

## II. Assessments

### General Principles

1. Symptoms (mental and physical), signs, activities of daily living (ADLs), level of functioning, and side effects are key areas to assess at all phases of the illness.
2. Collateral information (for example, from family members, caregivers, and health care professionals) is usually essential for a more complete understanding of symptoms, signs, and functioning.
3. Longitudinal follow-up by the same clinician(s) to monitor improvements or worsening is optimal.
4. Patients will often not spontaneously bring complaints and information to clinicians, and therefore, active, specific questioning and informed examination and investigation are usually necessary.
5. The patient's competency to accept or refuse treatment must be periodically assessed and recorded.

### Acute Phase

The physician's goals are to make an initial diagnosis and to plan and initiate treatment. Investigation of the symptoms of psychosis begins with a history, a physical examination, and other appropriate investigations. The clinical history should include all aspects of a general psychiatric evaluation as well as a focus on specific issues related to schizophrenia. The primary goal of the assessments described in this section is to provide a guide for clinicians caring for patients with schizophrenia, not for all forms of psychosis. Although not described in detail here, the differential diagnosis of schizophrenia from schizoaffective disorder, bipolar disorder, depression with psychosis, and other forms of psychotic illness has implications for outcome (9–11). Collateral information should be sought, with the knowledge and consent of the patient, from others who knew the patient before the acute episode. Semistructured interviews may increase the reliability of application of diagnostic criteria and may elicit features that might be otherwise overlooked. Clinical rating scales can

help quantify symptom severity and permit longitudinal assessment. Most of these instruments require training to ensure reliable administration. Most important, taking time to build rapport with patients and caregivers will help maximize understanding of the longitudinal course and phenomenology of the illness.

The initial assessment should include inquiries specifically directed to the following (Table 3):

- positive symptoms such as hallucinations and delusions
- negative symptoms such as flat or blunted affect, poverty of thought or thought content, and avolition
- disorganization such as thought disorder, inappropriate affect, and disorganized behaviour
- affective symptoms such as anxiety or depression, particularly in relation to the psychotic symptoms
- suicidal or aggressive thinking and behaviour, impulsivity, because any risk for suicide or violence has implications for where the patient should be assessed and treated
- the time of onset or exacerbation of symptoms and the context and possible precipitating factors
- substance use and abuse in relation to the onset and persistence of psychotic and associated symptoms
- the current living situation, including housing, finances, social supports, ADLs, social activity, school, and work
- a mental status examination, including office or bedside assessment of cognitive function, based on data from all sources of information, in which positive and negative findings should be documented, since they may change over time
- a physical examination, including neurologic examination, and laboratory tests, including screening toxicology
- a general medical history and review of symptoms

Repeated relapses necessitate special attention to assessment of the patient's insight (including patient's and family's

Table 3 Assessments for patients with schizophrenia				
Areas		First episode	Acute phase	Stable
Psychopathology	Positive	Baseline assessment	Baseline and at least weekly thereafter, more frequently depending on clinical context	At least every 3 months for medication adherent, more frequent for medication nonadherent
	Negative Disorganization Mood Suicide, aggression, or impulsivity			
Level of function	Social	Baseline assessment	Baseline assessment	Every 3 months
	Living situation Occupational or vocational			
Substance use or abuse	Inquiry	Baseline assessment	Baseline assessment	As indicated clinically
	Toxicology screen			
Cognitive function	Neuropsychological testing	Baseline assessment	As indicated clinically	As indicated clinically
Genetic	Family history of psychosis	Baseline assessment		
	Clinical screening for chromosome 22q11 deletion syndrome (with testing as indicated clinically)	Baseline assessment	As indicated clinically	As indicated clinically
Structural brain abnormalities	CT or MRI	Baseline assessment	As indicated clinically	As indicated clinically
Hematology	CBC	Baseline assessment	Baseline assessment	As indicated clinically
Blood chemistries	Electrolytes	Baseline assessment	Baseline assessment	As indicated clinically
	Renal function tests			
	Liver function tests			
	Thyroid function tests			
Infectious diseases	Syphilis test	Baseline assessment	As indicated clinically	As indicated clinically
	Hepatitis or HIV tests if indicated			
Cataracts	Inquiry	Baseline assessment	Baseline assessment	Every 2 years up to age 40
	Ocular exam			Yearly for age 40 and older
Cardiovascular	Vital signs	Baseline assessment	As clinically indicated with changes in medications	As indicated clinically
	ECG		QTc indicated when affected by multiple medications	

