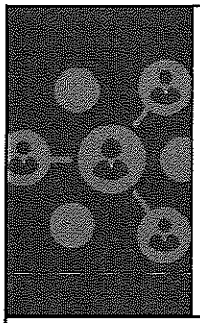

Reconnect & Rediscover:
A Convening Pediatric Experts and Advocates

Oct. 2-4, 2021

National Association of Pediatric Nurse Practitioners

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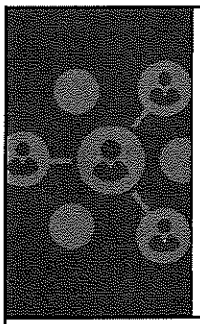

Prescribing Respiratory Medications for Children

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National Association of Pediatric Nurse Practitioners

2

Disclosures

- I have no financial relationships to disclose
- Off label use of remdesivir for COVID19 will be discussed

3

Learning Objectives

- At the end of this session participants will have up-to-date information pharmacological management of common respiratory illnesses in children
- At the end of this session participants will understand the safety and efficacy of respiratory medications in children

4

Common Pediatric Respiratory Disorders

- URI
- Bronchiolitis
- Croup
- Influenza
- Pneumonia
- Asthma
- Pertussis
- Measles
- Mumps
- Coronavirus

5

Viral Common Cold

- Rhinovirus (100 serotypes) most common virus (50%)
  - Adenovirus
  - RSV
  - Coronavirus
  - Enteroviruses/adenovirus
- In the northern hemisphere there is a predictable seasonal pattern (Pappas, 2019)
  - rhinovirus infections in September
  - followed by parainfluenza viruses in October and November
  - Winter months: respiratory syncytial virus, influenza virus, and coronavirus
  - a small wave of rhinovirus infections in March and April
  - Adenovirus infections are continuously present at a low rate throughout the common cold season.
- Children get 6 to 8 colds a year
- Last 7-10 days
- Significant runny nose and cough on days 1 to 4 predictive for viral origin

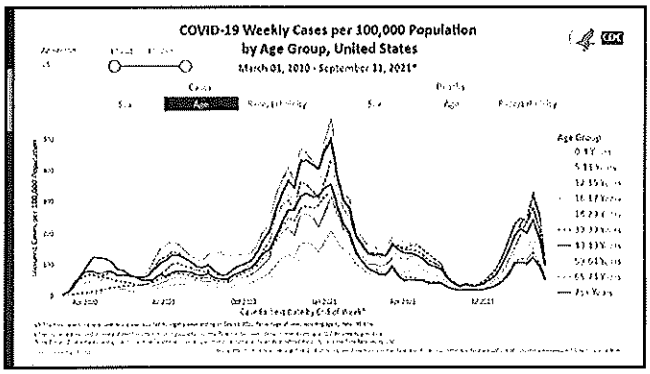
6

COVID-19 and Children

- Coronavirus in children
  - Common cold
  - Croup
  - Pneumonia
  - Middle ear infections
  - Common to be present with other viruses when cultured
- COVID19 and children (CDC, 2021)
  - 1-4 yrs: 749,951 cases, 2.3%
  - 5 to 11 yrs: 1,513,941 cases, 4.7%
  - 12 to 15 yrs: 1,287,211 cases, 4%
  - 16 to 17 yrs: 853,038 cases, 2.7%
  - Multisystem inflammatory syndrome in children (MIS-C)
    - As of 8/27/2021, CDC has received reports of 4,661 confirmed cases of MIS-C and 41 deaths

Coronavirus Disease 2019 (COVID-19) | CDC

7



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Treatment of COVID in Children (NIH, 2021)

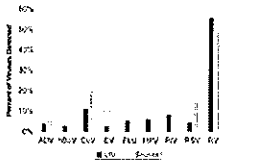
- Remdesivir is recommended for the treatment of COVID-19 in hospitalized patients with severe disease
  - No pediatric clinical trials
  - Remdesivir is available for children through an FDA Emergency Use Authorization
- Dexamethasone recommended for hospitalized children requiring high flow O2, ventilator or ECMO
- Panel recommends against convalescent plasma in children
- Supportive care is recommended for pediatric multisystem inflammatory syndrome

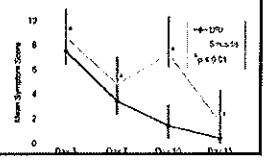
https://www.covid19treatmentguidelines.nih.gov/special-populations/children/

9

Viral URI vs Sinusitis

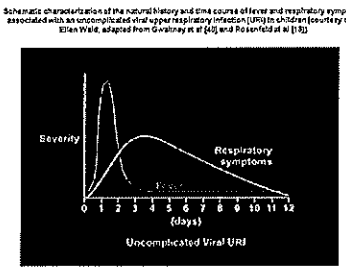
- Viruses identified 81% of URIs on Day 3
- Symptoms worse in URIs leading to sinusitis





DeMuri et al, 2019

10



11

URI Treatment: Decongestants

- Systemic Sympathomimetics
  - Pseudoephedrine
  - Phenylephrine
- Topical decongestants
  - Phenylephrine (Neosynephrine)
  - Oxymetazoline (Afrin)
- Honey
- Vick's Vaporub

12

Decongestants

- Comparison of decongestant use before and after health advisory
  - nearly 20% of children age 12-23.9 months with severe bronchiolitis received cough and cold medications (O'Donnell et al, 2015)
- Small adult study (N = 10) found that pseudoephedrine decreases middle ear pressures (Teixeira et al, 2015)
- Cochrane Review of use of decongestants for common cold in Oct 2016 (Deckx et al, 2016)
  - "Insufficient good-quality evidence to draw any firm conclusions"

