NAME OF THE DRUG
Fentanyl citrate

DESCRIPTION
Fentanyl citrate is a 4-anilinopiperidine derivative.

\[
\text{N-(1-phenethyl-4-piperidyl) propionanilide dihydrogen citrate}
\]

CAS 438-38-7 C\textsubscript{22}H\textsubscript{28}N\textsubscript{2}O\textsubscript{4}, C\textsubscript{8}H\textsubscript{6}O\textsubscript{7} MW: 528.6

SUBLIMAZE injection contains fentanyl 50 micrograms per mL (as fentanyl citrate). It is a clear colourless solution with a pH 3.8 - 7.5.

PHarmacology

Pharmacodynamics
Fentanyl is a potent opioid analgesic with a rapid onset and short duration of action. The principal actions of therapeutic value are analgesia and sedation. At a dose of 100 micrograms (2 mL), the analgesic activity of fentanyl is approximately equivalent to 10 mg of morphine or 75 mg of pethidine. Fentanyl differs from morphine by its short duration of analgesic activity, lack of emetic activity, and minimal hypotensive activity.

The action of fentanyl is qualitatively similar to those of morphine and pethidine, i.e. analgesia, euphoria, miosis, bradycardia, respiratory depression, bronchoconstriction, muscle rigidity and suppression of cough reflexes. These effects can be reversed by specific opioid antagonists, e.g. naloxone. As with morphine, fentanyl-induced bradycardia from vagal stimulation is blocked or reversed by atropine. Alterations in respiratory rate and alveolar ventilation, associated with opioid analgesics may last longer than the analgesic effect. As the dose of the opioid is increased, the decrease in pulmonary exchange becomes greater. Larger doses may produce apnoea. The behavioural effects in mice of fentanyl and morphine are similar, and with toxic doses death is due to respiratory depression. The respiratory depressant properties of fentanyl appear to be due to a central effect by decreasing the sensitivity of the respiratory centre to carbon dioxide. In an experiment in cats, no effect on neuromuscular transmission was observed in the presence of severe respiratory depression.

Histamine assays and skin wheal testing in man, as well as in vivo testing in dogs, indicate that histamine release rarely occurs with fentanyl. Experiments in dogs, have shown that intravenously administered fentanyl at doses 2-4 times the recommended human dose, had
minimal effect on blood pressure and heart rate. Much higher doses of fentanyl citrate, ranging from 100-400 micrograms/kg, produce an immediate fall in blood pressure, followed by partial recovery, and a sustained hypotensive effect lasting up to 30 minutes.

Fentanyl produces a minimum of cortical depression, and it is suggested that it exerts its action by filling receptor sites located in the thalamus, mid-brain, and spinal cord. A specific opioid antagonist, e.g. naloxone, produces reversal of respiratory, cardiovascular, miotic, and motor incoordination effects, as well as analgesia, euphoria, and sedation. Rigidity of the diaphragm and intercostal muscles can be eliminated by succinylcholine. Cholinergic effects, e.g. bradycardia, are reversed by atropine.

Pharmacokinetics

The onset of action of fentanyl is almost immediate when the drug is given intravenously. However, the maximal analgesic and respiratory depressant effect may not be noted for several minutes. The usual duration of action of analgesic effect is 30 to 60 minutes after a single I.V. dose of up to 100 micrograms. Following intramuscular administration, the onset of action is from 7 to 8 minutes and the duration of action is 1 to 2 hours.

As with longer acting opioid analgesics, the duration of the respiratory depressant effect of fentanyl may be longer than the analgesic effect. The following observations have been reported concerning altered respiratory response to CO₂ stimulation following administration of fentanyl to man:

**DIMINISHED SENSITIVITY TO CO₂ STIMULATION MAY PERSIST LONGER THAN DEPRESSION OF RESPIRATORY RATE.**

Fentanyl frequently slows the respiratory rate, but this effect is seldom noted for longer than 30 minutes regardless of the dose administered. Altered sensitivity to CO₂ stimulation has been demonstrated for up to four hours following a single intravenous dose of 600 micrograms (12 mL) fentanyl to healthy volunteers. Duration and degree of respiratory depression is dose-related.

The peak respiratory depressant effect of a single intravenous dose of fentanyl is noted 5 to 15 minutes following injection. (See also PRECAUTIONS concerning respiratory depression.)

