often involves eating only a few types of foods, eating only certain textures or colours of food, and/or disruptive mealtime behaviour. These issues have many causes, including sensory aversions, anxiety (e.g. after an incidence of choking, gagging or vomiting) and rigidity (aversion to change). Many children with autism also have motor issues that involve difficulty with chewing and swallowing. Still others have digestion problems such as slow stomach emptying.

By contrast, the term **eating disorder** refers to conditions such as anorexia and bulimia, which relate to problems with body image and fear of weight gain. Some research suggests an overlap between anorexia and autism in some young women (Wentz et al., 2005).

Chronic overeating is a common issue among both children and adults on the autism spectrum. Some people with autism have poor sensitivity to internal cues such as feeling full. Autism-related aversions to strong flavours, textures and smells can lead to overconsumption of high-calorie, low-nutrient foods. In addition, increased appetite is a common and serious side effect of the FDA-approved medicines for autism-associated challenging behaviour (agitation) – risperidone (Risperdal) and aripiprazole (Abilify) (Maayan & Correll, 2011; Scahill et al., 2016). The result is a high incidence of obesity – often combined with nutritional deficiencies – in both children and adults on the autism spectrum (Shmaya, Eilat-Adar, Leitner, Reif, & Gabis, 2015; Croen, et al., 2015; Hill, Zuckerman, & Fombonne, 2015)



Pica, the dangerous habit of eating nonfood items, is another feeding disorder long associated with autism. Anecdotally, pica appears to be concentrated among those whose autism is accompanied by intellectual disability. It can include swallowing sharp objects such as nails, broken glass and pins, as well as poisonous substances such as paint chips and swimming pool chlorine tablets (Call, Simmons, Lomas, Mevers, & Alvarez, 2015). Pica can place tremendous stress on caregivers by demanding their constant vigilance.

GUIDANCE ON RESTRICTED EATING

By some estimates, highly selective “picky” eating affects around 75 percent of children on the spectrum (Emond, Emmett, Steer, & Golding, 2010; Beighley, Matson, Rieske, & Adams, 2013; Castro et al., 2016).

Some studies suggest that “selective eaters” with autism are more likely than are other children to be underweight and have one or more nutrient deficiencies (Zimmer et al., 2012; Mari-Bauset, Llopis-González, Zazpe-García, Marí-Sanchis, & Morales-Suárez-Varela, 2015). Other research suggests that restricted eaters with autism tend to have similar growth rates as other children, despite lower consumption of key nutrients such as vitamins C and D (Emond, Emmett, Steer, & Golding, 2010).

Many autism specialty clinics employ a team approach to help children with feeding problems. These teams typically include a pediatrician, dietician and one or more therapists (occupational, behavioural and/or speech). The team meets with the child and parents to discuss concerns and the family’s eating routines. Team members watch the child eat and screen for underlying medical and motor issues. They will assess the child’s diet and nutrition, often with food diaries sent home with the parents. The team then develops a personalized therapy plan. During visits, one or more therapists will work with the child on improving feeding skills and/or gradually broadening food choices and tolerance. The therapist also teaches parents strategies to use at home, while monitoring progress. Pill swallowing can be included among the skills taught in this manner.

OVEREATING AND OBESITY

In 2015, researchers with Oregon Health & Science University found that the tendency for unhealthy weight gain starts surprisingly early in life for children affected by autism. Of the 5,053 children with autism in the study, nearly a third (32 percent) of 2- to 5-year olds were overweight, compared to less than a quarter (23 percent) of 2- to 5-year-olds in the general population. Sixteen percent of 2- to 5-year-olds with autism were medically obese,

compared to 10 percent of 2- to 5-yearolds in the general population. The investigators found that the likelihood of being overweight or obese increased with the number of psychoactive behavioural medicines a child or teen was taking. Some of these children were taking as many as five (Hill, Zuckerman, & Fombonne, 2015).

Stemming weight gain – particularly weight gain related to behavioural medications – is a major concern for specialists in autism healthcare (Coury, 2014). First-line solutions include dietary and behavioural approaches such as healthier food choices, reducing portion size and increasing daily exercise. Sometimes this involves removing high-calorie foods from the home entirely or locking refrigerators and pantries. Family activities such as walking and riding bicycles can help reverse unwanted weight gain, and many parents find that increased physical activity has the added benefit of reducing their child's problem behaviours. Behavioural therapists experienced with autism can help families use autism-friendly communication tools and daily schedules to help curb overeating while increasing nutrition and exercise (Ward, 2015).

