

Adult Moderate Sedation/Deep Sedation Drugs									
Dosage Guidelines – Actual drug dosages to be determined by the practitioner ordering the drug and titrated to effect.									
Medication	Dose & Frequency	Onset	Peak	Duration	Half-Life	Admin. Techniques	Potential Adverse Reactions	Special Nursing Considerations	Patient Teaching
Diazepam IV (Valium)	1-2 mg q 3-10 min. to a maximum of 10mg	1-5 min	10-30 min	2-6 hrs	20-40 hrs	Slowly over 1min/5mg. Repeat q 5-10 min. Maximum dose:	- Drowsiness, rash, thrombosis & phlebitis @site, slurred speech, nausea, bradycardia, hypotension respiratory depression, blurred vision	- To reduce reactions at the site, give slowly (5mg/min). Avoid small veins. Solution is unstable, do not mix with any other drugs.	Drug may cause dizziness. Avoid activities that require mental alertness of 24 hours.
Lorazepam (Ativan)	1-2mg IV over 1-2 minutes to maximum of 0.04mg/kg	1-5 min	15-20 min	6-10 hrs	20-40 hrs	Slowly over 1 minute	Drowsiness, respiratory depression & hypotension when combined with opioids	Give slowly; observe the patient and vital signs during administration. Note any untoward reactions	Drug may cause drowsiness. Avoid activities that require mental alertness of 24 hours
Midazolam IV (Versed)	0.25 mg-1mg (up to 5mg total dose) q 1-5 min	3-5 min	10-15 min	1-2.5 hrs	1.2-12.3 hrs	Titrate to patient response. Never administer in bolus. Administer dose over 2 min into infusing line. Wait 2 min. To evaluate effects. Maximum dose generally 5mg.	- Fluctuation in vital signs, apnea, hypotension, hiccoughs, n & v, coughing, over sedation, headaches, drowsiness, confusion, retrograde amnesia, restlessness, emergence, nightmares, excessive salivation, warm or cold feeling at injection site. Monitor pt. constantly for early signs of respiratory distress during procedure and recovery phases.	- Hypotension may be more common when patient has also received a narcotic. Geriatric and debilitated clients require lower doses and are more prone to side effects. (AORN recommends decreased doses for those over age 60). - Use with caution when severe electrolyte disturbances are present.	Drug may cause dizziness. Avoid activities that require mental alertness for 24 hours. Avoid ETOH and other CNS depressants for 24 hours following drug administration. Reinforce post-procedure instructions and provide them in writing, as client may not fully recall instructions.
Morphine IV	1-4 mg q 2-15 min	1-2.5 min	10-20 min	1-2 hrs	3-7 hrs	Slowly over 5 minutes into infusing IV line. May repeat every 15 minutes. Maximum: generally, 20mg in 60 minutes.	- Nausea and vomiting, dizziness, injection site pain, agitation, headache, flushing, hot flashes, paresthesia, emotional liability, inflammation at injection site, abnormal vision, fatigue, convulsions for those on benzodiazepines for seizure control	- Rapid administration increases the risk of adverse effects. - Geriatric and debilitated clients require lower doses and are more prone to side effects. AORN recommends decreased doses for those over age 60)	Drug may cause dizziness. Avoid use of ETOH and other CNS depressants. Postural hypotension may occur-instruct patient to rise slowly from a prone or sitting position.
Meperidine IV (Demerol)	12.5-25 mg. q 2-15 min	3-5 min	10-20 min	1-2 hrs	2-6 hrs	Administer over a 30 second period into infusing IV line. May repeat every 10-15 min. Maximum : generally, 100 mg in 60 minutes	- Hypersensitivity, respiratory, depression, apnea, hypotension, peripheral, circulatory, collapse, cardiac arrest, lightheadedness, dizziness nausea and vomiting, diaphoresis, tachycardia, bradycardia, euphoria, dysphoria, weakness.	- Use with caution in clients with asthma. - Meperidine has atropine-like effects that may aggravate glaucoma, esp. when given with other drugs which should be used with caution in glaucoma.	May cause dizziness, nausea and vomiting.
Fentanyl IV	Start with 25-50 mcg then 12.5-50 mcg q 5-10 min and titrate to patient's response	3-5 min	3-5 min	30-60 min	3-4 hrs	Slowly over 1-2 minutes into infusing line. Maximum: Titrate to patient's response	- Respiratory depression, apnea, rigidity, bradycardia, hypotension, dizziness, blurred vision, n & v, laryngospasm, and diaphoresis.	- Rapid IV administration may cause seizures, skeletal and thoracic muscle rigidity. - Should be given with caution to patients with neuromuscular diseases.	Caution to rise slowly as they may experience orthostatic hypotension. Drug causes dizziness. Avoid alcohol and any other CNS depressant for at least 24 hours.
Nitrous Oxide/Oxygen Premixed	N2O does not exceed 50% inspired.	1-5 min	10 min	10-15 min	30 min	Inhalation	Respiratory Depression Nausea Dizziness	Continuously monitor patients during procedure for respiratory depression, nausea,	May cause dizziness, nausea and vomiting.