Distribution

After intravenous injection, fentanyl plasma concentrations fall rapidly, with sequential distribution half-lives of 1 minute and 18 minutes and a terminal elimination half-life of 475 minutes. Fentanyl has a Vₖ (volume of distribution of the central compartment) of 13 L, and a total Vₐss (distribution volume at steady-state) of 339 L. The total blood binding of fentanyl is about 83% (comprised of plasma protein binding about 43% and red blood cell binding about 40%).

Metabolism

Fentanyl is extensively metabolised by the liver and it has a high hepatic extraction ratio (0.8 – 1.0). Consequently, the hepatic clearance of fentanyl approaches hepatic blood flow. In humans, in vitro experiments have demonstrated that fentanyl is metabolised mainly by cytochrome P450 3A4 (CYP 3A4) to norfentanyl via oxidative N-dealkylation.

Elimination

Approximately 75% of the administered dose is excreted in the urine within 72 hours and only 8.4% of the dose recovered in urine is present as unchanged drug.

Special Populations

Paediatrics

Pharmacokinetic information in children is limited and obtained from different sources. CYP3A4 activity is very low at birth but increases after birth to reach 30-40% of adult levels at 1 month of age. The clearance and volume of distribution adjusted for body weight are higher
in infants and children than in adults after iv administration of fentanyl. The terminal elimination half-life is longer in newborn infants.

<table>
<thead>
<tr>
<th></th>
<th>CI (mL/kg/min)</th>
<th>Vss (L/kg)</th>
<th>t½ beta (hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants Post-natal age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-26 days; n= 72</td>
<td>3.4 – 58.7</td>
<td>1.3 – 30.3</td>
<td>1.3 – 15.9</td>
</tr>
<tr>
<td>Infants Post-natal age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48-71 days; n= 3</td>
<td>21.9 – 32.3</td>
<td>6.0 – 9.5</td>
<td>3.1 – 15.5</td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.17 ± 0.68 years; n= 6</td>
<td>11.5 ± 4.19</td>
<td>3.06 ± 1.02</td>
<td>4.1 ± 1.3</td>
</tr>
<tr>
<td>Adolescents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 ± 1.73 years; n= 3</td>
<td>7.05 ± 1.24</td>
<td>1.92 ± 1.04</td>
<td>3.5 ± 1.2</td>
</tr>
</tbody>
</table>

Data for infants are given as range of individual values, other data as mean ± SD

After intravenous administration, the plasma protein binding of fentanyl in newborn infants is lower than in adults. It is higher in pre-term neonates (77%) than in those born at term (approximately 62%).

**Adult Patients with Burns**

An increase in median clearance of 45% together with a larger volume of distribution results in lower fentanyl plasma concentrations. This may require an increased dose of fentanyl.

**INDICATIONS**

SUBLIMAZE is indicated for:

- analgesic action of short duration during anaesthetic periods, premedication, induction and maintenance, and in the immediate post-operative period (recovery room) as the need arises;
- use as an opioid analgesic supplement in general and regional anaesthesia;
- administration with a neuroleptic such as droperidol injection as an anaesthetic premedication, for the induction of anaesthesia, and as an adjunct in the maintenance of general and regional anaesthesia.

**CONTRAINDICATIONS**

SUBLIMAZE is contraindicated in patients with known intolerance to fentanyl, any of the components of SUBLIMAZE or other opioids.

SUBLIMAZE should not be administered to children two years of age or younger, because safe conditions for use have not been established. (See PRECAUTIONS - Paediatric use)

SUBLIMAZE should not be administered to patients suffering from bronchial asthma. As for any opioid analgesic, it should not be used in patients who may be particularly susceptible to respiratory depression, such as comatose patients who may have a head injury or brain tumour (see PRECAUTIONS). Severe and unpredictable potentiation by MAO inhibitors has been reported with opioid analgesics.

There is no evidence that fentanyl is potentiated by MAO inhibitors, but since such potentiation is found with other opioid analgesics, the use of SUBLIMAZE in patients who have received MAO inhibitors within 14 days is not recommended. (See PRECAUTIONS, INTERACTIONS WITH OTHER MEDICINES).
SUBLIMAZE may cause thoracic muscle rigidity upon intravenous administration. Therefore, the need for reversal with muscle relaxants contraindicates its use in patients with a history of myasthenia gravis.

**PRECAUTIONS**

**Drug dependence *and potential for abuse***

SUBLIMAZE can produce drug dependence of the morphine type and therefore has the potential for being abused. SUBLIMAZE MAY BE HABIT FORMING.

