Brand Names

Anaspaz, A-Spas S/L, Colidrops Pediatric , Colytrol Pediatric , Cystospaz, Cystospaz M, Dispas, ED-Spaz, Hyco, HyoMax, HyoMax-DT, HyoMax-FT , HyoMax-SL, HyoMax-SR , Hyosol SL, Hyospaz, Hyosyne, IB Stat , Levbid, Levsin, Levsin SL, Levsinex, Losamine, Medispaz , neosol, NuLev, OSCIMIN , OSCIMIN SR, Spacol , Spasdel , Symax, Symax Duotab, Symax FasTabs, Symax SR

Indication Specific Dosing

For the treatment of irritable bowel syndrome, functional gastrointestinal disorders, neurogenic bladder, and neurogenic bowel disturbances (including the splenic flexure syndrome and neurogenic colon) as an adjunct; for control of gastric secretion, visceral spasm and hypermotility in spastic colitis, spastic bladder, cystitis, pylorospasm, and associated abdominal cramps; for the treatment of functional intestinal disorders to reduce symptoms, such as those seen in mild dysenteries, diverticulitis, and acute enterocolitis; for the treatment of infant colic; for the treatment of biliary and renal colic in combination with opioids; for the treatment of acute rhinitis as a drying agent; for the treatment of parkinsonism to reduce rigidity and tremors and to control associated sialorrhea and hyperhidrosis; and for the treatment of anticholinesterase agent poisoning

Oral or Sublingual dosage (immediate-release, sublingual, or orally-disintegrating tablets)

Adults

0.125 to 0.25 mg PO or SL every 4 hours or as needed. Max: 1.5 mg/day.

Children and Adolescents 12 to 17 years

0.125 to 0.25 mg PO or SL every 4 hours or as needed. Max: 1.5 mg/day.

Children 2 to 11 years

0.0625 to 0.125 mg PO or SL every 4 hours or as needed. Max: 0.75 mg/day.

Oral dosage (extended-release and biphasic release tablets)

Adults

0.375 to 0.75 mg PO every 12 hours. May adjust dose to 0.375 mg PO every 8 hours if needed. Max: 1.5 mg/day.

Children and Adolescents 12 to 17 years

0.375 to 0.75 mg PO every 12 hours. May adjust dose to 0.375 mg PO every 8 hours if needed. Max: 1.5 mg/day.

Oral dosage (drops)

Adults

0.125 to 0.25 mg PO every 4 hours or as needed. Max: 1.5 mg/day.

Children and Adolescents 12 to 17 years

0.125 to 0.25 mg PO every 4 hours or as needed. Max: 1.5 mg/day.

Children 2 to 11 years

0.03125 to 0.125 mg PO every 4 hours or as needed. Max: 0.75 mg/day.

Infants and Children younger than 2 years weighing approximately 10 kg

0.0275 mg PO every 4 hours or as needed. Max: 0.16 mg/day.

Infants and Children younger than 2 years weighing approximately 7 kg

0.02 mg PO every 4 hours or as needed. Max: 0.12 mg/day.

Infants and Children younger than 2 years weighing approximately 5 kg

0.0175 mg PO every 4 hours or as needed. Max: 0.105 mg/day.

Infants and Children younger than 2 years weighing approximately 3.4 kg

0.01375 mg PO every 4 hours or as needed. Max: 0.0825 mg/day.

Oral dosage (oral solutions or elixirs with hyoscyamine sulfate 0.125 mg per 5 mL)

Adults

0.125 to 0.25 mg PO every 4 hours or as needed. Max: 1.5 mg/day.

Children and Adolescents 12 to 17 years

0.125 to 0.25 mg PO every 4 hours or as needed. Max: 1.5 mg/day.

Children 2 to 11 years weighing approximately 50 kg

0.125 mg PO every 4 hours or as needed. Max: 0.75 mg/day.

Children 2 to 11 years weighing approximately 40 kg

0.09375 mg PO every 4 hours or as needed. Max: 0.5625 mg/day.

Children 2 to 11 years weighing approximately 20 kg

0.0625 mg PO every 4 hours or as needed. Max: 0.375 mg/day.

Children 2 to 11 years weighing approximately 10 kg

0.03125 mg PO every 4 hours or as needed. Max: 0.1875 mg/day.

Intramuscular, Intravenous, or Subcutaneous dosage

Adults

0.25 to 0.5 mg IM, IV, or subcutaneously as a single dose or 2 to 4 times daily at 4-hour intervals.

For aspiration prophylaxis† prior to anesthesia to reduce excessive salivary and respiratory tract secretions

Intramuscular, Intravenous, or Subcutaneous dosage

Adults

5 mcg/kg (0.005 mg/kg) IV, IM, or subcutaneously 30 to 60 minutes before induction of anesthesia or at the time other preanesthetic medications are administered. NOTE: Hyoscyamine has not been found by the FDA to be safe and

effective, and the product labeling has not been approved by FDA. Hyoscyamine is generally no longer used for aspiration prophylaxis prior to anesthesia.

For intraoperative use to reverse drug-induced bradycardia in adults

Intramuscular, Intravenous, or Subcutaneous dosage

Adults

0.125 mg IV, IM, or subcutaneous; may repeat as necessary.

For the treatment of organophosphate insecticide toxicity†

Oral, Intravenous, and Intramuscular dosage

Adults

The usual initial dose is 1—2 mg IM or IV, preferably IV. Additional 1 mg doses may be administered IM or IV every 3—10 minutes until muscarinic signs and symptoms subside; repeat dose if signs and symptoms reappear. Up to 25 mg may be required during the first 24 hours of therapy. Subsequently, 0.5—1 mg PO may be administered at intervals of several hours as maintenance therapy until signs and symptoms completely subside. A cholinesterase reactivator (e.g., pralidoxime) should be administered concomitantly.

For the relaxation of the upper gastrointestinal tract and colon prior to radiographic examination

Intravenous, Intramuscular, and Subcutaneous dosage

Adults

0.25—0.5 mg IV, IM, or subcutaneous 5—10 minutes before diagnostic radiologic procedure.

For cholinesterase inhibitor-induced muscarinic effects prophylaxis when anticholinesterase agents (i.e., neostigmine, physostigmine, pyridostigmine) are used to reverse the neuromuscular blockade produced by curariform agents

Intravenous, Intramuscular, and Subcutaneous dosage

Adults

0.2 mg IV, IM, or subcutaneous for each 1 mg of neostigmine or equivalent dose of physostigmine or pyridostigmine administered. Administer hyoscyamine sulfate concurrently with (in a separate syringe), or a few minutes prior to, the anticholinesterase agent. In the presence of bradycardia, give hyoscyamine sulfate before the anticholinesterase agent to increase the pulse rate to approximately 80 beats/minute.

Contraindications And Precaution

Drug Interactions

The coadministration of certain medications may lead to harm and require avoidance or therapy modification; review all drug interactions prior to concomitant use of other medications.

Hypersensitivity

This medication is contraindicated in patients with a history of hypersensitivity to it or any of its components.

prostatic hypertrophy, renal disease, urinary tract obstruction

Hyoscyamine is contraindicated in patients with urinary tract obstruction (such as bladder neck obstruction due to prostatic hypertrophy), as hyoscyamine may aggravate urinary retention. As the majority of the medication is excreted in the urine, caution is advised when using hyoscyamine in people with renal disease.

autonomic neuropathy, myasthenia gravis

Hyoscyamine is contraindicated in patients with myasthenia gravis. Caution is advised when using hyoscyamine in patients with autonomic neuropathy.

glaucoma

Hyoscyamine is contraindicated in patients with glaucoma. The mydriatic effect of hyoscyamine causes an increase in intraocular pressure thereby potentially precipitating an acute attack of glaucoma.

cardiac arrhythmias, coronary artery disease, heart failure, hemorrhagic shock, hypertension, tachycardia

Hyoscyamine is contraindicated in unstable cardiovascular status in acute hemorrhage (hemorrhagic shock). Caution is advised when using hyoscyamine in patients with

coronary artery disease, congestive heart failure, cardiac arrhythmias, or hypertension. Pre-existing tachycardia should be investigated and managed prior to initiating hyoscyamine, as anticholinergic medications can increase heart rate.

activities requiring coordination and concentration, conditions contributing to an elevated core body temperature, driving or operating machinery, fever

Like other anticholinergic agents, hyoscyamine may produce drowsiness, dizziness or blurred vision. Patients should be warned to avoid activities requiring mental alertness such as driving or operating machinery or performing other activities requiring coordination and concentration while taking hyoscyamine. Use of hyoscyamine may also decrease sweating, resulting in heat prostration or heat stroke; patients with fever or other conditions contributing to an elevated core body temperature should use caution.