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Honey for Cough

- Cochrane Review of 6 RCTs (Oduwole et al, 2018)
- Honey may be better than placebo for reduction of cough frequency
- Honey may be better than 'no treatment' in reducing the frequency of cough
- Honey does not differ significantly from dextromethorphan in reducing cough frequency
  - DMX has more ADRs
- Honey (10ml) + milk (90 ml) before bed is as effective as DM (Micali Sopo et al, 2015)
- Sucrose increases the cough threshold (Wise et al, 2012)
- Polysaccharide-resin-honey vs mucolytic (Cohen et al, 2017)

(Oduwole, Meremikwu & Oyo-Ita, 2014; Grogan & Egitto, 2016)

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Chronic Wet Cough

- Systematic review (Chang et al, 2016; Chang et al, 2017)
- Chronic cough is defined as *daily cough* for 4 weeks or longer
- In children aged ≤ 14 years with chronic (> 4 weeks' duration) wet or productive cough, the use of appropriate antibiotics improves cough resolution. (high-quality)
- When specific cough pointers (eg, digital clubbing) are present in children with wet cough, further investigations should be conducted. (high-quality)
- When the wet **cough** does not improve after 4 weeks of antibiotic treatment, children should be referred to determine whether an underlying lung or other disease is present. (moderate quality)

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Cough Suppressants

- Dextromethorphan
- Codeine
- Action: centrally acting cough suppressant
- Evidence:
  - Codeine no more effective than DM or placebo
  - Little efficacy in cough d/t URI
  - Approximately 5-10% of Caucasians are poor DXM metabolizers
  - DXM + antidepressants may induce serotonergic syndrome
- Codeine cough and cold medications
  - European Medicines Agency (EMA) April 2015
  - FDA July 2015 announced safety investigation
  - FDA April 2017 codeine contraindicated in children < 12 yrs
  - FDA January 2018 label changed to limit opioid cough and cold medications to adults age 18 yrs or older

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Dextromethorphan

- Onset of CNS effects within 20 minutes
- Extensively metabolized in the liver by CYP 2D6
  - Poor metabolizers unable to convert dextromethorphan to dextrophan, leading to toxicity
  - Extensive 2D6 metabolizers may experience more euphoria
- Adverse events (N 1716) reported to poison center or FDA (Paul et al, 2016)
  - Central nervous system [e.g., ataxia (N = 420)]
  - Autonomic symptoms [e.g., tachycardia (N = 224)]
  - Flushing and/or urticarial rash occurred in 18.1%
  - Dystonia occurred in 5.4%.

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Expectorants

- Guaifenesin (Robitussin)
- Action: stimulates respiratory tract secretions, decreases viscosity of respiratory secretion
- Evidence:
  - No evidence for efficacy in chronic cough or cough d/t URI
  - Study on adults: 1200mg Mucinex® for cough clearance in acute upper respiratory infection -> NO effect on cough or mucociliary clearance (vs placebo) (Bennett et al, 2015)
  - "disconnect between marketing claims and evidence" for the use of mucolytics (Weinberger & Hendeles, 2018)

18

Vick's Vaporub

- For both cough severity and cough frequency, VR was significantly better than no treatment (P<.01)
  - Only marginally better than petrolatum
- Children treated with VR were significantly more able to sleep
- Toxicity concerns addressed
- Menthol vapor increases cough threshold (Wise et al, 2012)

Paul et al, 2010

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URI Treatment

- Symptomatic care
  - Fluids, antipyretics
  - Nasal bulb suctioning in infants
  - Honey for cough (> age 1 yr)
  - Decongestants in older children
- No antibiotics
  - No difference in clinical outcomes
- No homeopathic remedies (Hawke et al, 2018)

20

Vitamin D and URIs

- Canadian study of 3 to 15 yr olds (N = 743) Science, M. et al. (2013)
  - Measured 25(OH)D levels and followed through winter months
  - Lab confirmed URIs
  - Lower serum 25(OH)D levels were associated with increased risk of laboratory-confirmed viral respiratory infections
- Vitamin D deficiency increased risk of wheezing with viral URI 23.57 times in children (Eroglu et al, 2019)

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Bronchiolitis

- Respiratory syncytial virus (RSV)
- Meta-analysis of 51 bronchiolitis studies (Kenmoe et al., 2020)
  - RSV 59%
  - Rhinovirus 19.3%
  - Human bocavirus 8.2%
  - Adenovirus 6%
  - Parinfluenza virus 5.4%
  - Human metapneumovirus 5.4%
  - Influenza 2.9%
  - Coronavirus 2.1%
  - Enterovirus 2.86%

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AAP Bronchiolitis Guidelines

- DIAGNOSIS
  - 1a. Diagnose bronchiolitis and assess disease severity on the basis of history and physical examination
  - 1b. Assess risk factors for severe disease
  - 1c. No routine radiographic or laboratory studies

AAP Committee on Infectious Disease and Bronchiolitis Committee (2014)

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2014 AAP Bronchiolitis Guidelines

- TREATMENT
  - No albuterol
  - No epinephrine
  - No nebulized hypertonic saline in ED
  - May administer nebulized hypertonic saline to infants and children hospitalized for bronchiolitis
    - May not make a difference (Flores et al, 2016; Silver et al., 2016)
  - No systemic corticosteroids
  - No antibiotics
  - Administer NG or IV fluids if not able to maintain hydration orally

AAP Committee on Infectious Disease and Bronchiolitis Committee (2014)

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2014 AAP Bronchiolitis Guidelines

- PREVENTION – palivizumab
  - 5 monthly doses (15 mg/kg/dose) of palivizumab during the respiratory syncytial virus season
  - First year of life
    - Gestational < age 29 weeks, 0 days
    - Hemodynamically significant heart disease or chronic lung disease of prematurity defined as preterm infants <32weeks 0days' gestation who require >21% oxygen for at least the first 28 days of life
  - Second year of life
    - chronic lung disease of infancy and continue to require supplemental oxygen or medical therapy

AAP Committee on Infectious Disease and Bronchiolitis Committee (2014)