Despite an absence of hard numbers, studies suggest that, as a group, children and teens with autism engage in less physical activity than typically developing children (Rimmer, Rowland, & Yamaki, 2007; Rimmer & Rowland, 2008). Social difficulties appear to reduce involvement in team and competitive sports. However, many people with autism enjoy more-solitary physical activity such as running, bicycling and swimming (Potvin, Snider, Prelock, Kehayia, & Wood-Dauphinee, 2013). In addition, research suggests that parents' physical activity is the single strongest influence on physical activity levels among children with special needs, including those with autism (Yazdani, Yee, & Chung, 2013).

At the same time, food restriction and increased exercise can prove particularly difficult for some people who have autism. When behavioural strategies fail, many parents find themselves in the difficult position of choosing between their child's physical health and a behavioural medicine that improves their child's ability to function on a daily basis. Given the long-term health consequences of obesity, we urgently need more research aimed at solutions to this complex issue.

Autism and Mental Health

Epidemiological studies suggest that between 54 and 70 percent of people with autism also have one or more other mental health conditions (Simonoff et al., 2008; Hofvander et al., 2009; Croen et al., 2015; Romero et al., 2016).

In order of estimated prevalence, these include:

Attention deficit and hyperactivity disorder (ADHD) affects up to 61 percent of people with autism. (Goldstein & Schwebach 2004, Lee & Ousley, 2006; Gadow, DeVincent, & Pomeroy, 2006; Romero et al., 2016)

Anxiety disorders affect up to 42 percent of people with autism (Vasa et al., 2016; White, Oswald, Ollendick, & Scahill, 2009; Croen et al., 2015; Romero et al., 2016).

Depression affects an estimated 7 percent of children and 26 percent of adults with autism (Greenlee, Mosley, Shui, Veenstra-VanderWeele, & Gotham, 2016; Croen et al., 2015).

Schizophrenia affects up to 35 percent of adults with autism (Chisolm, Lin, Abu-Akel, & Wood, 2015).

Like autism, ADHD, schizophrenia and bipolar disorder are neurodevelopmental conditions that appear to have roots in early brain development (Munesue et al., 2008; Sikora, Vora, Coury, & Rosenberg, 2012; Rapoport, Giedd, & Gogtay, 2012). Among people with autism, anxiety and depression may stem, at least in part, from autism-related impairments that increase daily stress and social isolation and decrease overall quality of life (Vasa et al., 2016; Greenlee, Mosley, Shui, Veenstra-VanderWeele, & Gotham, 2016).

Untreated mental health conditions can profoundly worsen autism's behavioural challenges. But because of overlapping symptoms, they can be particularly difficult to identify in someone who has autism (Levy et al., 2010; Sikora, Vora, Coury, & Rosenberg, 2012; Miodovnik, Harstad, Sideridis, & Huntington, 2015). The social withdrawal associated with depression or schizophrenia, for example, can be difficult to distinguish from autism-related social impairments. In addition, many people with autism have difficulty identifying and expressing emotions and other internal feelings.

In recent years, autism specialists have developed guidelines for diagnosing and treating some of the most common mental health conditions affecting children, teens and adults who have autism. The following sections provide an overview of the latest understanding.

AUTISM AND ADHD

Parents and autism specialists have long noticed that many children with autism also struggle with ADHD. Over the last decade, studies have suggested that between 30 and 61 percent of people with autism also have symptoms of ADHD. (Goldstein & Schwebach, 2004; Lee & Ousley, 2006; Gadow, DeVincent, & Pomeroy, 2006; Romero et al., 2016) By contrast, the Centre for Disease Control and Prevention estimates that ADHD affects 6 to 7 percent of the general population (Perou et al., 2013).

Between 30 and 61 percent of children with autism also have symptoms of ADHD, which affects just 6 to 7 percent of the general population.

In addition, geneticists have discovered that many of the same gene variations that increase autism risk also increase risk for ADHD (Lionel et al., 2011).