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(DEM & Dentistry)								dizziness	
Ketamine IV	0.2 – 1.5mg/kg	20 sec	1 min	5-15 min			<ul style="list-style-type: none"> <li>-Emergence Delirium (dreaming, hallucinations, akathisia)</li> <li>-HTN (esp. patients on epinephrine, cocaine, methamphetamines)</li> <li>-hypotension (Catecholamine depleted)</li> <li>-Potentiates other sedatives, hypnotics, and opioids.</li> <li>-Increases ICP, IOP (cranial, ocular)</li> <li>-Increases airway secretions</li> <li>-Heightens laryngeal reflexes</li> <li>-Diplopia, nystagmus</li> <li>-Same as above</li> </ul>	- Emergence delirium reduced by premed with benzodiazepine and droperidol	
Etomidate (Amidate)	3-6 mcg/kg/min IV	20 sec	1 min	5-10 min		<ul style="list-style-type: none"> <li>- Useful for hemodynamically unstable patients</li> <li>- Has minimal effects on cardiovascular function</li> </ul>	<ul style="list-style-type: none"> <li>- Hiccups or coughing incidence similar to methohexital</li> <li>- 30-40% incidence of nausea and vomiting</li> <li>- Pain on injection</li> <li>- Myoclonus</li> </ul>		
Methohexital I (Brevital)	0.25-1.5mg/kg	20 sec	45 sec	5-10 min		<ul style="list-style-type: none"> <li>- Supplied as powder.</li> <li>- Stability (as follows): When mixed with H2O - (6 weeks) When mixed with D5W or NS - (24 hrs)</li> <li>-Extravascular injection may cause necrosis</li> <li>-Intra-arterial injection may lead to gangrene</li> <li>-Incompatible in LR</li> </ul>	<ul style="list-style-type: none"> <li>- Potentiates CNS and circulatory depressant effects of narcotics, sedative hypnotics, and alcohol.</li> <li>- Paradoxical excitement (reduced with opioid premedication)</li> <li>-Myocardial depression,</li> <li>-Respiratory depression.</li> <li>-Laryngospasm, bronchospasm</li> <li>-Hiccups, seizures, myoclonus</li> </ul>	<ul style="list-style-type: none"> <li>-Contraindicated in patients with porphyria</li> <li>-Decrease dose in elderly or hypovolemic patients.</li> </ul>	
Propofol	20-50mg (0.5-1mg/kg)	40 sec	1 min	5-10 min		<ul style="list-style-type: none"> <li>-Strict aseptic technique must be maintained during handling</li> <li>-Once opened, good for 6 hours</li> <li>-Minimize pain on injection by administration via large vein and/or mix with lidocaine 0.1mg/kg</li> </ul>	<ul style="list-style-type: none"> <li>-Hypotension</li> <li>-Respiratory Depression</li> <li>-Disinhibition</li> <li>-Contraindicated in patient allergic to eggs or soybean oil</li> </ul>	<ul style="list-style-type: none"> <li>-Decrease dose in elderly or hypovolemic patient.</li> <li>-Antiemetic properties</li> </ul>	

