

# Schizophrenia

## What is schizophrenia?

Schizophrenia is a severe and debilitating brain disorder affecting how one thinks, feels and acts. People with schizophrenia can have trouble distinguishing reality from fantasy, expressing and managing normal emotions and making decisions. Thought processes may also be disorganized and the motivation to engage in life's activities may be blunted. Those with the condition may hear imaginary voices and believe others are reading their minds, controlling their thoughts or plotting to harm them.

Schizophrenia affects approximately 1 percent of the world's population over age 18 — nearly 2.5 million people in the United States. Symptoms usually first appear in men in their late teens and early 20s and in women four to five years later. The disease can begin after age 45 and before puberty, but is less likely to do so.

Most people with schizophrenia suffer from symptoms either continuously or intermittently throughout life and are often severely stigmatized by people who do not understand the disease. Contrary to popular perception, people with schizophrenia do not have “split” or multiple personalities, and most pose no danger to others. However, the symptoms are terrifying to those afflicted and can make them unresponsive, agitated or withdrawn. People with schizophrenia attempt suicide more often than people in the general population, and estimates are that up to 10 percent of people with schizophrenia will complete a suicide in the first 10 years of the illness—particularly young men with schizophrenia.

While schizophrenia is a chronic disorder, it can be treated with medication, psychological and social treatments, substantially improving the lives of people with the condition. Scientists are working to understand the genetic and environmental mechanisms that combine to cause schizophrenia. As they learn more about the chemical circuitry and structure of the brains of people with the disease, they are

developing better ways to diagnose schizophrenia early on and provide earlier interventions and treatments.

## What are the symptoms of schizophrenia?

Schizophrenia is what physicians call a heterogeneous condition: it can have very different symptoms in different people. The way the disease manifests itself and progresses in a person depends on the time of onset, severity, and duration of symptoms, which are categorized as positive, negative and cognitive. “Positive” symptoms are active symptoms, such as hallucinations, that people without psychosis don't have, while “negative” symptoms reflect a loss of functioning in areas such as emotion or motivation; and “cognitive” symptoms affect thinking and higher brain functions. All three kinds of symptoms reflect problems in the functioning of the brain. Relapse and remission cycles often occur; a person can get better, worse, and better again repeatedly over time.

**Positive symptoms**, which can be severe or mild, include delusions, hallucinations, and thought disorders. Some psychiatrists also include psychomotor problems that affect movement in this category. Delusions, hallucinations and inner voices are collectively called psychosis, which also can be a hallmark of other serious mental illnesses such as bipolar disorder. Delusions lead people to believe others are monitoring or threatening them, or reading their thoughts. Hallucinations cause a patient to hear, see, feel or smell something that is not there. Thought disorders may involve difficulty putting cohesive thoughts together or making sense of speech. Psychomotor problems may appear as clumsiness, unusual mannerisms or repetitive actions, and in extreme cases, motionless rigidity held for extended periods of time.

**Negative symptoms** include loss or reduction in the ability to initiate plans, speak, express emotion or find pleasure in life. They include emotional flatness or lack of expression, diminished ability to begin and sustain a planned activity, social withdrawal, and

apathy. These symptoms can be mistaken for laziness or depression.

**Cognitive symptoms** involve problems with attention and memory, especially in planning and organizing to achieve a goal. Cognitive deficits are the most disabling for patients trying to lead a normal life.

Schizophrenia has a number of subtypes:

- Paranoid schizophrenia — feelings of extreme suspicion, persecution or grandiosity, or a combination of these.
- Disorganized schizophrenia — incoherent thoughts, but not necessarily delusional.
- Catatonic schizophrenia — withdrawal, negative affect and isolation, and marked psychomotor disturbances.
- Residual schizophrenia — delusions or hallucinations may go away, but motivation or interest in life is gone.
- Schizoaffective disorder — symptoms of both schizophrenia and a major mood disorder, such as depression.

For most people, though, the symptoms may be quite variable and not fall into any particular subtype.

## How is schizophrenia diagnosed?

Currently, schizophrenia is diagnosed by the presence of symptoms or their precursors for a period of six months. Two or more symptoms, such as hallucinations, delusions, disorganized speech and grossly disorganized or catatonic behavior, must be significant and last for at least one month. Only one symptom is required for diagnosis if delusions are bizarre enough or if hallucinations consist either of a voice constantly commenting on the person's behavior/ thoughts or two or more voices "conversing." Social or occupational problems can also be part of the diagnosis during the six-month period.

While the illness may develop abruptly or gradually, schizophrenia is often difficult to diagnose. The person's behavioral problems may seem mild at first even though family members and the individual sense something is wrong. Research is now being done to find markers, such as abnormal brain scans or blood chemicals, that can help detect early disease and allow for quicker interventions.

