

## Arrow - Quetiapine

Quetiapine fumarate 25 mg, 100 mg, 150 mg, 200 mg, 300 mg

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### Presentation

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ARROW - QUETIAPINE 25 mg is a peach coloured, round, biconvex, film-coated tablet with "QT" on one side and ">" on reverse side. Each tablet contains 25mg of quetiapine as quetiapine fumarate.

ARROW - QUETIAPINE 100 mg is a yellow round, biconvex, film-coated tablet with "QT<sub>100</sub>" on one side and ">" on reverse side. Each tablet contains 100mg of quetiapine as quetiapine fumarate.

ARROW - QUETIAPINE 150 mg is a yellow round, biconvex, film-coated tablet with "QT<sub>150</sub>" on one side and ">" on reverse side. Each tablet contains 150mg of quetiapine as quetiapine fumarate.

ARROW - QUETIAPINE 200 mg is a white to off-white round, biconvex, film-coated tablet with "QT<sub>200</sub>" on one side and ">" on reverse side. Each tablet contains 200mg of quetiapine as quetiapine fumarate.

ARROW - QUETIAPINE 300 mg is a white to off-white capsule shaped, film-coated tablet with "QT<sub>300</sub>" on one side and ">" on reverse side. Each tablet contains 300mg of quetiapine as quetiapine fumarate.

Do not halve ARROW – QUETIAPINE tablets.

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### Uses

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#### *Actions*

#### **Mechanism of action**

Quetiapine is an atypical antipsychotic agent. Quetiapine and the active human plasma metabolite, norquetiapine interact with a broad range of neurotransmitter receptors. Quetiapine and norquetiapine exhibit affinity for brain serotonin (5HT<sub>2</sub>) and dopamine D<sub>1</sub> and D<sub>2</sub> receptors. It is this combination of receptor antagonism with a higher selectivity for 5HT<sub>2</sub> relative to Dopamine<sub>2</sub> receptors which is believed to contribute to the clinical antipsychotic properties and low extrapyramidal side effects (EPS) liability of quetiapine. Additionally, norquetiapine has high affinity for the norepinephrine transporter (NET). Quetiapine and norquetiapine also have high affinity at histaminergic and adrenergic alpha<sub>1</sub> receptors, with a lower affinity at

adrenergic  $\alpha_2$  and serotonin 5HT<sub>1A</sub> receptors. Quetiapine has no appreciable affinity at cholinergic muscarinic or benzodiazepine receptors.

### **Pharmacodynamic effects**

Quetiapine is active in tests for antipsychotic activity, such as conditioned avoidance. It also reverses the action of dopamine agonists, measured either behaviourally or electrophysiologically and elevates dopamine metabolite concentrations, a neurochemical index of dopamine D<sub>2</sub> receptor blockade.

In pre-clinical tests predictive of EPS, quetiapine is unlike standard antipsychotics and has an atypical profile. Quetiapine does not produce dopamine D<sub>2</sub> receptor supersensitivity after chronic administration. Quetiapine produces only weak catalepsy at effective dopamine D<sub>2</sub> receptor blocking doses. Quetiapine demonstrates selectivity for the limbic system by producing depolarisation blockade of the A10 mesolimbic but not the A9 nigrostriatal dopamine-containing neurones following chronic administration. Quetiapine exhibits minimal dystonic liability in haloperidol-sensitised or drug-naïve Cebus monkeys after acute and chronic administration.

### **Clinical efficacy**

Clinical trials have demonstrated that quetiapine is effective when given twice a day, although quetiapine has a pharmacokinetic half-life of approximately 7 hours. This is further supported by the data from a positron emission tomography (PET) study which identified that for quetiapine, 5HT<sub>2</sub> and Dopamine<sub>2</sub> receptor occupancy are maintained for up to 12 hours. The safety and efficacy of doses greater than 800 mg/day have not been evaluated.

#### Schizophrenia:

In clinical trials, quetiapine has been shown to be effective in the treatment of both positive and negative symptoms of schizophrenia. In comparative clinical trials, quetiapine has been shown to be as effective as standard antipsychotic agents such as chlorpromazine and haloperidol.

#### **Adolescents (13 to 17 years of age):**

The efficacy of quetiapine in the treatment of schizophrenia in adolescents (13-17 years of age) was demonstrated in a 6-week, double-blind, placebo-controlled trial. Patients who met DSM-IV diagnostic criteria for schizophrenia were randomised into one of three treatment groups: quetiapine 400mg/day (n = 73), quetiapine 800mg/day (n = 74), or placebo (n = 75). Study medication was initiated at 50mg/day and on day 2 increased to 100 mg/day. Subsequently, the dose was titrated to the target dose of 400 or 800 mg using increments of 100mg/day, given two or three times daily. The primary efficacy variable was the mean change from baseline in total Positive and Negative Syndrome Scale.

Results of the study demonstrated efficacy of quetiapine 400mg/day and 800mg/day compared to placebo. Greater efficacy of the 800mg dose compared with the 400 mg dose has not been established.

#### Bipolar mania:

In clinical trials, quetiapine has been shown to be effective as monotherapy or as adjunct therapy in reducing manic symptoms in patients with bipolar mania. Efficacy has been demonstrated up to 12 weeks in the monotherapy setting. In the adjunct

setting, there are no efficacy data beyond 6 weeks. The mean last week median dose of quetiapine in responders, was approximately 600 mg and approximately 85% of the responders were in the dose range of 400 to 800 mg/day.

#### **Children and adolescents (10 to 17 years of age):**

The efficacy of quetiapine in the treatment of acute manic episodes associated with Bipolar I Disorder in children and adolescents (10 to 17 years of age) was demonstrated in a 3-week, double-blind, placebo-controlled, multicentre trial. Patients who met DSM-IV diagnostic criteria for a manic episode were randomised into one of three treatment groups: quetiapine 400mg/day (n = 95), quetiapine 600mg/day (n = 98), or placebo (n = 91). Study medication was initiated at 50mg/day and on day 2 increased to 100mg/day. Subsequently, the dose was titrated to a target dose of 400 or 600 mg using increments of 100mg/day, given two or three times daily. The primary efficacy variable was the mean change from baseline in total YMRS score.

Results of the study demonstrated superior efficacy of quetiapine 400mg/day and 600mg/day compared with placebo. Greater efficacy of the 600mg dose compared with the 400mg dose has not been established.

#### **Bipolar depression:**

In four clinical trials, which included patients who are bipolar I, bipolar II and patients with and without rapid cycling courses, quetiapine has been shown to be effective in patients with bipolar depression at doses of 300 and 600 mg/day, however, no additional benefit was seen with the 600 mg dose during short-term treatment.