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Bronchiolitis - Nasal Irritation

- Infants who presented to ED with bronchiolitis and O2 sats 88 to 94%
- Nasal irrigation with isotonic saline or hypertonic saline
- Isotonic saline nasal irrigation had statistically significant better scores for sats, wheeze, resp rate and retractions at 5 min, 15 min, 20 min and 50 minutes

Schreiber et al, 2016

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Bronchiolitis Treatment Research

- IV magnesium single 100 mg/kg dose (Alansari et al, 2017)
  - No improvement over standard therapy
- Nebulized hypertonic saline (≥ 3%)
  - Shorter length of hospital stay
  - Low quality evidence for use in outpatient setting
  - Zhang et al (2017) Cochrane Review; Zhang et al, 2018
  - Meta-analysis of the use of 3% nebulized saline decreased hosp stay by 0.54 days (Hseih, et al, 2020)

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RSV Vaccine Development

- Active immunization in neonates and young infants is challenging due to maternal antibodies
  - May need maternal vaccine
  - Maternal vaccines in phase I testing
- Older infants and children have more mature immune system and lower maternal antibodies
  - Live attenuated vaccine
  - Several in Phase I testing

Kim, L. (2016) July ACIP 2016 meeting

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Croup

- Laryngotracheobronchitis
- Parainfluenza viruses
  - Also influenza, hMPV, adenovirus, coronavirus
- Treatment
  - Supportive care
  - Dexamethasone (0.6 mg/kg) x1
    - Systemic corticosteroids decrease symptoms and the rate of hospital admissions in patients with severe croup (Biegelman et al, 2015)
  - Oral or IM same results
  - Nebulized epinephrine

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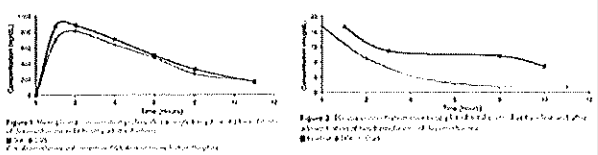
Injectable dexamethasone orally?

- In order to be bioequivalent the FDA requires 90% confidence interval between serum concentrations (Cmax, AUC)
- "DPSI given orally is absorbed sufficiently for use in the ED"



(Toledo et al, 2015)

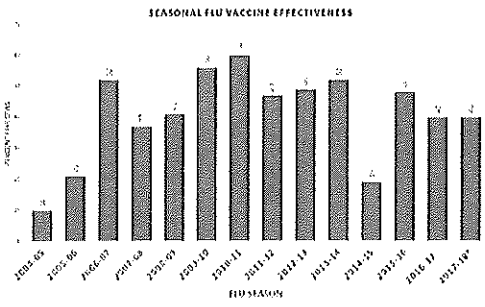
30

Influenza

- 2019-2020 season
  - 136 pediatric deaths (119 last year)
  - Widespread influenza
- "Good" year vaccine is 50% to 60% effective
- Influenza should be high on list of diagnosis
- Highest risk of complications
  - > 65 yrs of age
  - < 5 yrs of age – greatest risk in < 2 yrs

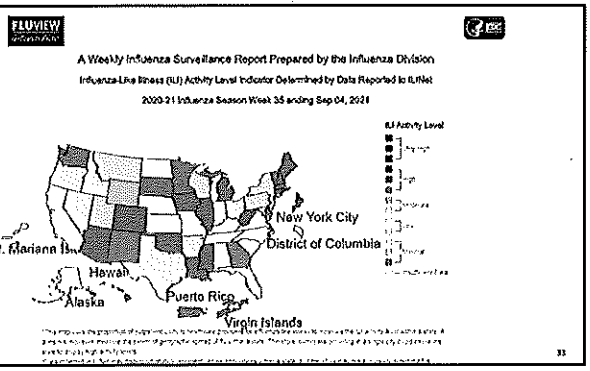
CDC.gov/flu

31



https://www.cdc.gov/flu/professionals/vaccination/effectiveness-studies.htm

32



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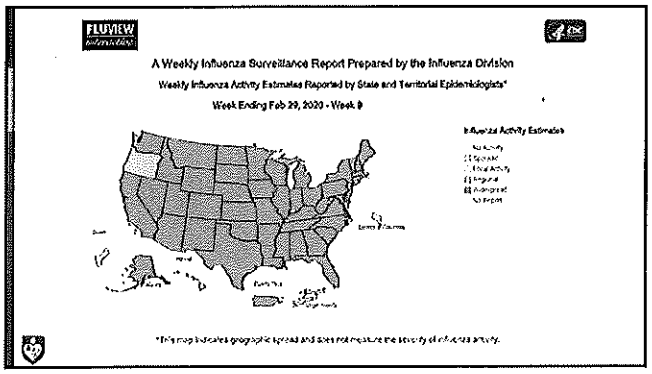
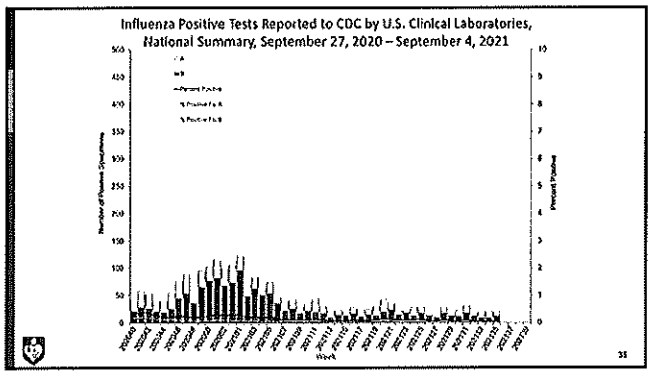
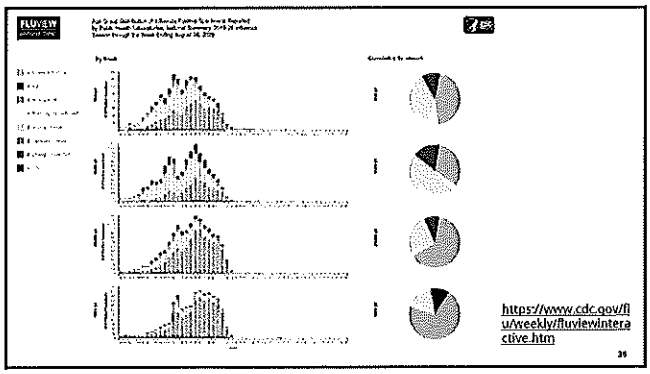

