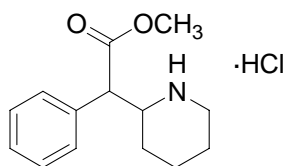


**CONCERTA<sup>®</sup>**  
**(methylphenidate HCl)**  
**Extended-release Tablets CII**

**DESCRIPTION**

CONCERTA<sup>®</sup> is a central nervous system (CNS) stimulant. CONCERTA<sup>®</sup> is available in four tablet strengths. Each extended-release tablet for once-a-day oral administration contains 18, 27, 36, or 54 mg of methylphenidate HCl USP and is designed to have a 12-hour duration of effect. Chemically, methylphenidate HCl is d,l (racemic) methyl  $\alpha$ -phenyl-2-piperidineacetate hydrochloride. Its empirical formula is C<sub>14</sub>H<sub>19</sub>NO<sub>2</sub>•HCl. Its structural formula is:



Methylphenidate HCl USP is a white, odorless crystalline powder. Its solutions are acid to litmus. It is freely soluble in water and in methanol, soluble in alcohol, and slightly soluble in chloroform and in acetone. Its molecular weight is 269.77.

CONCERTA<sup>®</sup> also contains the following inert ingredients: butylated hydroxytoluene, carnauba wax, cellulose acetate, hypromellose, lactose, phosphoric acid, poloxamer, polyethylene glycol, polyethylene oxides, povidone, propylene glycol, sodium chloride, stearic acid, succinic acid, synthetic iron oxides, titanium dioxide, and triacetin.

**System Components and Performance**

CONCERTA<sup>®</sup> uses osmotic pressure to deliver methylphenidate HCl at a controlled rate. The system, which resembles a conventional tablet in appearance, comprises an osmotically active trilayer core surrounded by a semipermeable membrane with an immediate-release drug overcoat. The trilayer core is composed of two drug layers containing the drug and excipients, and a push layer containing osmotically active components. There is a precision-laser drilled orifice on the drug-layer end of the tablet. In an aqueous environment, such as the gastrointestinal tract, the drug overcoat dissolves within one hour, providing an initial dose of methylphenidate. Water permeates through the membrane into the tablet core. As the osmotically active polymer excipients expand, methylphenidate is released through the orifice. The membrane controls the rate at which water enters the tablet core, which in turn controls drug delivery. Furthermore, the drug release rate from the system increases with time over a period of 6 to 7 hours due to the drug concentration gradient

incorporated into the two drug layers of CONCERTA<sup>®</sup>. The biologically inert components of the tablet remain intact during gastrointestinal transit and are eliminated in the stool as a tablet shell along with insoluble core components. It is possible that CONCERTA<sup>®</sup> extended-release tablets may be visible on abdominal x-rays under certain circumstances, especially when digital enhancing techniques are utilized.

## **CLINICAL PHARMACOLOGY**

### **Pharmacodynamics**

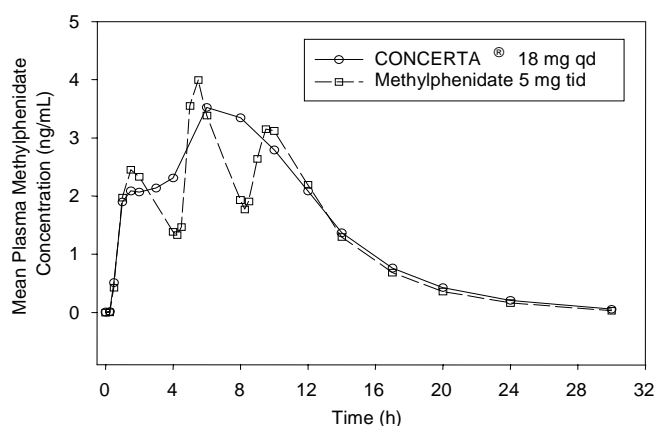
Methylphenidate HCl is a central nervous system (CNS) stimulant. The mode of therapeutic action in Attention Deficit Hyperactivity Disorder (ADHD) is not known. Methylphenidate is thought to block the reuptake of norepinephrine and dopamine into the presynaptic neuron and increase the release of these monoamines into the extraneuronal space. Methylphenidate is a racemic mixture comprised of the d- and l-isomers. The d-isomer is more pharmacologically active than the l-isomer.

### **Pharmacokinetics**

#### **Absorption**

Methylphenidate is readily absorbed. Following oral administration of CONCERTA<sup>®</sup>, plasma methylphenidate concentrations increase rapidly reaching an initial maximum at about 1 hour, followed by gradual ascending concentrations over the next 5 to 9 hours after which a gradual decrease begins. Mean times to reach peak plasma concentrations across all doses of CONCERTA<sup>®</sup> occurred between 6 to 10 hours.

CONCERTA<sup>®</sup> qd minimizes the fluctuations between peak and trough concentrations associated with immediate-release methylphenidate tid (see Figure 1). The relative bioavailability of CONCERTA<sup>®</sup> qd and methylphenidate tid in adults is comparable.

**FIGURE 1**

**Figure 1.** Mean methylphenidate plasma concentrations in 36 adults, following a single dose of CONCERTA® 18 mg qd and immediate-release methylphenidate 5 mg tid administered every 4 hours

The mean pharmacokinetic parameters in 36 adults following the administration of CONCERTA® 18 mg qd and methylphenidate 5 mg tid are summarized in Table 1.

**TABLE 1: Mean ± SD Pharmacokinetic Parameters**

Parameters	CONCERTA® (18 mg qd) (n=36)	Methylphenidate (5 mg tid) (n=35)
$C_{max}$ (ng/mL)	$3.7 \pm 1.0$	$4.2 \pm 1.0$
$T_{max}$ (h)	$6.8 \pm 1.8$	$6.5 \pm 1.8$
$AUC_{inf}$ (ng•h/mL)	$41.8 \pm 13.9$	$38.0 \pm 11.0$
$t_{1/2}$ (h)	$3.5 \pm 0.4$	$3.0 \pm 0.5$

No differences in the pharmacokinetics of CONCERTA® were noted following single and repeated once-daily dosing indicating no significant drug accumulation. The AUC and  $t_{1/2}$  following repeated once-daily dosing are similar to those following the first dose of CONCERTA® 18 mg.

#### Dose Proportionality

Following administration of CONCERTA® in single doses of 18, 36, and 54 mg/day to adults,  $C_{max}$  and  $AUC_{(0-inf)}$  of d-methylphenidate were proportional to dose, whereas l-methylphenidate  $C_{max}$  and  $AUC_{(0-inf)}$  increased disproportionately with respect to dose. Following administration of CONCERTA®, plasma concentrations of the l-isomer were approximately 1/40th the plasma concentrations of the d-isomer.