In all four studies, quetiapine was superior to placebo in reduction of Montgomery-Asberg Depression Scale (MADRS) total score. The antidepressant effect of quetiapine was significant at Day 8 (Week 1) and was maintained through the end of the studies (Week 8). Treatment with either quetiapine 300 or 600 mg at bedtime reduced depressive symptoms and anxiety symptoms in patients with bipolar depression. There were fewer episodes of treatment emergent mania with either dose of quetiapine than with placebo.

In 3 out of 4 studies, for the 300 mg and 600 mg dose group, statistically significant improvements over placebo were seen in reductions in suicidal thinking as measured by MADRS item 10 and in 2 out of 3 studies, for the 300 mg dose group, overall quality of life and satisfaction related to various areas of functioning, as measured using the Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q).

In two bipolar depression clinical trials, maintenance of antidepressant efficacy was established. These trials included an 8-week placebo-controlled acute phase, followed by a placebo-controlled continuation phase of at least 26 weeks but up to 52-weeks in duration. Patients were required to be stable at the end of the acute phase in order to be randomized into continuation phase. In both trials, quetiapine was superior to placebo in increasing the time to recurrence of any mood event (depressed, mixed or manic). The risk reduction from the pooled trials was 49%. The risk of a mood event for quetiapine versus placebo was reduced by 41% for the 300 mg dose and by 55% for the 600 mg dose.

#### **Bipolar Maintenance:**

The efficacy of quetiapine in the maintenance treatment of bipolar disorder was established in 2 placebo-controlled trials in 1326 patients who met DSM-IV criteria

for bipolar I disorder. The trials included patients whose most recent mood episode was manic, depressed, or mixed, with or without psychotic features. In the open-label phase, patients were required to be stabilised on quetiapine in combination with mood stabiliser (lithium or valproate) for a minimum of 12 weeks in order to be randomised. In the randomisation phase, patients either continued treatment with quetiapine (administered twice daily totalling 400 to 800 mg per day) in combination with mood stabiliser (lithium or valproate) or received placebo in combination with mood stabiliser (lithium or valproate) for up to 104 weeks.

In each study, quetiapine was superior to placebo in increasing the time to recurrence of any mood event (manic, mixed or depressed), the primary endpoint. The risk reductions were 70%, 67% and 74% for mood, manic and depressive events.

Maintenance treatment with quetiapine was superior to placebo in increasing the time to recurrence of a depressive event. Patients on quetiapine also had a lower risk of experiencing a depressive event prior to week 28 and week 52 compared to patients on placebo.

Similarly, maintenance treatment with quetiapine was superior to placebo in increasing the time to recurrence of a manic event. Patients on quetiapine also had a lower risk of experiencing a manic event prior to week 28 and week 52 compared to patients on placebo.

Efficacy was demonstrated to be independent of the nature of the most recent episode (manic, mixed or depressed), the mood stabiliser (lithium or valproate), rapid cycling course, gender, age or ethnicity.

#### Suicide/suicidal thoughts or clinical worsening:

In short-term placebo-controlled clinical trials across all indications and ages, the incidence of suicide-related events was 0.8% for both quetiapine (76/9327) and for placebo (37/4845).

In these trials of patients with schizophrenia the incidence of suicide related events was 1.4% (3/212) for quetiapine and 1.6% (1/62) for placebo in patients 18-24 years of age, 0.8% (13/1663) for quetiapine and 1.1% (5/463) for placebo in patients  $\geq$  25 years of age, and 1.4% (2/147) for quetiapine and 1.3% (1/75) for placebo in patients <18 years of age.

In these trials of patients with bipolar mania the incidence of suicide related events was 0% for both quetiapine (0/60) and placebo (0/58) in patients 18-24 years of age, 1.2% for both quetiapine (6/496) and placebo (5/463) in patients  $\geq$  25 years of age, and 1.0% (2/193) for quetiapine and 0% (0/90) for placebo in patients <18 years of age (see WARNINGS AND PRECAUTIONS).

In these trials of patients with bipolar depression the incidence of suicide related events was 3.0% (7/233) for quetiapine and 0% (0/120) for placebo in patients 18-24 and 1.8% for both quetiapine (19/1616) and placebo (11/622) in patients  $\geq$  25 years of age. There has been one trial conducted in patients 10-17 years of age in which efficacy was not established. The incidence of suicide related events was 1.0% (1/92) for quetiapine and 1% (0/100) for placebo. In this study there were two additional events in two patients that occurred during an extended post-treatment follow-up phase of the study; one of these patients was on quetiapine at the time for the event (see WARNINGS AND PRECAUTIONS).

### Cataracts/lens opacities:

In a clinical trial to evaluate the cataractogenic potential of quetiapine versus risperidone in the long-term treatment of patients with schizophrenia or schizoaffective disorder, quetiapine at doses of 200-800 mg/day was non-inferior for the 2-year event rate of increase in LOCS II (Lens Opacities Classification System II) lens opacity grade (Nuclear opalescence, Cortical, and Posterior subcapsular standards for LOCS II) to risperidone at doses of 2 to 8 mg/day for patients with at least 21 months of exposure (see FURTHER INFORMATION).

### **Pharmacokinetics**

Quetiapine is well absorbed and extensively metabolised following oral administration. The bioavailability of quetiapine is not significantly affected by administration with food. Quetiapine is approximately 83% bound to plasma proteins. Steady-state peak molar concentrations of the active metabolite norquetiapine are 35% of that observed for quetiapine. The elimination half-lives of quetiapine and norquetiapine are approximately 7 and 12 hours, respectively.

The pharmacokinetics of quetiapine and norquetiapine are linear across the approved dosing range. The kinetics of quetiapine does not differ between men and women.

The mean clearance of quetiapine in the elderly is approximately 30 to 50% lower than that seen in adults aged 18 to 65 years.

The mean plasma clearance of quetiapine was reduced by approximately 25% in subjects with severe renal impairment (creatinine clearance less than 30 mL/min/1.73m<sup>2</sup>) and in subjects with hepatic impairment (stable alcoholic cirrhosis), but the individual clearance values are within the range for normal subjects. The average molar dose fraction of free quetiapine and the active human plasma metabolite norquetiapine is <5% excreted in the urine.

Quetiapine is extensively metabolised by the liver with parent compound accounting for less than 5% of unchanged drug-related material in the urine or faeces, following the administration of radiolabelled quetiapine. Approximately 73% of the radioactivity is excreted in the urine and 21% in the faeces. The mean plasma clearance of quetiapine is reduced by approximately 25% in subjects with hepatic impairment (stable alcoholic cirrhosis). Since quetiapine is extensively metabolised by the liver, higher plasma levels are expected in the hepatically impaired population, and dosage adjustment may be needed in these patients (see DOSAGE AND ADMINISTRATION).

