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# Cough

Office Hours Telephone Triage Protocols | Pediatric | 2020

## DEFINITION

- A cough is the sound made when the cough reflex suddenly forces air and secretions from the lungs
- A coughing spasm is over 5 minutes of continuous, uncontrollable coughing
- Caution: You must rule out respiratory distress in these calls

## TRIAGE ASSESSMENT QUESTIONS

### Call EMS 911 Now

- Severe difficulty breathing (struggling for each breath, unable to speak or cry because of difficulty breathing, making grunting noises with each breath)  
*Triage Tip: Listen to the child's breathing.*
- Child has passed out or stopped breathing  
*R/O: apnea, anaphylaxis, cough syncope*
- Lips or face are bluish (or gray) when not coughing  
*R/O: cyanosis and need for oxygen*
- Sounds like a life-threatening emergency to the triager

### See More Appropriate Protocol

- Stridor (harsh sound with breathing in) is present  
*Go to Protocol: Croup (Pediatric)*
- Hoarse voice with deep barking cough and croup in the community  
*Go to Protocol: Croup (Pediatric)*
- Choked on a small object or food that could be caught in the throat  
*Go to Protocol: Choking - Inhaled Foreign Body (Pediatric)*
- Previous diagnosis of asthma (or RAD) OR regular use of asthma medicines for wheezing  
*Go to Protocol: Asthma Attack (Pediatric)*
- Age < 2 years and given albuterol inhaler or neb for home treatment to use within the last 2 weeks  
*Go to Protocol: Bronchiolitis Follow-up Call (Pediatric)*
- Wheezing is present, but NO previous diagnosis of asthma or NO regular use of asthma medicines for wheezing  
*Go to Protocol: Wheezing - Other Than Asthma (Pediatric)*
- Coughing occurs within 21 days of whooping cough EXPOSURE  
*Go to Protocol: Whooping Cough Exposure (Pediatric)*

### Go to ED Now

- Choked on a small object that could be caught in the throat  
*R/O: airway FB*
- Blood coughed up (Exception: blood-tinged sputum)  
*R/O: pneumonia, FB, tuberculosis*
- Ribs are pulling in with each breath (retractions) when not coughing  
*R/O: pneumonia*

### Go to ED/UCC Now (or to Office with PCP Approval)

- Age < 12 weeks with fever 100.4° F (38.0° C) or higher rectally  
*R/O: sepsis*
- Difficulty breathing present when not coughing  
*Triage Tip: Listen to the child's breathing.*
- Rapid breathing (Breaths/min > 60 if < 2 mo; > 50 if 2-12 mo; > 40 if 1-5 years; > 30 if 6-11 years; > 20 if > 12 years old)  
*R/O: respiratory distress. Caution: do not attribute abnormal RR to fever.*
- Lips have turned bluish during coughing, but not present now  
*R/O: bronchiolitis, FB, or pertussis*
- Can't take a deep breath because of chest pain  
*R/O: pneumonia, pleurisy*
- Stridor (harsh sound with breathing in) is present  
*R/O: croup*
- Fever and weak immune system (sickle cell disease, HIV, chemotherapy, organ transplant, chronic steroids, etc)  
*R/O: serious bacterial infection*
- High-risk child (e.g., underlying heart, lung or severe neuromuscular disease)  
*Reason: high risk for respiratory distress*
- Child sounds very sick or weak to the triager  
*Reason: severe acute illness or serious complication suspected*

### Go to Office Now

- Drooling or spitting out saliva (because can't swallow) (Exception: normal drooling in young children)  
*R/O: peritonsillar abscess, retropharyngeal abscess*
- Wheezing (purring or whistling sound) occurs
- Age < 3 months old (Exception: coughs a few times)  
*R/O: pneumonia, chlamydia, pertussis*
- Dehydration suspected (e.g., no urine in > 8 hours, no tears with crying, and very dry mouth)

- Fever > 105° F (40.6° C)