**Pediatric Moderate Sedation/Deep Sedation Drugs**

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Medication	Dose & Frequency	Onset	Peak	Duration	Half-Life	Admin. Techniques	Potential Adverse Reactions	Special Nursing Considerations	Patient Teaching
Diazepam IV (Valium)	0.04-0.3mg/kg Oral: 0.2-0.3mg/kg (max. 10mg) 45-60 min. Prior to procedure or q 15-30 min (max dose <0.25mg/kg)	1-5 min	10-30 min	2-6 hrs	20-80 hrs	Slowly over 3 min. Do not exceed 1-2mg/min. Rapid IV may cause sudden respiratory depression, apnea, or hypotension. Do not use small veins. Do not mix or dilute with other meds or solutions. If given with narcotic reduce narcotic dose by 1/3.	Drowsiness, rash, thrombosis & phlebitis @site, slurred speech, nausea, bradycardia, hypotension respiratory depression, blurred vision.	To reduce reactions at the site, give slowly (1-2mg/min). Avoid small veins. Solution is unstable, do not mix with any other drug.	Drug may cause dizziness. Avoid activities that require mental alertness for 24 hours.
Morphine IV	0.05-0.1 mg/kg 5 minutes before procedure	1-2.5 min.	10-20 min	1-2 hrs	3-7 hrs	Push slowly into infusing IV line. May repeat every 15 minutes.	N & V, dizziness, injection site pain, agitation, headache, flushing, hot flashes, paresthesia, emotional lability, inflammation at injection site, abnormal vision, fatigue, convulsions for those on benzodiazepines for seizure control.	Rapid administration increases the risk of adverse effects. Debilitated clients require lower doses and are more prone to side effects.	Drug may cause dizziness. Avoid use of ETOH and other CNS depressants. Postural hypotension may occur- instruct patient to rise slowly from a prone or sitting position.
Meperidine IV (Demerol)	1-1.5 mg/kg Dose q 3-4 hours or 1-2 mg/kg as single dose preop.  Max dose is 100mg	1-5 min	10-20 min	1-2 hrs	2-6 hrs	Administer over a 30 second period into infusing IV line. Maximum dose 2mg/kg. Useful for procedures less than 30 minutes.	Hypersensitivity respiratory depression, apnea, hypotension, peripheral circulatory collapse, cardiac arrest, lightheaded, dizziness, nausea and vomiting, diaphoresis, tachycardia, bradycardia, euphoria, dysphoria, weakness.	Use with caution in clients with asthma. Meperidine has atropine like effects.	May cause dizziness, nausea, and vomiting.
Midazolam (Versed)	0.5-0.75mg/kg orally 0.1-0.3mg/kg nasally 0.3-0.5mg/kg rectally 0.05-0.1mg/kg I.V.	10-30 min 5-10 min 20-30 min 1-5 min	1 hrs 10 min 30 min 5-7 min	30-60 min  20-30 min	2-7 hrs  3-5 hrs		Apnea, Depression of hypoxic ventilatory response	Supervision	
Fentanyl	0.5-1 micrograms/kg to max 5 micrograms/kg IM or IV PO- Oralet – 5-10 micrograms	Almost immediately		30-60 min	2-4 hrs		Respiratory depression, apnea, rigidity, bradycardia, hypotension, dizziness, blurred vision, n & v, laryngospasm, and diaphoresis.		

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Ketamine IV	0.2 – 1.5mg/kg	20 Sec		1 min	5-15 min	10-15 min		<ul style="list-style-type: none"> <li>-Emergence Delirium (dreaming, hallucinations, akathisia)</li> <li>-HTN (Pt. on epi, cocaine, methamphetamines)</li> <li>-hypotension (Catecholamine depleted)</li> <li>-Potentiates other sedatives, hypnotics, and opioids.</li> <li>-Increases ICP, IOP (cranial, ocular)</li> <li>-Increases airway secretions</li> <li>-Heightens laryngeal reflexes</li> <li>-Diplopia, nystagmus</li> <li>-Same as above</li> </ul>	- Emergence delirium reduced by premed with benzodiazepine and droperidol
Propofol	20-50mg (0.5-1mg/kg)	40 seconds		1 min	5-10 min	2-8 min	<ul style="list-style-type: none"> <li>-Strict aseptic technique must be maintained during handling</li> <li>-Once opened, good for 6 hours</li> <li>-Minimize pain on injection by administration via large vein and/or mix with lidocaine 0.1mg/kg</li> </ul>	<ul style="list-style-type: none"> <li>-Hypotension</li> <li>-Respiratory Depression</li> <li>-disinhibition</li> <li>- Egg and or soy allergy is NOT a contraindication</li> </ul>	<ul style="list-style-type: none"> <li>-Decrease dose in elderly or hypovolemic patient.</li> <li>-Antiemetic properties</li> </ul>