Symptoms of ADHD include a persistent pattern of inattention, hyperactivity and/or impulsivity that interferes with daily life, social development and learning. People with ADHD often fail to pay close attention to details and make careless mistakes at school or work. Often, they don't appear to listen when spoken to, have trouble organizing tasks and fail to follow through on instructions and assignments, especially those that require sustained attention (DSM-5, 2013). The classic symptoms of ADHD or similar symptoms can likewise result from autism. For these reasons it's important that an evaluation be made by someone with expertise in both disorders.

In 2012, researchers looked more deeply at autism and ADHD symptoms among more than 3,000 patients, ages 2 to 18, seen at centers in the Autism Speaks Autism Treatment Network (Sikora, Vora, Coury, & Rosenberg, 2012). They found multiple symptoms of ADHD symptoms in more than half these children and teens with autism. Further evaluation showed that the combination of ADHD and autism symptoms resulted in significantly worse daily function, health and overall quality of life. Yet few of these children (11 percent) were receiving treatment for their ADHD before they came to an ATN center for care. Research continues to find that diagnosis of either one of these disorders tends to significantly delay the diagnosis and treatment of the other (Miodovnik, Harstad, Sideridis, & Huntington, 2015). Distinguishing autism and ADHD may remain particularly challenging because both conditions involve impaired social development and challenges with attention, learning and communication.

In 2012, the journal *Pediatrics* published the first guidelines on the evaluation of ADHD in children and teens who have autism, together with detailed guidance on selecting and evaluating the best ADHD medication for those patients (Mahajan et al., 2012). This included information on evaluating the benefits and side effects of ADHD medications and their dosages in consultation with the family. The guidelines emphasize that decisions

about using such medications are highly personal and should involve the individual and/or parents in a meaningful evaluation of goals and values.

AUTISM AND ANXIETY

Studies suggest that between 11 and 42 percent of people with autism struggle with one or more anxiety disorders (Vasa et al., 2016; White, Oswald, Ollendick, & Scahill, 2009; Croen et al., 2015; Romero et al., 2016). By contrast, the Centre for Disease Control and Prevention estimates that anxiety disorders affect 3 percent of children and 15 percent of adults in the general population (Perou et al., 2013; Kessler et al., 2009). These disorders include separation anxiety, panic disorder and phobias (e.g.: extreme fear of certain noises, places and so on).

Studies suggest that between 11 and 42 percent of people with autism struggle with one or more anxiety disorders.

Social anxiety – or extreme fear of new people, crowds and social situations – is especially common among those who have autism. While adults with autism continue to be understudied, case reports suggest that anxiety often remains high throughout life (Gillott & Standen, 2007; Moss, Howlin, Savage, Bolton, & Rutter, 2015).

Even in the absence of a full-fledged anxiety disorder, many people with autism have difficulty controlling anxiety once something triggers it. For many, anxiety is wrapped around autism symptoms such as difficulty navigating social situations and extreme sensory sensitivities to loud noises, lights, tastes and smells. This can produce “anticipatory anxiety” when simply anticipating or otherwise thinking about an anxiety trigger produces extreme anxiety. Another broad source of anxiety in those with autism involves the need for routine or sameness. This can produce anxiety in the face of changes in schedule or familiar people – for example, a new teacher, aide or even store clerk.

To date, most research on anxiety in autism has focused on children and adults who are verbal and have normal to high intelligence. Experts agree on the need for more studies involving the one-third of people with autism who are non-verbal or minimally verbal and/or have intellectual disability.

RECOGNIZING AND TREATING ANXIETY IN AUTISM

In 2016, the journal *Pediatrics* published the first guidelines for recognizing and treating anxiety in people affected by autism (Vasa et al., 2016). Because many people with autism have trouble assessing and expressing how they feel, behaviour often provides the best clues to underlying anxiety. Anxiety can trigger strong internal sensations of tension that

include a racing heart, muscle tightness and stomachache. In someone with autism, these feelings can prompt an increase in self-soothing, repetitive behaviours (flapping, rocking, spinning, etc.) and/or destructive or self-harming behaviours (shredding clothing, head banging, etc.). Similarly, anxiety can be the underlying cause of new resistance to what had been an enjoyed activity (a trip to the beach, a birthday party, school, etc.).