*R/O: serious bacterial infection*

### See Today in Office

- Chest pain that's present even when not coughing  
*R/O: pleurisy*
- Continuous (nonstop) coughing  
*R/O: asthma*
- Age < 2 years and ear infection suspected by triager  
*Reason: recognizes child too young to report earache*
- Fever present > 3 days  
*R/O: pneumonia*
- Fever returns after going away > 24 hours and symptoms worse or not improved  
*R/O: otitis media or sinusitis (if symptoms better, probably onset of new URI)*

### See Today or Tomorrow in Office

- Earache  
*R/O: otitis media*
- Sinus pain (not just congestion) persists > 48 hours after using nasal washes (Age: 6 years or older)  
*R/O: sinusitis*
- Age 3-6 months and fever with cough

### See Within 3 Days in Office

- Vomiting from hard coughing occurs 3 or more times
- Coughing has kept home from school for 3 or more days
- Pollen-related cough not responsive to antihistamines  
*R/O: asthma*
- Nasal discharge present > 14 days  
*R/O: strep rhinitis in infants, sinusitis, allergic rhinitis*
- Whooping cough in the community and coughing lasts > 2 weeks
- Cough has been present > 3 weeks  
*R/O: asthma, exercise-induced bronchospasm, FB, smoking in teens*
- Concerns about vaping or smoking  
*Reason: discuss health risks with HCP*
- Triager thinks child needs to be seen for non-urgent problem

- Caller wants child seen for non-urgent problem

## Home Care

- Cough (lower respiratory infection) with no complications
- Pollen-related cough (allergic cough)

## HOME CARE ADVICE FOR COUGH

- 1. Reassurance and Education:**
  - It doesn't sound like a serious cough.
  - Coughing up mucus is very important for protecting the lungs from pneumonia.
  - We want to encourage a productive cough, not turn it off.
- 2. Homemade Cough Medicine:**
  - **Age 3 Months to 1 year:** Give warm clear fluids (e.g., apple juice or lemonade) to thin the mucus and relax the airway. Dosage: 1-3 teaspoons (5-15 ml) four times per day.
  - **Note to Triager:** Option to be discussed only if caller complains that nothing else helps: Give a small amount of corn syrup. Dosage: ¼ teaspoon (1 ml). Can give up to 4 times a day when coughing. Caution: Avoid honey until 1 year old (Reason: risk for botulism)
  - **Age 1 Year and Older:** Use honey 1/2 to 1 tsp (2 to 5 ml) as needed as a homemade cough medicine. It can thin the secretions and loosen the cough. (If not available, can use corn syrup.) OTC cough syrups containing honey are also available. They are not more effective than plain honey and cost much more per dose.
  - **Age 6 Years and Older:** Use cough drops (throat drops) to decrease the tickle in the throat. If not available, can use hard candy. Avoid cough drops before 6 years. Reason: risk of choking.
- 3. OTC Cough Medicine (DM):**
  - OTC cough medicines are not recommended. (Reason: no proven benefit for children and not approved by the FDA in children under 6 years old)
  - Honey has been shown to work better. Caution: Avoid honey until 1 year old.
  - If the caller insists on using one AND the child is over 6 years old, help them calculate the dosage.
  - Use one with dextromethorphan (DM) that is present in most OTC cough syrups.
  - Indication: Give only for severe coughs that interfere with sleep, school or work.
  - DM Dosage: See Dosage table. Teen dose 20 mg. Give every 6 to 8 hours.
- 4. Coughing Fits or Spells - Warm Mist and Fluids:**
  - Breathe warm mist (such as with shower running in a closed bathroom).
  - Give warm clear fluids to drink. Examples are apple juice and lemonade. Don't use warm fluids before 3 months of age.
  - Amount. If 3 - 12 months of age, give 1 ounce (30 ml) each time. Limit to 4 times per day. If over 1 year of age, give as much as needed.
  - Reason: Both relax the airway and loosen up any phlegm.
- 5. Vomiting from Coughing:**
  - For vomiting that occurs with hard coughing, reduce the amount given per feeding (e.g., in infants, give 2 oz. or 60 ml less formula)
  - Reason: Cough-induced vomiting is more common with a full stomach.
- 6. Encourage Fluids:**
  - Encourage your child to drink adequate fluids to prevent dehydration.
  - This will also thin out the nasal secretions and loosen the phlegm in the airway.