GI obstruction, toxic megacolon, ulcerative colitis

Hyoscyamine can decrease gastric motility and tone. This can aggravate GI obstruction or ileus and/or exacerbate retention in patients with pyloroduodenal obstruction. Hyoscyamine is contraindicated in patients with GI obstruction (e.g., achalasia or pyloroduodenal stenosis), paralytic ileus, intestinal atony of older or debilitated patients, severe ulcerative colitis, or toxic megacolon complicating ulcerative colitis. Further, hyoscyamine should be administered with extreme caution in persons with diarrhea, which may be an early symptom of incomplete intestinal obstruction, particularly in patients with ileostomy or colostomy.

pregnancy

Only use during pregnancy if clearly needed. Animal reproduction studies have not been conducted with hyoscyamine. Hyoscyamine crosses the placenta. It is not known whether hyoscyamine can cause fetal harm when administered during pregnancy or if the drug can affect reproduction capacity.

gastroesophageal reflux disease with esophagitis, hiatal hernia

Hyoscyamine should be used cautiously in people with hiatal hernia associated with reflux esophagitis (gastroesophageal reflux disease with esophagitis). Hyoscyamine decreases gastric motility and relaxes the lower esophageal sphincter. These effects promote gastric retention and aggravate reflux in these people.

breast-feeding

According to the manufacturer, hyoscyamine is distributed into breast milk. Although the extent of distribution into breast milk has not been determined, the chronic use of hyoscyamine should be avoided during breast-feeding since infants are usually very sensitive to the effects of anticholinergics. Nevertheless, the American Academy of Pediatrics has considered the use of hyoscyamine to be usually compatible with breast-feeding due to a lack of reported adverse effects in nursing infants ; single doses may not be of concern. Consider the benefits of breast-feeding, the risk of potential infant drug exposure, and the risk of an untreated or inadequately treated condition. If a breast-feeding infant experiences an adverse effect related to a maternally ingested drug, healthcare providers are encouraged to report the adverse effect to the FDA.

geriatric

Geriatric adults have an increased susceptibility to anticholinergic effects of hyoscyamine, such as constipation, dry mouth, urinary retention, possible precipitation of glaucoma, and memory impairment. Discontinue hyoscyamine if anticholinergic side effects occur and continue or are severe. The anticholinergic effects are additive with other anticholinergic medications, particularly in older adults. Hyoscyamine is also substantially excreted by the kidney, and the risk of toxic reactions may be increased in people with impaired renal function. Because geriatric patients are more likely to have decreased renal function, cautious dose selection and regular monitoring is advised in this population. According to the Beers Criteria, antispasmodics such as hyoscyamine are considered potentially inappropriate medications in geriatric adults and should be avoided due to high anticholinergic activity and uncertain effectiveness. Strong anticholinergic medications should also be avoided in older adults with the following conditions due to the potential for symptom exacerbation or adverse effects: dementia/cognitive impairment (adverse CNS effects), delirium/high risk of delirium (new-onset or worsening delirium), or lower urinary tract symptoms/benign prostatic hyperplasia in men (urinary retention or hesitancy).

children, infants, neonates

Hyoscyamine solution for injection should be used cautiously in neonates, infants, and children as they are especially susceptible to the toxic effects of anticholinergic agents. Close supervision is recommended for infants and children with spastic paralysis or brain damage because an increased response to anticholinergics has been noted.

hyperthyroidism

Use hyoscyamine with caution in people with hyperthyroidism.

Pregnancy And Lactation

Only use during pregnancy if clearly needed. Animal reproduction studies have not been conducted with hyoscyamine. Hyoscyamine crosses the placenta. It is not known whether hyoscyamine can cause fetal harm when administered during pregnancy or if the drug can affect reproduction capacity.

Interactions

AbobotulinumtoxinA: (Moderate) The use of systemic antimuscarinic/anticholinergic agents following the administration of botulinum toxins may result in a potentiation of systemic anticholinergic effects (e.g., blurred vision, dry mouth, constipation, or urinary retention).
Acetaminophen; Aspirin; diphenhydrAMINE: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetaminophen; Caffeine; Dihydrocodeine: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when dihydrocodeine is used concomitantly with an anticholinergic drug. The concomitant use of dihydrocodeine and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Acetaminophen; Caffeine; Pyrilamine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetaminophen; Chlorpheniramine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetaminophen; Chlorpheniramine; Dextromethorphan: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetaminophen; Chlorpheniramine; Dextromethorphan; Phenylephrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetaminophen; Chlorpheniramine; Dextromethorphan; Pseudoephedrine: (Moderate)

Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetaminophen; Chlorpheniramine; Phenylephrine : (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetaminophen; Codeine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Acetaminophen; Dextromethorphan; Doxylamine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetaminophen; diphenhydrAMINE: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetaminophen; HYDROcodone: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant hydrocodone and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Acetaminophen; oxyCODONE: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant oxycodone and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Acetaminophen; Pamabrom; Pyrilamine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Acetylcholine Chloride: (Major) The muscarinic actions of drugs known as parasympathomimetics, including both direct cholinergic receptor agonists and cholinesterase inhibitors, can antagonize the antimuscarinic actions of anticholinergic drugs, and vice versa.
Aclidinium: (Moderate) Although aclidinium is minimally absorbed into the systemic circulation after inhalation, there is the potential for aclidinium to have additive anticholinergic effects when administered with other anticholinergics or antimuscarinics. Per the manufacturer, avoid concomitant administration of aclidinium with other anticholinergic medications, when possible.
Aclidinium; Formoterol: (Moderate) Although aclidinium is minimally absorbed into the systemic circulation after inhalation, there is the potential for aclidinium to have additive

anticholinergic effects when administered with other anticholinergics or antimuscarinics. Per the manufacturer, avoid concomitant administration of aclidinium with other anticholinergic medications, when possible.
ALFentanil: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when alfentanil is used concomitantly with an anticholinergic drug. The concomitant use of alfentanil and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Aliskiren; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Alosetron: (Major) Concomitant use of alosetron and anticholinergics, which can decrease GI motility, may seriously worsen constipation, leading to events such as GI obstuction, impaction, or paralytic ileus. Although specific recommendations are not available from the manufacturer, it would be prudent to avoid anticholinergics in patients taking alosetron.
Aluminum Hydroxide: (Moderate) Antacids may inhibit the oral absorption of anticholinergics. Simultaneous oral administration should be avoided when feasible; separate dosing by at least 2 hours to limit an interaction.
Aluminum Hydroxide; Magnesium Carbonate: (Moderate) Antacids may inhibit the oral absorption of anticholinergics. Simultaneous oral administration should be avoided when feasible; separate dosing by at least 2 hours to limit an interaction.
Aluminum Hydroxide; Magnesium Hydroxide: (Moderate) Antacids may inhibit the oral absorption of anticholinergics. Simultaneous oral administration should be avoided when feasible; separate dosing by at least 2 hours to limit an interaction.
Aluminum Hydroxide; Magnesium Hydroxide; Simethicone: (Moderate) Antacids may inhibit the oral absorption of anticholinergics. Simultaneous oral administration should be avoided when feasible; separate dosing by at least 2 hours to limit an interaction.
Aluminum Hydroxide; Magnesium Trisilicate: (Moderate) Antacids may inhibit the oral absorption of anticholinergics. Simultaneous oral administration should be avoided when feasible; separate dosing by at least 2 hours to limit an interaction.
Amantadine: (Major) Additive anticholinergic effects may be seen when hyoscyamine is used concomitantly with other drugs that possess antimuscarinic effects.
aMILoride; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate

of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Amitriptyline: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
amLODIPine; Valsartan; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Amoxapine: (Moderate) Depending on the specific agent, additive anticholinergic effects may be seen when amoxapine is used concomitantly with other anticholinergic agents. Clinicians should note that anticholinergic effects might be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation. Additive CNS effects are also possible when these drugs are combined with amoxapine.
Antacids: (Moderate) Antacids may inhibit the oral absorption of anticholinergics. Simultaneous oral administration should be avoided when feasible; separate dosing by at least 2 hours to limit an interaction.
Aspirin, ASA; Caffeine; Orphenadrine: (Moderate) Additive anticholinergic effects may be seen when hyoscyamine is used concomitantly with other drugs with moderate to significant anticholinergic effects including orphenadrine.
Aspirin, ASA; Carisoprodol; Codeine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Aspirin, ASA; Citric Acid; Sodium Bicarbonate: (Moderate) Separate the time of administration of oral hyoscyamine and oral sodium bicarbonate by at least 2 hours. Simultaneous coadministration may decrease oral hyoscyamine absorption and reduce efficacy.
Aspirin, ASA; oxyCODONE: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant oxycodone and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Atenolol; Chlorthalidone: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Atropine; Difenoxin: (Moderate) Diphenoxylate is a synthetic opiate derivative that appears to exert its effect locally and centrally on the smooth mucle cells of the GI tract

to inhibit GI motility and slow excess GI propulsion. The effects can be additive to antimuscarinic agents, such as hyoscyamine. In some cases, constipation might occur, and effects on the CNS or bladder function may also be additive.
Azilsartan; Chlorthalidone: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Belladonna; Opium: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when opium is used concomitantly with an anticholinergic drug. The concomitant use of opium and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Benazepril; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Benzgalantamine: (Moderate) The therapeutic benefits of galantamine, a cholinesterase inhibitor, may be diminished during chronic co-administration with antimuscarinics or medications with potent anticholinergic activity. When concurrent use is not avoidable, the patient should be monitored for cognitive decline and anticholinergic side effects. Clinicians should generally avoid multiple medications with anticholinergic activity in the patient with dementia. Some of the common selective antimuscarinic drugs for bladder problems, (such as oxybutynin, darifenacin, trospium, fesoterodine, tolerodine, or solifenacin), do not routinely cause problems with medications used for dementia, but may cause anticholinergic side effects in some patients. Atropine may be used to offset bradycardia in cholinesterase inhibitor overdose.
Benzhydrocodone; Acetaminophen: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when benzhydrocodone is used concomitantly with an anticholinergic drug. The concomitant use of benzhydrocodone and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Bethanechol: (Major) The muscarinic actions of drugs known as parasympathomimetics, including both direct cholinergic receptor agonists and cholinesterase inhibitors, can antagonize the antimuscarinic actions of anticholinergic drugs, and vice versa.

Bisoprolol; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Botulinum Toxins: (Moderate) The use of systemic antimuscarinic/anticholinergic agents following the administration of botulinum toxins may result in a potentiation of systemic anticholinergic effects (e.g., blurred vision, dry mouth, constipation, or urinary retention).
Brompheniramine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Brompheniramine; Dextromethorphan; Phenylephrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Brompheniramine; Phenylephrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Brompheniramine; Pseudoephedrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Brompheniramine; Pseudoephedrine; Dextromethorphan: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Buprenorphine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant buprenorphine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Buprenorphine; Naloxone: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant buprenorphine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
buPROPion: (Moderate) Additive anticholinergic effects may be seen when hyoscyamine is used concomitantly with bupropion. Additive drowsiness may occur. Clinicians should note that antimuscarinic effects might be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation.
buPROPion; Naltrexone: (Moderate) Additive anticholinergic effects may be seen when hyoscyamine is used concomitantly with bupropion. Additive drowsiness may occur.

Clinicians should note that antimuscarinic effects might be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation.
Butalbital; Acetaminophen; Caffeine; Codeine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Butalbital; Aspirin; Caffeine; Codeine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Butorphanol: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when butorphanol is used concomitantly with an anticholinergic drug. The concomitant use of butorphanol and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Calcium Carbonate: (Major) Avoid concomitant use of calcium carbonate and anticholinergics. Antacids may interfere with the absorption of anticholinergics.
Calcium Carbonate; Famotidine; Magnesium Hydroxide: (Major) Avoid concomitant use of calcium carbonate and anticholinergics. Antacids may interfere with the absorption of anticholinergics.
Calcium Carbonate; Magnesium Hydroxide: (Major) Avoid concomitant use of calcium carbonate and anticholinergics. Antacids may interfere with the absorption of anticholinergics.
Calcium Carbonate; Magnesium Hydroxide; Simethicone: (Major) Avoid concomitant use of calcium carbonate and anticholinergics. Antacids may interfere with the absorption of anticholinergics.
Calcium Carbonate; Simethicone: (Major) Avoid concomitant use of calcium carbonate and anticholinergics. Antacids may interfere with the absorption of anticholinergics.
Calcium; Vitamin D: (Major) Avoid concomitant use of calcium carbonate and anticholinergics. Antacids may interfere with the absorption of anticholinergics.
Candesartan; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Captopril; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate

of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Carbinoxamine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Celecoxib; Tramadol: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant tramadol and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Cetirizine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant cetirizine and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Cetirizine; Pseudoephedrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant cetirizine and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Cevimeline: (Major) The muscarinic actions of drugs known as parasympathomimetics, including both direct cholinergic receptor agonists and cholinesterase inhibitors, can antagonize the antimuscarinic actions of anticholinergic drugs, and vice versa.
Chlophedianol; Dexbrompheniramine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlophedianol; Dexchlorpheniramine; Pseudoephedrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorcyclizine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
chlordiazePOXIDE; Amitriptyline: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorothiazide: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Chlorpheniramine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorpheniramine; Codeine: (Moderate) Monitor for signs of urinary retention or

reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorpheniramine; Dextromethorphan: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorpheniramine; Dextromethorphan; Phenylephrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorpheniramine; Dextromethorphan; Pseudoephedrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorpheniramine; HYDROcodone: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant hydrocodone and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorpheniramine; Ibuprofen; Pseudoephedrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorpheniramine; Phenylephrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Chlorpheniramine; Pseudoephedrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
chlorproMAZINE: (Moderate) Additive anticholinergic effects may be seen when anticholinergics are used concomitantly with phenothiazines, including chlorpromazine. Clinicians should note that antimuscarinic effects may be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation. Additive drowsiness or other additive CNS effects may also occur.
Chlorthalidone: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the

antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Cholinergic agonists: (Major) The muscarinic actions of drugs known as parasympathomimetics, including both direct cholinergic receptor agonists and cholinesterase inhibitors, can antagonize the antimuscarinic actions of anticholinergic drugs, and vice versa.
Cisapride: (Moderate) The use of drugs that decrease GI motility, such as hyoscyamine, may pharmacodynamically oppose the effects of cisapride.
Clemastine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
clomiPRAMINE: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
cloZAPine: (Major) Avoid co-prescribing clozapine with other anticholinergic medicines that can cause gastrointestinal hypomotility, due to a potential to increase serious constipation, ileus, and other potentially serious bowel conditions that may result in hospitalization. Clozapine exhibits potent anticholinergic effects. Additive anticholinergic effects may be seen when clozapine is used concomitantly with anticholinergic agents. Adverse effects may be seen not only on GI smooth muscle, but also on bladder function, the CNS, the eye, and temperature regulation. Additive drowsiness may also occur, depending on the anticholinergic agent used.
Codeine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Codeine; Dexbrompheniramine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Codeine; guaiFENesin: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Codeine; guaiFENesin; Pseudoephedrine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Codeine; Phenylephrine; Promethazine: (Moderate) Monitor for signs of urinary

retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant promethazine and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Codeine; Promethazine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant codeine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant promethazine and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Crofelemer: (Moderate) Pharmacodynamic interactions between crofelemer and antimuscarinics are theoretically possible. Crofelemer does not affect GI motility mechanisms, but does have antidiarrheal effects. Patients taking medications that decrease GI motility, such as antimuscarinics, may be at greater risk for serious complications from crofelemer, such as constipation with chronic use. Use caution and monitor GI symptoms during coadministration.
Cyclobenzaprine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant cyclobenzaprine and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Cyproheptadine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Dasiglucagon: (Major) The concomitant use of intravenous glucagon and anticholinergics increases the risk of gastrointestinal adverse reactions due to additive effects on inhibition of gastrointestinal motility. Concomitant use is not recommended.
DaxibotulinumtoxinA: (Moderate) The use of systemic antimuscarinic/anticholinergic agents following the administration of botulinum toxins may result in a potentiation of systemic anticholinergic effects (e.g., blurred vision, dry mouth, constipation, or urinary retention).
Desipramine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Dexbrompheniramine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Dexbrompheniramine; Dextromethorphan; Phenylephrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.