*In vitro* investigations established that CYP3A4 is the primary enzyme responsible for cytochrome P450 mediated metabolism of quetiapine. norquetiapine is primarily formed and eliminated via CYP3A4.

Quetiapine and several of its metabolites (including norquetiapine) were found to be weak inhibitors of human cytochrome P450 1A2, 2C9, 2C19, 2D6 and 3A4 activities *in vitro*. *In vitro* CYP inhibition is observed only at concentrations approximately 5 to 50 fold higher than those observed at a dose range of 300 to 800 mg/day in humans. Based on these *in vitro* results, it is unlikely that coadministration of quetiapine with other drugs will result in clinically significant drug inhibition of cytochrome P450 mediated metabolism of the other medicine.

## Children and adolescents (10 to 17 years of age)

At steady-state the pharmacokinetics of the parent compound in children and adolescents (10 - 17 years of age) were similar to adults, while AUC and  $C_{max}$  of the active metabolite, norquetiapine, were higher in children and adolescents than in adults, 45% and 31%, respectively. However, when adjusted for weight AUC and  $C_{max}$  of the parent compound in children and adolescents were lower than in adults, 41% and 39%, respectively, while the pharmacokinetics of the metabolite, norquetiapine, was similar.

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## Indications

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Quetiapine is indicated for the treatment of:

- Acute and chronic psychoses, including schizophrenia
- Bipolar Disorder including:
  - treatment of manic episodes satisfying DSM-IV criteria for mania associated with bipolar disorder
  - treatment of depressive episodes associated with bipolar disorder
  - maintenance treatment of bipolar I disorder, in combination with a mood stabiliser, for the prevention of recurrence of manic, depressive or mixed episodes

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## Dosage and Administration

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### **Adults**

#### **For the treatment of acute and chronic psychoses, including schizophrenia:**

ARROW - QUETIAPINE should be administered twice daily, with or without food.

The total daily dose for the first four days of therapy is 50 mg (Day 1), 100 mg (Day 2), 200 mg (Day 3) and 300 mg (Day 4).

From Day 4 onwards, the dose should be titrated to the usual effective dose range of 300-450 mg/day. However, this may be adjusted, depending on the clinical response and tolerability of the individual patient, within the range 150 to 750 mg/day.

#### **For the treatment of manic episodes associated with bipolar disorder:**

ARROW - QUETIAPINE should be administered twice daily, with or without food.

The total daily dose for the first four days of therapy is 100 mg (Day 1), 200 mg (Day 2), 300 mg (Day 3) and 400 mg (Day 4). Further dosage adjustments up to 800 mg/day by Day 6 should be in increments of no greater than 200 mg/day.

The dose may be adjusted depending on clinical response and tolerability of the individual patient, within the range of 200 to 800 mg/day. The usual effective dose is in the range of 400 to 800 mg/day.

**For the treatment of depressive episodes associated with bipolar disorder:**

ARROW - QUETIAPINE should be administered once daily at bedtime, with or without food.

The usual dose is 300 mg/day. The daily dose for the first four days of therapy is 50 mg (Day 1), 100 mg (Day 2), 200 mg (Day 3) and 300 mg (Day 4). Quetiapine can be titrated to 400 mg on Day 5 and up to 600 mg by Day 8.

Antidepressant efficacy was demonstrated with quetiapine at 300 mg and 600 mg however no additional benefit was seen in the 600 mg group during short term treatment. (See CLINICAL EFFICACY - BIPOLAR DEPRESSION and ADVERSE EFFECTS).

**For the maintenance treatment of bipolar I disorder in combination with mood stabilisers**

Patients who have responded to quetiapine in combination therapy with a mood stabiliser for acute treatment of bipolar disorder should continue on quetiapine therapy at the same dose.

The quetiapine dose can be re-adjusted depending on clinical response and tolerability of the individual patient.

Efficacy was demonstrated with quetiapine (administered twice daily totalling 400 mg to 800 mg a day) as combination therapy with a mood stabiliser.

***Elderly***

As with other antipsychotics, quetiapine should be used with caution in the elderly, especially during the initial dosing period. The rate of dose titration may need to be slower, and the daily therapeutic dose lower, than that used in younger patients, depending on the clinical response and tolerability of the individual patient. The mean plasma clearance of quetiapine was reduced by 30% to 50% in elderly subjects when compared with younger patients.

***Children and Adolescents***

ARROW - QUETIAPINE is not indicated for use in children and adolescents below 18 years of age. Data from placebo-controlled clinical trials are detailed within the data sheet (see WARNINGS and PRECAUTIONS, ADVERSE EFFECTS, USES).

***Renal Impairment***

Dosage adjustment is not necessary.

***Hepatic Impairment***

Quetiapine is extensively metabolised by the liver. Therefore, quetiapine should be used with caution in patients with known hepatic impairment, especially during the initial dosing period. Patients with hepatic impairment should be started on 25 mg/day. The dose should be increased daily in increments of 25-50 mg/day to an effective dose, depending on the clinical response and tolerability of the individual patient.

Do not halve ARROW – QUETIAPINE tablets.

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**Contraindications**

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ARROW - QUETIAPINE is contraindicated in patients who are hypersensitive to any component of this product.

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## **Warnings and Precautions**

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### **Suicide/suicidal thoughts or clinical worsening**

Depression is associated with an increased risk of suicidal thoughts, self-harm and suicide (suicide-related events). This risk persists until significant remission occurs. As improvement may not occur during the first few weeks or more of treatment, patients should be closely monitored until such improvement occurs. It is general clinical experience that the risk of suicide may increase in the early stages of recovery.

Other psychiatric conditions for which quetiapine are prescribed can also be associated with an increased risk of suicide-related events. In addition, these conditions may be co-morbid with major depressive disorder. The same precautions observed when treating patients with major depressive disorder should therefore be observed when treating patients with other psychiatric disorders.

Patients with a history of suicide-related events, or those exhibiting a significant degree of suicidal ideation prior to commencement of treatment are known to be at greater risk of suicidal thoughts or suicide attempts, and should receive careful monitoring during treatment. An FDA meta-analysis of placebo-controlled clinical trials of antidepressant drugs in approximately 4,400 children and adolescents and 77,000 adult patients with psychiatric disorders showed an increased risk of suicidal behavior with antidepressants compared to placebo in children, adolescents, and young adult patients less than 25 years old. This meta-analysis did not include trials involving quetiapine. (see PHARMACODYNAMIC PROPERTIES).