7. **Humidifier:**
  - If the air is dry, use a humidifier (reason: dry air makes coughs worse).
8. **Fever Medicine:**
  - For fever above 102° F (39° C), give acetaminophen (e.g., Tylenol) or ibuprofen.
  - For fevers 100-102 F (37.8 to 39 C), fever medicines are not needed. Reason: Fever turns on your body's immune system. Fever helps fight the infection.
9. **Avoid Tobacco Smoke:**
  - Active or passive smoking makes coughs much worse.
10. **Contagiousness:**
  - Your child can return to day care or school after the fever is gone and your child feels well enough to participate in normal activities.
  - For practical purposes, the spread of coughs and colds cannot be prevented.
11. **Expected Course:**
  - Viral coughs normally last 2 to 3 weeks.
  - Antibiotics are not helpful.
  - Sometimes your child will cough up lots of phlegm (mucus). The mucus can normally be gray, yellow or green.
12. **Call Back If:**
  - Difficulty breathing occurs
  - Wheezing occurs
  - Fever lasts over 3 days
  - Cough lasts over 3 weeks
  - Your child becomes worse
13. **Extra Advice: Pollen-Related Allergic Cough -Antihistamines**
  - Reassurance: Pollens usually cause a reaction in the nose and eyes. In some children with hay fever, cough is one of the main symptoms. Treatment of the nasal symptoms usually also brings the cough under control.
  - Antihistamines can bring an allergic cough and nasal allergy symptoms under control within 1 hour.
  - Benadryl or Chlorpheniramine (CTM) products are very effective and OTC.
  - They need to be given every 6 to 8 hours (See Dosage table).
  - Zyrtec or Claritin can also be used for an allergic cough (See Dosage table). They have the advantage of being long-acting (24 hours) and not causing much drowsiness.

## FIRST AID

N/A

## BACKGROUND INFORMATION

### Causes of Cough

- **Common Cold.** Most coughs are part of a cold that includes the lower airway. The medical name is viral bronchitis. The bronchi are the lower part of the airway that go to the lungs. Bronchitis in children is always caused by a virus. This includes cold viruses, influenza and croup. Bacteria do not cause bronchitis in healthy children.
- **Sinus Infection.** The exact mechanism is unknown. It may be that post-nasal drip irritates the lower

throat. Or pressure within the sinus may trigger the cough reflex.

- **Allergic Cough.** Some children get a cough from breathing in an allergic substance. Examples are pollens or cats. Allergic coughs can be controlled with allergy medicines, such as Benadryl.
- **Asthma.** Asthma is the most common cause of chronic coughs in children. In adults, it's smoking.
- **Air Pollution Cough.** Fumes of any kind can irritate the airway and cause a cough. Tobacco smoke is the most common example. Others are auto exhaust, smog and paint fumes.
- **Exercise Induced Cough.** Running will make most coughs worse. If the air is cold or polluted, coughing is even more likely.
- **Serious Causes.** Pneumonia, bronchiolitis, whooping cough and airway foreign body (object)

### **Cough Variant Asthma**

- Asthma is the most common cause of chronic cough in children.
- Some 25% of children with asthma only cough and never wheeze (called cough variant asthma).
- The cough is usually dry (nonproductive). Coughing spells can come on suddenly.
- The coughing spells have the same triggers as asthma attacks.
- The lung exam and all asthma tests are normal.
- Cough variant asthma is treated with asthma meds. It responds best to inhaled steroids. Antihistamines sometimes help.

### **Respiratory Distress Severity**

- **Mild:** no SOB at rest, mild SOB with walking, speaks normally in sentences, can lay down flat, no retractions.
- **Moderate:** SOB at rest, speaks in phrases, prefers to sit (can't lay down flat), mild retractions.
- **Severe:** severe SOB at rest, speaks in single words, struggling to breathe, severe retractions. (Exception: These symptoms are transient and only present when coughing).

### **Respiratory Distress (also known as Working Hard to Breathe or Shortness of Breath)**

- Always rule out respiratory distress. Listen for grunting, stridor, wheezing, tachypnea in respiratory calls.
- How to assess: Listen to the child's breathing early in your assessment. Reason: What you hear is more valid than the caller's answers to your triage questions.
- Reason: It's the leading cause of ED under-referral and adverse outcomes in the first 3 years of life.