In a multiple-dose study in adolescent ADHD patients aged 13 to 16 administered their prescribed dose (18 to 72 mg/day) of CONCERTA<sup>®</sup>, mean C<sub>max</sub> and AUC<sub>TAU</sub> of d- and total methylphenidate increased proportionally with respect to dose.

### Distribution

Plasma methylphenidate concentrations in adults and adolescents decline biexponentially following oral administration. The half-life of methylphenidate in adults and adolescents following oral administration of CONCERTA<sup>®</sup> was approximately 3.5 h.

### Metabolism and Excretion

In humans, methylphenidate is metabolized primarily by de-esterification to  $\alpha$ -phenyl-piperidine acetic acid (PPA), which has little or no pharmacologic activity. In adults the metabolism of CONCERTA<sup>®</sup> qd as evaluated by metabolism to PPA is similar to that of methylphenidate tid. The metabolism of single and repeated once-daily doses of CONCERTA<sup>®</sup> is similar.

After oral dosing of radiolabeled methylphenidate in humans, about 90% of the radioactivity was recovered in urine. The main urinary metabolite was PPA, accounting for approximately 80% of the dose.

### Food Effects

In patients, there were no differences in either the pharmacokinetics or the pharmacodynamic performance of CONCERTA<sup>®</sup> when administered after a high fat breakfast. There is no evidence of dose dumping in the presence or absence of food.

### Special Populations

#### *Gender*

In healthy adults, the mean dose-adjusted AUC<sub>(0-inf)</sub> values for CONCERTA<sup>®</sup> were 36.7 ng•h/mL in men and 37.1 ng•h/mL in women, with no differences noted between the two groups.

#### *Race*

In adults receiving CONCERTA<sup>®</sup>, dose-adjusted AUC<sub>(0-inf)</sub> was consistent across ethnic groups; however, the sample size may have been insufficient to detect ethnic variations in pharmacokinetics.

#### *Age*

Increase in age resulted in increased apparent oral clearance (CL/F) (58% increase in adolescents compared to children). Some of these differences could be explained by body weight differences among these populations. This suggests that subjects with

higher body weight may have lower exposures of total methylphenidate at similar doses.

The pharmacokinetics of CONCERTA<sup>®</sup> has not been studied in children less than 6 years of age.

#### Renal Insufficiency

There is no experience with the use of CONCERTA<sup>®</sup> in patients with renal insufficiency. After oral administration of radiolabeled methylphenidate in humans, methylphenidate was extensively metabolized and approximately 80% of the radioactivity was excreted in the urine in the form of PPA. Since renal clearance is not an important route of methylphenidate clearance, renal insufficiency is expected to have little effect on the pharmacokinetics of CONCERTA<sup>®</sup>.

#### Hepatic Insufficiency

There is no experience with the use of CONCERTA<sup>®</sup> in patients with hepatic insufficiency.

### **CLINICAL STUDIES**

CONCERTA<sup>®</sup> was demonstrated to be effective in the treatment of Attention Deficit Hyperactivity Disorder (ADHD) in 4 randomized, double-blind, placebo-controlled studies in children and adolescents who met the Diagnostic and Statistical Manual 4<sup>th</sup> edition (DSM-IV) criteria for ADHD.

#### **Children**

Three double blind, active- and placebo-controlled studies were conducted in 416 children aged 6 to 12. The controlled studies compared CONCERTA<sup>®</sup> given qd (18, 36, or 54 mg), methylphenidate given tid over 12 hours (15, 30, or 45 mg total daily dose), and placebo in two single-center, 3-week crossover studies (Studies 1 and 2) and in a multicenter, 4-week, parallel-group comparison (Study 3). The primary comparison of interest in all three trials was CONCERTA<sup>®</sup> versus placebo.

Symptoms of ADHD were evaluated by community schoolteachers using the Inattention / Overactivity with Aggression (IOWA) Conners scale. Statistically significant reduction in the Inattention / Overactivity subscale versus placebo was shown consistently across all three controlled studies for CONCERTA<sup>®</sup>. The scores for CONCERTA<sup>®</sup> and placebo for the three studies are presented in Figure 2.

FIGURE 2  
 Mean (SEM) Community School Teacher IOWA Conners  
 Inattention/Overactivity Scores

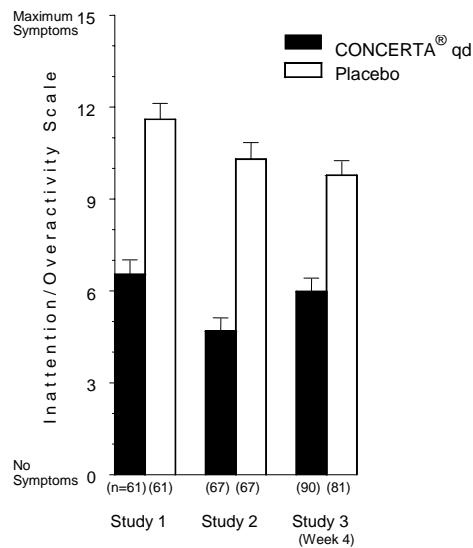
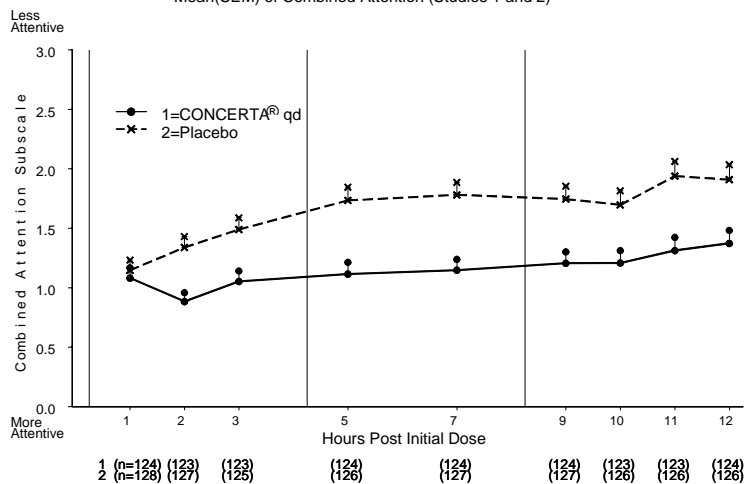


Figure 2. Mean Community School Teacher IOWA Conners Inattention/Overactivity Scores with CONCERTA® once-daily (18, 36, or 54 mg) and placebo. Studies 1 and 2 involved a 3-way crossover of 1 week per treatment arm. Study 3 involved 4 weeks of parallel group treatments with a Last Observation Carried Forward analysis at week 4. Error bars represent the mean plus standard error of the mean.