*continued*

Table 3 continued				
	Areas	First episode	Acute phase	Stable
Extrapyramidal symptoms and signs	Parkinsonism (bradykinesia, rigidity, tremor), Dystonia, Dyskinesia, Akathisia	Baseline assessment	Before initiating a new antipsychotic or when dosage is changed, then weekly for 2 to 4 weeks	Every 6 months, or more often for patients at higher risk
Body mass	BMI Waist circumference	Baseline assessment	Before initiating a new antipsychotic, then monthly for 6 months	Every 3 months on a stable antipsychotic dosage
Blood sugar	Fasting plasma glucose	Baseline assessment	Baseline assessment, 4 months after initiating a new antipsychotic	Yearly, or more frequently if symptomatic or gaining weight
Hyperlipidemia	Lipid panel (total cholesterol, low- and high-density lipoprotein, cholesterol, triglycerides)	Baseline assessment	Baseline assessment	At least every 2 years, or every 6 months if LDL levels above the normal range
Endocrine and sexual function	Functional inquiry: Women: menstruation, libido, galactorrhea Men: libido, erectile and ejaculatory function Where clinically indicated: prolactin level	Baseline assessment	Baseline assessment Monthly for 3 months after initiating a new antipsychotic	Yearly
	Risk behaviours for STDs and HIV	Baseline assessment	As indicated clinically	As indicated clinically

attribution of the patient's behaviour), awareness of the significance of illness, attitude toward treatment and restoring health, medication adherence, substance use or abuse, treatment response, and side effects, as well as attention to the availability and use of psychosocial interventions designed to reduce symptom recurrence. The setting selected for treatment will depend primarily on safety issues and on the ability of the patient to care for him- or herself and adhere to treatment.

### Stabilization Phase

The aim of assessment in the stabilization phase is to monitor for symptomatic and functional recovery after an acute episode. Treatment may not completely eliminate symptoms, but it is important to document changes, including diminished frequency or intensity of symptoms or behavioural responses to treatment (12). The extent to which positive and negative symptoms and cognitive impairment persist following optimal treatment of an index episode may be predictive of

more severe residual symptoms and a poorer functional recovery (13–16).

### Stable Phase

Assessments in the stable phase of the illness support the treatment goals of this phase. These goals are to optimize functional recovery, to promote insight and understanding, to learn to detect early signs of relapse, and to monitor for side effects and comorbid conditions. Patients in the stable phase who have good functional recovery and are in a stable living situation should be assessed by a physician at least every 3 months. More frequent assessments are often required by patients who, for example, have poor functional recovery or associated conditions such as substance use or abuse, have limited social support, are changing medications, are initiating a new psychosocial intervention, or are experiencing stressful life events. Persistent symptoms (positive, negative, and comorbid) are not always associated with overt patient distress but often limit functional recovery (17).

**Table 4 Recommendations**

Recommendation	Evidence	Evidence level
Symptoms and signs of illness and functional impairment should be carefully evaluated and differential diagnosis made.	Among illnesses with psychosis as a clinical feature, the diagnosis of schizophrenia has significant implications for prognosis.	A
Suicidal and aggressive thinking and behaviour should be regularly assessed.	Patients with schizophrenia have increased risk of suicide and aggression.	A
Regular assessment of substance use and abuse is necessary.	Substance abuse is common in patients with schizophrenia.	A
Neuropsychological testing is suggested in patients with first-episode psychosis and those with poor response to treatment.	Schizophrenia is associated with mild but significant cognitive impairment, which is associated with poor functional recovery.	B
Symptoms, level of function, and factors associated with poor treatment adherence and relapse should be regularly assessed.	Schizophrenia is frequently characterized by exacerbations of symptoms and periods of acute relapse.	A
Clinical features suggestive of chromosome 22q11 syndrome should be evaluated in patients with schizophrenia and laboratory testing obtained when indicated.	Chromosome 22q11 deletion is associated with schizophrenia.	B
Computed tomography or magnetic resonance imaging at illness onset and in patients with refractory illness should be done.	Patients with schizophrenia have an increased prevalence of structural brain abnormalities.	B
Regular clinical and laboratory monitoring for movement disorders, obesity, diabetes, hyperlipidemia and sexual dysfunction indicated in patients with schizophrenia. (see Table 3)	Patients with schizophrenia have reduced life expectancy; the combination of illness and the effects of antipsychotic treatment place patients at risk of movement disorders, obesity, diabetes, hyperlipidemia, and sexual dysfunction.	A

Assessments of functional recovery focus on the severity of persisting or residual symptoms, on the ability to perform basic self-care functions and ADLs, on the extent of social relationships, on the ability to learn and work, and on the frequency of hospitalization due to relapses. Thorough assessment may be particularly important to inform decisions concerning level of care and housing support needed in the community. Collateral information from caregivers and (or) a home visit may be very helpful in this assessment. Poor recovery of ADLs and social function is often related to persisting cognitive dysfunction. In addition to objectively assessing functional recovery, seek the patient's own account of satisfaction or quality of life. Setting realistic goals and expectations for functional recovery requires knowledge of the patient's longitudinal history, including his or her best level of functioning, educational history, culture, interests, and supports.