### **Concomitant Illness**

Quetiapine should be used with caution in patients with known cardiovascular disease, cerebrovascular disease, or other conditions predisposing to hypotension. Quetiapine may induce orthostatic hypotension especially during the initial dose-titration period.

Dysphagia (see ADVERSE EFFECTS) and aspiration have been reported with quetiapine. Although a causal relationship with aspiration pneumonia has not been established, quetiapine should be used with caution in patients at risk of aspiration pneumonia.

### **Seizures**

In controlled clinical trials there was no difference in the incidence of seizures in patients treated with quetiapine or placebo. As with other antipsychotics, caution is recommended when treating patients with a history of seizures (see ADVERSE EFFECTS).

### **Extrapyramidal Symptoms (EPS) and Tardive Dyskinesia**

Tardive dyskinesia is a syndrome of potentially irreversible, involuntary, dyskinetic movements that may develop in patients treated with antipsychotic medicines including quetiapine. If signs and symptoms of tardive dyskinesia appear, dose reduction or discontinuation of quetiapine should be considered. The symptoms

tardive dyskinesia can worsen or even arise after discontinuation of treatment (see ADVERSE EFFECTS).

In placebo-controlled clinical trials for schizophrenia and bipolar mania, the incidence of EPS was no different from that of placebo across the recommended therapeutic dose range. This predicts that quetiapine has less potential than standard antipsychotic agents to induce tardive dyskinesia in schizophrenia and bipolar mania patients. In short-term, placebo-controlled clinical trials in adult patients for bipolar depression, the incidence of EPS was higher in quetiapine treated patients than in placebo treated patients (see ADVERSE EFFECTS for rates of EPS observed in all indications and ages).

### **Neuroleptic Malignant Syndrome**

Neuroleptic malignant syndrome has been associated with antipsychotic treatment including quetiapine (see ADVERSE EFFECTS). Clinical manifestations include hyperthermia, altered mental status, muscular rigidity, autonomic instability, and increased creatine phosphokinase. In such an event, quetiapine should be discontinued and appropriate medical treatment given.

### **QT prolongation**

In clinical trials quetiapine was not associated with a persistent increase in absolute QT intervals. However, in post-marketing experience there were cases reported of QT prolongation with overdose (see OVERDOSAGE). As with other antipsychotics, caution should be exercised when quetiapine is prescribed in patients with cardiovascular disease or family history of QT prolongation. Also caution should be exercised when quetiapine is prescribed either with medicines known to increase QT interval or with concomitant neuroleptics, especially for patients with increased risk of QT prolongation, ie. the elderly, patients with congenital long QT syndrome, congestive heart failure, heart hypertrophy, hypokalaemia or hypomagnesaemia (see INTERACTIONS).

### **Neutropenia**

Severe neutropenia ( $<0.5 \times 10^9/L$ ) has been uncommonly reported in quetiapine clinical trials. Most cases of severe neutropenia have occurred within the first two months of starting therapy with quetiapine. There was no apparent dose relationship. Possible risk factors for neutropenia include pre-existing low white cell count (WBC) and history of drug induced neutropenia. Quetiapine should be discontinued in patients with a neutrophil count  $<1.0 \times 10^9/L$ . These patients should be observed for signs and symptoms of infection and neutrophil counts followed (until they exceed  $1.5 \times 10^9/L$ ). See ADVERSE EFFECTS.

### **Withdrawal**

Acute withdrawal symptoms such as insomnia, nausea and vomiting have been described after abrupt cessation of antipsychotic drugs including quetiapine. Gradual withdrawal over a period of at least one to two weeks is advisable (see ADVERSE EFFECTS).

### **Hyperglycaemia and Diabetes Mellitus**

Increases in blood glucose and hyperglycaemia, and occasional reports of diabetes, have been observed in clinical trials with quetiapine. Although a causal relationship with diabetes has not been established, patients who are at risk for developing

diabetes are advised to have appropriate clinical monitoring. Similarly, patients with existing diabetes should be monitored for possible exacerbation (see ADVERSE EFFECTS).

Patients with an established diagnosis of diabetes mellitus who are started on atypical antipsychotics should be monitored regularly for worsening of glucose control. Patients with risk factors for diabetes mellitus (eg. obesity, family history of diabetes) who are starting treatment with atypical antipsychotics should undergo fasting blood glucose testing at baseline and periodically during treatment. Any patient treated with atypical antipsychotics should be monitored for symptoms of hyperglycaemia including polydipsia, polyuria, polyphagia, and weakness. Patients who develop symptoms of hyperglycaemia during treatment with atypical antipsychotics should undergo fasting blood glucose testing. In some cases, hyperglycaemia has resolved when the atypical antipsychotic was discontinued; however, some patients required continuation of antidiabetic treatment despite discontinuation of the suspect drug.

### **Lipids**

Increases in triglycerides and cholesterol have been observed in clinical trials with quetiapine (see ADVERSE EFFECTS). Lipid increases should be managed as clinically appropriate.

### **Metabolic Factors**

In some patients, a worsening of more than one of the metabolic factors of weight, blood glucose and lipids was observed in clinical studies. Changes in these parameters should be managed as clinically appropriate.

### **Pancreatitis**

Pancreatitis has been reported in clinical trials and during the post marketing experience, however a causal relationship has not been established. Among the post marketing reports, many patients had factors which are known to be associated with pancreatitis such as increased triglycerides (see Lipids section above), gallstones and alcohol consumption.

### **Children and Adolescents (10 to 17 years of age)**

Quetiapine is not indicated for use in children and adolescents below 18 years of age.

Although not all adverse reactions that have been identified in adult patients have been observed in clinical trials with quetiapine in children and adolescent patients, the same warnings and precautions for use that appear for adults should be considered for paediatrics. Changes in blood pressure and thyroid function tests and increases in weight and prolactin levels have been observed in children and adolescents and should be managed as clinically appropriate (see ADVERSE EFFECTS).

Long-term safety data including growth, maturation, and behavioural development, beyond 26 weeks of treatment, is not available for children and adolescents (10 - 17 years of age).

### **Safety Experience in Elderly Patients with Dementia-related psychosis**

Quetiapine is not approved for the treatment of dementia-related psychosis.

An approximately 3-fold increase of cerebrovascular adverse events has been seen in randomised placebo-controlled clinical trials in the dementia population with some atypical antipsychotics. The mechanism for this increased risk is not known. An increased risk cannot be excluded for other antipsychotics or other patient populations. Quetiapine should be used with caution in patients with risk factors for stroke.