In Studies 1 and 2, symptoms of ADHD were evaluated by laboratory schoolteachers using the SKAMP\* laboratory school rating scale. The combined results from these two studies demonstrated significant improvements in attention and behavior in patients treated with CONCERTA® versus placebo that were maintained through 12 hours after dosing. Figure 3 presents the laboratory schoolteacher SKAMP ratings for CONCERTA® and placebo.

\*Swanson, Kotkin, Agler, M-Fynn and Pelham

**FIGURE 3**Laboratory School Teacher SKAMP Ratings  
Mean(SEM) of Combined Attention (Studies 1 and 2)

Note: Mean and mean plus standard error of mean shown

## Adolescents

In a randomized, double blind, multi-center, placebo-controlled trial (Study 4) involving 177 patients, CONCERTA<sup>®</sup> was demonstrated to be effective in the treatment of ADHD in adolescents aged 13 to 18 at doses up to 72 mg/day (1.4 mg/kg/day). Of 220 patients who entered an open 4-week titration phase, 177 were titrated to an individualized dose (maximum of 72 mg/day) based on meeting specific improvement criteria on the ADHD Rating Scale and the Global Assessment of Effectiveness with acceptable tolerability. Patients who met these criteria were then randomized to receive either their individualized dose of CONCERTA<sup>®</sup> (18 – 72 mg/day, n=87) or placebo (n=90) during a two-week double-blind phase. At the end of this phase, mean scores for the investigator rating on the ADHD Rating Scale demonstrated that CONCERTA<sup>®</sup> was significantly superior to placebo.

## INDICATION AND USAGE

### Attention Deficit Hyperactivity Disorder (ADHD)

CONCERTA<sup>®</sup> is indicated for the treatment of Attention Deficit Hyperactivity Disorder (ADHD).

The efficacy of CONCERTA<sup>®</sup> in the treatment of ADHD was established in three controlled trials of children aged 6-12 and in one controlled trial in adolescents aged 13-17. All patients met DSM-IV criteria for ADHD (see **CLINICAL PHARMACOLOGY**).

A diagnosis of Attention Deficit Hyperactivity Disorder (ADHD; DSM-IV) implies the presence of hyperactive-impulsive or inattentive symptoms that caused

impairment and were present before age 7 years. The symptoms must cause clinically significant impairment, eg, in social, academic, or occupational functioning, and be present in two or more settings, eg, school (or work) and at home. The symptoms must not be better accounted for by another mental disorder. For the Inattentive Type, at least six of the following symptoms must have persisted for at least 6 months: lack of attention to details/careless mistakes; lack of sustained attention; poor listener; failure to follow through on tasks; poor organization; avoids tasks requiring sustained mental effort; loses things; easily distracted; forgetful. For the Hyperactive-Impulsive Type, at least six of the following symptoms must have persisted for at least 6 months: fidgeting/squirming; leaving seat; inappropriate running/climbing; difficulty with quiet activities; “on the go;” excessive talking; blurting answers; can’t wait turn; intrusive. The Combined Type requires both inattentive and hyperactive-impulsive criteria to be met.

### Special Diagnostic Considerations

Specific etiology of this syndrome is unknown, and there is no single diagnostic test. Adequate diagnosis requires the use of medical and special psychological, educational, and social resources. Learning may or may not be impaired. The diagnosis must be based upon a complete history and evaluation of the patient and not solely on the presence of the required number of DSM-IV characteristics.

### Need for Comprehensive Treatment Program

CONCERTA<sup>®</sup> is indicated as an integral part of a total treatment program for ADHD that may include other measures (psychological, educational, social) for patients with this syndrome. Drug treatment may not be indicated for all patients with this syndrome. Stimulants are not intended for use in patients who exhibit symptoms secondary to environmental factors and/or other primary psychiatric disorders, including psychosis. Appropriate educational placement is essential and psychosocial intervention is often helpful. When remedial measures alone are insufficient, the decision to prescribe stimulant medication will depend upon the physician's assessment of the chronicity and severity of the patient's symptoms.

### Long-Term Use

The effectiveness of CONCERTA<sup>®</sup> for long-term use, ie, for more than 4 weeks, has not been systematically evaluated in controlled trials. Therefore, the physician who elects to use CONCERTA<sup>®</sup> for extended periods should periodically re-evaluate the long-term usefulness of the drug for the individual patient (see **DOSAGE AND ADMINISTRATION**).



## **CONTRAINDICATIONS**

### **Agitation**

CONCERTA<sup>®</sup> is contraindicated in patients with marked anxiety, tension, and agitation, since the drug may aggravate these symptoms.

### **Hypersensitivity to Methylphenidate**

CONCERTA<sup>®</sup> is contraindicated in patients known to be hypersensitive to methylphenidate or other components of the product.

### **Glaucoma**

CONCERTA<sup>®</sup> is contraindicated in patients with glaucoma.

### **Tics**

CONCERTA<sup>®</sup> is contraindicated in patients with motor tics or with a family history or diagnosis of Tourette's syndrome (see **ADVERSE REACTIONS**).

### **Monoamine Oxidase Inhibitors**

CONCERTA<sup>®</sup> is contraindicated during treatment with monoamine oxidase (MAO) inhibitors, and also within a minimum of 14 days following discontinuation of a MAO-inhibitor (hypertensive crises may result) (see **PRECAUTIONS, Drug Interactions**).

## **WARNINGS**

### **Serious Cardiovascular Events**

Sudden Death and Pre-existing Structural Cardiac Abnormalities or Other Serious Heart Problems

#### *Children and Adolescents*

Sudden death has been reported in association with CNS stimulant treatment at usual doses in children and adolescents with structural cardiac abnormalities or other serious heart problems. Although some serious heart problems alone carry an increased risk of sudden death, stimulant products generally should not be used in children or adolescents with known serious structural cardiac abnormalities, cardiomyopathy, serious heart rhythm abnormalities, or other serious cardiac problems that may place them at increased vulnerability to the sympathomimetic effects of a stimulant drug.

#### *Adults*

Sudden deaths, stroke, and myocardial infarction have been reported in adults taking stimulant drugs at usual doses for ADHD. Although the role of stimulants in these adult cases is also unknown, adults have a greater likelihood than children of having serious structural cardiac abnormalities, cardiomyopathy, serious heart rhythm

abnormalities, coronary artery disease, or other serious cardiac problems. Adults with such abnormalities should also generally not be treated with stimulant drugs.