Dexbrompheniramine; Pseudoephedrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Dexchlorpheniramine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Dexchlorpheniramine; Dextromethorphan; Pseudoephedrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Dextromethorphan; buPROPion: (Moderate) Additive anticholinergic effects may be seen when hyoscyamine is used concomitantly with bupropion. Additive drowsiness may occur. Clinicians should note that antimuscarinic effects might be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation.
Dextromethorphan; diphenhydrAMINE; Phenylephrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Dextromethorphan; quiNIDine: (Major) Hyoscyamine may increase the absorption of quinidine by decreasing GI motility and thereby enhancing absorption with possible toxicity. Increased monitoring is advised in patients receiving a combination of these drugs.
Digoxin: (Moderate) Anticholinergics, because of their ability to cause tachycardia, can antagonize the beneficial actions of digoxin in atrial fibrillation/flutter. Routine therapeutic monitoring should be continued when an antimuscarinic agent is prescribed with digoxin until the effects of combined use are known.
dimenhyDRINATE: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
diphenhydrAMINE: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
diphenhydrAMINE; Ibuprofen: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
diphenhydrAMINE; Naproxen: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
diphenhydrAMINE; Phenylephrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use.

Concomitant use may result in additive anticholinergic adverse effects.
Diphenoxylate; Atropine: (Moderate) Diphenoxylate is a synthetic opiate derivative that appears to exert its effect locally and centrally on the smooth mucle cells of the GI tract to inhibit GI motility and slow excess GI propulsion. The effects can be additive to antimuscarinic agents, such as hyoscyamine. In some cases, constipation might occur, and effects on the CNS or bladder function may also be additive.
Disopyramide: (Moderate) In addition to its electrophysiologic effects, disopyramide exhibits clinically significant anticholinergic properties. These can be additive with other anticholinergics. Clinicians should be aware that urinary retention, particularly in males, and aggravation of glaucoma are realistic possibilities of using disopyramide with other anticholinergic agents.
Donepezil: (Moderate) The therapeutic benefits of donepezil, a cholinesterase inhibitor, may be diminished during chronic co-administration with antimuscarinics or medications with potent anticholinergic activity. When concurrent use is not avoidable, the patient should be monitored for cognitive decline and anticholinergic side effects. Clinicians should generally avoid multiple medications with anticholinergic activity in the patient with dementia. Some of the common selective antimuscarinic drugs for bladder problems, (such as oxybutynin, darifenacin, trospium, fesoterodine, tolerodine, or solifenacin), do not routinely cause problems with medications used for dementia, but may cause anticholinergic side effects in some patients. Atropine may be used to offset bradycardia in cholinesterase inhibitor overdose.
Donepezil; Memantine: (Moderate) The adverse effects of anticholinergics, such as dry mouth, urinary hesitancy or blurred vision may be enhanced with use of memantine; dosage adjustments of the anticholinergic drug may be required when memantine is coadministered. In addition, preliminary evidence indicates that chronic anticholinergic use in patients with Alzheimer's Disease may possibly have an adverse effect on cognitive function. Therefore, the effectiveness of drugs used in the treatment of Alzheimer's such as memantine, may be adversely affected by chronic antimuscarinic therapy. (Moderate) The therapeutic benefits of donepezil, a cholinesterase inhibitor, may be diminished during chronic co-administration with antimuscarinics or medications with potent anticholinergic activity. When concurrent use is not avoidable, the patient should be monitored for cognitive decline and anticholinergic side effects. Clinicians should generally avoid multiple medications with anticholinergic activity in the patient with dementia. Some of the common selective antimuscarinic drugs for bladder problems, (such as oxybutynin, darifenacin, trospium, fesoterodine, tolerodine, or solifenacin), do not routinely cause problems with medications used for dementia, but may cause anticholinergic side effects in some patients. Atropine may be used to offset bradycardia in cholinesterase inhibitor overdose.
Doxepin: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result

in additive anticholinergic adverse effects.
Doxylamine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Doxylamine; Pyridoxine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
droNABinol: (Moderate) Use caution if coadministration of dronabinol with anticholinergics is necessary. Concurrent use of dronabinol, THC with anticholinergics may result in additive drowsiness, hypertension, tachycardia, and possibly cardiotoxicity.
Eluxadoline: (Major) Avoid use of eluxadoline with medications that may cause constipation, such as anticholinergics. Discontinue use of eluxadoline in patients who develop severe constipation lasting more than 4 days.
Enalapril; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
fentaNYL: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant fentanyl and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
fluPHENAZine: (Moderate) Additive anticholinergic effects may be seen when anticholinergics are used concomitantly with phenothiazines, including fluphenazine. Clinicians should note that antimuscarinic effects may be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation. Additive drowsiness or other additive CNS effects may also occur.
Fluticasone; Umeclidinium; Vilanterol: (Moderate) There is the potential for umeclidinium to have additive anticholinergic effects when administered with other anticholinergics or antimuscarinics. Per the manufaturer, avoid concomitant administration of umeclidinium with other anticholinergic medications when possible.
Fosinopril; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Galantamine: (Moderate) The therapeutic benefits of galantamine, a cholinesterase inhibitor, may be diminished during chronic co-administration with antimuscarinics or medications with potent anticholinergic activity. When concurrent use is not avoidable, the patient should be monitored for cognitive decline and anticholinergic side effects. Clinicians should generally avoid multiple medications with anticholinergic activity in the

patient with dementia. Some of the common selective antimuscarinic drugs for bladder problems, (such as oxybutynin, darifenacin, trospium, fesoterodine, tolerodine, or solifenacin), do not routinely cause problems with medications used for dementia, but may cause anticholinergic side effects in some patients. Atropine may be used to offset bradycardia in cholinesterase inhibitor overdose.
Gepotidacin: (Moderate) Monitor for reduced efficacy of both medications during concomitant use. Gepotidacin is a cholinesterase inhibitor. Anticholinergic medications and cholinesterase inhibitors antagonize each other.
Glucagon: (Major) The concomitant use of intravenous glucagon and anticholinergics increases the risk of gastrointestinal adverse reactions due to additive effects on inhibition of gastrointestinal motility. Concomitant use is not recommended.
Glycopyrronium: (Moderate) Although glycopyrronium is minimally absorbed into the systemic circulation after topical application, there is the potential for glycopyrronium to have additive anticholinergic effects when administered with other antimuscarinics. Per the manufaturer, avoid concomitant administration of glycopyrronium with other anticholinergic medications.
Guanidine: (Major) The muscarinic actions of drugs known as parasympathomimetics, including both direct cholinergic receptor agonists and cholinesterase inhibitors, can antagonize the antimuscarinic actions of anticholinergic drugs, and vice versa.
Haloperidol: (Moderate) Additive adverse effects resulting from cholinergic blockade may occur when hyoscyamine is administered concomitantly with haloperidol.
Homatropine; HYDROcodone: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant hydrocodone and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
hydroCHLOROthiazide, HCTZ; Moexipril: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
HYDROcodone: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant hydrocodone and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
HYDROcodone; Ibuprofen: (Moderate) Monitor for signs of urinary retention or reduced

gastric motility during concomitant hydrocodone and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
HYDROmorphone: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when hydromorphone is used concomitantly with an anticholinergic drug. The concomitant use of hydromorphone and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
hydrOXYzine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Ibritumomab Tiuxetan: (Moderate) Use anticholinergics, such as hyoscyamine, and concomitant solid oral dosage forms of potassium chloride with caution due to risk for gastrointestinal mucosal injury. Anticholinergics may decrease gastric motility and increase the transit time of solid oral dosage forms of potassium chloride leading to prolonged contact with the gastrointestinal mucosa.
Imipramine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
IncobotulinumtoxinA: (Moderate) The use of systemic antimuscarinic/anticholinergic agents following the administration of botulinum toxins may result in a potentiation of systemic anticholinergic effects (e.g., blurred vision, dry mouth, constipation, or urinary retention).
Ipratropium: (Moderate) Although ipratropium is minimally absorbed into the systemic circulation after inhalation, there is the potential for additive anticholinergic effects when administered with other antimuscarinic or anticholinergic medications. Per the manufacturer, avoid coadministration.
Ipratropium; Albuterol: (Moderate) Although ipratropium is minimally absorbed into the systemic circulation after inhalation, there is the potential for additive anticholinergic effects when administered with other antimuscarinic or anticholinergic medications. Per the manufacturer, avoid coadministration.
Irbesartan; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Itraconazole: (Moderate) Antimuscarinics can raise intragastric pH. This effect may decrease the oral bioavailability of itraconazole; antimuscarinics should be used

