Medications for Respiratory Disorders -

Medication	Geriatric Dosing	Clinical Pearls	Class Clinical Pearls
Inhaled $Beta_2$-adrenergic agonists			
	See Table listing individual agents characterized by Activity and Delivery Mechanism Short-acting (SABA) vs. Long-acting (LABA) agents	Dosing depends on ability to coordinate actuation of hand held devices for metered dose inhalers or inspiration effort for dry powder inhalers. LABA agents are used for prevention of symptoms while SABA agents can be used for control of acute symptoms	MOA: functional antagonism to bronchoconstriction through beta2 adrenergic receptor stimulation ADRs: resting sinus tachycardia, cardiac rhythm disturbances in susceptible patients, tremor in elderly
Inhaled Anti-muscarinics			
	See Table listing individual agents characterized by Activity and Delivery Mechanism	Short-acting (SAMA) vs. Long-acting (LAMA) agents Dosing depends on ability to coordinate actuation of hand held devices for metered dose inhalers or inspiration effort for dry powder inhalers. LAMA agents are used for prevention of symptoms while SAMA agents can be used for control of acute symptoms	MOA: blocks M3 muscarinic receptors reducing Ach induced bronchoconstriction ADRs: dry mouth
Inhaled corticosteroids			
	See Table listing individual agents characterized by Activity and Delivery Mechanism Availability: MDI inhalers	ADRs: oral candidiasis, hoarse voice, skin bruising, increased risk pneumonia, enhance osteoporosis (bone fractures)	MOA: reduce inflammatory gene expression and inhibiting inflammatory cells
Systemic corticosteroids			
PO: IV:	prednisone 40mg once daily x 5 days methylprednisolone or hydrocortisone 60-125mg (once daily to QID) followed by PO prednisone for 5-7 total days	ADRs: serious adverse effects associated with high doses and long term use: increased glucose, truncal obesity and fat redistribution, thinning and discolored skin, decreased immune response, altered mental status, enhance osteoporosis (bone fractures),sodium retention leading to increased blood pressure and swelling, peptic ulcer, ophthalmic changes, impaired wound healing	MOA: reduce inflammatory gene expression and inhibiting inflammatory cells
Phosphodiesterase-4 inhibitors			
Roflumilast	250 mcg once daily for 4 weeks (improves tolerability) then increase to 500 mcg daily	ADRs: nausea, anorexia, weight loss, diarrhea, sleep disturbance, headache – occur early in treatment often causing discontinuation in trials – will diminish over time Availability: oral tablet No dose adjustment needed for renal impairment. Use contraindicated in moderate to severe liver disease	MOA: reduces cAMP breakdown in bronchial cells reducing bronchoconstriction, reduces number of eosinophils and neutrophils
Phosphodiesterase-3/4 inhibitors			
Ensifentrine	3 mg (one ampule) twice daily administered by oral inhalation	ADRs: back pain, hypertension, UTIs, pscyh events including suicidality	MOA: inhibitor of the PDE3 and PDE4

	using a standard jet nebulizer with a mouthpiece.		enzymes. PDE3 primarily hydrolyzes the second-messenger molecule cyclic adenosine monophosphate (cAMP) but is also capable of hydrolyzing cyclic guanosine monophosphate (cGMP). PDE4 hydrolyzes cAMP only. Inhibition of PDE3 and PDE4 results in accumulation of intracellular levels of cAMP and/or cGMP, resulting in various downstream signalling effects
Methylxanthines			
Theophylline	Individualized dosing based on steady-state serum concentrations Dose based on ideal body weight Loading dose of 5mg/kg using PO immediate release product (or 4.6mg/kg/dose IV) will result in serum concentration of approximately 10 mcg/ml	Methylxanthines not recommended unless inadequate response to other bronchodilators Availability: aminophylline (parenteral) or PO theophylline SR tablets ADRs: nausea, anorexia, diarrhea, restlessness, tremor, insomnia, headache, dizziness, restlessness, nervousness. Many drug interactions. Seizures and tachycardia/dysrhythmias at toxic levels. Low therapeutic index.	MOA: inhibits phosphodiesterase and possibly PDE4 producing bronchodilation and possible reduced inflammation