### **Hypertension and Other Cardiovascular Conditions**

Stimulant medications cause a modest increase in average blood pressure (about 2-4 mmHg) and average heart rate (about 3-6 bpm) [see Adverse Reactions-Hypertension], and individuals may have larger increases. While the mean changes alone would not be expected to have short-term consequences, all patients should be monitored for larger changes in heart rate and blood pressure. Caution is indicated in treating patients whose underlying medical conditions might be compromised by increases in blood pressure or heart rate, e.g., those with pre-existing hypertension, heart failure, recent myocardial infarction, or ventricular arrhythmia.

### **Assessing Cardiovascular Status in Patients Being Treated With Stimulant Medications**

Children, adolescents, or adults who are being considered for treatment with stimulant medications, should have a careful history (including assessment for a family history of sudden death or ventricular arrhythmia) and physical exam to assess for the presence of cardiac disease, and should receive further cardiac evaluation if findings suggest such disease (e.g., electrocardiogram and echocardiogram). Patients who develop symptoms such as exertional chest pain, unexplained syncope, or other symptoms suggestive of cardiac disease during stimulant treatment should undergo a prompt cardiac evaluation.

## **PSYCHIATRIC ADVERSE EVENTS**

### **Pre-Existing Psychosis**

Administration of stimulants may exacerbate symptoms of behavior and thought disorder in patients with a pre-existing psychotic disorder.

### **Bipolar Illness**

Particular care should be taken in using stimulants to treat ADHD in patients with comorbid bipolar disorder because of concern for possible induction of a mixed/manic episode in such patients. Prior to initiating treatment with a stimulant, patients with comorbid depressive symptoms should be adequately screened to determine if they are at risk for bipolar disorder; such screening should include a detailed psychiatric history, including a family history of suicide, bipolar disorder, and depression.

### **Emergence of New Psychotic or Manic Symptoms**

Treatment emergent psychotic or manic symptoms, e.g., hallucinations, delusional thinking, or mania in children and adolescents without a prior history of psychotic

illness or mania can be caused by stimulants at usual doses. If such symptoms occur, consideration should be given to a possible causal role of the stimulant, and discontinuation of treatment may be appropriate. In a pooled analysis of multiple short-term, placebo-controlled studies, such symptoms occurred in about 0.1% (4 patients with events out of 3482 exposed to methylphenidate or amphetamine for several weeks at usual doses) of stimulant-treated patients compared to 0 in placebo-treated patients.

### **Aggression**

Aggressive behavior or hostility is often observed in children and adolescents with ADHD, and has been reported in clinical trials and the postmarketing experience of some medications indicated for the treatment of ADHD. Although there is no systematic evidence that stimulants cause aggressive behavior or hostility, patients beginning treatment for ADHD should be monitored for the appearance of or worsening of aggressive behavior or hostility.

### **Long-Term Suppression of Growth**

Careful follow-up of weight and height in children ages 7 to 10 years who were randomized to either methylphenidate or non-medication treatment groups over 14 months, as well as in naturalistic subgroups of newly methylphenidate-treated and non-medication treated children over 36 months (to the ages of 10 to 13 years), suggests that consistently medicated children (i.e., treatment for 7 days per week throughout the year) have a temporary slowing in growth rate (on average, a total of about 2 cm less growth in height and 2.7 kg less growth in weight over 3 years), without evidence of growth rebound during this period of development. Published data are inadequate to determine whether chronic use of amphetamines may cause similar suppression of growth, however, it is anticipated that they likely have this effect as well. Therefore, growth should be monitored during treatment with stimulants, and patients who are not growing or gaining height or weight as expected may need to have their treatment interrupted.

### **Seizures**

There is some clinical evidence that stimulants may lower the convulsive threshold in patients with prior history of seizures, in patients with prior EEG abnormalities in absence of seizures, and, very rarely, in patients without a history of seizures and no prior EEG evidence of seizures. In the presence of seizures, the drug should be discontinued.

### **Visual Disturbance**

Difficulties with accommodation and blurring of vision have been reported with stimulant treatment.

### **Potential for Gastrointestinal Obstruction**

Because the CONCERTA<sup>®</sup> tablet is nondeformable and does not appreciably change in shape in the GI tract, CONCERTA<sup>®</sup> should not ordinarily be administered to patients with preexisting severe gastrointestinal narrowing (pathologic or iatrogenic, for example: esophageal motility disorders, small bowel inflammatory disease, “short gut” syndrome due to adhesions or decreased transit time, past history of peritonitis, cystic fibrosis, chronic intestinal pseudoobstruction, or Meckel’s diverticulum). There have been rare reports of obstructive symptoms in patients with known strictures in association with the ingestion of drugs in nondeformable controlled-release formulations. Due to the controlled-release design of the tablet, CONCERTA<sup>®</sup> should only be used in patients who are able to swallow the tablet whole (see **PRECAUTIONS: Information for Patients**).

### **Use in Children Under Six Years of Age**

CONCERTA<sup>®</sup> should not be used in children under six years, since safety and efficacy in this age group have not been established.

#### **DRUG DEPENDENCE**

CONCERTA<sup>®</sup> should be given cautiously to patients with a history of drug dependence or alcoholism. Chronic abusive use can lead to marked tolerance and psychological dependence with varying degrees of abnormal behavior. Frank psychotic episodes can occur, especially with parenteral abuse. Careful supervision is required during withdrawal from abusive use since severe depression may occur. Withdrawal following chronic therapeutic use may unmask symptoms of the underlying disorder that may require follow-up.

### **PRECAUTIONS**

#### **Hematologic Monitoring**

Periodic CBC, differential, and platelet counts are advised during prolonged therapy.

#### **Information for Patients**

Prescribers or other health professionals should inform patients, their families, and their caregivers about the benefits and risks associated with treatment with methylphenidate and should counsel them in its appropriate use. A patient Medication Guide is available for CONCERTA<sup>®</sup>. The prescriber or health professional should instruct patients, their families, and their caregivers to read the Medication Guide and should assist them in understanding its contents. Patients should be given the opportunity to discuss the contents of the Medication Guide and to obtain answers to

any questions they may have. The complete text of the Medication Guide is reprinted at the end of this document.

Patients should be informed that CONCERTA<sup>®</sup> should be swallowed whole with the aid of liquids. Tablets should not be chewed, divided, or crushed. The medication is contained within a nonabsorbable shell designed to release the drug at a controlled rate. The tablet shell, along with insoluble core components, is eliminated from the body; patients should not be concerned if they occasionally notice in their stool something that looks like a tablet.