- **New NARSAD-supported research on diagnosing schizophrenia includes:**
- Identifying unique blood factors in schizophrenia that may lead to a test to detect schizophrenia as early as possible
  - Understanding the relationship between marijuana use and the onset of psychosis in schizophrenia.

- Learning how abnormal decision-making processes may be an early sign of schizophrenia.
- Combining brain imaging and behavioral assessments to discover how the brains of individuals with schizophrenia may be unable to filter out information, a hallmark of the disease

## How is schizophrenia treated?

While no cure exists for schizophrenia, it is treatable and manageable with medication and psychotherapy, especially if diagnosed early and treated continuously. Those with acute symptoms, such as severe delusions or hallucinations, suicidal thoughts or the inability to care for themselves, may require hospitalization. Antipsychotic drugs are the primary medications to treat schizophrenia. They relieve the positive symptoms through their impact on the brain's neurotransmitter systems. Psychiatrists may also give antidepressants if an individual with schizophrenia is depressed.

The first generation of antipsychotics, introduced in the 1950s, block the neurotransmitter dopamine. While they help to control abnormal thinking, they may also limit emotional expression, and cause muscle slowing and stiffness. Dopamine receptor blockers include: chlorpromazine (Thorazine); fluphenazine (Prolixin); haloperidol (Haldol), thiothixene (Navane), trifluoperazine (Stelazine), perphenazine (Trilafon) and thioridazine (Mellaril).

Side effects can include dry mouth, constipation, blurred vision, drowsiness, sexual dysfunction, menstrual changes, significant weight gain, restlessness, stiffness, tremors, muscle spasms and tardive dyskinesia (repetitive, involuntary stereotypic movements that may be irreversible).

Recently, the so-called atypical antipsychotics, which block both the dopamine and serotonin neurotransmitters and act at other receptors, too, have become available. They appear as effective as older medications in reducing positive symptoms, but have different side effect profiles. Atypicals include: risperidone (Risperdal), clozapine (Clozaril), olanzapine (Zyprexa), quetiapine (Seroquel) and ziprasidone (Geodon).

Atypical antipsychotics have a variable side effect profile because of their multiple neurotransmitter receptor effects. They may cause drowsiness or dizziness when first taken. Blurred vision, a rapid heartbeat, menstrual problems, sensitivity to the sun or skin rashes may also occur. Many of these side effects diminish after the first days of treatment. Clozapine can lower the white blood cell count, making some patients infection-prone, and must be

monitored with regular laboratory tests. Atypical antipsychotics also can lead to weight gain and increase the risk of developing diabetes and other metabolic problems. Despite these problems, pharmacologic treatment is usually essential for a person with schizophrenia, and antipsychotic medication should not be discontinued without medical supervision.

Numerous studies have found psychosocial treatments — various forms of psychotherapy, behavioral therapy, counseling and occupational therapies — can help patients who have stabilized on antipsychotic medications. These approaches improve communication, motivation and self-care and teach coping mechanisms so that individuals with schizophrenia may attend school, go to work and socialize. Patients undergoing regular psychosocial treatment comply better with medication and have fewer relapses and hospitalizations. A positive relationship with a therapist or a case manager also gives a patient a reliable source of information about schizophrenia, as well as empathy, encouragement and hope. Social networks and family member support are very helpful, too. The “Recovery Movement” is a new trend in self-help that empowers people with schizophrenia to focus on their strengths in spite of the challenges of living with the condition.

► **New NARSAD-supported research on treating schizophrenia includes:**

- **Improving drugs to treat schizophrenia through pharmacogenetics, an approach to understanding how people with different genetic backgrounds respond to different drugs**
- **Understanding new, alternate neurotransmitter pathways in the brain, including the GABA and glutamate systems, that may contribute to schizophrenia, and how they could be affected by new drugs**
- **Figuring out why some individuals become less responsive to antipsychotic medications over time**
- **Developing drugs that target the cognitive symptoms of schizophrenia, which are not directly treated by antipsychotic drugs**
- **Measuring the effectiveness of an online cognitive behavioral program to help patients deal with auditory hallucinations**
- **Creating employment programs that help people with schizophrenia and other mental illnesses improve cognitive skills, work and contribute to society**
- **Developing ways to treat or prevent the weight gain and metabolic side effects that come with atypical antipsychotics**

## **What causes schizophrenia?**

Like other serious neuropsychiatric illnesses, schizophrenia is a highly complex disease believed to result from many factors, including genetic vulnerability, biological imbalances in the brain’s chemistry and even environmental events that occur during a person’s development, in some cases possibly during the prenatal period.

Studies of identical twins suggest schizophrenia runs in families. Scientists have identified a number of gene variations that appear to increase risk for the disorder. Deletions or amplification of certain genes may also increase the risk of schizophrenia. Some epigenetic changes, or genetic alterations that alter gene expression but do not affect the sequence of genes, also have been linked to schizophrenia. Scientists are still studying how these gene changes, alone or in combination, cause illness.