In meta-analysis of atypical antipsychotic medicines, it has been reported that elderly patients with dementia-related psychosis are at an increased risk of death compared to placebo.

In two 10-week placebo-controlled quetiapine studies in elderly patients (n=710; mean age; 83 years; range: 56-99 years) with dementia-related psychosis, the incidence of death in quetiapine-treated patients was 5.5% vs. 3.2% in the placebo group. The patients in these trials died from a variety of causes that were consistent with expectations for this population. These data do not establish a causal relationship between quetiapine treatment and death in elderly patients with dementia.

### **Interactions**

Also see INTERACTIONS section.

Concomitant use of quetiapine with hepatic enzyme inducers such as carbamazepine may substantially decrease systemic exposure to quetiapine. Depending on clinical response, higher doses of quetiapine may need to be considered if quetiapine is used concomitantly with a hepatic enzyme inducer.

During concomitant administration of drugs which are potent CYP3A4 inhibitors (such as azole antifungals, macrolide antibiotics and protease inhibitors), plasma concentrations of quetiapine can be significantly higher than observed in patients in clinical trials. As a consequence of this, lower doses of quetiapine should be used. Special consideration should be given in elderly and debilitated patients. The risk-benefit ratio needs to be considered on an individual basis in all patients.

### **Other**

Myocarditis and cardiomyopathy were reported during post approval use of Quetiapine. These events were temporally related to Quetiapine therapy but a causal relationship has not been established.

### ***Use in Pregnancy***

The safety and efficacy of quetiapine during human pregnancy have not been established. Therefore, quetiapine should only be used during pregnancy if the benefits justify the potential risks.

### ***Use in Lactation***

There have been published reports of quetiapine excretion into human breast milk, however the degree of excretion was not consistent. Women who are breast-feeding should therefore be advised to avoid breast-feeding while taking quetiapine.

### ***Effect on Ability to Drive and Use Machines***

Given its primary central nervous system effects, quetiapine may interfere with activities requiring mental alertness. Therefore, patients should be advised not to drive or operate machinery, until individual susceptibility is known.

## Adverse Effects

The most commonly reported Adverse Drug Reactions (ADRs) with quetiapine are somnolence, dizziness, dry mouth, withdrawal (discontinuation) symptoms, elevations in serum triglyceride levels, elevations in total cholesterol (predominantly LDL cholesterol), decreases in HDL cholesterol, weight gain, decreased haemoglobin and extrapyramidal symptoms.

The incidences of ADRs associated with quetiapine therapy, are tabulated below according to the format recommended by the Council for International Organisations of Medical Sciences (CIOMS III Working Group; 1995).

Frequency	System Organ Class	Event
Very Common (≥10%)	Gastrointestinal disorders	Dry Mouth
	General disorders and administration site conditions	Withdrawal (discontinuation) symptoms <sup>1,10</sup>
	Investigations	Elevations in serum triglyceride levels <sup>1, 11</sup>
		Elevations in total cholesterol (predominantly LDL cholesterol) <sup>1, 12</sup>
		Decreases in HDL cholesterol <sup>18</sup>
		Weight gain <sup>3</sup>
		Decreased haemoglobin <sup>19</sup>
	Nervous system disorders	Dizziness <sup>1, 5, 17</sup>
		Somnolence <sup>2, 17</sup>
		Extrapyramidal symptoms <sup>1, 16</sup>
Common (≥1% - <10%)	Blood and lymphatic system disorders	Leukopenia <sup>1, 24</sup>
	Cardiac disorders	Tachycardia <sup>1, 5</sup>
		Palpitations <sup>20</sup>
	Eye disorders	Vision blurred
	Gastrointestinal disorders	Constipation
		Dyspepsia
		Vomiting <sup>22</sup>
	General disorders and administration site conditions	Mild asthenia
		Peripheral oedema
		Irritability
		Pyrexia

<p>Common (≥1% - &lt;10%)</p>	<p>Investigations</p> <p>Nervous system disorders</p> <p>Metabolism and nutrition disorders</p> <p>Respiratory, thoracic, and mediastinal disorders</p> <p>Vascular disorders</p> <p>Psychiatric disorders</p>	<p>Elevations in serum transaminases (ALT)<sup>4</sup></p> <p>Elevations in gamma-GT levels<sup>4</sup></p> <p>Neutrophil count decreased<sup>1,7</sup></p> <p>Blood glucose increased to hyperglycaemic level<sup>1,8</sup></p> <p>Elevations in serum prolactin<sup>15</sup></p> <p>Decreases in Total T<sub>4</sub><sup>21</sup></p> <p>Decreases in Free T<sub>4</sub><sup>21</sup></p> <p>Decreases in Total T<sub>3</sub><sup>21</sup></p> <p>Increases in TSH<sup>21</sup></p> <p>Dysarthria</p> <p>Increased appetite</p> <p>Dyspnoea<sup>20</sup></p> <p>Orthostatic hypotension<sup>1, 5, 17</sup></p> <p>Abnormal dreams and nightmares</p>
<p>Uncommon (≥0.1% - &lt;1%)</p>	<p>Cardiac disorders</p> <p>Gastrointestinal disorders</p> <p>Immune system disorders</p> <p>Investigations</p> <p>Nervous system disorders</p> <p>Respiratory, thoracic and mediastinal disorders</p>	<p>Bradycardia<sup>25</sup></p> <p>Dysphagia<sup>1, 9</sup></p> <p>Hypersensitivity</p> <p>Elevations in serum aspartate aminotransferase (AST)<sup>4</sup></p> <p>Platelet count decreased<sup>14</sup></p> <p>Decreases in Free T<sub>3</sub><sup>21</sup></p> <p>Seizure<sup>1</sup></p> <p>Restless legs syndrome</p> <p>Tardive dyskinesia<sup>1</sup></p> <p>Syncope<sup>1, 5, 17</sup></p> <p>Rhinitis</p>
<p>Rare (0.01% - &lt;0.1%)</p>	<p>General disorders and administration site conditions</p> <p>Investigations</p> <p>Psychiatric disorders</p> <p>Reproductive system and breast disorders</p>	<p>Neuroleptic malignant syndrome<sup>1</sup></p> <p>Hypothermia</p> <p>Elevations in blood creatine phosphokinase<sup>13</sup></p> <p>Somnambulism and other related events</p> <p>Priapism</p> <p>Galactorrhoea</p>
<p>Very Rare</p>	<p>Immune system disorders</p>	<p>Anaphylactic reaction<sup>6</sup></p>