### **Drug Interactions**

CONCERTA<sup>®</sup> should not be used in patients being treated (currently or within the proceeding 2 weeks) with MAO inhibitors (see **CONTRAINDICATIONS, Monoamine Oxidase Inhibitors**).

Because of possible increases in blood pressure, CONCERTA<sup>®</sup> should be used cautiously with vasopressor agents.

Human pharmacologic studies have shown that methylphenidate may inhibit the metabolism of coumarin anticoagulants, anticonvulsants (eg, phenobarbital, phenytoin, primidone), and some antidepressants (tricyclics and selective serotonin reuptake inhibitors). Downward dose adjustment of these drugs may be required when given concomitantly with methylphenidate. It may be necessary to adjust the dosage and monitor plasma drug concentrations (or, in the case of coumarin, coagulation times), when initiating or discontinuing concomitant methylphenidate.

Serious adverse events have been reported in concomitant use with clonidine, although no causality for the combination has been established. The safety of using methylphenidate in combination with clonidine or other centrally acting alpha-2 agonists has not been systematically evaluated.

### **Carcinogenesis, Mutagenesis, and Impairment of Fertility**

In a lifetime carcinogenicity study carried out in B6C3F1 mice, methylphenidate caused an increase in hepatocellular adenomas and, in males only, an increase in hepatoblastomas at a daily dose of approximately 60 mg/kg/day. This dose is approximately 30 times and 4 times the maximum recommended human dose of CONCERTA<sup>®</sup> on a mg/kg and mg/m<sup>2</sup> basis, respectively. Hepatoblastoma is a relatively rare rodent malignant tumor type. There was no increase in total malignant hepatic tumors. The mouse strain used is sensitive to the development of hepatic tumors, and the significance of these results to humans is unknown.

Methylphenidate did not cause any increases in tumors in a lifetime carcinogenicity study carried out in F344 rats; the highest dose used was approximately 45 mg/kg/day, which is approximately 22 times and 5 times the maximum recommended human dose of CONCERTA<sup>®</sup> on a mg/kg and mg/m<sup>2</sup> basis, respectively.

In a 24-week carcinogenicity study in the transgenic mouse strain p53+/-, which is sensitive to genotoxic carcinogens, there was no evidence of carcinogenicity. Male and female mice were fed diets containing the same concentration of methylphenidate as in the lifetime carcinogenicity study; the high-dose groups were exposed to 60 to 74 mg/kg/day of methylphenidate.

Methylphenidate was not mutagenic in the in vitro Ames reverse mutation assay or the in vitro mouse lymphoma cell forward mutation assay. Sister chromatid exchanges and chromosome aberrations were increased, indicative of a weak clastogenic response, in an in vitro assay in cultured Chinese Hamster Ovary cells. Methylphenidate was negative in vivo in males and females in the mouse bone marrow micronucleus assay.

Methylphenidate did not impair fertility in male or female mice that were fed diets containing the drug in an 18-week Continuous Breeding study. The study was conducted at doses up to 160 mg/kg/day, approximately 80-fold and 8-fold the highest recommended human dose of CONCERTA<sup>®</sup> on a mg/kg and mg/m<sup>2</sup> basis, respectively.

### **Pregnancy: Teratogenic Effects**

Pregnancy Category C: Methylphenidate has been shown to have teratogenic effects in rabbits when given in doses of 200 mg/kg/day, which is approximately 100 times and 40 times the maximum recommended human dose on a mg/kg and mg/m<sup>2</sup> basis, respectively.

A reproduction study in rats revealed no evidence of harm to the fetus at oral doses up to 30 mg/kg/day, approximately 15-fold and 3-fold the maximum recommended human dose of CONCERTA<sup>®</sup> on a mg/kg and mg/m<sup>2</sup> basis, respectively. The approximate plasma exposure to methylphenidate plus its main metabolite PPA in pregnant rats was 2 times that seen in trials in volunteers and patients with the maximum recommended dose of CONCERTA<sup>®</sup> based on the AUC.

The safety of methylphenidate for use during human pregnancy has not been established. There are no adequate and well-controlled studies in pregnant women.

CONCERTA<sup>®</sup> should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

### **Nursing Mothers**

It is not known whether methylphenidate is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised if CONCERTA<sup>®</sup> is administered to a nursing woman.

### **Pediatric Use**

The safety and efficacy of CONCERTA<sup>®</sup> in children under 6 years old have not been established. Long-term effects of methylphenidate in children have not been well established (see **WARNINGS**).

### **ADVERSE REACTIONS**

The development program for CONCERTA<sup>®</sup> included exposures in a total of 2121 participants in clinical trials (1797 patients, 324 healthy adult subjects). These participants received CONCERTA<sup>®</sup> 18, 36, 54 and/or 72 mg/day. Children, adolescents, and adults with ADHD were evaluated in four controlled clinical studies, three open-label clinical studies and two clinical pharmacology studies. Adverse reactions were assessed by collecting adverse events, results of physical examinations, vital signs, weights, laboratory analyses, and ECGs.

Adverse events during exposure were obtained primarily by general inquiry and recorded by clinical investigators using terminology of their own choosing. Consequently, it is not possible to provide a meaningful estimate of the proportion of individuals experiencing adverse events without first grouping similar types of events into a smaller number of standardized event categories. In the tables and listings that follow, COSTART terminology has been used to classify reported adverse events.

The stated frequencies of adverse events represent the proportion of individuals who experienced, at least once, a treatment-emergent adverse event of the type listed. An event was considered treatment emergent if it occurred for the first time or worsened while receiving therapy following baseline evaluation.

### **Adverse Findings in Clinical Trials With CONCERTA<sup>®</sup>**

#### **Adverse Events Associated with Discontinuation of Treatment**

In the 4-week placebo-controlled, parallel-group trial in children (Study 3) one CONCERTA<sup>®</sup>-treated patient (0.9%; 1/106) and one placebo-treated patient (1.0%; 1/99) discontinued due to an adverse event (sadness and increase in tics, respectively).

In the 2-week placebo-controlled phase of a trial in adolescents (Study 4), no CONCERTA<sup>®</sup>-treated patients (0%; 0/87) and 1 placebo-treated patient (1.1%; 1/90) discontinued due to an adverse event (increased mood irritability).

In the two open-label, long-term safety trials (Studies 5 and 6: one 24-month study in children aged 6 to 13 and one 9-month study in child, adolescent and adult patients treated with CONCERTA<sup>®</sup>) 6.7% (101/1514) of patients discontinued due to adverse events. These events with an incidence of >0.5% included: insomnia (1.5%), twitching (1.0%), nervousness (0.7%), emotional lability (0.7%), abdominal pain (0.7%), and anorexia (0.7%).