Brand Name	Ingredients	Dosing	MDI/DPI	SABA	LABA	SAMA	LAMA	ICS
ProAir, Proventil, Ventolin	Albuterol (salbutamol)	QID & PRN	MDI & DPI	X				
Xopenex	Levalbuterol	QID & PRN	MDI	X				
Perforomist	Formoterol	BID	Neb		X			
Striverdi	Olodaterol	Daily	SMI		X			
Serevent	Salmeterol	BID	MDI & DPI		X			
Atrovent	Ipratropium	QID & PRN	MDI			X		
Tudorza	Aclidinium	BID	DPI				X	
Lonhala	Glycopyrronate	BID	Neb				X	
Spiriva	Tiotropium	Daily	DPI & SMI				X	
Incruse	Umeclidinium	Daily	DPI				X	
Qvar	Beclomethasone	BID	MDI					X
Pulmicort	Budesonide	BID	MDI					X
Asmanex	Mometasone	Daily	MDI					X
ArmonAir, Arnuity	Fluticasone	BID	MDI & DPI					X
Combivent, DuoNeb	Albuterol (salbutamol) + Ipratropium	QID & PRN	MDI	X		X		
Dualklir	Formoterol + Aclidinium	BID	DPI		X		X	
Bevespi	Formoterol + Glycopyrronium	BID	MDI		X		X	
Anoro	Vilanterol + Umeclidinium	Daily	DPI		X		X	
Stiolto	Olodaterol + Tiotropium	Daily	SMI		X		X	
Symbicort	Formoterol + Budesonide	BID	MDI		X			X
Dulera	Formoterol + Mometasone	BID	MDI		X			X
Advair, AirDuo, Wixela	Salmeterol + Fluticasone	BID	MDI & DPI		X			X
Breo	Vilanterol + Fluticasone	Q Day	DPI		X			X
Trelegy	Vilanterol + Fluticasone +Umeclidinium	Q Day	DPI		X		X	X
Breztri	Budesonide + glycopyrrolate + formoterol	BID	MDI		X		X	X

Nasal steroids			
		Use of systemic glucocorticosteroids in rhinitis not recommended for allergic rhinitis in older patients Offer greater nasal symptom relief than topical antihistamines (H1 receptor antagonists) Well tolerated by the elderly Adverse reactions identical to those in younger population (epistaxis, dryness and burning sensation) Prolonged use often unblocks nose and improves olfaction	Localized anti-inflammatory activity with a low rate of side effects due to pharmacokinetic and pharmacodynamic characteristics
Beclomethasone	1 or 2 sprays each nostril twice daily		
Budesonide	1 spray each nostril once daily		
Ciclesonide	2 sprays each nostril once daily		
Flunisolide	2 sprays each nostril twice to three times daily		
Fluticasone	2 sprays each nostril once daily		
Mometasone	2 sprays each nostril once daily		
Triamcinolone	1-2 sprays each nostril once daily		
Antihistamines			
		First-generation antihistamines (diphenhydramine, others) not recommended for allergic rhinitis (especially in older patients) due to high risk of adverse reactions - anxiety, confusion, dyskinesias, sedation or sleepiness, arrhythmias, urinary disturbances, constipation, hypotension, memory dysfunction, and problems with kinetic coordination that lead to falls Available in drops and oral dosage forms Safety is based on a relatively low rate of passage across the blood–brain barrier Second generation H1-receptor antagonists less likely to cause adverse central nervous than old H1-antagonists in the elderly	Standard therapy for most types of allergic rhinitis, conjunctivitis and other allergic skin diseases Good oral absorption when administered orally, most provide effective plasma concentration within 3 hrs after oral administration
Fexofenadine	60 mg twice daily or 180 mg once daily		
Cetirizine	Max 5 mg once daily		
Loratadine	10 mg once daily		
Levocetirizine	2.5 to 5 mg once daily (in evening)		
Desloratadine	5 mg once daily		