*Tolerance, physical dependence, and psychological dependence may develop upon repeated administration of opioids. Risks are increased in patients with a personal or family history of substance abuse (including drug or alcohol abuse or addiction) or mental illness (e.g., major depression). Patients on chronic opioid therapy or with a history of opioid abuse may require higher doses.*

**Physical dependence may result in acute withdrawal symptoms after abrupt discontinuation or a significant dosage reduction of opioids.**

**Fentanyl can be abused in a manner similar to other opioid agonists. Abuse or intentional misuse of SUBLIMAZE may result in overdose and/or death. Persons at increased risk of opioid abuse should be carefully and appropriately managed when treated with SUBLIMAZE.**

**Hypoventilation (respiratory depression)**

Profound analgesia is accompanied by marked respiratory depression, which can persist or recur in the post-operative period. Hyperventilation during anaesthesia may alter the patient's responses to CO₂, thus affecting respiration post-operatively. Therefore, patients should remain under appropriate surveillance.

SUBLIMAZE should be used with caution in patients with severe impairment of pulmonary function because of the possibility of respiratory depression, e.g., patients with chronic obstructive pulmonary disease, patients with decreased respiratory reserve, or any patient with potentially compromised respiration. In such patients, opioids may additionally decrease respiratory drive and increase airway resistance. During anaesthesia, this can be managed by assisted or controlled respiration.

Respiratory depression caused by opioid analgesics is dose related and can be reversed by opioid antagonists, such as naloxone, but additional doses of naloxone may be necessary because the respiratory depression may last longer than the duration of action of the opioid antagonist. Consult individual prescribing information (naloxone) before employing opioid antagonists. Appropriate surveillance should be maintained because the duration of respiratory depression of doses of fentanyl employed during anaesthesia may be longer than the duration of opioid antagonist action. The use of an opioid antagonist will also reverse analgesia. See also discussion of opioid antagonists in OVERDOSAGE.)

Respiratory depression is more likely to occur with intravenous administration if a dose is given too rapidly and it rarely occurs with intramuscular administration.

Resuscitative equipment and an opioid antagonist should be readily available to manage apnoea.

**Risk from concomitant use of central nervous system (CNS) depressants, especially benzodiazepines or related drugs**

Concomitant use of SUBLIMAZE and CNS depressants especially benzodiazepines or related drugs in spontaneous breathing patients, may increase the risk of profound sedation, respiratory depression, coma and death. If a decision is made to administer SUBLIMAZE concomitantly with a CNS depressant, especially a benzodiazepine or a related drug, the lowest effective dose of both drugs should be administered, for the shortest period of concomitant use. Patients should be carefully monitored for signs and symptoms of respiratory depression and profound sedation. In this respect, it is strongly recommended to inform
patients and their caregivers to be aware of these symptoms (see INTERACTIONS WITH OTHER MEDICINES).

**Muscle rigidity**

SUBLIMAZE may cause muscle rigidity, particularly involving the muscles of respiration. This effect is related to the speed of injection and its incidence can be reduced by a slow intravenous injection (ordinarily sufficient for lower doses), premedication with benzodiazepines and the use of muscle relaxants.

Once the effect occurs, it is managed by the use of assisted or controlled respiration and, if necessary, by a neuromuscular blocking agent compatible with the patient's condition.

Non-epileptic (myo)clonic movements can occur.

**Head injuries and increased intracranial pressure**

SUBLIMAZE should be used with caution in patients who may be particularly susceptible to respiratory depression, such as comatose patients who may have a head injury or brain tumour. In addition, SUBLIMAZE fentanyl may obscure the clinical course of patients with a head injury.

The use of rapid bolus injections of opioids should be avoided in patients with compromised intracerebral compliance; in such patients the transient decrease in the mean arterial pressure has occasionally been accompanied by a short-lasting reduction of the cerebral perfusion pressure.

**Cardiac effects**

SUBLIMAZE may produce bradycardia and possibly cardiac arrest if the patient has received an insufficient amount of anticholinergic, or when SUBLIMAZE is combined with non-vagolytic muscle relaxants. Bradycardia may be treated with atropine. However, SUBLIMAZE should be used with caution in patients with cardiac bradyarrhythmias.

Opioids may induce hypotension, especially in hypovolaemic patients. Appropriate measures to maintain a stable arterial pressure should be taken.