*Treatment-Emergent Adverse Events Among CONCERTA<sup>®</sup>-Treated Patients*

Table 2 enumerates, for a 4-week placebo-controlled, parallel-group trial (Study 3) in children with ADHD at CONCERTA<sup>®</sup> doses of 18, 36, or 54 mg/day, the incidence of treatment-emergent adverse events. The table includes only those events that occurred in 1% or more of patients treated with CONCERTA<sup>®</sup> where the incidence in patients treated with CONCERTA<sup>®</sup> was greater than the incidence in placebo-treated patients.

The prescriber should be aware that these figures cannot be used to predict the incidence of adverse events in the course of usual medical practice where patient characteristics and other factors differ from those which prevailed in the clinical trials. Similarly, the cited frequencies cannot be compared with figures obtained from other clinical investigations involving different treatments, uses, and investigators. The cited figures, however, do provide the prescribing physician with some basis for estimating the relative contribution of drug and non-drug factors to the adverse event incidence rate in the population studied.

**TABLE 2: Incidence of Treatment-Emergent Events<sup>1</sup> in a 4-Week Placebo-Controlled Clinical Trial of CONCERTA<sup>®</sup> In Children**

Body System	Preferred Term	CONCERTA <sup>®</sup> (n=106)	Placebo (n= 99)
General	Headache	14 %	10 %
	Abdominal pain (stomachache)	7 %	1 %
Digestive	Vomiting	4 %	3 %
	Anorexia (loss of appetite)	4 %	0 %
Nervous	Dizziness	2 %	0 %
	Insomnia	4 %	1 %
Respiratory	Upper Respiratory Tract Infection	8 %	5 %
	Cough Increased	4 %	2 %
	Pharyngitis	4 %	3 %
	Sinusitis	3 %	0 %

<sup>1</sup>: Events, regardless of causality, for which the incidence for patients treated with CONCERTA<sup>®</sup> was at least 1% and greater than the incidence among placebo-treated patients. Incidence has been rounded to the nearest whole number.



Table 3 lists the incidence of treatment-emergent adverse events for a 2-week placebo-controlled trial (Study 4) in adolescents with ADHD at CONCERTA<sup>®</sup> doses of 18, 36, 54 or 72 mg/day.

**TABLE 3: Incidence of Treatment-Emergent Events<sup>1</sup> in a 2-Week Placebo-Controlled Clinical Trial of CONCERTA<sup>®</sup> in Adolescents**

<b>Body System</b>	<b>Preferred Term</b>	<b>CONCERTA<sup>®</sup> (n=87)</b>	<b>Placebo (n=90)</b>
General	Accidental injury	6 %	3 %
	Fever	3 %	0 %
	Headache	9 %	8 %
Digestive	Anorexia	2 %	0 %
	Diarrhea	2 %	0 %
	Vomiting	3 %	0 %
Nervous	Insomnia	5 %	0 %
Respiratory	Pharyngitis	2 %	1 %
	Rhinitis	3 %	2 %
Urogenital	Dysmenorrhea	2 %	0 %

<sup>1</sup>: Events, regardless of causality, for which the incidence for patients treated with CONCERTA<sup>®</sup> was at least 2% and greater than the incidence among placebo-treated patients. Incidence has been rounded to the nearest whole number.

### Tics

In a long-term uncontrolled study (n=432 children), the cumulative incidence of new onset of tics was 9% after 27 months of treatment with CONCERTA<sup>®</sup>.

In a second uncontrolled study (n=682 children) the cumulative incidence of new onset tics was 1% (9/682 children). The treatment period was up to 9 months with mean treatment duration of 7.2 months.

### Hypertension

In the laboratory classroom clinical trials in children (Studies 1 and 2), both CONCERTA<sup>®</sup> qd and methylphenidate tid increased resting pulse by an average of 2-6 bpm and produced average increases of systolic and diastolic blood pressure of roughly 1-4 mm Hg during the day, relative to placebo.

In the placebo-controlled adolescent trial (Study 4), mean increases from baseline in resting pulse rate were observed with CONCERTA<sup>®</sup> and placebo at the end of the double-blind phase (5 and 3 beats/minute, respectively). Mean increases from baseline in blood pressure at the end of the double-blind phase for CONCERTA<sup>®</sup> and placebo-treated patients were 0.7 and 0.7 mm Hg (systolic) and 2.6 and 1.4 mm Hg (diastolic), respectively (see **WARNINGS**).

### Post-Marketing Experience With CONCERTA<sup>®</sup>:

Post-marketing experiences with CONCERTA<sup>®</sup> have revealed spontaneous reports of the following adverse events: difficulties in visual accommodation, blurred vision,

abnormal liver function test (e.g., transaminase elevation), palpitations, arrhythmia, leucopenia, and thrombocytopenia.

### **Adverse Events With Other Methylphenidate HCl Products**

Nervousness and insomnia are the most common adverse reactions reported with other methylphenidate products. Other reactions include hypersensitivity (including skin rash, urticaria, fever, arthralgia, exfoliative dermatitis, erythema multiforme with histopathological findings of necrotizing vasculitis, and thrombocytopenic purpura); anorexia; nausea; dizziness; headache; dyskinesia; drowsiness; blood pressure and pulse changes, both up and down; tachycardia; angina; abdominal pain; weight loss during prolonged therapy. There have been rare reports of Tourette's syndrome. Toxic psychosis has been reported. Although a definite causal relationship has not been established, the following have been reported in patients taking this drug: hepatic coma; isolated cases of cerebral arteritis and/or occlusion; anemia; transient depressed mood; a few instances of scalp hair loss. Very rare reports of neuroleptic malignant syndrome (NMS) have been received, and, in most of these, patients were concurrently receiving therapies associated with NMS. In a single report, a ten-year-old boy who had been taking methylphenidate for approximately 18 months experienced an NMS-like event within 45 minutes of ingesting his first dose of venlafaxine. It is uncertain whether this case represented a drug-drug interaction, a response to either drug alone, or some other cause.

In children, loss of appetite, abdominal pain, weight loss during prolonged therapy, insomnia, and tachycardia may occur more frequently; however, any of the other adverse reactions listed above may also occur.

## **DRUG ABUSE AND DEPENDENCE**

### **Controlled Substance Class**

CONCERTA<sup>®</sup>, like other methylphenidate products, is classified as a Schedule II controlled substance by federal regulation.

### **Abuse, Dependence, and Tolerance**

See **WARNINGS** for boxed warning containing drug abuse and dependence information.