(<0.01%)		
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1. See WARNINGS AND PRECAUTIONS
2. Somnolence may occur, usually during the first two weeks of treatment and generally resolves with the continued administration of quetiapine.
3. Based on  $\geq 7\%$  increase in body weight from baseline. Occurs predominantly during the early weeks of treatment.
4. Asymptomatic elevations (shift from normal to  $> 3 \times$  ULN at any time) in serum transaminase (ALT, AST) or gamma-GT levels have been observed in some patients administered quetiapine. These elevations were usually reversible on continued quetiapine treatment.
5. As with other antipsychotics with  $\alpha_1$  adrenergic blocking activity, quetiapine may induce orthostatic hypotension, associated with dizziness, tachycardia and, in some patients, syncope, especially during the initial dose-titration period.
6. The inclusion of anaphylactic reaction is based on post marketing reports.
7. In short-term placebo-controlled monotherapy trials among patients with a baseline neutrophil count  $\geq 1.5 \times 10^9/L$ , the incidence of at least one occurrence of neutrophil count  $< 1.5 \times 10^9/L$ , was 1.9% in patients treated with quetiapine, compared to 1.3% in placebo-treated patients. The incidence  $\geq 0.5 - < 1.0 \times 10^9/L$  was 0.2% in patients treated with quetiapine and 0.2% in placebo-treated patients. In clinical trials conducted prior to a protocol amendment for discontinuation of patients with treatment-emergent neutrophil count  $< 1.0 \times 10^9/L$ , among patients with a baseline neutrophil count  $\geq 1.5 \times 10^9/L$ , the incidence of at least one occurrence of neutrophil count  $< 0.5 \times 10^9/L$  was 0.21% in patients treated with quetiapine and 0% in placebo treated patients.
8. Fasting blood glucose  $\geq 126$  mg/dL or a non fasting blood glucose  $\geq 200$  mg/dL on at least one occasion.
9. An increase in the rate of dysphagia with quetiapine vs. placebo was only observed in the clinical trials in bipolar depression.
10. In acute placebo-controlled, monotherapy clinical trials, which evaluated discontinuation symptoms, the aggregated incidence of discontinuation symptoms after abrupt cessation was 12.1% for quetiapine and 6.7% for placebo. The aggregated incidence of the individual adverse events (eg, insomnia, nausea, headache, diarrhoea, vomiting, dizziness and irritability) did not exceed 5.3% in any treatment group and usually resolved after 1 week post-discontinuation.
11. Triglycerides  $\geq 200$  mg/dL (patients  $\geq 18$  years of age) or  $\geq 150$  mg/dL (patients  $< 18$  years of age) on at least one occasion.
12. Cholesterol  $\geq 240$  mg/dL (patients  $\geq 18$  years of age) or  $\geq 200$  mg/dL (patients  $< 18$  years of age) on at least one occasion.
13. Based on clinical trial adverse event reports of blood creatine phosphokinase increase not associated with neuroleptic malignant syndrome.
14. Platelets  $\leq 100 \times 10^9/L$  on at least one occasion.
15. Prolactin levels (patients  $\geq 18$  years of age):  $> 20$  mcg/L males;  $> 30$  mcg/L females at any time
16. See text below
17. May lead to falls

18. HDL cholesterol: < 40 mg/dL males; < 50 mg/dL females at any time
19. Decreased haemoglobin to  $\leq 13$  g/dL males,  $\leq 12$  g/dL females on at least one occasion occurred in 11% of quetiapine patients in all trials including open label extensions. In short term placebo controlled trials, decreased haemoglobin to  $\leq 13$  g/dL males,  $\leq 12$  g/dL females on at least one occasion occurred in 8.3% of quetiapine patients compared to 6.2% of placebo patients.
20. These reports often occurred in the setting of tachycardia, dizziness, orthostatic hypotension, and/or underlying cardiac/respiratory disease.
21. Based on shifts from normal baseline to potentially clinically important value at anytime post-baseline in all trials. Shifts in Total  $T_4$ , free  $T_4$ , total  $T_3$  and free  $T_3$  are defined as  $< 0.8 \times \text{LLN}$  (pmol/L) and shift in TSH is  $> 5 \text{ mIU/L}$  at any time.
22. Based on the increased rate of vomiting in elderly patients ( $\geq 65$  years of age).
23. Based on shifts from normal baseline to potentially clinically important value at any time post-baseline in all trials. Shifts in eosinophil are defined as  $> 1 \times 10^9$  cells/L at any time.
24. Based on shifts from normal baseline to potentially clinically important value at any time post-baseline in all trials. Shifts in WBCs are defined as  $< 3 \times 10^9$  cells/L at any time.
25. May occur at or near initiation of treatment and be associated with hypotension and/or syncope. Frequency based on adverse event reports of bradycardia and related events in all clinical trials with quetiapine.

## **Extrapyramidal Symptoms**

In short-term, placebo-controlled clinical trials in schizophrenia and bipolar mania the aggregated incidence of extrapyramidal symptoms was similar to placebo (schizophrenia: 7.8% for quetiapine and 8.0% for placebo; bipolar mania: 11.2% for quetiapine and 11.4% for placebo). In short-term, placebo-controlled clinical trials in bipolar depression the aggregated incidence of extrapyramidal symptoms was 8.9% for quetiapine compared to 3.8% for placebo, though the incidence of the individual adverse events (eg, akathisia, extrapyramidal disorder, tremor, dyskinesia, dystonia, restlessness, muscle contractions involuntary, psychomotor hyperactivity and muscle rigidity) were generally low and did not exceed 4% in any treatment group. In long-term studies of schizophrenia and bipolar disorder the aggregated exposure adjusted incidence of treatment-emergent extrapyramidal symptoms was similar between quetiapine and placebo.

## **Diabetes Mellitus**

Exacerbation of pre-existing diabetes mellitus, and diabetic ketoacidosis, have occurred very rarely with quetiapine therapy. The causal association with quetiapine has not been established (see WARNINGS AND PRECAUTIONS).

## **Thyroid Levels**

Quetiapine treatment was associated with dose-related decreases in thyroid hormone levels. In short term placebo-controlled clinical trials, the incidence of potentially clinically significant shifts in thyroid hormone levels were: total  $T_4$  : 3.4% for quetiapine versus 0.6% for placebo; free  $T_4$  : 0.7% for quetiapine versus 0.1% for placebo; were total  $T_3$  : 0.54% for quetiapine versus 0.0% for placebo and free  $T_3$  : 0.2% for quetiapine versus 0.0% for placebo. The incidence shifts in TSH was 3.2%

for quetiapine versus 2.7% for placebo. In short term placebo-controlled monotherapy trials, the incidence of reciprocal, potentially clinically significant shifts in T<sub>3</sub> and TSH was 0.0% for both quetiapine and placebo and 0.1% for quetiapine versus 0.0% for placebo for shifts in T<sub>4</sub> and TSH. These changes in thyroid hormone levels are generally not associated with clinically symptomatic hypothyroidism. The reduction in total and free T<sub>4</sub> was maximal within the first six weeks of quetiapine treatment, with no further reduction during long-term treatment. In nearly all cases, cessation of quetiapine treatment was associated with a reversal of the effects on total and free T<sub>4</sub>, irrespective of the duration of treatment. In eight patients, where TBG was measured, levels of TBG were unchanged.