### **Trouble Breathing: How to Discuss Respiratory Distress with Callers**

- Trouble breathing is a reason to see a doctor right away.
- Here are symptoms to watch for:
- Struggling for each breath or shortness of breath
- Tight breathing so that your child can barely speak or cry
- Ribs are pulling in with each breath (called retractions)
- Breathing has become noisy (such as wheezes)
- Lips or face turn a blue color

### **Sputum or Phlegm**

- Yellow or green phlegm is a normal part of the healing process of viral bronchitis.
- This means the lining of the trachea was damaged by the viral infection and is being coughed up as new mucosa replaces it.
- Bacteria do not cause bronchitis in healthy children. Purulent sputum is a poor predictor for bacterial superinfection. Antibiotics are not indicated for the yellow or green phlegm seen with colds.
- The main treatment of a productive cough is to facilitate it with good fluid intake, a humidifier (if the

air is dry) and warm chicken broth or apple juice for coughing spasms (if over age 1).

### **Productive Coughs Don't Help with Etiology**

- Dry coughs usually turn into wet (productive) coughs during the course of a lower respiratory tract infection.
- Few coughs remain only dry or only wet.
- The amount of mucus production does not help determine etiology.
- There are no nonproductive cough organisms or productive cough organisms.
- That is why there are no separate Productive Cough and Non-Productive Cough guidelines.

### **Congestion - Types**

Congestion means different things to different people. None of the causes are usually urgent. Ask a few questions to determine which of the following 4 protocols would be most helpful:

- **Colds:** Use for nasal congestion. This is a common problem for infants.
- **Cough:** Use for chest congestion or "rattles" (vibrations) in the chest.
- **Ear Congestion:** Use for a blocked ear, muffled hearing or ear popping sensation.
- **Sinus Pain or Congestion:** Use for a blocked sinus, sinus pressure or head congestion.

### **Benign Causes of Noisy Breathing without Respiratory Distress**

- Mechanism: Noisy breathing is due to vibrations set up somewhere in the airway (nose, throat, vocal cords, windpipe, bronchi or lungs)
- Rattling Sounds: Rattling sounds are due to vibrations from mucus pooling in the lower throat or larynx (not the lungs). These transmitted sounds can be eliminated by coughing or swallowing. Temporarily placing an infant on his stomach (prone) while observed often helps. Many parents are needlessly concerned about a "rattly chest". (See Cough)
- Snorting Sounds: Most of these daytime sounds are from vibrations in the nose - usually partial blockage by nasal mucus. If the snorting makes your child uncomfortable, the problem can be eliminated by warm water or saline nosedrops and nasal suction. (See Colds)

### **Continuous or Nonstop Coughing: How to Define**

- Caution: Don't directly ask the caller, "Is the coughing continuous or nonstop?" You will commonly trigger a positive response that is false. Instead ask questions about what the cough keeps the child from doing (function).
- **First:** To qualify as continuous coughing, the coughing needs to greatly interfere with function.
- The baby or child is not able to sleep for more than a 30 minutes at a time. Then he's fully awake and crying again. Coughing during sleep does not count.
- The baby or child cannot drink adequate fluids. In babies, formula intake is less than half of normal intake. Recent research found this to be associated with hypoxia.
- The baby or child is not able to play.
- **Second:** The severe, tight coughing should be heard at the time of the call. In fact, for any respiratory call about a child less than 2 years old, our policy is that the nurse needs to listen to the child's breathing over the phone. Listening early in assessment may help reduce call time.
- **Third:** The baby or child must fail to improve on standard treatment advice before referring them to be seen urgently. That means they have already tried warm fluids, honey (if 1 year or older), warm mist, nasal suctioning with saline drops.
- Reasons for seeing these children: Many of them are hypoxic, especially if they are infants.

### **Home Remedies for Infants**

- Giving apple juice or corn syrup for cough are not evidence based.