**Reversal Agent Drugs – Procedural Sedation**

**Dosage Guidelines – Actual drug dosages to be determined by the practitioner ordering the drug and titrated to effect.**

Medication	Dose & Frequency	Onset	Peak	Duration	Half-Life	Admin. Techniques	Potential Adverse Reactions	Special Nursing Considerations	Patient Teaching
Naloxone Hydrochloride (Narcan)	<p><b>Adult:</b> Initial dose: 0.04-2mg IV; if necessary additional IV doses may be repeated at 2-3 min. intervals.</p> <p><b>Pediatric:</b> Initial dose: 0.01 mg/kg IV; then 0.1.mg/kg if needed. The SC or IM route may be used if IV not available.</p>	IV: 2 mins	5-15 mins	Dependent on dose and route of administration but may be as short as 45 minutes.	60-100 mins	<ul style="list-style-type: none"> <li>- May administer undiluted at a rate of 0.4 mg over 15 seconds with narcotic OD.</li> <li>- Do not mix Naloxone with preparations containing bisulfate, metabisulfite, long-chain or high molecular weight anions, or solutions with an alkaline pH.</li> <li>- Not recommended for use in neonates.</li> </ul>	<ul style="list-style-type: none"> <li>- Nausea and vomiting, sweating, hypertension, tremors, sweating due to reversal of narcotic depression.</li> <li>- If used post-operatively, excessive doses may cause v-tach and or v-fib, hypo- or hypertension, pulmonary edema, and seizures. (infrequent)</li> </ul>	<ul style="list-style-type: none"> <li>- The duration of the effects of the narcotic may exceed the effects of Naloxone.</li> <li>- More than one dose may be necessary to counteract the effects of the narcotic.</li> <li>- Observe client closely and determine narcotic half-life.</li> <li>- May cause narcotic withdrawal symptoms in chronic narcotic users.</li> </ul>	<ul style="list-style-type: none"> <li>- Drug may cause dizziness.</li> <li>- Avoid use of ETOH and other CNS depressants.</li> <li>- Postural hypotension may occur- instruct patient to rise slowly from a prone or sitting position.</li> </ul>
Flumazenil (Romazicon)	Adults, initial: 0.1mg given IV over 15 seconds. May be repeated after 45 seconds and again at 60 s	1-2 mins	6-10 mins	The duration is related to the plasma levels of the benzodiazepine and the dose of Flumazenil	60 mins	<ul style="list-style-type: none"> <li>- Dose must be individualized. Give the smallest amount necessary.</li> <li>- The 1-min wait between doses may be too short for high risk pts., as it takes 6-10 min. for single dose to reach full effects. Thus, slow rate in high-risk as either dose of long action or large dose of short acting benzodiazepines may exceed that of Flumazenil.</li> <li>- Repeat dose at 20 min. intervals as necessary. Give through “free running” large IV to decrease pain at site.</li> <li>- Doses larger than a total of 3mg do not reliably produce additional effects.</li> </ul>	<ul style="list-style-type: none"> <li>- The dose of flumazenil should be reduced to 40%-60% of normal in clients with severe hepatic dysfunction.</li> <li>- May cause pain at injection site.</li> <li>- Chronic Benzodiazepine users may experience withdrawal symptoms.</li> <li>- Seizures common in pts on anti-seizure meds and also, may occur at random.</li> </ul>	<ul style="list-style-type: none"> <li>- Stable only of 24 hours when mixed with NSS, LR or D5W.</li> <li>- Discard after 24 hours.</li> <li>- For optimal sterility, flumazenil should remain in the vial until just before use.</li> </ul>	<ul style="list-style-type: none"> <li>- Instruct patient regarding medication given after patient is alert.</li> </ul>