The guidelines call for personalizing treatment to the developmental level of the patient, including language level and intellectual ability. They also cite the effectiveness of an autism-tailored version of cognitive-behavioural therapy (Wood et al., 2009; Drahota, Wood, Sze, & Van Dyke, 2011; Wood et al., 2015). Several types of cognitive behavioural therapy (CBT) have been developed to address anxiety in children and teens with ASD.

In general, cognitive-behavioural techniques include challenging negative thoughts with logic, role-playing, modeling courageous behaviour and gradual exposure to feared situations. Gradual exposure can start with merely looking at a related picture. The autism-adapted version of this approach includes the use of visual aids that tap into the strongly visual style of learning shared by many people with autism. It also incorporates special interests to encourage participation. For example, the therapist may use a favourite cartoon character to model coping skills. They may also integrate conversations about a person's special interest throughout the treatment session.

Some people with autism respond strongly to the logical aspect of cognitive behavioural therapy. In clinical trials, cognitive behavioural therapy has proven particularly effective among people on the spectrum who are verbal and have normal to high intelligence (Wood et al., 2009; Wood et al., 2015; Hepburn, Blakeley-Smith, Wolff, & Reaven, 2016). Building on this work, researchers are further modifying the approach to help those with intellectual disability and/or little to no verbal language (Danial & Wood, 2013).

MEDICATIONS FOR ANXIETY IN PEOPLE WITH AUTISM

Sometimes, counselling and behavioural therapy aren't sufficient to relieve severe anxiety. In these cases, the patient and/or family may want to consult an appropriate specialist about adding an anti-anxiety medication to the treatment program. No medication has FDA-approval specifically for the treatment of anxiety in children with autism. Autism specialists commonly prescribe drugs approved to treat anxiety disorders in the general population. These include selective serotonin reuptake inhibitors (SSRIs) such as Prozac and Zoloft. However, some studies suggest that anti-anxiety medications are less effective, overall, in those with autism than with other groups (Williams, Wheeler, Silove, & Hazell, 2010). It may be that the underlying cause of autism-associated anxiety differs from that of anxiety in the general population.

Autism and Depression

Depression affects an estimated 7 percent of children and 26 percent of adults with autism (Greenlee, Mosley, Shui, Veenstra-VanderWeele, & Gotham, 2016; Croen et al., 2015). This compares to 2 percent of children and close to 7 percent of adults in the general U.S. population (Perou et al., 2013; NIMH, 2015). A recent report in the journal *Pediatrics* found that the rate of depression among children with autism rose dramatically with age, from just under 5 percent in grade-schoolers to just over 20 percent in teenagers (Greenlee, Mosley, Shui, Veenstra-VanderWeele, & Gotham, 2016). It likewise rose with intellectual ability (IQ), as well as the presence of one or more of the medical conditions that commonly accompany autism – particularly seizures and gastrointestinal issues.

That depression rates rise with age and intellectual ability suggests a painful awareness of autism’s social challenges and isolation. Because depression can be so difficult to diagnose in those with ASD, it’s important to see a mental health professional who has expertise with autism.

RECOGNIZING DEPRESSION IN THOSE WITH AUTISM

Signs and symptoms of depression include chronic feelings of sadness, hopelessness, worthlessness, emptiness and/or irritability. Also common: social isolation, moving or talking slowly, feeling restless, and having trouble sitting still or concentrating. At its most serious, depression can include frequent thoughts about death and/or suicide.

But recognizing depression in people who have autism can present special challenges (Gotham, Unruh, & Lord, 2015). Having a “flat,” or unemotional, facial expression, for example, is a common trait of both autism and depression. So, too, is irritability and social isolation. As a result, it can be difficult seeing beyond a person’s autism to the underlying depression. In addition, many people on the autism spectrum have difficulty identifying and expressing how they feel. For these reasons, autism specialists have been developing and testing revised methods for diagnosing depression among children and teens on the autism spectrum (Sterling et al., 2015).

Depression, Autism and Suicide

In 2012, researchers at Penn State College of Medicine reported the disturbing finding that 14 percent of children with autism age 16 or younger “sometimes” or “very often” contemplated or attempted suicide – a rate 28 times higher than for similarly aged children with typical development (Mayes, Gorman, Hillwig-Garcia, & Syed, 2013). This increase in suicidal tendencies became significant after age 10, with signs of depression being the strongest predictor. Neither autism severity nor IQ altered the frequency. The

authors urged healthcare providers to screen all children with autism for suicidal thoughts or attempts, in addition to raising awareness of the issue with parents.