## **OVERDOSAGE**

### **Signs and Symptoms**

Signs and symptoms of acute methylphenidate overdose, resulting principally from overstimulation of the CNS and from excessive sympathomimetic effects, may include the following: vomiting, agitation, tremors, hyperreflexia, muscle twitching, convulsions (may be followed by coma), euphoria, confusion, hallucinations,

delirium, sweating, flushing, headache, hyperpyrexia, tachycardia, palpitations, cardiac arrhythmias, hypertension, mydriasis, and dryness of mucous membranes.

### **Recommended Treatment**

Treatment consists of appropriate supportive measures. The patient must be protected against self-injury and against external stimuli that would aggravate overstimulation already present. Gastric contents may be evacuated by gastric lavage as indicated. Before performing gastric lavage, control agitation and seizures if present and protect the airway. Other measures to detoxify the gut include administration of activated charcoal and a cathartic. Intensive care must be provided to maintain adequate circulation and respiratory exchange; external cooling procedures may be required for hyperpyrexia.

Efficacy of peritoneal dialysis or extracorporeal hemodialysis for CONCERTA<sup>®</sup> overdose has not been established.

The prolonged release of methylphenidate from CONCERTA<sup>®</sup> should be considered when treating patients with overdose.

### **Poison Control Center**

As with the management of all overdose, the possibility of multiple drug ingestion should be considered. The physician may wish to consider contacting a poison control center for up-to-date information on the management of overdose with methylphenidate.

### **DOSAGE AND ADMINISTRATION**

CONCERTA<sup>®</sup> should be administered orally once daily in the morning with or without food.

CONCERTA<sup>®</sup> must be swallowed whole with the aid of liquids, and must not be chewed, divided, or crushed (see **PRECAUTIONS: Information for Patients**).

Based on an assessment of clinical benefit and tolerability, doses may be increased at weekly intervals for patients who have not achieved an optimal response at a lower dose.

### **Patients New to Methylphenidate**

The recommended starting dose of CONCERTA<sup>®</sup> for patients who are not currently taking methylphenidate, or for patients who are on stimulants other than methylphenidate, is 18 mg once daily.

<b>Patient Age</b>	<b>Recommended Starting Dose</b>	<b>Maximum Dosage</b>
Children 6-12 years of age	18 mg/day	54 mg/day
Adolescents 13-17 years of age	18 mg/day	72 mg/day not to exceed 2 mg/kg/day

### **Patients Currently Using Methylphenidate**

The recommended dose of CONCERTA<sup>®</sup> for patients who are currently taking methylphenidate bid or tid, at doses of 10 to 45 mg/day is provided in Table 4. Dosing recommendations are based on current dose regimen and clinical judgment. Initial conversion dosage should not exceed 54 mg daily. After conversion, dosages may be adjusted to a maximum of 72 mg/day taken once daily in the morning. In general, dosage adjustment may proceed at approximately weekly intervals.

**TABLE 4: Recommended Dose Conversion from Methylphenidate Regimens to CONCERTA<sup>®</sup>**

<b>Previous Methylphenidate Daily Dose</b>	<b>Recommended CONCERTA<sup>®</sup> Starting Dose</b>
5 mg Methylphenidate bid or tid	18 mg q am
10 mg Methylphenidate bid or tid	36 mg q am
15 mg Methylphenidate bid or tid	54 mg q am

Other methylphenidate regimens: Clinical judgment should be used when selecting the starting dose.

A 27 mg dosage strength is available for physicians who wish to prescribe between the 18 mg and 36 mg dosages.

### **Maintenance/Extended Treatment**

There is no body of evidence available from controlled trials to indicate how long the patient with ADHD should be treated with CONCERTA<sup>®</sup>. It is generally agreed, however, that pharmacological treatment of ADHD may be needed for extended periods.

Nevertheless, the physician who elects to use CONCERTA<sup>®</sup> for extended periods in patients with ADHD should periodically re-evaluate the long-term usefulness of the drug for the individual patient with trials off medication to assess the patient's functioning without pharmacotherapy. Improvement may be sustained when the drug is either temporarily or permanently discontinued.

### **Dose Reduction and Discontinuation**

If paradoxical aggravation of symptoms or other adverse events occur, the dosage should be reduced, or, if necessary, the drug should be discontinued.

If improvement is not observed after appropriate dosage adjustment over a one-month period, the drug should be discontinued.

### **HOW SUPPLIED**

CONCERTA<sup>®</sup> (methylphenidate HCl) Extended-release Tablets are available in 18 mg, 27 mg, 36 mg, and 54 mg dosage strengths. The 18 mg tablets are yellow and imprinted with “alza 18”. The 27 mg tablets are gray and imprinted with “alza 27”. The 36 mg tablets are white and imprinted with “alza 36”. The 54 mg tablets are brownish-red and imprinted with “alza 54”. All four dosage strengths are supplied in bottles containing 100 tablets.

18 mg 100 count bottle	NDC 17314-5850-2
27 mg 100 count bottle	NDC 17314-5853-2
36 mg 100 count bottle	NDC 17314-5851-2
54 mg 100 count bottle	NDC 17314-5852-2

### **Storage**

Store at 25°C (77°F); excursions permitted to 15-30°C (59-86°F) [see USP Controlled Room Temperature]. Protect from humidity.

### **REFERENCE**

American Psychiatric Association. Diagnosis and Statistical Manual of Mental Disorders. 4th ed. Washington DC: American Psychiatric Association 1994.

### **Rx Only**

For more information call 1-888-440-7903 or visit [www.concerta.net](http://www.concerta.net)

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## MEDICATION GUIDE

### CONCERTA<sup>®</sup> (kon SER-ta)

#### (methylphenidate HCl) Extended-release Tablets CII

Read the Medication Guide that comes with CONCERTA<sup>®</sup> before you or your child starts taking it and each time you get a refill. There may be new information. This Medication Guide does not take the place of talking to your doctor about you or your child's treatment with CONCERTA<sup>®</sup>.

#### What is the most important information I should know about CONCERTA<sup>®</sup>?

The following have been reported with use of methylphenidate HCl and other stimulant medicines:

##### 1. Heart-related problems:

- sudden death in patients who have heart problems or heart defects
- stroke and heart attack in adults
- increased blood pressure and heart rate

Tell your doctor if you or your child have any heart problems, heart defects, high blood pressure, or a family history of these problems.

Your doctor should check you or your child carefully for heart problems before starting CONCERTA<sup>®</sup>.

Your doctor should check you or your child's blood pressure and heart rate regularly during treatment with CONCERTA<sup>®</sup>.