FLUVIEW
A Weekly Influenza Surveillance Report Prepared by the Influenza Division
Weekly Influenza Activity Estimates Reported by State and Territorial Epidemiologists*
Week Ending Feb 29, 2020 - Week 9
Influenza Activity Estimates

34


Influenza Positive Tests Reported to CDC by U.S. Clinical Laboratories,
National Summary, September 27, 2020 – September 4, 2021
Number of Positive Specimens
Percent Positive
Week

35


FLUVIEW
https://www.cdc.gov/flu/weekly/fluviewinteractive.htm

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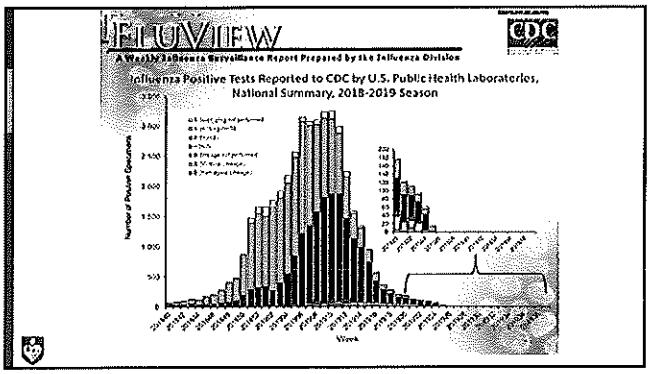

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Influenza Vaccine effectiveness 2019-2020

- All vaccine types, against influenza A or B viruses
  - All ages 39% effective
  - 6 mo to 8 yrs – 33% effective
  - 9yr to 17 yr – 37% effective
- Effectiveness against influenza A(H1N1)pdm09 viruses
  - All ages 31%
  - 6 mo to 8 yrs – 22%
  - 9 yrs to 17 yrs – 29%
- Effectiveness against influenza B/Victoria viruses
  - All 44%
  - 6m to 8 yrs – 38%
  - 9 yrs to 17 yrs – 39%

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Oseltamivir (Tamiflu®) – Treatment

- **Treat for 5 days**
- **If younger than 1 yr old[1]:**
  3 mg/kg/dose twice daily
  If 1 yr or older, dose varies by child's weight:
  15 kg or less, the dose is 30 mg **twice** a day
  >15 to 23 kg, the dose is 45 mg **twice** a day
  >23 to 40 kg, the dose is 60 mg **twice** a day
  >40 kg, the dose is 75 mg **twice** a day
- **Adults:** 75 mg **twice** daily

http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm#dosage

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Oseltamivir (Tamiflu®) – Prophylaxis

- **Chemo-prophylaxis (7 days)**
- **If child is 3 months or older and younger than 1 yr old**
  3 mg/kg/dose once daily
  If 1 yr or older, dose varies by child's weight:
  15 kg or less, the dose is 30 mg **once** a day
  >15 to 23 kg, the dose is 45 mg **once** a day
  >23 to 40 kg, the dose is 60 mg **once** a day
  >40 kg, the dose is 75 mg **once** a day
- **Adults**: 75 mg **once** daily

http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm#dosage

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Zanamivir (Relenza®) inhalation

Use	Children	Adults
Treatment (5 days)	10 mg (two 5-mg inhalations) twice daily (FDA approved and recommended for use in children 7 yrs or older)	10 mg (two 5-mg inhalations)twice daily
Chemo-prophylaxis (7 days)	10 mg (two 5-mg inhalations) once daily (FDA approved for and recommended for use in children 5 yrs or older)	10 mg (two 5-mg inhalations)once daily

http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm#dosage

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Baloxavir (Xofluza) oral

- FDA approved and recommended for use in children 12 yrs or older weighing at least 40 kg
- Dose
  - 40 to <80 kg: One 40 mg dose
  - ≥80 kg: One 80 mg dose

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Peramivir (Rapivab)

- FDA approved for IV administration for early treatment of uncomplicated influenza in age 2 yrs or older
- Neuraminidase Inhibitor
- One dose within 48 hours of symptom onset.
- Dose by weight:
  - 40 kg to 80 kg: 40 mg
  - > 80 kg: 80 mg
- Avoid co-administration with dairy products, calcium-fortified beverages, polyvalent cation-containing laxatives, antacids, or oral supplements (e.g., calcium, iron, magnesium, selenium, or zinc).
- Safety and efficacy in patients less than 12 years of age or weighing less than 40 kg have not been established

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Flu Surveillance

- www.cdc.gov/flu
- Weekly flu activity surveillance
- Virologic surveillance
  - Prevalence of Type A or B, plus subtypes
- Resistance patterns

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Pertussis

- 2017 18,975 cases
- 2018 15,609 cases
- 2019 18,617 cases

- DTaP vaccine coverage (CDC, 2020)
  - 2018 children 19-35 mo ≥ 3 doses: 95.1% ≥ 4 doses: 87.9%
  - 2018-2019 kindergarten rates: 94.9%
- Tdap (2020) one dose by age 17 yrs: 90.1%