**Serotonin syndrome**

Caution is advised when SUBLIMAZE is coadministered with drugs that affect the serotonergic neurotransmitter systems.

The development of a potentially life-threatening serotonin syndrome may occur with the concomitant use of serotonergic drugs such as Selective Serotonin Re-uptake Inhibitors (SSRIs) and Serotonin Norepinephrine Re-uptake Inhibitors (SNRIs), and with drugs which impair metabolism of serotonin (including Monoamine Oxidase Inhibitors [MAOIs]). This may occur within the recommended dose.

Serotonin syndrome may include mental-status changes (e.g., agitation, hallucinations, coma), autonomic instability (e.g., tachycardia, labile blood pressure, hyperthermia), neuromuscular abnormalities (e.g., hyperreflexia, incoordination, rigidity), and/or gastrointestinal symptoms (e.g., nausea, vomiting, diarrhoea).

If serotonin syndrome is suspected, rapid discontinuation of SUBLIMAZE should be considered.

**General**

As has been observed with all opioid analgesics, episodes suggestive of sphincter of Oddi spasm may occur with SUBLIMAZE.

Vital signs should be monitored carefully.

**Use in the elderly or debilitated patients**

It is recommended to reduce the dosage of SUBLIMAZE in the elderly and in debilitated patients. Opioids should be titrated with caution in patients with any of the following conditions:
uncontrolled hypothyroidism, pulmonary disease, decreased respiratory reserve, alcoholism, or impaired hepatic function. Such patients also require prolonged post-operative monitoring.

Renal Impairment

Opioids should be titrated with caution. It is recommended to reduce the dosage of SUBLIMAZE in patients with renal impairment. They should be observed carefully for signs of fentanyl toxicity. Such patients also require prolonged post-operative monitoring.

Obese Patients

SUBLIMAZE should be administered with additional caution in obese patients. Obese patients should be observed carefully for signs of fentanyl toxicity.

Paediatric use

The safety of SUBLIMAZE in children younger than two years of age has not been established.

Use in pregnancy - Category C

There are no adequate data from the use of SUBLIMAZE in pregnant women. The foetal respiratory centre is particularly sensitive to opiates. Intramuscular or intravenous administration during childbirth (including caesarean section) is not recommended because fentanyl crosses the placenta (foetal blood concentrations about 40% of maternal blood concentrations) and may suppress spontaneous respiration in the newborn period. If fentanyl is administered, assisted ventilation equipment must be immediately available for the mother and infant if required. An opioid antagonist for the child must always be available.

In pregnant rats, fentanyl is embryocidal as evidenced by increased resorptions at doses of 30 micrograms/kg/day intravenously or 160 micrograms/kg/day or greater subcutaneously. Intravenous administration to rats at 30 micrograms/kg/day during organogenesis was associated with prolonged delivery time and increased postnatal mortality of offspring. There was no effect on embryofetal development when rats received subcutaneous fentanyl at doses up to 500 micrograms/kg/day throughout gestation, and no evidence of teratogenicity in rabbits administered fentanyl at intravenous doses up to 400 µg/kg/day during organogenesis. The potential risk for humans is unknown.

Use in lactation

Fentanyl is excreted into human milk and may cause sedation/respiratory depression in the newborn/infant. Therefore, breast-feeding or use of expressed breast milk is not recommended for 24 hours following the administration of SUBLIMAZE. The risk/benefit of breast-feeding following SUBLIMAZE administration should be considered.

Effects on fertility

Impairment of fertility has been observed in female rats given fentanyl 160 micrograms/kg/day subcutaneously (no effect dose not established) or 400 micrograms/kg/day intravenously (no effect dose 100 micrograms/kg/day). Fertility in male rats was unaffected at 400 micrograms/kg/day intravenously.

Carcinogenicity

In a two-year carcinogenicity study in rats, fentanyl was not associated with an increased incidence of tumours at subcutaneous doses up to 33 micrograms/kg/day in males or 100 micrograms/kg/day in females, which were the respective maximum tolerated doses.

Genotoxicity

Fentanyl showed no evidence of genotoxic potential in assays for gene mutations (Ames reverse mutation test, mouse lymphoma thymidine kinase assay), chromosomal damage (Chinese hamster ovary cells, mouse micronucleus test) and other genotoxic effects.
(unscheduled DNA synthesis in rat hepatocytes, mammalian cell transformation assay). The genotoxic potential of fentanyl is considered to be low.