Treating Depression in Those Affected by Autism

Cognitive-behavioural therapy has shown promise for treating depression in teens and adults who have autism (Kuroda et al., 2013). This work builds on a much larger body of research using an autism-modified version of cognitive behavioural therapy for extreme and chronic anxiety. There are no FDA-approved medications specifically for depression in patients who have autism, so psychiatrists typically prescribe those used in the general population. More research may be warranted given a 2011 study suggesting that patients with autism are more likely to experience antidepressant side effects (Boyd, Woodbury-Smith, & Szatmari, 2011). The most common of these include sleepiness, agitation, increased irritability, restless leg syndrome and gastrointestinal problems.

Autism and Schizophrenia

In the 1960s, psychiatrists referred to autism as a subtype of childhood schizophrenia (DSM II, 1968). By the 1990s, the field had made a clear distinction between the two conditions (Rapoport, Chavez, Greenstein, Addington, & Gogtay, 2009). Yet they share many biological similarities. Both appear to have roots in prenatal brain development. They share similar prenatal risk factors including maternal inflammation and infection as well as advanced parental age at the time of conception (Patterson, 2009; Menon, 2011; Insel, 2010). Research has also identified many common genetic risk factors. In other words, many of the same gene changes known to increase autism risk also increase the risk of schizophrenia (Guilmatre et al., 2009; McCarthy et al., 2014).

In terms of symptoms, autism and schizophrenia both involve impairments in processing language and understanding other people's thoughts and feelings. Clear differences include schizophrenia's hallmark psychosis, which often involves hallucinations. In addition, autism's core symptoms typically emerge between ages 1 and 3 years; schizophrenia's in early adulthood.

Anecdotally, many clinicians have reported identifying autism at high rates in adults already diagnosed with schizophrenia and vice versa. However, investigations looking at how commonly these two conditions occur together vary widely in their findings (Chisolm Lin, Abu-Akel, & Wood, 2015). Taken together, the studies found schizophrenia in 4 to 35 percent of adults who have autism and found autism in 4 to 60 percent of those who have schizophrenia. The authors of the above studies urge greater screening for autism among

adults already diagnosed with schizophrenia as well as monitoring for schizophrenia symptoms in teens and adults diagnosed with autism.

Autism and Bipolar Disorder

Bipolar disorder is a mood disorder once known as “manic depression.” People with bipolar disorder tend to alternate between a frenzied state known as mania and episodes of depression. While some people experience only the manic episodes, most alternate between these two states and can show extreme irritability.

Research shows that children and adults with autism are at increased risk for bipolar disorder (Munesue et al., 2008; Rosenberg, Kaufmann, Law, & Law, 2011; Vannucchi et al., 2014; Guinchat et al., 2015). However, studies vary widely in estimating the prevalence of bipolar disorder among people with autism, ranging from 6 to 27 percent. By comparison, bipolar disorder affects around 4 percent of the general population (Kessler et al., 1994).

Some leading experts propose that bipolar disorder may be over-diagnosed in those who have autism, due to overlapping symptoms such as hyperactivity, irritability and disturbed sleep (Witwer, 2014). They caution mental health providers to tease apart the symptoms of true bipolar disorder from those of autism by looking at when the symptoms appeared and how long they lasted. For example, a child with autism may be consistently high-energy and socially intrusive through childhood. As such, his or her tendency to talk to strangers and make inappropriate comments are likely a consistent part of his or her autism, not symptoms of a manic mood swing.

Treatment of Bipolar Disorder in Autism

Some of the medications used to treat bipolar disorder can be problematic and even dangerous in someone who has difficulty recognizing and expressing feelings – as is common with autism. Lithium, for example, can in rare cases produce life-threatening toxicity. The warning signs include increasing thirst and shakiness. Anti-seizure, mood-stabilizing medications such as valproic acid may be a safer treatment for those with autism (Witwer, 2014). In addition, the antipsychotics risperidone and aripiprazole are both FDA-approved to treat irritability in children with autism, though both tend to produce significant weight gain and diabetes risk.

To learn more about physical and mental health conditions that frequently accompany autism spectrum disorder, please see the full report released by Autism Speaks, “[Autism and Health: A Special Report](#)”.