cautiously in patients receiving itraconazole.
Levocetirizine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant cetirizine and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Levorphanol: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when levorphanol is used concomitantly with an anticholinergic drug. The concomitant use of levorphanol and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Linaclotide: (Moderate) Anticholinergics can promote constipation and pharmacodynamically oppose the action of drugs used for the treatment of constipation or constipation-associated irritable bowel syndrome, such as linaclotide.
Lisinopril; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Losartan; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Loxapine: (Moderate) Loxapine has anticholinergic activity. The concomitant use of loxapine and other anticholinergic drugs can increase the risk of anticholinergic adverse reactions including exacerbation of glaucoma, constipation, and urinary retention. Depending on the agent used, additive drowsiness/dizziness may also occur.
Lubiprostone: (Moderate) Antimuscarinic drugs can promote constipation and pharmacodynamically oppose the action of drugs used for the treatment of constipation, such as lubiprostone. The clinical significance of these potential interactions is uncertain.
Lurasidone: (Moderate) Antipsychotic agents may disrupt core temperature regulation; therefore, caution is recommended during concurrent use of lurasidone and medications with anticholinergic activity such as antimuscarinics. Concurrent use of lurasidone and medications with anticholinergic activity may contribute to heat-related disorders. Monitor patients for heat intolerance, decreased sweating, or increased body temperature if lurasidone is used with antimuscarinics.
Macimorelin: (Major) Avoid use of macimorelin with drugs that may blunt the growth hormone response to macimorelin, such as antimuscarinic anticholinergic agents.

Healthcare providers are advised to discontinue anticholinergics at least 1 week before administering macimorelin. Use of these medications together may impact the accuracy of the macimorelin growth hormone test.
Magnesium Hydroxide: (Moderate) Antacids may inhibit the oral absorption of anticholinergics. Simultaneous oral administration should be avoided when feasible; separate dosing by at least 2 hours to limit an interaction.
Magnesium Salts: (Moderate) Antacids may inhibit the oral absorption of anticholinergics. Simultaneous oral administration should be avoided when feasible; separate dosing by at least 2 hours to limit an interaction.
Maprotiline: (Moderate) Additive anticholinergic effects may be seen when hyoscyamine is used concomitantly with other drugs with moderate to significant anticholinergic effects including maprotiline. Clinicians should note that antimuscarinic effects might be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation.
Meclizine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Memantine: (Moderate) The adverse effects of anticholinergics, such as dry mouth, urinary hesitancy or blurred vision may be enhanced with use of memantine; dosage adjustments of the anticholinergic drug may be required when memantine is coadministered. In addition, preliminary evidence indicates that chronic anticholinergic use in patients with Alzheimer's Disease may possibly have an adverse effect on cognitive function. Therefore, the effectiveness of drugs used in the treatment of Alzheimer's such as memantine, may be adversely affected by chronic antimuscarinic therapy.
Meperidine: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when meperidine is used concomitantly with an anticholinergic drug. The concomitant use of meperidine and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Methadone: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when methadone is used concomitantly with an anticholinergic drug. The concomitant use of methadone and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Metoclopramide: (Moderate) Drugs with significant antimuscarinic activity, such as

anticholinergics and antimuscarinics, may slow GI motility and thus may reduce the prokinetic actions of metoclopramide. Monitor patients for an increase in gastrointestinal complaints, such as reflux or constipation. Additive drowsiness may occur as well. The clinical significance is uncertain.
metOLazone: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Metoprolol; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Molindone: (Moderate) Antipsychotics are associated with anticholinergic effects; therefore, additive effects may be seen during concurrent use of molindone and other drugs having anticholinergic activity such as antimuscarinics. Clinicians should note that antimuscarinic effects may be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation. Additive drowsiness or other CNS effects may also occur.
Morphine: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant morphine and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Nalbuphine: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when nalbuphine is used concomitantly with an anticholinergic drug. The concomitant use of nalbuphine and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Neostigmine: (Major) The muscarinic actions of neostigmine can antagonize the antimuscarinic actions of hyoscyamine.
Neostigmine; Glycopyrrolate: (Major) The muscarinic actions of neostigmine can antagonize the antimuscarinic actions of hyoscyamine.
Nortriptyline: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
OLANZapine: (Moderate) Additive anticholinergic effects may be seen when olanzapine and anticholinergics are used concomitantly; use with caution. Use of olanzapine and other drugs with anticholinergic activity can increase the risk for severe gastrointestinal

adverse reactions related to hypomotility. Olanzapine exhibits anticholinergic activity. Adverse effects may be seen not only on GI smooth muscle, but also on bladder function, the CNS, the eye, and temperature regulation. Additive drowsiness may also occur, depending on the anticholinergic agent used.
OLANZapine; FLUoxetine: (Moderate) Additive anticholinergic effects may be seen when olanzapine and anticholinergics are used concomitantly; use with caution. Use of olanzapine and other drugs with anticholinergic activity can increase the risk for severe gastrointestinal adverse reactions related to hypomotility. Olanzapine exhibits anticholinergic activity. Adverse effects may be seen not only on GI smooth muscle, but also on bladder function, the CNS, the eye, and temperature regulation. Additive drowsiness may also occur, depending on the anticholinergic agent used.
OLANZapine; Samidorphan: (Moderate) Additive anticholinergic effects may be seen when olanzapine and anticholinergics are used concomitantly; use with caution. Use of olanzapine and other drugs with anticholinergic activity can increase the risk for severe gastrointestinal adverse reactions related to hypomotility. Olanzapine exhibits anticholinergic activity. Adverse effects may be seen not only on GI smooth muscle, but also on bladder function, the CNS, the eye, and temperature regulation. Additive drowsiness may also occur, depending on the anticholinergic agent used.
Oliceridine: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when oliceridine is used with hyoscyamine. Use of anticholinergics may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Olmesartan; amLODIPine; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Olmesartan; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Omeprazole; Sodium Bicarbonate: (Moderate) Separate the time of administration of oral hyoscyamine and oral sodium bicarbonate by at least 2 hours. Simultaneous coadministration may decrease oral hyoscyamine absorption and reduce efficacy.
OnabotulinumtoxinA: (Moderate) The use of systemic antimuscarinic/anticholinergic agents following the administration of botulinum toxins may result in a potentiation of systemic anticholinergic effects (e.g., blurred vision, dry mouth, constipation, or urinary retention).
Orphenadrine: (Moderate) Additive anticholinergic effects may be seen when

hyoscyamine is used concomitantly with other drugs with moderate to significant anticholinergic effects including orphenadrine.
oxyCODONE: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant oxycodone and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
oxyMORphone: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when oxymorphone is used concomitantly with an anticholinergic drug. The concomitant use of oxymorphone and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
PARoxetine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant anticholinergic medication and paroxetine use. Concomitant use may result in additive anticholinergic adverse effects.
Pentazocine; Naloxone: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when pentazocine is used concomitantly with an anticholinergic drug. The concomitant use of pentazocine and anticholinergic medications may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Perphenazine: (Moderate) Additive anticholinergic effects may be seen when anticholinergics are used concomitantly with phenothiazines, including perphenazine. Clinicians should note that antimuscarinic effects may be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation. Additive drowsiness or other additive CNS effects may also occur.
Perphenazine; Amitriptyline: (Moderate) Additive anticholinergic effects may be seen when anticholinergics are used concomitantly with phenothiazines, including perphenazine. Clinicians should note that antimuscarinic effects may be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation. Additive drowsiness or other additive CNS effects may also occur. (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Phentermine; Topiramate: (Moderate) Monitor for decreased sweating and increased body temperature, especially in hot weather, during concomitant use of topiramate and other drugs that predispose persons to heat-related disorders, such as anticholinergic medications. Concomitant use increases the risk for oligohidrosis and hyperthermia.