**Effects on ability to drive and use machines**

Patients should only drive or operate a machine if sufficient time has elapsed (at least 24 hours) after the administration of SUBLIMAZE.

**INTERACTIONS WITH OTHER MEDICINES**

**Effects of other medicines on SUBLIMAZE**

**Central Nervous System (CNS) depressants:** Drugs, such as, barbiturates, benzodiazepines or related drugs, neuroleptics, opioids, alcohol and general anaesthetics, will have additive or potentiating effects with SUBLIMAZE. When patients have received such CNS depressant drugs, the dose of SUBLIMAZE required may be less than usual. Concomitant use with SUBLIMAZE in spontaneous breathing patients may increase the risk of respiratory depression, profound sedation, coma and death (see PRECAUTIONS). Post-operative opioids including SUBLIMAZE and other depressants should be given initially in reduced doses, as low as 1/4 to 1/3 of those usually recommended. As with other opioids, the respiratory depressant effect of SUBLIMAZE persists longer than the measured analgesic effect. The total dose of all opioid analgesics should be considered before ordering opioid analgesics during recovery from anaesthesia.

**Conduction anaesthesia:** Certain forms of conduction anaesthesia, such as spinal anaesthesia and some peridural anaesthetics, can alter respiration by blocking intercostal nerves. Through other mechanisms (see PHARMACOLOGY) SUBLIMAZE can also alter respiration. Therefore, when SUBLIMAZE is used to supplement these forms of anaesthesia, the anaesthetist should be familiar with the special properties of each drug (particularly with the widely differing durations of actions), the physiological alterations involved and be prepared to manage them in patients selected for these forms of anaesthesia.

**Neuroleptics:** If SUBLIMAZE is administered with a neuroleptic, the user should be familiar with the special properties of each drug, particularly the difference in duration of action. When SUBLIMAZE is used with a neuroleptic such as droperidol, blood pressure may be altered and hypotension can occur. If this occurs, the possibility of hypovolaemia should also be considered and managed with appropriate parenteral fluid therapy. Repositioning the patient improves venous return to the heart and should be considered when operative conditions permit. Care should be exercised in moving and positioning patients because of the possibility of orthostatic hypotension. If volume expansion with fluids together with other counter measures do not correct hypotension, the administration of pressor agents other than adrenaline should be considered. Because of the alpha-adrenergic blocking action of droperidol, adrenaline may paradoxically decrease the blood pressure in patients treated with droperidol. Pulmonary arterial pressure may also be decreased. This should be considered when interpreting pulmonary arterial pressure measurements as it might determine the final management of the patient. When droperidol is used with SUBLIMAZE and the EEG is used for post-operative monitoring, it may be found that the EEG pattern returns to normal slowly. Neuroleptics can induce extrapyramidal symptoms that can be controlled with anti-Parkinson agents.

**Monoamine oxidase inhibitors (MAOI):** Severe and unpredictable potentiation by MAO inhibitors has been reported with opioid analgesics. Since the safety of fentanyl in this regard has not been established, the use of SUBLIMAZE in patients who have received MAO inhibitors within 14 days is not recommended.

**Serotonergic Drugs:** Co-administration of fentanyl with a serotonergic agent, such as a Selective Serotonin Re-uptake Inhibitor (SSRI) or a Serotonin Norepinephrine Re-uptake Inhibitor (SNRI) or a Monoamine Oxidase Inhibitor (MAOI), may increase the risk of serotonin syndrome, a potentially life-threatening condition.
Cytochrome P450 3A4 (CYP 3A4) inhibitors: Fentanyl, a high clearance drug, is rapidly and extensively metabolised in the liver via CYP 3A4 enzyme and has a high hepatic extraction ratio. Therefore, hepatic blood flow rather than enzyme activity is the main determinant of fentanyl clearance. Theoretically, coadministration of CYP 3A4 enzyme inhibitors should cause only a small increase in plasma concentrations of fentanyl. When SUBLIMAZE is used, the concomitant use of a CYP3A4 inhibitor may result in a decrease in fentanyl clearance. With single-dose SUBLIMAZE administration, the period of a risk of respiratory depression may be prolonged, which may require special patient care and longer observation. With multiple-dose SUBLIMAZE administration, the risk for acute and/or delayed respiratory depression may be increased, and a dose reduction of SUBLIMAZE may be required to avoid accumulation of fentanyl.