- January 2020 ACIP Recommendation: may use Tdap for all booster doses

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Pertussis Treatment

- If treatment is started early, symptoms may be lessened
- Treat persons aged >1 year within 3 weeks of cough onset and infants aged <1 year and pregnant women (especially near term) within 6 weeks of cough onset
- Consider treating before test results are available

www.cdc.gov/pertussis

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Pertussis Treatment

- Erythromycin, clarithromycin, and azithromycin are preferred for the treatment of pertussis in persons ≥1 month of age.
- For infants <1 month of age, azithromycin is preferred
- ≥2 months of age, an alternative is trimethoprim-sulfamethoxazole

www.cdc.gov/pertussis

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Pertussis Treatment

Antibiotic	Patient Age	Dose	Length of Treatment
Azithromycin	<6 months	10 mg/kg per day	5 days
	children aged ≥ 6 months	10 mg/kg (maximum: 500 mg) on day 1, followed by 5 mg/kg per day (maximum: 250 mg) on days 2–5	5 days
	Adults	500 mg on day 1, followed by 250 mg per day on days 2–5	5 days
Erythromycin	Infants aged <1 month	not preferred because of risk for IHPS	
	≥1 month	40–50 mg/kg per day (maximum: 2 g per day) in 4 divided doses	14 days
	Adults	2 g per day in 4 divided doses	14 days

www.cdc.gov/pertussis

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Pertussis

- A person is infectious from the beginning of the catarrhal stage through the third week after the onset of paroxysms or until 5 days after the start of effective antimicrobial treatment.
- Post-exposure prophylaxis to asymptomatic household contacts within 21 days of onset of cough
- Treat post-exposure with same antibiotics as for pertussis

www.cdc.gov/pertussis

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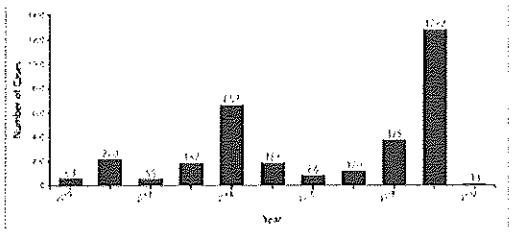
Number of measles cases reported by year

2010-2020*(as of December 31, 2020)



https://www.cdc.gov/measles/cases-outbreaks.html

50

Measles

- Measles is transmitted by direct contact with infectious droplets
- Fever, cough, coryza, and conjunctivitis, followed by a maculopapular rash beginning on the face and spreading cephalocaudally and centrifugally
- The incubation period generally is 8 to 12 days from exposure to onset of symptoms.
- In family studies, the average interval between appearance of rash in the index case and subsequent cases is 14 days, with a range of 7 to 21 days.

AAP Redbook, 20121

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Measles Treatment

- No specific antiviral therapy
- The WHO recommends vitamin A for all children with acute measles, regardless of their country of residence.
- Vitamin A for treatment of measles is administered once daily for 2 days, at the following doses:
  - 200 000 IU for children 12 months or older
  - 100 000 IU for infants 6 through 11 months of age
  - 50 000 IU for infants younger than 6 months.
  - A 3rd dose is given 2 to 6 wks later to children with clinical signs of Vit A deficiency

AAP Redbook, 2021, WHO 2021

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Measles: Care of Exposed People

- < 6 mo of age: give IG and quarantine for 28 days
- Measles vaccine within 72 hrs of exposure
- Immune Globulin (IG) can be administered either intramuscularly (IGIM) or intravenously (IGIV) within 6 days of exposure
  - IGIM 0.50 mL/kg IM (max. dose by volume is 15 mL)
  - IGIV (400 mg/kg) is the recommended IG preparation for:
    - Pregnant women; severely immunocompromised hosts; bone marrow transplant; patients on treatment for ALL within and until at least 6 months after completion of immunosuppressive chemotherapy; and HIV infection
    - Home quarantine for 28 days after exposure
- Give measles vaccine 6 mo after IGIM dose

AAP Redbook, 2021

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MMR Vaccine

- Immunization During an Outbreak
  - Infants 6 through 11 months of age
    - Does not "count," will need MMR at 12 to 15 mo
- International Travel
  - Infants 6 through 11 mo: 1 of MMR vaccine before departure
    - Does not "count," will need MMR at 12 to 15 mo
  - Children 12-15 mo: give first dose of MMR vaccine before departure, second dose at age 4 to 6 yr
  - ≥ 12 months who have received 1 dose and traveling to areas where measles is endemic or epidemic get their second dose before departure, provided the interval between doses is 28 days or more
- Outbreak Control
  - All 6 to 11 mo olds at risk for exposure are vaccinated
  - Preschoolers get a second dose

AAP Redbook, 2021

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Mumps

- Spread by droplets
- Fever, headache, muscle aches, swollen parotid glands
  - Fever may persist for 3–4 days and parotitis, when present, usually lasts 7–10 days.
- Incubation period for mumps is 16-18 days, with a range of 12–25 days.
- Infectious from 1-2 days before until 5 days after onset of parotitis
- If collecting the specimen from a buccal swab massage the parotid for 30 sec before specimen collection

www.cdc.gov/mumps; AAP Redbook 2021

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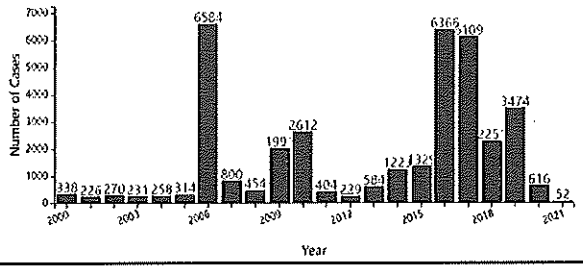
Reported Mumps Cases by Year — United States, 2000–2021*



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Mumps

- Outbreak Control
  - Administer second dose to 1-4 yr olds and anyone else who only had one dose
  - Isolate anyone with zero doses of MMR
    - from 12th day after exposure to 25th day after exposure
  - A third dose of MMR should be administered to target populations during an outbreak

www.cdc.gov/mumps

MMWR 67(1):33–38; AAP Redbook 2021

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Asthma: 2020 Focused Update to NHLBI guidelines for treatment