## Relapse and Adherence to Treatment

The course of schizophrenia is often characterized by relapses of acute psychosis (18). Signs and symptoms associated with relapse are often observed by relatives or caregivers and usually appear more than 1 week prior to relapse. Initial signs and symptoms are likely to be nonpsychotic (such as anxiety, tension, depression, decreased insight, trouble sleeping, and social withdrawal). A relapse may also coincide with sensitivity to minor stresses or "hassles" at home or work. Relapse prevention is closely related to effective antipsychotic medication and to adherence to treatment. Adherence to treatment is promoted by a good relationship with the clinician, by patient and family knowledge about the illness, by understanding the risk of nonadherence to medication (up to 90% chance of relapse within 1 year), and by low medication side effects. Nonadherence is associated with denial of illness, distressing side effects, complicated dosage schedules,

substance abuse, problems with access to treatment, financial obstacles to receiving medication, and stigma.

## Specific Clinical Situations and Assessments

### *First Episode*

The assessment for a first episode of psychosis is similar to an acute phase assessment. Particular attention should be paid to the longitudinal assessment of the onset of changes in behaviour and to the timing and course of onset of the first symptoms of psychosis. Developmental history, including social and academic functioning in childhood and adolescence, may help indicate the onset of decline in function and may be of prognostic value regarding degree of symptomatic and functional recovery. The duration of untreated psychosis (DUP) may have similar prognostic value (19–21).

For individuals referred with a suspicion of psychosis, variables that may be associated with increased risk of conversion to psychosis include poor level of functioning (particularly with recent decline), long duration of symptoms, depression, impaired attention, family history of psychosis, and recent subclinical symptoms of psychosis (22).

### *Neuropsychological Assessment*

A consensus on cognitive testing for clinical trials in schizophrenia is developing through a US National Institute of Mental Health initiative (23). Preliminary reports from this group and additional studies suggest that cognitive testing in first-episode illness may be of prognostic value for functional recovery. As well, cognitive decline to frank dementia can occur over the course of illness in schizophrenia, although it is uncommon (24). Baseline assessments are particularly valuable should reassessment be indicated clinically later in the illness course. Cognitive testing should include an estimate of premorbid IQ, current IQ, and specific tests related to working memory, attention, verbal learning and memory, visual learning and memory, reasoning and problem solving, speed of processing, and social cognition. Adequate assessment of these domains of function is more important than the specific tests administered.

Cognitive testing in the stable phase of illness may also be of significant value in addressing different issues related to the heterogeneity of schizophrenia and variability in functional recovery. Strengths and weaknesses in specific domains of cognitive function may help guide the design of individual strategies for rehabilitation. Documentation of capacity to learn may be particularly important.

The timing of neuropsychological assessment also needs to be individualized. Psychometrists and psychologists experienced in testing patients with psychosis can obtain valid information in the presence of positive symptoms; however, testing in the stable rather than the acute phase of illness is

generally preferred. For patients experiencing a first episode of illness, testing within the first 3 months at a time where symptoms do not directly disrupt the assessment process is suggested. Finally, for any specialized assessment (neuropsychological or the following genetic and imaging studies), sufficient information should be provided to the consulting clinician to help inform the tests to be carried out. Requesting information on the previously described domains of cognitive function is preferable to a referral question such as “rule out organicity.”