Ritonavir is a highly potent inhibitor of CYP 3A4. Oral administration of ritonavir in healthy volunteers, at 200-300 mg t.d.s. for 2 days, significantly inhibits the metabolism of fentanyl at a dose of 5 micrograms/kg, given as a single intravenous infusion over 2 minutes. Ritonavir decreased the clearance of fentanyl by 67%, prolonged the half-life of fentanyl by 100% and increased AUC (0 to infinity) by 174%. Ritonavir had no significant effect on the steady state volume of distribution of fentanyl. When fentanyl is given continuously with ritonavir, the dose of fentanyl should be reduced in order to lower the risk for severe and prolonged respiratory depression. When fentanyl is given as a single dose concomitantly with ritonavir, the duration of respiratory monitoring should be increased and the dose of fentanyl may need to be reduced. Oral administration of itraconazole (another potent inhibitor of CYP 3A4) at 200 mg/day for 4 days did not have a statistically significant effect on the pharmacokinetics of fentanyl at a dose of 3 micrograms/kg given as a single intravenous infusion over 2 minutes. Co-administration of other potent or less potent CYP3A inhibitors, such as voriconazole or fluconazole, and SUBLIMAZE may also result in an increased and/or prolonged exposure to fentanyl.

There are no data on the in vivo interactions between fentanyl and other drugs inhibiting CYP 3A4 (e.g. ketoconazole, erythromycin, diltiazem and cimetidine).

Effects of SUBLIMAZE on other medicines

Following the administration of fentanyl, the dose of other CNS-depressant drugs should be reduced. This is particularly important after surgery, because profound analgesia is accompanied by marked respiratory depression, which can persist or recur in the postoperative period. Administration of a CNS depressant, such as benzodiazepine or related drugs, during this period may disproportionally increase the risk of respiratory depression (see PRECAUTIONS).

For etomidate, the total plasma clearance is decreased by 2.7-fold and volume of distribution is decreased by a factor 2.4 while half-life increased by 1.2 times when administered with fentanyl. Simultaneous administration of fentanyl and intravenous midazolam results in an increase in the terminal plasma half-life and a reduction in the plasma clearance of midazolam. When these drugs are co-administered with fentanyl their dose may need to be reduced.

ADVERSE EFFECTS

Clinical Trial Data

The safety of SUBLIMAZE was evaluated in 376 subjects who participated in 20 clinical trials evaluating SUBLIMAZE used as an anaesthetic. These subjects took at least one dose of SUBLIMAZE and provided safety data. Adverse Drug Reactions (ADRs), as identified by the investigator, reported for ≥1% of SUBLIMAZE-treated subjects in these studies are shown in Table 1.
Table 1. Adverse Drug Reactions Reported by ≥ 1% of SUBLIMAZE-treated Subjects in 20 Clinical Trials of SUBLIMAZE

<table>
<thead>
<tr>
<th>System/Organ Class</th>
<th>SUBLIMAZE (n=376)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse Reaction</td>
<td>%</td>
</tr>
<tr>
<td>Nervous System Disorders</td>
<td></td>
</tr>
<tr>
<td>Sedation</td>
<td>5.3</td>
</tr>
<tr>
<td>Dizziness</td>
<td>3.7</td>
</tr>
<tr>
<td>Dyskinesia</td>
<td>3.2</td>
</tr>
<tr>
<td>Eye Disorders</td>
<td></td>
</tr>
<tr>
<td>Visual disturbance</td>
<td>1.9</td>
</tr>
<tr>
<td>Cardiac Disorders</td>
<td></td>
</tr>
<tr>
<td>Bradycardia</td>
<td>6.1</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>4.0</td>
</tr>
<tr>
<td>Arrhythmia</td>
<td>2.9</td>
</tr>
<tr>
<td>Vascular Disorders</td>
<td></td>
</tr>
<tr>
<td>Hypotension</td>
<td>8.8</td>
</tr>
<tr>
<td>Hypertension</td>
<td>8.8</td>
</tr>
<tr>
<td>Vein pain</td>
<td>2.9</td>
</tr>
<tr>
<td>Respiratory, Thoracic and Mediastinal</td>
<td></td>
</tr>
<tr>
<td>Disorders</td>
<td></td>
</tr>
<tr>
<td>Apnoea</td>
<td>3.5</td>
</tr>
<tr>
<td>Bronchospasm</td>
<td>1.3</td>
</tr>
<tr>
<td>Laryngospasm</td>
<td>1.3</td>
</tr>
<tr>
<td>Gastrointestinal Disorders</td>
<td></td>
</tr>
<tr>
<td>Nausea</td>
<td>26.1</td>
</tr>
<tr>
<td>Vomiting</td>
<td>18.6</td>
</tr>
<tr>
<td>Skin and Subcutaneous Tissue Disorders</td>
<td></td>
</tr>
<tr>
<td>Dermatitis allergic</td>
<td>1.3</td>
</tr>
<tr>
<td>Musculoskeletal and Connective Tissue</td>
<td></td>
</tr>
<tr>
<td>Disorders</td>
<td></td>
</tr>
<tr>
<td>Muscle rigidity (which may also involve</td>
<td>10.4</td>
</tr>
<tr>
<td>the thoracic muscles)</td>
<td></td>
</tr>
<tr>
<td>Injury, Poisoning and Procedural</td>
<td></td>
</tr>
<tr>
<td>Complications</td>
<td></td>
</tr>
<tr>
<td>Confusion postoperative</td>
<td>1.9</td>
</tr>
<tr>
<td>Anaesthetic complication neurological</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Additional ADRs that occurred in <1% of SUBLIMAZE-treated subjects in the 20 clinical trials are listed below in Table 2.