### QT prolongation

Cases of QT prolongation, ventricular arrhythmia, sudden unexplained death, cardiac arrest and torsades de pointes have been reported very rarely with the use of neuroleptics and are considered class effects.

### Children and adolescents (10 to 17 years of age)

The same ADRs described above for adults should be considered for children and adolescents. The following table summarises ADRs that occur in a higher frequency category in children and adolescent patients (10-17 years of age) than in the adult population or ADRs that have not been identified in the adult population.

Frequency	System Organ Class	Event
Very Common (≥10%)	Metabolism and nutrition disorders	Increased appetite
	Investigations	Elevations in prolactin <sup>1</sup> Increases in blood pressure <sup>2</sup> Weight gain <sup>3</sup>
	Gastrointestinal disorders	Vomiting <sup>2</sup>
Common (≥1 - <10%)	Respiratory, thoracic, and mediastinal disorders	Rhinitis <sup>2</sup>
	Nervous system disorders	Syncope <sup>2</sup>

1. Prolactin levels (patients < 18 years of age): >20 mcg/L (>869.56 pmol/L) males; >26 mcg/L (>1130.428 pmol/L) females at any time. Less than 1% of patients had an increase to a prolactin level >100 mcg/L
2. Based on shifts above clinically significant thresholds (adapted from the National Institutes of Health criteria) or increases >20mmHg for systolic or >10 mmHg for diastolic blood pressure at any time in two acute (3-6 weeks) placebo-controlled trials in children and adolescents.
3. See text below

### Weight Gain in Children and Adolescents (10 to 17 years of age)

In one 6-week, placebo-controlled trial in adolescent patients (13-17 years of age) with schizophrenia, the mean increase in body weight, was 2.0 kg in the quetiapine

group and - 0.4 kg in the placebo group. Twenty one percent of quetiapine treated patients and 7% of placebo-treated patients gained  $\geq 7\%$  of their body weight.

In one 3-week, placebo-controlled trial in children and adolescent patients (10-17 years of age) with bipolar mania, the mean increase in body weight was 1.7 kg in the quetiapine group and 0.4 kg in the placebo group. Twelve percent of quetiapine treated patients and 0% of placebo-treated patients gained  $\geq 7\%$  of their body weight.

In the open-label study that enrolled patients from the above two trials, 63% of patients (241/380) completed 26 weeks of therapy with quetiapine. After 26 weeks of treatment the mean weight increase for patients treated was 4.4 kg. Forty five percent of the patients gained  $\geq 7\%$  of their body weight, not adjusted for normal growth. In order to adjust for normal growth over 26 weeks an increase of at least 0.5 standard deviation from baseline in BMI was used as a measure of a clinically significant change; 18.3% of patients on quetiapine met this criterion after 26 weeks of treatment.

### **Extrapyramidal Symptoms in Children and Adolescent Population (10 to 17 years of age)**

In a short-term placebo-controlled monotherapy trial in adolescent patients (13-17 years of age) with schizophrenia, the aggregated incidence of extrapyramidal symptoms was 12.9% for quetiapine and 5.3% for placebo, though the incidence of the individual adverse events (eg, akathisia, tremor, extrapyramidal disorder, hypokinesia, restlessness, psychomotor hyperactivity, muscle rigidity, dyskinesia) was generally low and did not exceed 4.1% in any treatment group. In a short-term placebo-controlled monotherapy trial in children and adolescent patients (10-17 years of age) with bipolar mania, the aggregated incidence of extrapyramidal symptoms was 3.6% for quetiapine and 1.1% for placebo.

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## **Interactions**

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Given the primary central nervous system effects of quetiapine, ARROW - QUETIAPINE should be used with caution in combination with other centrally acting medicines and alcohol.

Caution should be exercised when quetiapine is used concomitantly with medicines known to cause electrolyte imbalance or to increase QT interval (see WARNINGS AND PRECAUTIONS).

The pharmacokinetics of lithium were not altered when co-administered with quetiapine.

The pharmacokinetics of sodium valproate and quetiapine were not altered to a clinically relevant extent when co-administered.

The pharmacokinetics of quetiapine were not significantly altered following co-administration with the antipsychotics risperidone or haloperidol. However, co-administration of quetiapine and thioridazine caused increases in the clearance of quetiapine.

Quetiapine did not induce the hepatic enzyme systems involved in the metabolism of antipyrine. However, in a multiple dose trial in patients to assess the pharmacokinetics of quetiapine given before and during treatment with

carbamazepine (a known hepatic enzyme inducer), co-administration of carbamazepine significantly increased the clearance of quetiapine. This increase in clearance reduced systemic quetiapine exposure (as measured by AUC) to an average of 13% of the exposure during administration of quetiapine alone; although a greater effect was seen in some patients. As a consequence of this interaction, lower plasma concentrations can occur, and hence, in each patient, consideration for a higher dose of ARROW - QUETIAPINE, depending on clinical response, should be considered. It should be noted that the recommended maximum daily dose of quetiapine is 750 mg/day, for the treatment of acute and chronic psychoses including schizophrenia, and 800 mg/day for the treatment of manic episodes associated with bipolar disorder.

Continued treatment at higher doses should only be considered as a result of careful consideration of the benefit risk assessment for an individual patient. Co-administration of quetiapine with another microsomal enzyme inducer, phenytoin, also caused increases in the clearance of quetiapine. Increased doses of quetiapine may be required to maintain control of psychotic symptoms in patients co-administered quetiapine and phenytoin and other hepatic enzyme inducers (e.g. barbiturates, rifampicin etc.). The dose of ARROW - QUETIAPINE may need to be reduced if phenytoin or carbamazepine or other hepatic enzyme inducers are withdrawn and replaced with a non-inducer (e.g. sodium valproate).