- Fractional exhaled nitric oxide (FeNO) may be a useful indicator of inflammation in the airway in age > 5 yrs
- FeNO may be useful in monitoring asthma in > 5 yrs:
  - Individuals ages 5 years and older with uncontrolled persistent asthma who are currently taking an ICS or an ICS with a long-acting beta2-agonist, montelukast, or omalizumab
  - Individuals whose symptoms indicate that they might require additional anti-inflammatory therapy
  - Individuals with atopy, especially children
  - FeNO is not accurate in children 0 to 4 yrs

https://www.nhlbi.nih.gov/health-topics/asthma-management-guidelines-2020-updates

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Asthma: 2020 Focused Update to NHLBI guidelines for treatment

- In children 0-4 yrs with recurrent wheezing with RTIs the EP recommends a short course of daily ICS at onset of RTI with prn SABA
- In ≥ 4 yrs with mild to moderate asthma on daily ICS, intermittent increase of ICS is not recommended
- In ≥ 4 yrs with moderate to persistent asthma the EP recommends ICS-formoterol used as both daily controller and reliever therapy
  - Do not exceed 8 puffs (4 to 11 yrs) or 12 puffs (12 yrs or older)

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Asthma: 2020 Focused Update to NHLBI guidelines – role of immunotherapy

- In age 5 yrs or older with mild to moderate allergic asthma, the EP recommends SC immunotherapy as an adjunct
- The panel recommends against sublingual immunotherapy

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Prednisone vs Dexamethasone

- Multiple studies comparing dexamethasone vs prednisone
- Shorter hospital stays if dexamethasone started in ED
- Outpatient studies
  - 2 doses of dexamethasone (0.6 mg/kg/dose) vs 5 days of prednisone (1.5 mg/kg.day) (Panlagua et al, 2017)
  - Dexamethasone (2 day course) vs prednisone (5 day course): rates of hospital admissions, ED visits, and symptom follow-up were similar between the 2 groups (Volk et al, 2018)

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COVID-19 and asthma *(as at April 3, 2020)*

- Advise patients with asthma to continue taking their prescribed asthma medications, particularly *inhaled corticosteroids* (ICS), and oral corticosteroids (OCS) if prescribed
  - Asthma medications should be continued as usual. Stopping ICS often leads to potentially dangerous worsening of asthma
  - For patients with severe asthma: continue biologic therapy, and do not suddenly stop OCS if prescribed
- Make sure that all patients have a *written asthma action plan* with instructions about:
  - Increasing controller and reliever medication when asthma worsens
  - Taking a short course of OCS for severe asthma exacerbations
  - When to seek medical help
  - See the GINA 2020 report for more information about treatment options for asthma action plans.
- *Avoid nebulizers* where possible
  - Nebulizers increase the risk of disseminating virus to other patients AND to health care professionals
  - Pressurized metered dose inhaler via a spacer is the preferred treatment during severe exacerbations, with a [illegible] face mask if required

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COVID-19 and asthma *(as at April 26, 2021)*

- *Avoid spirometry* in patients with confirmed/suspected COVID-19
  - Spirometry can disseminate viral particles and expose staff and patients to risk of infection
  - While community transmission of the virus is occurring in your region, postpone spirometry and peak flow measurement within health care facilities unless there is an urgent need
  - Follow contact and droplet precautions
- *Follow strict infection control procedures* if aerosol-generating procedures are needed
  - For example: nebulization, oxygen therapy (including with nasal prongs), sputum induction, manual ventilation, non-invasive ventilation and intubation
  - World Health Organization (WHO) infection control recommendations are found here: www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125
- *Follow local health advice* about hygiene strategies and use of personal protective equipment, as new information becomes available in your country or region

https://ginasthma.org/reports/

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Asthma management in children (GINA, 2020)

- School-based programs that included asthma self-management are associated with improved asthma outcomes *(Kircele et al, Thorax 2019)*
  - Fewer emergency department visits
  - Fewer hospitalizations
  - Fewer days of reduced activity
- Severe eosinophilic asthma in children aged 6-11 years
  - Mepolizumab approved by European Medicines Agency for this age-group (already approved for 12 years and older)
  - Efficacy data are limited to one small uncontrolled open-label study *(Gupta et al, JACI 2019)*
- Children aged 5 years and younger
  - Assessment of severe exacerbations updated: respiratory rate >40/min added; pulse rate criteria modified; sub-glottic/sub-sternal retractions removed as too subjective

https://ginasthma.org/reports/

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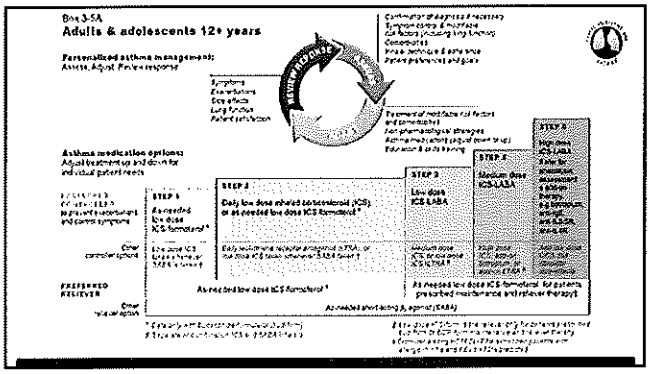