Table 2. Adverse Drug Reactions Reported by < 1% of SUBLIMAZE-treated Subjects in 20 Clinical Trials of SUBLIMAZE

| System/Organ Class                        |                   |
| Adverse Reaction                          |                   |
| Psychiatric Disorders                     |                   |
| Euphoric mood                             |                   |
| Nervous System Disorders                  |                   |
| Headache                                  |                   |
| Vascular Disorders                        |                   |
| Blood pressure fluctuation                |                   |
| Phlebitis                                 |                   |
| Respiratory, Thoracic and Mediastinal     |                   |
| Disorders                                 |                   |
| Hiccups                                   |                   |
| Hyperventilation                          |                   |
| General Disorders and Administration Site|                   |
| Conditions                                |                   |
| Chills                                     |                   |
| Hypothermia                               |                   |
System/Organ Class
Adverse Reaction

Injury, Poisioning and Procedural Complications
Agitation postoperative
Procedural complication
Airway complication of anaesthesia

Postmarketing Data
Adverse drug reactions first identified during postmarketing experience with SUBLIMAZE are included in Table 3, based on spontaneous reporting rates. The frequencies are provided according to the following convention:

- Very common: $\geq 1/10$
- Common: $1/100$ and $< 1/10$
- Uncommon: $1/1,000$ and $< 1/100$
- Rare: $1/10,000$ and $< 1/1,000$
- Very rare: $< 1/10,000$, including isolated reports

Table 3: Adverse Drug Reactions Identified During Postmarketing Experience with SUBLIMAZE by Frequency Category Estimated from Spontaneous Reporting Rates

<table>
<thead>
<tr>
<th>Immune System Disorders</th>
<th>Very rare</th>
<th>Hypersensitivity (such as anaphylactic shock, anaphylactic reaction, urticaria)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nervous System Disorders</td>
<td>Very rare</td>
<td>Convulsions, Loss of consciousness, Myoclonus</td>
</tr>
<tr>
<td>Cardiac Disorders</td>
<td>Very rare</td>
<td>Cardiac arrest (also see PRECAUTIONS)</td>
</tr>
<tr>
<td>Respiratory, Thoracic and Mediastinal Disorders</td>
<td>Very rare</td>
<td>Respiratory depression (also see PRECAUTIONS)</td>
</tr>
<tr>
<td>Skin and Subcutaneous Tissue Disorders</td>
<td>Very rare</td>
<td>Pruritus</td>
</tr>
</tbody>
</table>

When a neuroleptic is used with SUBLIMAZE, the following adverse reactions may be observed: chills and/or shivering; restlessness, post-operative hallucinatory episodes; and extrapyramidal symptoms.

**DOSAGE AND ADMINISTRATION**
Dosage should be individualised. Some of the factors to be considered in determining the dose are: age, body weight, physical status, underlying pathological condition, use of other drugs, type of anaesthesia to be used, and the surgical procedure involved.

Vital signs should be monitored routinely.