### *Genetic Assessment*

Schizophrenia is a “complex disorder” with significant interactive components of genes and environment as etiologic factors. There are no screening genetic tests available that provide useful information in regard to most patients. However, genetic assessment is indicated in patients who have dysmorphic or other features suggesting the presence of chromosomal syndromes. Chromosome 22q11 deletion syndrome is associated with significantly increased risk for psychosis, predominantly schizophrenia (25). This syndrome is present in approximately 1/4000 births and increases the risk for schizophrenia approximately 25-fold. Chromosome 22q11 deletion syndrome is also known as velocardiofacial syndrome, DiGeorge syndrome, and Shprintzen syndrome. Testing samples of patients with schizophrenia for 22q11 deletion yields widely variable prevalence estimates, likely influenced significantly by the ascertainment criteria used. Overall, 1% to 2% of individuals with schizophrenia have 22q11 deletion syndrome (26). This is medically significant, as a range of associated conditions exists, including cardiac defects, immune system dysfunction, platelet abnormalities, and hypocalcemia. Clinical features of 22q11 deletion syndrome in individuals with schizophrenia or first-episode psychosis include the following:

- childhood learning difficulties, such as special education, developmental delay, or articulation disorder
- palatal features, such as hypernasal speech, high arched palate, or history of cleft palate
- cardiac features, that is, a history of congenital cardiac abnormalities
- craniofacial abnormalities, such as dysmorphic facies (typically, long, narrow face, flat cheeks, prominent nose with bulbous tip, minor ear anomalies, may also include narrow or slanted palpebral fissures and retrognathia)
- other physical congenital abnormalities, including slender or tapered fingers, high arches or talipes, and scoliosis
- a history of recurrent ear infections or hearing loss may also be relevant. Clinical screening of patients for the presence of features from 2 or more of the above areas may indicate the need for fluorescent in situ hybridization

(the FISH test) testing for diagnosis and (or) referral to a medical geneticist (27,28). Presence of 22q11 deletion syndrome is also an indication for genetic counselling.

#### *Neuroimaging*

Other brain diseases can mimic the presentation of schizophrenia. Rarely, patients with first-episode psychosis and no neurologic findings will have an unsuspected brain disease revealed by brain imaging with computed tomography (CT) or magnetic resonance imaging (MRI). The most common finding with CT imaging in first-episode psychosis is nonspecific ventricular and cortical sulcal enlargement, which may be present in 30% to 40% of patients (29). More severe atrophy is related to poorer outcome. Focal findings, usually developmental anomalies that do not influence treatment, will occur in 2% to 6% of patients imaged with CT. Over 20% of MRI scans at the onset of psychosis may be read as abnormal by radiologists; this increases to as high as 50% in chronic illness (30). Excluding patients with head injury, neurologic disease, seizures, or substance abuse, 7.9% of MRI scans obtained in first-episode patients were of “clinical importance, affecting prognosis, diagnosis, or management” (30, p 334) and led to referral for additional evaluation. The comparable frequency in patients with chronic illness was 20%. In this study and in other studies of volunteers, incidental findings led to referral in 3% to 5% (30,31). Imaging data may help patients and families to accept that neurologic causes of illness have been excluded.

#### *Poorly Responsive or “Refractory” Illness*

Diagnostic reassessment is a first step in developing a treatment plan for individuals with incomplete treatment response. Very few patients with apparently treatment-resistant schizophrenia actually have schizoaffective disorder, a mood disorder with psychosis, or undetected physical conditions that may have different treatment implications (32,33). Diagnostic criteria must be applied systematically. Factors that contribute to misdiagnosis in severely ill patients include failure to consider lifetime history of illness; an assumption that all severe, chronic psychosis with functional impairment is schizophrenia; failure to appreciate irritability, which may indicate mania; and confusion between negative symptoms and depression. Access to collateral sources of information for assessment is particularly important in this group of patients.

#### *Comorbid Conditions*

Comorbid conditions include suicidal behaviour, anxiety and depressive symptoms, and substance abuse. Completed suicide and suicide attempts are distressingly common in schizophrenia patients (34). The following specific factors further increase the risk for suicide in those with schizophrenia: depression, being within 6 years of first hospitalization, young age, high IQ, high premorbid achievement and

aspirations, and awareness of loss of functioning. As well, command auditory hallucinations, recent discharge from hospital, treatment nonadherence, and akathisia may be related to suicide risk.

Depressive symptoms are common in schizophrenia and must be differentiated from negative symptoms such as blunting of emotional expression, decreased spontaneous speech, and lack of motivation (35). Depressive symptoms may precede or be coincident with psychotic symptoms, particularly in the early course of illness, or may be more prominent following resolution of psychotic symptoms.

Anxiety symptoms may be comorbid in schizophrenia, part of a relapse, or secondary to caffeine, other drugs, or alcohol abuse. Agitation and (or) violence may accompany an exacerbation of symptoms but must be distinguished from akathisia or delirium (such as may occur secondary to substance abuse or excessive water drinking).