PHYSostigmine: (Major) The muscarinic actions of physostigmine can antagonize the antimuscarinic actions of hyoscyamine.
Pilocarpine: (Major) The muscarinic actions of drugs known as parasympathomimetics, including both direct cholinergic receptor agonists and cholinesterase inhibitors, can antagonize the antimuscarinic actions of anticholinergic drugs, and vice versa.
Potassium Bicarbonate: (Moderate) Use anticholinergics, such as hyoscyamine, and concomitant solid oral dosage forms of potassium chloride with caution due to risk for gastrointestinal mucosal injury. Anticholinergics may decrease gastric motility and increase the transit time of solid oral dosage forms of potassium chloride leading to prolonged contact with the gastrointestinal mucosa.
Potassium Chloride: (Moderate) Use anticholinergics, such as hyoscyamine, and concomitant solid oral dosage forms of potassium chloride with caution due to risk for gastrointestinal mucosal injury. Anticholinergics may decrease gastric motility and increase the transit time of solid oral dosage forms of potassium chloride leading to prolonged contact with the gastrointestinal mucosa.
Pralidoxime: (Major) The muscarinic actions of drugs known as parasympathomimetics, including both direct cholinergic receptor agonists and cholinesterase inhibitors, can antagonize the antimuscarinic actions of anticholinergic drugs, and vice versa.
Pramlintide: (Major) Pramlintide therapy should not be considered in patients taking medications that alter gastric motility, such as anticholinergics. Pramlintide slows gastric emptying and the rate of nutrient delivery to the small intestine. Medications that have depressive effects on GI could potentiate the actions of pramlintide.
Procainamide: (Moderate) The anticholinergic effects of procainamide may be significant and may be enhanced when combined with anticholinergics. Anticholinergic agents administered concurrently with procainamide may produce additive antivagal effects on AV nodal conduction, although this is not as well documented for procainamide as for quinidine.
Prochlorperazine: (Moderate) Additive anticholinergic effects may be seen when anticholinergics are used concomitantly with phenothiazines, including prochlorperazine. Clinicians should note that antimuscarinic effects may be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation. Additive drowsiness or other additive CNS effects may also occur.
Promethazine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant promethazine and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Promethazine; Dextromethorphan: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant promethazine and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Promethazine; Phenylephrine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant promethazine and hyoscyamine use.

Concomitant use may result in additive anticholinergic adverse effects.
Protriptyline: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Pseudoephedrine; Triprolidine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
pyRIDostigmine: (Major) The muscarinic actions of pyridostigmine can antagonize the antimuscarinic actions of hyoscyamine.
QUEtiapine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant quetiapine and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Quinapril; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
quiNIDine: (Major) Hyoscyamine may increase the absorption of quinidine by decreasing GI motility and thereby enhancing absorption with possible toxicity. Increased monitoring is advised in patients receiving a combination of these drugs.
Rasagiline: (Moderate) MAOIs exhibit secondary anticholinergic actions. Additive anticholinergic effects may be seen when MAOIs are used concomitantly with antimuscarinics. Clinicians should note that antimuscarinic effects might be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation. Additive CNS effects are also possible when many of these drugs are combined with MAOIs.
Remifentanil: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when remifentanil is used concomitantly with an anticholinergic drug. The concomitant use of remifentanil and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Revefenacin: (Moderate) Although revefenacin is minimally absorbed into the systemic circulation after inhalation, there is the potential for additive anticholinergic effects when administered with other antimuscarinics. Avoid concomitant administration with other anticholinergic and antimucarinic medications.
RimabotulinumtoxinB: (Moderate) The use of systemic antimuscarinic/anticholinergic agents following the administration of botulinum toxins may result in a potentiation of systemic anticholinergic effects (e.g., blurred vision, dry mouth, constipation, or urinary

retention).
Rivastigmine: (Moderate) The therapeutic benefits of rivastigmine, a cholinesterase inhibitor, may be diminished during chronic co-administration with antimuscarinics or medications with potent anticholinergic activity. When concurrent use is not avoidable, the patient should be monitored for cognitive decline and anticholinergic side effects. Clinicians should generally avoid multiple medications with anticholinergic activity in the patient with dementia. Some of the common selective antimuscarinic drugs for bladder problems, (such as oxybutynin, darifenacin, trospium, fesoterodine, tolerodine, or solifenacin), do not routinely cause problems with medications used for dementia, but may cause anticholinergic side effects in some patients. Atropine may be used to offset bradycardia in cholinesterase inhibitor overdose.
Secretin: (Major) Discontinue anticholinergic medications at least 5 half-lives before performing a secretin stimulation test. Anticholinergics may cause a hyporesponse to secretin stimulation testing and interfere with the test's diagnostic accuracy.
Sedating H1-blockers: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Sincalide: (Moderate) Sincalide-induced gallbladder ejection fraction may be affected by anticholinergics. False study results are possible in patients with drug-induced hyper- or hypo-responsiveness; thorough patient history is important in the interpretation of procedure results.
Sodium Bicarbonate: (Moderate) Separate the time of administration of oral hyoscyamine and oral sodium bicarbonate by at least 2 hours. Simultaneous coadministration may decrease oral hyoscyamine absorption and reduce efficacy.
Sodium Sulfate; Magnesium Sulfate; Potassium Chloride: (Moderate) Use anticholinergics, such as hyoscyamine, and concomitant solid oral dosage forms of potassium chloride with caution due to risk for gastrointestinal mucosal injury. Anticholinergics may decrease gastric motility and increase the transit time of solid oral dosage forms of potassium chloride leading to prolonged contact with the gastrointestinal mucosa.
Solifenacin: (Moderate) Additive anticholinergic effects may be seen when drugs with antimuscarinic properties like solifenacin are used concomitantly with other antimuscarinics. Blurred vision and dry mouth would be common effects. Clinicians should note that additive antimuscarinic effects may be seen not only on GI smooth muscle, but also on bladder function, the CNS, the eye, and temperature regulation. Additive drowsiness may also occur.
Spironolactone; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase

urinary frequency, which may aggravate bladder symptoms.
SUFentanil: (Moderate) Monitor patients for signs of urinary retention or reduced gastric motility when sufentanil is used concomitantly with an anticholinergic drug. The concomitant use of sufentanil and anticholinergic drugs may increase risk of urinary retention and/or severe constipation, which may lead to paralytic ileus. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect.
Tapentadol: (Moderate) Tapentadol should be used cautiously with anticholinergic medications since additive depressive effects on GI motility or bladder function may occur. Monitor patients for signs of urinary retention or reduced gastric motility. Opiates increase the tone and decrease the propulsive contractions of the smooth muscle of the gastrointestinal tract. Prolongation of the gastrointestinal transit time may be the mechanism of the constipating effect. Opiate analgesics combined with antimuscarinics can cause severe constipation or paralytic ileus, especially with chronic use. Additive CNS effects like drowsiness or dizziness may also occur.
Tegaserod: (Major) Drugs that exert significant anticholinergic properties such as antimuscarinics may pharmacodynamically oppose the effects of prokinetic agents such as tegaserod. Avoid administering antimuscarinics along with tegaserod under most circumstances. Inhaled respiratory antimuscarinics, such as ipratropium, are unlikely to interact with tegaserod. Ophthalmic anticholinergics may interact if sufficient systemic absorption of the eye medication occurs.
Telmisartan; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Tenapanor: (Moderate) Anticholinergics can promote constipation and pharmacodynamically oppose the action of drugs used for the treatment of constipation or constipation-associated irritable bowel syndrome, such as tenapanor.
Thiazide diuretics: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Thioridazine: (Moderate) Additive anticholinergic effects may be seen when drugs with anticholinergic properties like thioridazine are used concomitantly with anticholinergic agents. Adverse effects may be seen not only on GI smooth muscle, but also on bladder function, the CNS, the eye, and temperature regulation. Additive drowsiness may also occur, depending on the interacting agent.

Thiothixene: (Moderate) Anticholinergics may have additive effects with thiothixene, an antipsychotic with the potential for anticholinergic activity. Monitor for anticholinergic-related adverse effects such as xerostomia, blurred vision, constipation, and urinary retention during concurrent use.
Tiotropium: (Major) Avoid concomitant use of anticholinergic medications and tiotropium due to increased risk for anticholinergic adverse effects.
Tiotropium; Olodaterol: (Major) Avoid concomitant use of anticholinergic medications and tiotropium due to increased risk for anticholinergic adverse effects.
Tolterodine: (Moderate) Additive anticholinergic effects may be seen when tolterodine is used concomitantly with other antimuscarinics. When possible, avoid concurrent use, especially in the elderly, who are more susceptible to the anticholinergic effects. Consider alternatives to these other medications, if available. Clinicians should note that antimuscarinic effects might be seen not only on bladder smooth muscle, but also on GI function, the eye, and temperature regulation. Blurred vision, constipation, and dry mouth may be more prominent additive effects. With many of the listed agents, additive drowsiness may also occur when combined.
Topiramate: (Moderate) Monitor for decreased sweating and increased body temperature, especially in hot weather, during concomitant use of topiramate and other drugs that predispose persons to heat-related disorders, such as anticholinergic medications. Concomitant use increases the risk for oligohidrosis and hyperthermia.
traMADol: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant tramadol and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Tramadol; Acetaminophen: (Moderate) Monitor for signs of urinary retention or reduced gastric motility during concomitant tramadol and hyoscyamine use. Concomitant use may increase the risk of urinary retention and/or severe constipation, which may lead to paralytic ileus.
Triamterene; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Tricyclic antidepressants: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Trifluoperazine: (Moderate) Additive anticholinergic effects may be seen when anticholinergics are used concomitantly with phenothiazines, including trifluoperazine. Clinicians should note that antimuscarinic effects may be seen not only on GI smooth muscle, but also on bladder function, the eye, and temperature regulation. Additive drowsiness or other additive CNS effects may also occur.