**Usual dosage in adults**

**Premedication** (To be appropriately modified in the elderly, debilitated and those who have received other depressant drugs)
50 to 100 micrograms (1 to 2 mL) may be administered intramuscularly 30 to 60 minutes prior to surgery.
Adjunct to general anaesthesia

**Induction** - 50 to 100 micrograms (1 to 2 mL) may be administered initially intravenously and may be repeated at 2 to 3 minute intervals until the desired effect is achieved. A reduced dose as low as 25 to 50 micrograms (0.5 to 1 mL) is recommended in elderly and poor-risk patients.

**Maintenance** - 25 to 50 micrograms (0.5 to 1 mL) may be administered intravenously or intramuscularly when movement and/or changes in vital signs indicate surgical stress or lightening of analgesia.

Adjunct to regional anaesthesia

50 to 100 micrograms (1 to 2 mL) may be administered intramuscularly or slowly intravenously when additional analgesia is required.

Post-operatively – (Recovery room)

50 to 100 micrograms (1 to 2 mL) may be administered intramuscularly for the control of pain, tachypnoea, and emergence delirium. The dose may be repeated in one or two hours as needed.

Special Populations

**Elderly and debilitated patients**

As with other opioids, the initial dose should be reduced in the elderly (>65 years of age) and in debilitated patients. The effect of the initial dose should be taken into account in determining supplemental doses.

**Renal Impairment**

Refer to PRECAUTIONS – Renal Impairment

**Paediatrics**

For induction and maintenance in children 2-12 years of age, a reduced dose as low as 20 to 30 micrograms (0.4 to 0.6 mL) per 10 kg is recommended. (See PRECAUTIONS for use of SUBLIMAZE with other CNS depressants and in patients with altered response.)

Instructions for Use and Handling

Fentanyl should be given only in an environment where the airway can be controlled and by personnel who can control the airway (see PRECAUTIONS- Hypoventilation (respiratory depression)).

Wear gloves while opening the ampoule.

Accidental dermal exposure should be treated by rinsing the affected area with water. Avoid usage of soap, alcohol, and other cleaning materials that may cause chemical or physical abrasions to the skin.

OVERDOSAGE

The oral LD$_{50}$ for SUBLIMAZE in rats is 18.0 mg/kg. The intravenous LD$_{50}$ is 2.3 mg/kg, and the intramuscular LD$_{50}$ is 1.0 mg/kg in rats. The toxic dose in man is unknown.

**Signs and symptoms**

The manifestations of SUBLIMAZE overdosage are an extension of its pharmacological actions. In sufficient overdosage, fentanyl would produce narcosis, which may be preceded by marked skeletal muscle rigidity. Respiratory depression, which can vary in severity from bradypnoea to apnoea, may occur. This may be accompanied by cyanosis, followed by a fall in body temperature, circulatory collapse, coma and death.
**Treatment**

In the presence of hypoventilation or apnoea, oxygen should be administered and respiration should be assisted or controlled as indicated. A patent airway must be maintained. An oropharyngeal airway or endotracheal tube might be indicated. If depressed respiration is associated with muscular rigidity, an intravenous neuromuscular blocking agent might be required to facilitate assisted or controlled respiration.

A specific opioid antagonist, such as naloxone, should be available for use as indicated to manage respiratory depression. This does not preclude the use of more immediate countermeasures. The duration of respiratory depression following over dosage of fentanyl may be longer than the duration of opioid antagonist action. Consult the package insert of the individual opioid antagonists for details about use. The patient should be carefully observed for 24 hours. Body warmth and adequate fluid intake should be maintained. If hypotension occurs, and is severe or persists, the possibility of hypovolaemia should be considered and managed with appropriate parenteral fluid therapy. The use of an opioid antagonist will also reverse analgesia.

**PRESENTATION AND STORAGE CONDITIONS**

SUBLIMAZE is supplied in clear glass ampoules which contain:

- 100 micrograms/2 mL of fentanyl, in cartons of 10 ampoules.
- 500 micrograms/10 mL of fentanyl, in cartons of 5 ampoules (for HOSPITAL USE ONLY).

All presentations also contain sodium chloride and water for injections. Store below 30°C. Protect from light.

**NAME AND ADDRESS OF THE SPONSOR**

JANSSEN-CILAG Pty Ltd,
1-5 Khartoum Road,
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Australia.

**POISON SCHEDULE OF THE MEDICINE**

Controlled Drug (Schedule 8)

**DATE OF FIRST INCLUSION IN THE ARTG**

7 March 1994

**DATE OF MOST RECENT AMENDMENT**

15 March 2019

Please note change(s) presented as *italicised text* in Product Information.