Schizophrenia may also be related to other environmental factors, such as viral infections, pre-natal malnutrition, perinatal problems, or a combination of factors. Although psychological and other kinds of stress have never been shown to cause schizophrenia, stress may play a role in the timing and symptoms of the disease and in recovery from it.

For quite some time scientists focused on how abnormal levels of the brain chemicals serotonin and dopamine, neurotransmitters that allow nerve cells to communicate, may be related to schizophrenia. A neurotransmitter imbalance affects the way the brain reacts to stimuli (sights, smells, sounds, tastes), and may make someone with schizophrenia overwhelmed by sensory information. Problems in processing external stimuli can contribute to psychosis. Recent studies have been examining how other neurotransmitters, such as glutamate and GABA, or gamma-aminobutyric acid, act in schizophrenia.

Brain imaging technology has revealed differences in the brains of people with schizophrenia compared to those who do not have the disease. People with schizophrenia may have reduced numbers of nerve cell connections (synapses) in some regions of the brain, and may have abnormal levels or activity of brain neurotransmitters, such as GABA and glutamate. These differences may not cause schizophrenia, but scientists are actively investigating the disease process to be able to design drugs or other treatments to overcome the problems.

New NARSAD-supported research on the causes of schizophrenia includes:

- Combining brain imaging and genetic studies to understand what factors increase the risk of schizophrenia
- Using brain imaging to study brain structure and function in schizophrenia
- Developing new methods, such as magnetic resonance imaging, to study brain structure and function in schizophrenia more precisely
- Working with animal models to analyze how genes and environmental stresses early in life may lead to schizophrenia
- Understanding and treating the debilitating cognitive problems of schizophrenia

## Living with schizophrenia

A diagnosis of schizophrenia takes time, since symptoms usually need to be observed over six months. Psychiatrists need to rule out other medical conditions, such as epilepsy, bipolar disorder, a brain tumor, steroid overdose, and substance abuse, all of which can cause psychosis. For some time before a psychotic episode emerges, family members, co-workers and the patient might be worried about unusual behavior — loss of friends, poor grades in school, trouble trusting people, or odd ways of communicating. A person hearing voices or hallucinating may be afraid to tell others about his or her experiences, and may not be diagnosed until disorganized thought becomes so obvious that medical care is warranted. In some cases, a psychotic episode or suicide attempt may bring the individual in contact with the police or to an emergency room, and may lead to hospitalization.

For some, a diagnosis of schizophrenia can be a relief, because it helps explain what has been so wrong. For others, it is devastating. In either case, a doctor can start right away to educate the patient and loved ones about the condition, start antipsychotic treatment, and help the person with schizophrenia cope with his or her unique form of the disease. It can be difficult to stay on antipsychotic medications because of their side effects, but it's critically important in recovery. Different drugs are available and new ones can always be tried to find the greatest benefit with the fewest side effects.

There is some evidence that the prognosis is best when schizophrenia is identified early, when an individual is still socially engaged with school or work and the brain hasn't suffered the biological effects of the disease. But continual care, such as therapy to help deal with stressors that can trigger psychosis, is helpful even for people who are diagnosed later on. New treatments are on the horizon and offer hope for people with this illness and their families.

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Content in this fact sheet  
was reviewed by a member  
of NARSAD's Scientific  
Council.*

## Help support NARSAD's research on schizophrenia

For the past 23 years, NARSAD has been at the forefront of research on mental illness. From 1987 through 2009, NARSAD has given more than \$252 million in grants to support innovative research by more than 2,800 scientists at leading universities, medical centers and research institutions around the world. Besides schizophrenia, NARSAD funds research on depression, bipolar disorder, anxiety disorders, and childhood mental illness.

For schizophrenia research specifically, NARSAD has provided:

- **2,006 grants** to researchers studying schizophrenia and related psychotic disorders
- **\$131 million dollars** for those research grants

NARSAD supports research on all aspects of schizophrenia and other mental illnesses — the causes and nature of the disease, structural and functional changes in the brain, chemical abnormalities, genetics, pharmacological and non-pharmacological treatments, and social and behavioral aspects of the illness.

NARSAD's grantmaking program is guided by its Scientific Council, a volunteer group of 116 leading neuroscientists, which reviews and recommends research proposals for funding.

NARSAD relies on the generosity of thousands of donors and volunteers to support this research, which has yielded great progress in the understanding, diagnosis and treatment of mental illnesses. Formerly known as the National Alliance for Research on Schizophrenia and Depression, NARSAD is a 501 (c)(3) organization that receives no government support. All donations are tax-deductible. To donate to NARSAD and to learn more about our work, please call (800) 829-8289, write to [info@narsad.org](mailto:info@narsad.org), or visit our website.

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