Substance abuse is common in schizophrenia, with up to an 80% lifetime prevalence and 25% cross-sectional prevalence (36). Multiple substances are often abused, and this is associated with poor functional recovery. Substance use or abuse may represent self-treatment of residual symptoms or distressing side effects. Common substances include tobacco, alcohol, cannabis, and amphetamines. Nonprescription antihistamines and analgesics may also be used. Knowledge of the patient’s substance use history will aid inquiries about the use of specific substances. Collateral information and specific urine drug screens may help assess the extent of substance use or abuse. Up to 80% of patients with schizophrenia smoke; as for any patient, smoking cessation strategies should be pursued (37).

Polydipsia and resulting hyponatremia may manifest as late afternoon restlessness, irritability, nausea, diarrhea, salivation, ataxia, and eventually stupor. The clinician should specifically enquire whether fluid intake exceeds about 3 L of fluid (any) daily. Weight gain of more than 2 kg during the day, excessive bathroom use, or daytime wetting may also indicate compulsive water drinking.

#### *Physical Health Monitoring*

Patients with schizophrenia are at high risk for underrecognition and undertreatment of physical illnesses. Specific questioning to uncover physical illnesses is more necessary than with other patients. As well as having a high suicide rate, patients with schizophrenia have a higher mortality rate from other causes, compared with the general population (38,39). Additional risks may be present that are related to antipsychotic medications, high prevalence of smoking, caffeine ingestion, comorbid alcohol or other substance abuse, and self-neglect. Common comorbid illnesses include cardiovascular disease, obesity, type II (adult onset) diabetes

mellitus, hyperlipidemia, and sexual dysfunction. Table 2 indicates a suggested approach to screening for these illnesses and pathophysiological states.

Monitoring for obesity can be carried out with assessment of body mass index (BMI) and waist circumference. Information concerning these measures can be found on-line at Health Canada ([www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/weight\\_book\\_tc\\_e.html](http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/weight_book_tc_e.html)). A BMI of 25.0 to 29.9 indicates overweight and an increased risk related to morbidity and possible mortality, and a BMI of 30.0 or greater is classified as obesity and is associated with a sharp rise in risk. Waist circumference of 102 cm (40 inches) or greater in men, and 88 cm (35 inches) or greater in women is associated with increased risks to health. In addition to these absolute values, an increase of 1 BMI unit during treatment should lead to considering an intervention (40) such as prescribing a weight-loss program, as would a 10% increase in total body weight.

Canadian Diabetes Association CPGs identify schizophrenia as a risk factor for type II diabetes (41). An algorithm for screening is available on-line ([www.diabetes.ca/cpg2003/chapters.aspx](http://www.diabetes.ca/cpg2003/chapters.aspx)). Health care providers, patients, and family members should be able to recognize the signs and symptoms of diabetes, including weight loss, polyuria, polydipsia and diabetic ketoacidosis, nausea, vomiting, dehydration, rapid respiration, and clouding of the sensorium.

Particular attention should be paid to patients who meet criteria for the metabolic syndrome, characterized by abdominal obesity, dyslipidemia, hypertension, dysglycemia, and insulin resistance. Although complete consensus on the definition of

this syndrome is lacking, a working definition is as follows: the presence of 3 or more of fasting plasma glucose = 6.1 mmol/L, blood pressure = 130/85 mm Hg, triglycerides = 1.7 mmol/L, HDL-C < 1.0 mmol/L (men) or < 1.3 mmol/L (women), and abdominal obesity indicated by waist circumference >102 cm (men) or 88 cm (women) (35).

Assessment of sexual functioning should be part of a systematic review of side effects in patients receiving antipsychotics. In women, menstrual calendars may be helpful. Questioning masturbatory activities and, in men, the presence of spontaneous morning erections may help differentiate deleterious pharmacologic impacts of medication from relational difficulties related to schizophrenia itself. Prolactin levels should be routinely assessed in the presence of menstrual changes in women and sexual dysfunctions or galactorrhea in both sexes. If isolated hyperprolactinemia is detected without clinical symptoms, treatment providers should remember that hormonal perturbations and consequences are still possible during the long-term course of treatment.

#### *Dual Diagnosis (Mental Retardation)*

Patients with mental retardation, especially those who are nonverbal, may be more challenging to assess; collateral information from caregivers is important. Cognitive and functional testing to delineate the patient's developmental level and relative strengths and weaknesses are also essential. Consultation with a medical geneticist is recommended if there are any dysmorphic features or congenital anomalies. Chromosomal studies using modern techniques may reveal detectable anomalies of diagnostic significance.