- But both are safe, unlike OTC cough medicines.
- The warm apple juice has been in the Cough protocol since 2000.
- It was added for parents who want to be giving their baby something. It may have placebo value.
- The corn syrup is a safe replacement for honey. Honey (for children over age 1) of course has 2 published studies to support its efficacy.
- If the reader has a more effective home treatment, for cough, please share it with the author.

### **Dextromethorphan Cough Medicines**

- The most common cough suppressant in OTC cough medications is dextromethorphan. Usually the letters 'DM' appear in the name. An example is Robitussin DM.
- Some research (Kelly 2004) suggests that dextromethorphan is no better than placebo at reducing the severity and frequency of coughing in children.
- The care advice in these protocols continues to support DM containing cough syrups for children over 6 years of age with a severe cough if the caller insists on using one. The rationale for this is: patients may benefit from the placebo effect of DM, many parents demand a recommendation for a cough syrup even after being told about honey, and generally DM has no side effects.
- Cough drops can often be substituted for cough syrups after age 6. While some would consider them a placebo similar to cough medicines, they may actually reduce coughing by soothing an irritated throat. In addition they have the advantage of portability. While cough drops with DM are available, they offer no advantage over plain cough drops and are not worth the added expense.
- It is important to note that dextromethorphan has become a drug of abuse. This problem has been seen most commonly in the adolescent population. Overdose symptoms can range from giggling, euphoria, to hallucinations or coma. (See Substance Abuse protocol for details)

### **Codeine Medications for Coughs - Never Recommend in Children or Teens**

- Prescription cough syrups containing codeine have long been available. It is available OTC in some states.
- An FDA advisory panel (2015) recommended that codeine not be used for the treatment of cough in children under the age of 18. Also do not prescribe codeine products to breastfeeding mothers.
- Reasons to not use: risk of serious side effects. In overdose, it has the unpredictable risk of respiratory depression, slowed breathing and respiratory arrest. Mechanism: Some patients have the gene to rapidly convert codeine to morphine. Also, codeine and hydrocodone are opioids. Exposure to opioid drugs can increase the risk of future opioid addiction.
- Resource: Tobias JD. AAP Committee on Drugs. Pediatrics 2016.

### **Cough and Cold Medicines: FDA Recommendation (October 2008)**

In October 2007, the AAP and other experts testified before the FDA about the safety of cough and cold medicines for young children. According to FDA data from 1969 to 2006, adverse reactions included 54 deaths from decongestants and 69 deaths from antihistamines. To put this in perspective, that's 3.3 reported deaths per year. The majority occurred in children younger than 2 years of age. In January 2008, the FDA issued a strong recommendation that parents "not use OTC cough and cold products to treat infants and children less than 2 years of age". In October 2008, the FDA supported changing this cutoff to 6 years of age. These recommendations have been implemented within the related guidelines. In addition, the information has been added to all the Dosage Tables for OTC medicines.

- Under 6 years of age: advise callers that OTC cough and cold medicines should never be used in this age group because of potential serious side effects. They also lack efficacy. (FDA recommendation October 2008)
- Over 6 years of age: advise callers that the best treatment for coughs is honey or cough drops. The best treatment for nasal congestion is nasal washes with saline drops or spray. However, if a parent wants to use a cough or cold medicine, help them calculate a safe dosage. (FDA advisory panel has



no recommendation at this time)

- For all ages, discourage the use of multiple-ingredient cough and cold medicines. (Reason: risk of overdose).

### **Honey as a Cough Syrup: Proven Efficacy**

- A 2007 study compared the efficacy of honey to DM to no treatment for nocturnal coughing.
- Honey consistently scored the best for reducing cough frequency and cough severity. It also scored best for improving sleep.
- DM did not score significantly better than no treatment at all.
- The study group contained 105 children age 2 to 18 years.
- The dose of honey used was ½ tsp (2 ml) for 2-5 year-olds, 1 teaspoon for 6 to 11 year-olds, and 2 tsp for 12 to 18 year-olds. A single dose was given at bedtime.
- One explanation for how honey works is that sweet substances naturally cause reflex salivation and increased airway secretions. These secretions may lubricate the airway and remove the trigger (or tickle) that causes a dry, nonproductive cough.
- Paul IM. Arch Pediatr Adolesc Med. 2007; 161(12):1140-1146.
- A 2012 study compared the efficacy of honey to a placebo. Honey showed the most improvement in cough frequency and severity during the night.
- Study group: 300 children age 1 to 5 years.
- Dosage of honey: 10 ml given as a single dose 30 minutes before bedtime.
- Cohen HA. Pediatrics 2012; 130:465-471.