Trimethobenzamide: (Moderate) Trimethobenzamide has CNS depressant effects and may cause drowsiness. The concurrent use of trimethobenzamide with other medications that cause CNS depression, like the anticholinergics, may potentiate the effects of either trimethobenzamide or the anticholinergic.
Trimipramine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant tricyclic antidepressant and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Triprolidine: (Moderate) Monitor for signs or symptoms of anticholinergic toxicity during concomitant sedating H1-blocker and hyoscyamine use. Concomitant use may result in additive anticholinergic adverse effects.
Trospium: (Moderate) Additive anticholinergic effects may be seen when trospium is used concomitantly with other antimuscarinics. When possible, avoid concurrent use, especially in the elderly, who are more susceptible to the anticholinergic effects. Consider alternatives to these other medications, if available. Clinicians should note that antimuscarinic effects might be seen not only on bladder smooth muscle, but also on GI function, the eye, and temperature regulation. Blurred vision, constipation, and dry mouth may be more prominent additive effects. With many of the listed agents, additive drowsiness may also occur when combined with trospium.
Umeclidinium: (Moderate) There is the potential for umeclidinium to have additive anticholinergic effects when administered with other anticholinergics or antimuscarinics. Per the manufaturer, avoid concomitant administration of umeclidinium with other anticholinergic medications when possible.
Umeclidinium; Vilanterol: (Moderate) There is the potential for umeclidinium to have additive anticholinergic effects when administered with other anticholinergics or antimuscarinics. Per the manufaturer, avoid concomitant administration of umeclidinium with other anticholinergic medications when possible.
Valsartan; hydroCHLOROthiazide, HCTZ: (Minor) Coadministration of thiazides and antimuscarinics (e.g., atropine and biperiden) may result in increased bioavailability of the thiazide. This is apparently a result of a decrease in gastrointestinal motility and rate of stomach emptying by the antimuscarinic agent. In addition, diuretics can increase urinary frequency, which may aggravate bladder symptoms.
Vibegron: (Moderate) Vibegron should be administered with caution in patients taking anticholinergics because of potential for an increased risk of urinary retention. Monitor for symptoms of urinary difficulties or urinary retention. Patients may note constipation or dry mouth with use of these drugs together.
Xanomeline; Trospium: (Moderate) Additive anticholinergic effects may be seen when trospium is used concomitantly with other antimuscarinics. When possible, avoid concurrent use, especially in the elderly, who are more susceptible to the anticholinergic effects. Consider alternatives to these other medications, if available. Clinicians should note that antimuscarinic effects might be seen not only on bladder smooth muscle, but

also on GI function, the eye, and temperature regulation. Blurred vision, constipation, and dry mouth may be more prominent additive effects. With many of the listed agents, additive drowsiness may also occur when combined with trospium.
Zonisamide: (Moderate) Zonisamide use is associated with case reports of decreased sweating, hyperthermia, heat intolerance, or heat stroke and should be used with caution in combination with other drugs that may also predispose patients to heat-related disorders like anticholinergics.

Adverse Reaction

anhidrosis, blurred vision, confusion, constipation, cycloplegia, dizziness, drowsiness, dysgeusia, dyspepsia, dysphagia, flushing, headache, ileus, impotence (erectile dysfunction), insomnia, mydriasis, nausea, palpitations, photophobia, psychosis, sinus tachycardia, urinary retention, vomiting, weakness, xerostomia

Adverse reactions to hyoscyamine are primarily due to its anticholinergic activity and are usually reversible when therapy is discontinued. The frequency and severity of adverse reactions are generally dose related and may be alleviated by a reduction in the hyoscyamine dose, however, dosage reduction may also eliminate any potential therapeutic effects of the drug. The most frequent adverse reactions associated with hyoscyamine therapy may include anhidrosis, blurred vision, confusion, constipation, cycloplegia, dizziness, drowsiness, dysgeusia, dyspepsia, dysphagia, flushing, headache, ileus, impotence (erectile dysfunction), mydriasis, nausea/vomiting, nervousness, palpitations, photophobia, sinus tachycardia, urinary retention or hesitancy, weakness, and xerostomia. In many patients, xerostomia is the dose-limiting adverse effect of anticholinergics. Saliva substitutes may be useful in patients who suffer this adverse effect. Insomnia and bloated feeling have also been reported. Infants, patients with Down's syndrome, and children with spastic paralysis or brain damage may be more sensitive to the mydriatic and positive chronotropic effects of anticholinergics. In patients with gastric ulcer, hyoscyamine may delay gastric emptying and cause antral stasis. Additionally, psychosis was reported in patients sensitive to anticholinergic drugs, and these symptoms included disorientation, memory impairment, hallucinations, dysarthria, ataxia, euphoria, anxiety, fatigue, agitation, and inappropriate affect. These effects typically resolve 12—48 hours after discontinuation of the drug.

lactation suppression

Adverse urogenital and reproductive effects that have been reported with the use of anticholinergic/antispasmodic drugs include impotence (erectile dysfunction), lactation suppression, urinary retention, and urinary hesitancy.

urticaria

Dermatologic adverse reactions that have been reported with the use of anticholinergic/antispasmodic drugs include allergic reactions, urticaria, and other dermal manifestations.

Description

L-Hyoscyamine is an oral and parenteral tertiary amine anticholinergic gastrointestinal agent. It is one of the optical isomers of atropine (dl-hyoscyamine). L hyoscyamine possesses all of the antimuscarinic activity; d-hyoscyamine essentially has no peripheral antimuscarinic activity. Hyoscyamine has been used as adjunct therapy in the management of peptic ulcer disease, hypermotility disorders of the lower urinary tract, infant colic, and as a preoperative medication to control salivation and excessive secretions. As with other antimuscarinic agents, there are no conclusive data from well-controlled studies that indicate that hyoscyamine aids in the healing, decreases the rate of occurrence, or prevents complications of peptic ulcers; more effective agents are available. Other indications for which hyoscyamine is FDA approved but have been replaced by more effective agents include biliary tract disorders, cystitis, and severe allergic rhinitis. Hyoscyamine has been available since before 1938. An orally disintegrating tablet was approved July 2000.

Mechanism Of Action

Hyoscyamine is a competitive inhibitor at autonomic postganglionic cholinergic receptors. These include receptors found in gastrointestinal and pulmonary smooth muscle, exocrine glands, the heart, and the eye. L-hyoscyamine does not block the actions of acetylcholine at the neuromuscular junction. The degree of sensitivity of various muscarinic receptors to antimuscarinic agents is dose-dependent. The most sensitive receptors are those of the salivary, bronchial, and sweat glands. Next are the receptors in the eye and heart, followed by the receptors in the gastrointestinal tract.

The principal clinical effects of l-hyoscyamine are a reduction in salivary, bronchial, and sweat gland secretions; mydriasis; cycloplegia; changes in heart rate; contraction of the bladder detrusor muscle and of the gastrointestinal smooth muscle; decreased gastric secretion; and decreased gastrointestinal motility. At lower doses, a paradoxical decrease in heart rate occurs, and at higher doses, effects are seen at nicotinic receptors in autonomic ganglia, causing restlessness, hallucinations, disorientation, and/or

delirium. Unlike scopolamine, l-hyoscyamine does not produce CNS depression (drowsiness, euphoria, amnesia, fatigue, decreased REM sleep) at usual therapeutic doses. Also, l-hyoscyamine's antimuscarinic potency is greater in the heart, bronchial, and gastrointestinal smooth muscle, and is lesser in the iris; ciliary body; and salivary, sweat, and bronchial glands.