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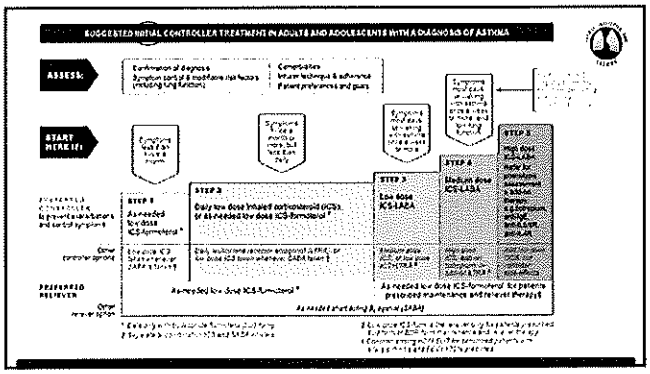

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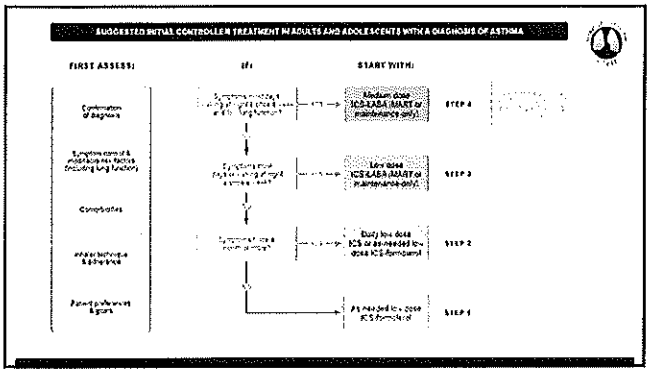
SUGGESTED INITIAL CONTROLLER TREATMENT IN ADULTS AND ADOLESCENTS WITH A DIAGNOSIS OF ASTHMA
FIRST ASSESS:
IF:
START WITH:
STEP 4
STEP 3
STEP 2
STEP 1

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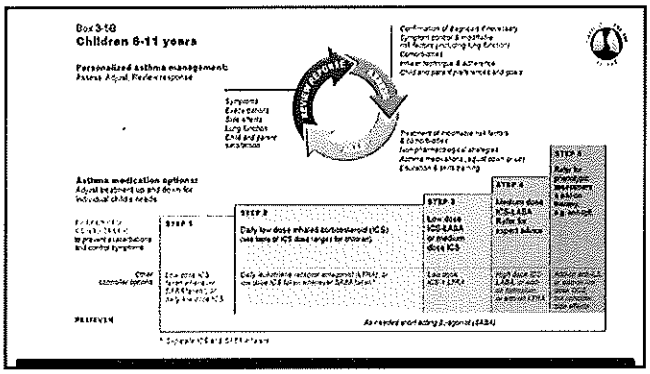
Box 3-1B
Children 6-11 years
Personalized asthma management
Assess, Adjust, Review response
Asthma medication options
STEP 1
STEP 2
STEP 3
STEP 4
RELIEVER

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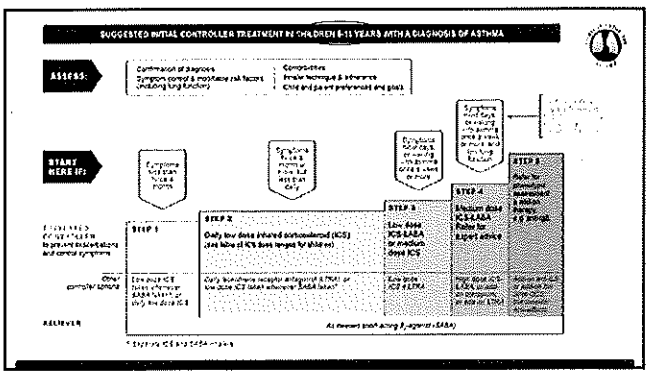
SUGGESTED INITIAL CONTROLLER TREATMENT IN CHILDREN 6-11 YEARS WITH A DIAGNOSIS OF ASTHMA
ASSESS:
START HERE IF:
STEP 1
STEP 2
STEP 3
STEP 4
RELIEVER

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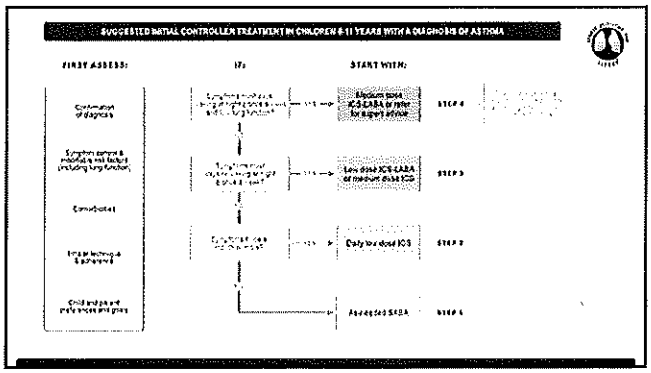

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Adverse effects with montelukast

- FDA boxed warning in March 2020 about risk of serious neuropsychiatric events, including suicidality, with montelukast
  - Includes suicidality in adults and adolescents
  - Nightmares and behavioral problems in children
- Before prescribing montelukast, health professionals should consider its benefits and risks, and patients should be counse

FDA requires Boxed Warning about serious mental health side effects for asthma and allergy drug montelukast (Singulair); advises restricting use for allergic rhinitis

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Allergic Rhinitis

- 2015 Clinical Practice Guideline for age 2 years and older
  - Seidman, MD et al (2015). Clinical Practice Guideline: Allergic Rhinitis. *Otolaryngology—Head and Neck Surgery, 152*(1S), S1-S43.
  - Recommendations for testing and treatment for children and adults
  - www.entnet.org/content/clinical-practice-guideline-allergic-rhinitis
- 2018 American Academy of Allergy, Asthma and Immunology (AAAAI) and the American College of Allergy, Asthma and Immunology (ACAAI), for age 12 years and older

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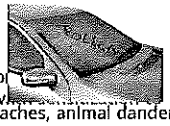
Allergic Rhinitis

- Diagnosis is made by history and physical exam
  - Nasal congestion
  - Runny nose
  - Clear rhinorrhea
  - Pale discoloration of nasal mucosa
  - Post nasal drip
  - Cough
  - Itchy nose
  - Sneezing
  - Red/watery eyes
- Seasonal disease: symptoms vary with seaso
- Perennial: symptoms tend to be associated v
  indoor allergens, such as dust mites, cockroaches, animal dander, and molds



Michael D. Seidman et al. Otolaryngology – Head and Neck Surgery 2015;152:S1-S43

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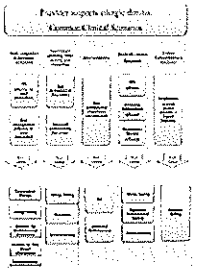
Common allergic rhinitis clinical scenarios.