**Call your doctor right away if you or your child has any signs of heart problems such as chest pain, shortness of breath, or fainting while taking CONCERTA<sup>®</sup>.**

##### 2. Mental (Psychiatric) problems:

###### All Patients

- new or worse behavior and thought problems
- new or worse bipolar illness
- new or worse aggressive behavior or hostility

###### Children and Teenagers

- new psychotic symptoms (such as hearing voices, believing things that are not true, are suspicious) or new manic symptoms

Tell your doctor about any mental problems you or your child have, or about a family history of suicide, bipolar illness, or depression.

**Call your doctor right away if you or your child have any new or worsening mental symptoms or problems while taking CONCERTA<sup>®</sup>, especially seeing or hearing things that are not real, believing things that are not real, or are suspicious.**

#### What Is CONCERTA<sup>®</sup>?

CONCERTA<sup>®</sup> is a central nervous system stimulant prescription medicine. **It is used for the treatment of attention deficit and hyperactivity disorder (ADHD).** CONCERTA<sup>®</sup> may help increase attention and decrease impulsiveness and hyperactivity in patients with ADHD.

CONCERTA<sup>®</sup> should be used as a part of a total treatment program for ADHD that may include counseling or other therapies.

**CONCERTA<sup>®</sup> is a federally controlled substance (CII) because it can be abused or lead to dependence. Keep CONCERTA<sup>®</sup> in a safe place to prevent misuse and abuse. Selling or giving away CONCERTA<sup>®</sup> may harm others, and is against the law.**

Tell your doctor if you or your child have (or have a family history of) ever abused or been dependent on alcohol, prescription medicines or street drugs.

#### Who should not take CONCERTA<sup>®</sup>?

CONCERTA<sup>®</sup> should not be taken if you or your child:

- are very anxious, tense, or agitated
- have an eye problem called glaucoma
- have tics or Tourette's syndrome, or a family history of Tourette's syndrome. Tics are hard to **control** repeated movements or sounds.
- are taking or have taken within the past 14 days an anti-depression medicine called a monoamine oxidase inhibitor or MAOI.
- are allergic to anything in CONCERTA<sup>®</sup>. See the end of this Medication Guide for a complete list of ingredients.

CONCERTA<sup>®</sup> should not be used in children less than 6 years old because it has not been studied in this age group.

**CONCERTA<sup>®</sup> may not be right for you or your child. Before starting CONCERTA<sup>®</sup> tell your or your child's doctor about all health conditions (or a family history of) including:**

- heart problems, heart defects, or high blood pressure
- mental problems including psychosis, mania, bipolar illness, or depression
- tics or Tourette's syndrome
- seizures or have had an abnormal brain wave test (EEG)
- esophagus, stomach, or small or large intestine problems

Tell your doctor if you or your child is pregnant, planning to become pregnant, or breastfeeding.

### **Can CONCERTA® be taken with other medicines?**

Tell your doctor about all of the medicines that you or your child take including prescription and nonprescription medicines, vitamins, and herbal supplements. CONCERTA® and some medicines may interact with each other and cause serious side effects. Sometimes the doses of other medicines will need to be adjusted while taking CONCERTA®.

Your doctor will decide whether CONCERTA® can be taken with other medicines.

### **Especially tell your doctor if you or your child takes:**

- anti-depression medicines including MAOIs
- seizure medicines
- blood thinner medicines
- blood pressure medicines
- cold or allergy medicines that contain decongestants

Know the medicines that you or your child takes. Keep a list of your medicines with you to show your doctor and pharmacist.

Do not start any new medicine while taking CONCERTA® without talking to your doctor first.

### **How should CONCERTA® be taken?**

- **Take CONCERTA® exactly as prescribed.** Your doctor may adjust the dose until it is right for you or your child.
- Do not chew, crush, or divide the tablets. Swallow CONCERTA® tablets whole with water or other liquids. Tell your doctor if you or your child cannot swallow CONCERTA® whole. A different medicine may need to be prescribed.
- CONCERTA® can be taken with or without food.
- Take CONCERTA® once each day in the morning. CONCERTA® is an extended release tablet. It releases medication into your/your child's body throughout the day.
- The CONCERTA® tablet does not dissolve completely in the body after all the medicine has been released. You or your child may sometimes notice the empty tablet in a bowel movement. This is normal.
- From time to time, your doctor may stop CONCERTA® treatment for a while to check ADHD symptoms.
- Your doctor may do regular checks of the blood, heart, and blood pressure while taking CONCERTA®. Children should have their height and weight checked often while taking CONCERTA®. CONCERTA® treatment may be stopped if a problem is found during these check-ups.
- **If you or your child takes too much CONCERTA® or overdoses, call your doctor or poison control center right away, or get emergency treatment.**

### **What are possible side effects of CONCERTA®?**

See “**What is the most important information I should know about CONCERTA®?**” for information on reported heart and mental problems.

### **Other serious side effects include:**

- slowing of growth (height and weight) in children
- seizures, mainly in patients with a history of seizures
- eyesight changes or blurred vision
- blockage of the esophagus, stomach, small or large intestine in patients who already have a narrowing in any of these organs

### **Common side effects include:**

- headache
- decreased appetite
- stomach ache
- nervousness
- trouble sleeping
- dizziness

Talk to your doctor if you or your child has side effects that are bothersome or do not go away.

This is not a complete list of possible side effects. Ask your doctor or pharmacist for more information.

### **How should I store CONCERTA®?**

- Store CONCERTA® in a safe place at room temperature, 59 to 86° F (15 to 30° C). Protect from moisture.
- **Keep CONCERTA® and all medicines out of the reach of children.**

### **General information about CONCERTA®**

Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. Do not use CONCERTA® for a condition for which it was not prescribed. Do not give CONCERTA® to other people, even if they have the same condition. It may harm them and it is against the law.

This Medication Guide summarizes the most important information about CONCERTA®. If you would like more information, talk with your doctor. You can ask your doctor or pharmacist for information about CONCERTA® that was written for healthcare professionals. For more information about CONCERTA® call 1-888-440-7903 or visit [www.concerta.net](http://www.concerta.net).

### **What are the ingredients in CONCERTA®?**

**Active Ingredient:** methylphenidate HCl

**Inactive Ingredients:** butylated hydroxytoluene, carnuba wax, cellulose acetate, hypromellose, lactose, phosphoric acid, poloxamer, polyethylene glycol, polyethylene oxides, povidone, propylene glycol, sodium chloride, stearic acid, succinic acid, synthetic iron oxides, titanium dioxide, and triacetin.

This Medication Guide has been approved by the U.S. Food and Drug Administration.

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