The respiratory effects of l-hyoscyamine include reducing the volume of secretions from the nose, mouth, pharynx, and bronchi and relaxing smooth muscles of the bronchi and bronchioles, which decrease airway resistance. Since l-hyoscyamine is a potent bronchodilator, it is especially effective in blocking the acetylcholine-induced stimulation of guanyl cyclase, which is responsible for producing cyclic guanosine monophosphate (cGMP), a mediator of bronchoconstriction released from mast cells. These actions of l-hyoscyamine are useful, but controversial, in the treatment of antigen-, methacholine-, and exercise-induced bronchospasm in asthmatic patients.

Pharmacokinetics

Hyoscyamine sulfate is administered orally, sublingually, or parenterally. Once in the systemic circulation, hyoscyamine is well distributed throughout the body. The drug crosses the blood-brain barrier and small amounts distribute into milk and can be found in placental tissues. Protein binding is about 50%. Hyoscyamine is metabolized in the liver to tropic acid, tropine, and hyoscyamine glucuronide. Excretion occurs in the urine primarily as unchanged drug (approximately 30—50%) and metabolites. The elimination half-life in patients with normal renal function is about 3.5 hours.

Route-Specific Pharmacokinetics

- **Oral Route**

Following oral administration, hyoscyamine is well absorbed from the gastrointestinal tract. Food does not affect absorption. Extended release formulations deliver hyoscyamine at a rate of approximately 0.125 mg/4 hours. The relative bioavailability from extended-release capsules was reported to be about 43% that of the conventional tablets. The relative bioavailability from extended-release tablets was reported to be about 92% that of the conventional tablets. The onset of action is about 20—30 minutes after administration of conventional tablets. When the conventional tablets are chewed or administered sublingually or when administered orally as an elixir or solution, the onset of action is 5—20 minutes; peak pharmacologic effects occur within 30—60 minutes and lasts for about 4 hours. After administration of hyoscyamine sulfate extended-release capsules or tablets, the drug has an onset of action of about 20—30 minutes; pharmacologic effects peak within 40—90 minutes and persists for about 12 hours.

- **Intravenous Route**

Parenteral administration of hyoscyamine sulfate results in an onset of action of 2—3 minutes with peak pharmacologic effects occurring within 15—30 minutes and persisting for up to 4 hours.

- **Intramuscular Route**

Parenteral administration of hyoscyamine sulfate results in an onset of action of 2—3 minutes with peak pharmacologic effects occurring within 15—30 minutes and persisting for up to 4 hours.

- **Subcutaneous Route**

Parenteral administration of hyoscyamine sulfate results in an onset of action of 2—3 minutes with peak pharmacologic effects occurring within 15—30 minutes and persisting for up to 4 hours.

- **Renal Impairment**

The elimination of hyoscyamine is prolonged in patients with impaired renal function.

Administration

For storage information, see the specific product information within the How Supplied section.

Oral Administration

Oral Solid Formulations

Immediate-release dosage forms: Administer 30 to 60 minutes before meals.
Orally disintegrating tablets: Place on the tongue and allow the tablet to rapidly disintegrate and be swallowed. May be taken with or without water.
Sublingual tablets: The tablets may be taken sublingually, orally or chewed. If used sublingually, place under the tongue and allow to dissolve.

Extended or Sustained-release tablets: Selected products may be broken to titrate dosage; check manufacturer specific allowances. Do not crush or chew.

Sustained-release capsules: Product should be swallowed whole; do not cut, crush or chew.

Biphasic tablets (e.g., Symax Duotabs): Product should be swallowed whole; do not cut, crush or chew.

Oral Liquid Formulations

Oral solution drops: Administer only using the calibrated dropper provided with the product.

Oral elixir or solution: Administer using a calibrated measuring device.

Injectable Administration

Hyoscyamine sulfate may be administered intramuscularly, intravenously, or subcutaneously without dilution.
Visually inspect parenteral products for particulate matter and discoloration prior to administration whenever solution and container permit.

Intravenous Administration

Inject slowly IV.

Intramuscular Administration

Inject into a large muscle. Aspirate prior to injection to avoid injection into a blood vessel.

Subcutaneous Administration

Inject subcutaneously taking care not to inject intradermally.

Maximum Dosage Limits

- **Adults**
  4 oral biphasic tablets/day PO; all other oral dosage forms 1.5 mg/day PO; maximum IV dose is dependent on indication.
- **Geriatric**
  4 oral biphasic tablets/day PO; all other oral dosage forms 1.5 mg/day PO; maximum IV dose is dependent on indication.
- **Adolescents**
  4 oral biphasic tablets/day PO; all other oral dosage forms 1.5 mg/day PO; maximum IV dose is dependent on indication.
- **Children**

  >= 12 years: 4 oral biphasic tablets/day PO; all other oral dosage forms 1.5 mg/day

PO; maximum IV dose is dependent on indication.
2—11 years, weighing approximately 50 kg: 2 oral biphasic tablets/day PO; all other oral dosage forms 0.75 mg/day; 5 mcg/kg/dose given once IV, IM, or subcutaneous.
2—11 years, weighing approximately 40 kg: 2 oral biphasic tablets/day PO; oral elixir 22.5 mL/day (0.563 mg/day); all other oral dosage forms 0.75 mg/day; 5 mcg/kg/dose given once IV, IM, or subcutaneous.
2—11 years, weighing approximately 20 kg: 2 oral biphasic tablets/day PO; oral elixir 15 mL/day (0.375 mg/day); all other oral dosage forms 0.75 mg/day; 5 mcg/kg/dose given once IV, IM, or subcutaneous.
2—11 years, weighing approximately 10 kg: 2 oral biphasic tablets/day PO; oral elixir 7.5 mL/day (0.188 mg/day); all other oral dosage forms 0.75 mg/day; 5 mcg/kg/dose given once IV, IM, or subcutaneous.
< 2 years, weighing approximately 10 kg: Oral drops, 48 drops/day; safe and effective use of other dosage forms has not been established.
< 2 years, weighing approximately 7 kg: Oral drops, 36 drops/day; safe and effective use of other dosage forms has not been established.
< 2 years, weighing approximately 5 kg: Oral drops, 30 drops/day; safe and effective use of other dosage forms has not been established.
< 2 years, weighing approximately 3.4 kg: Oral drops, 24 drops/day; safe and effective use of other dosage forms has not been established.

- **Infants**
  Weighing approximately 10 kg: Oral drops, 48 drops/day; safety and efficacy of other dosage forms has not been established.
  Weighing approximately 7 kg: Oral drops, 36 drops/day; safety and efficacy of other dosage forms has not been established.
  Weighing approximately 5 kg: Oral drops, 30 drops/day; safety and efficacy of other dosage forms has not been established.
  Weighing approximately 3.4 kg: Oral drops, 24 drops/day; safety and efficacy of other dosage forms has not been established.

Dosage Forms

- Anaspaz 0.125mg Tablet
- Digex NF 0.0625mg-15mg Capsule
- Hyoscyamine Sulfate 0.125mg Oral disintegrating tablet
- Hyoscyamine Sulfate 0.125mg Oral tablet
- Hyoscyamine Sulfate 0.125mg Sublingual tablet
- Hyoscyamine Sulfate 0.125mg/1mL Oral drops, solution
- Hyoscyamine Sulfate 0.125mg/5mL Oral solution
- Hyoscyamine Sulfate 0.375mg Oral tablet, extended release

- Hyoscyamine Sulfate 0.5mg/1mL Solution for injection
- Hyoscyamine Sulfate Bulk powder
- Hyosyne 0.125mg/5ml Elixir
- Hyosyne 0.125mg/ml Drops
- Levbid 0.375mg Extended-Release Tablet
- Levsin 0.125mg Tablet
- Levsin SL 0.125mg Sublingual Tablet
- NuLev 0.125mg Chewable Melt Tablet
- OSCIMIN 0.125mg Sublingual Tablet
- OSCIMIN 0.125mg Tablet
- OSCIMIN SR 0.375mg Extended-Release Tablet
- Symax 0.125mg Sublingual Tablet
- Symax Duotab 0.125mg-0.250mg Biphasic Tablet
- Symax SR 0.375mg Extended-Release Tablet

Dosage Adjustment Guidelines

Hepatic Impairment

Specific guidelines for dosage adjustments in hepatic impairment are not available; it appears that no dosage adjustments are needed.

Renal Impairment

Specific guidelines for dosage adjustments in renal impairment are not available; it appears that no dosage adjustments are needed.