CYP3A4 is the primary enzyme responsible for cytochrome P450 mediated metabolism of quetiapine. The pharmacokinetics of quetiapine were not altered following co-administration with cimetidine, a known P450 enzyme inhibitor. The pharmacokinetics of quetiapine were not significantly altered following co-administration with the antidepressants imipramine (a known CYP2D6 inhibitor) or fluoxetine (a known CYP3A4 and CYP2D6 inhibitor). In a multiple-dose trial in healthy volunteers to assess the pharmacokinetics of quetiapine given before and during treatment with ketoconazole, co-administration of ketoconazole resulted in an increase in mean  $C_{max}$  and AUC of quetiapine of 235% and 522%, respectively, with a corresponding decrease in mean oral clearance of 84%. The mean half-life of quetiapine increased from 2.6 to 6.8 hours, but the mean  $t_{max}$  was unchanged. Due to the potential for an interaction of a similar magnitude in a clinical setting, the dosage of quetiapine should be reduced during concomitant use of quetiapine and potent CYP3A4 inhibitors (such asazole antifungals, macrolide antibiotics and protease inhibitors).

There have been reports of false positive results in enzyme immunoassays for methadone and tricyclic antidepressants in patients who have taken quetiapine. Confirmation of questionable immunoassay screening results by an appropriate chromatographic technique is recommended.

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## Overdosage

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In clinical trials, survival has been reported in acute overdoses of up to 30 grams of quetiapine. Most patients who overdosed reported no adverse events or recovered fully from the reported events. Death has been reported in a clinical trial following an overdose of 13.6 grams of quetiapine alone.

In postmarketing experience, there have been very rare reports of overdose with quetiapine alone resulting in death or coma.

In post-marketing experience there were cases reported of QT prolongation with overdose.

Patients with pre-existing severe cardiovascular disease may be at increased risk of the effects of overdose (See WARNINGS AND PRECAUTIONS).

In general, reported signs and symptoms were those resulting from an exaggeration of the drug's known pharmacological effects, i.e. drowsiness and sedation, tachycardia and hypotension.

There is no specific antidote to quetiapine. In cases of severe intoxication, the possibility of multiple drug involvement should be considered, and intensive care procedures are recommended, including establishing and maintaining a patent airway, ensuring adequate oxygenation and ventilation, and monitoring and support of the cardiovascular system.

In cases of quetiapine overdose, refractory hypotension should be treated with appropriate measures such as intravenous fluids and/or sympathomimetic agents (adrenaline and dopamine should be avoided, since beta stimulation may worsen hypotension in the setting of quetiapine-induced alpha blockade).

Close medical supervision and monitoring should be continued until the patient recovers.

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## Pharmaceutical Precautions

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### ***Shelf-life***

3 years

### ***Storage Conditions***

Store below 25 °C.

### ***List of excipients***

#### **Core**

- Povidone
- Calcium hydrogen phosphate
- Microcrystalline cellulose
- Sodium starch glycollate
- Lactose monohydrate
- Magnesium stearate

#### **Coating**

- Opadry II 85F93422 Orange (25 mg tablet)
- Opadry II 85F92536 Yellow (100 mg tablet)
- Opadry II 85F62517 Yellow (150 mg tablet)
- Opadry II 85F18378 White (200 & 300 mg tablets)

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## Medicine Classification

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Prescription Medicine.

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## Package Quantities

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ARROW - QUETIAPINE 25 mg tablets are presented in a PVC/PVDC foil blister pack containing 60 or 90 tablets.

ARROW - QUETIAPINE 100 mg tablets are presented in a PVC/PVDC foil blister pack containing 60 or 90 tablets.

ARROW - QUETIAPINE 150 mg tablets are presented in a PVC/PVDC foil blister pack containing 60 or 90 tablets. (Not currently marketed in New Zealand)

ARROW - QUETIAPINE 200 mg tablets are presented in a PVC/PVDC foil blister pack containing 60 or 90 tablets.

ARROW - QUETIAPINE 300 mg tablets are presented in a PVC/PVDC foil blister pack containing 60 or 90 tablets.

**Not all pack sizes may be marketed.**

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## Further Information

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### ***Acute Toxicity Studies***

Quetiapine has low acute toxicity. Findings in mice and rats after oral (500 mg/kg) or intraperitoneal (100 mg/kg) dosing were typical of an effective neuroleptic agent and included decreased motor activity, ptosis, loss of righting reflex, fluid around the mouth and convulsions.

### ***Repeat-dose Toxicity Studies***

In multiple-dose studies in rats, dogs and monkeys, anticipated central nervous system effects of an antipsychotic drug were observed with quetiapine (e.g. sedation at lower doses and tremor, convulsions or prostration at higher exposures).

Hyperprolactinaemia, induced through the dopamine D<sub>2</sub> receptor antagonist activity of quetiapine or its metabolites, varied between species but was most marked in the rat, and a range of effects consequent to this were seen in the 12-month study, including mammary hyperplasia, increased pituitary weight, decreased uterine weight and enhanced growth of females.

Reversible morphological and functional effects on the liver, consistent with hepatic enzyme induction, were seen in mouse, rat and monkey.

Thyroid follicular cell hypertrophy and concomitant changes in plasma thyroid hormone levels occurred in rat and monkey.

Pigmentation of a number of tissues, particularly the thyroid, was not associated with any morphological or functional effects.

Transient increases in heart rate, unaccompanied by an effect on blood pressure, occurred in dogs.

Posterior triangular cataracts seen after 6 months in dogs at 100 mg/kg/day were consistent with inhibition of cholesterol biosynthesis in the lens. No cataracts were observed in Cynomolgus monkeys dosed up to 225 mg/kg/day, nor in rodents. Monitoring in clinical studies did not reveal drug-related corneal opacities in man.

No evidence of neutrophil reduction or agranulocytosis was seen in any of the toxicity studies.

### ***Carcinogenicity studies***

In the rat study (doses 0, 20, 75 and 250 mg/kg/day) the incidence of mammary adenocarcinomas was increased at all doses in female rats, consequential to prolonged hyperprolactinaemia.

In male rat (250 mg/kg/day) and mouse (250 and 750 mg/kg/day), there was an increased incidence of thyroid follicular cell benign adenomas, consistent with known rodent-specific mechanisms resulting from enhanced hepatic thyroxine clearance.

### ***Reproduction Studies***

Effects related to elevated prolactin levels (marginal reduction in male fertility and pseudopregnancy, protracted periods of diestrus, increased precoital interval and reduced pregnancy rate) were seen in rats, although these are not directly relevant to humans because of species differences in hormonal control of reproduction.

Quetiapine had no teratogenic effects.

### ***Mutagenicity studies***

Genetic toxicity studies with quetiapine show that it is not a mutagen or clastogen.

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## **Name and Address**

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Auckland  
New Zealand

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## **Date of Preparation**

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28 November 2011