Michael D. Seidman et al. Otolaryngology – Head and Neck Surgery 2015;152:S1-S43

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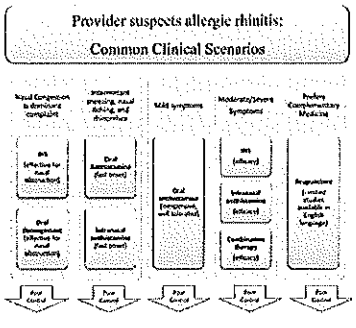

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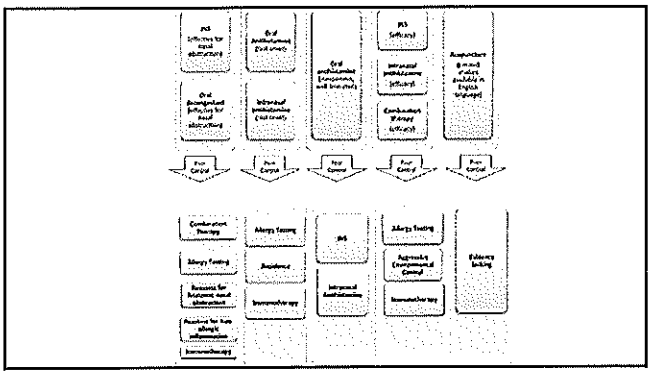

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Intranasal Corticosteroids

Generic name	Brand Name(s)	Usual Pediatric Dose per Nostril
Ciclesonide	Omnaris (50 mcg/spray)	2 to 11 years: One or two sprays once daily ≥12 years: Two sprays once daily
Fluticasone furoate	Flonase Sensimist (OTC) (27.5 mcg/spray)	One or two sprays once daily; in children 2 to 11 years, start with one spray once daily
Fluticasone propionate	Flonase Allergy Relief (OTC)	4 to 11 years: One spray once daily ≥12 years: Two sprays once daily or one spray twice daily
Mometasone	Nasonex (50 mcg/spray)	2 to 11 years: One spray once daily ≥12 years: Two sprays once daily
Budesonide	Rhinocort Allergy (OTC)	One to two sprays once daily; in children 6 to 11 years, start with one spray twice daily

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Intranasal Corticosteroids

Generic name	Brand Name(s)	Usual Pediatric Dose per Nostril
Beclomethasone	Beconase AQ (42 mcg/spray)	One or two sprays twice daily; in children 6 to 11 years, start with one spray twice daily
	Pediatric: Qnasl Children's (40 mcg/spray) Adolescent/adult: Qnasl (80 mcg/spray)	4 to 11 years: One spray once daily using 40 mcg/spray product ≥12 years: Two sprays once daily using 80 mcg/spray product
Flunisolide	Generic (formerly Nasarel) (25 mcg/spray)	6 to 14 years: One spray three times daily or two sprays twice daily ≥15 years: Two sprays two or three times daily
Triamcinolone	Nasacort Allergy 24 Hr (OTC)	2 to 5 years: One spray once daily ≥6 years: One to two sprays once daily; in children 6 to 11 years, start with one spray once daily

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Oral Antihistamines

- Cetirizine (Zyrtec)
  - Approved age ≥ 6 months
- Levocetirizine (Xyzal)
  - Approved age ≥ 6 months
- Fexofenadine (Allegra)
  - Approved age ≥ 2 yrs
- Loratadine (Claritin, Alavert)
  - Approved age ≥ 2 yrs
- Desloratadine (Clarinex)
  - Approved age ≥ 6 months

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Intranasal Antihistamines

- Olopatadine (Patanase)
  - Approved age ≥ 6 yrs
  - 6 to 11 years is 1 spray per nostril BID
  - children ≥12 years and adults is 2 sprays BID
- Azelastine 0.1% soln (Astelin)
  - Approved age ≥ 6 yrs
  - 1 spray per nare BID
- Azelastine 0.15% soln (Astepro)
  - Approved age ≥ 6 yrs 1 spray per nare BID
- Azelastine plus fluticasone (Dymista)
  - Approved age ≥ 12 yrs
  - 1 spray per nostril BID

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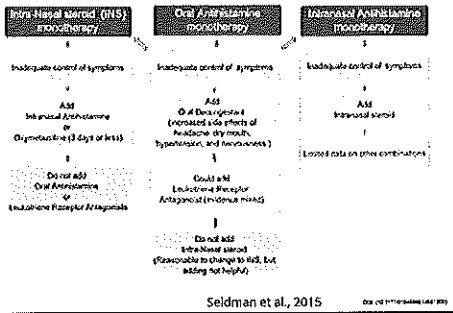
Recommendations for adding a second medication to treat allergic rhinitis



Seidman et al., 2015

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(AAAAI) and (ACAAI) 2018 Guidelines

- Initial treatment of seasonal allergic rhinitis in age 12 years or older
  - Initial therapy: intranasal corticosteroids
- Intranasal corticosteroids are preferred over leukotrienes in patients age 15 yrs or older
- In patients age 12 yrs or older with severe symptoms there seems to be a benefit of combining intranasal antihistamines with intranasal corticosteroids

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Questions?

- twoo@stmartin.edu

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