### **Honey and Infantile Botulism**

- Honey has a small association with infantile botulism.
- Mechanism: Clostridium botulinum spores are present in some honey products.
- Age of onset: 1 to 44 weeks (median: 15 weeks).
- Incubation period after consuming spores: 3-30 days
- Presenting symptoms: constipation, weak suck, weak cry, ptosis, droopy face. Progresses to generalized weakness.
- Therefore, honey is not recommended for any child less than 12 months of age in these protocols for any symptom.
- Prevalence of infantile botulism: 91 cases were reported in the US in 2007.
- Cause: Honey is a minor cause. Approximately 10% of cases of infantile botulism are associated with honey. The other 90% are either idiopathic or associated with blowing dust (especially in areas of active housing development). Botulism spores are found ubiquitously in all soil. They are also present fairly uniformly in vacuum cleaner contents.
- Source: AAP Redbook

### **Corn Syrup as a Cough Syrup: No Risk for Botulism (2010)**

- 2010 Care Advice change: Corn syrup has been added back as an option for homemade cough syrup for children less than 1 year of age. Since honey has proven efficacy, corn syrup may share similar properties. (Note: corn syrup lacks evidence for efficacy). However, to keep the telephone advice compatible with office advice, corn syrup should only be mentioned if the parent complains that the cough is severe and nothing previously recommended has helped.
- Safety: In 2009, the AAP, CDC and Health Canada websites all continue to recommend avoiding honey in infants less than 1 year old. However, none of these websites mention any concerns about corn syrup or the need to avoid it in infants.
- The 2006 and 2009 AAP Red Book states clearly that "no case of infant botulism has proved to be attributable to consumption of corn syrup".

### **Antibiotics for Cough**

- Acute Bronchitis: In healthy people, acute bronchitis is viral and part of a cold. Antibiotic therapy provides no benefit. There is no effect on duration of illness, severity of symptoms or return to school.
- Common Cold: Colds are caused by viruses. No medicine, "shot", or antibiotic will cure an uncomplicated cold.
- Pneumonia: Pneumonia in childhood is 90% viral and 10% bacterial. Antibiotic therapy is only helpful for bacterial pneumonia.
- Whooping Cough (Pertussis): Whooping cough is caused by a bacteria (*Bordetella pertussis*). Treatment with antibiotics is indicated when whooping cough is diagnosed.

### Vaping

- Talk with your child about the dangers of vaping.
- Vaping can cause severe lung injury. The lung damage can be permanent.
- Vaping can even cause death. (50 in the US in 2019)
- Vaping tobacco also causes nicotine addiction.
- If possible, give up all vaping.
- At least, only use solutions that come from a reliable brand and store.
- Never use home-made or street purchased solutions.

### Matching Pediatric Handouts for Callers

Printed home care advice instructions for patients have been written for this guideline. If your software contains them, they can be sent to the caller at the end of your call. Here are the names of the pediatric handouts (ACIs) that relate to this topic:

- Cough - Allergic
- Cough - Viral (Age 0-5)
- Cough - Viral (Age 6-21)
- Cough - Symptom (Age 0-5)
- Cough - Symptom (Age 6-21)
- Coughs and Colds: Medicines or Home Remedies?
- Fever - How to Take the Temperature
- Fever - Myths Versus Facts
- Acetaminophen (Tylenol) Dosage Table - Children
- Ibuprofen (Advil, Motrin) Dosage Table - Children

## REFERENCES

1. American Academy of Pediatrics, Committee on Drugs Use of codeine- and dextromethorphan-containing cough remedies in children. *Pediatrics*. 1997;99:918-919
2. Barker SJ. Honey for acute cough in children. *Paediatr Child Health*. 2016 May;21(4):199-200.
3. Bradley JS, Byington CL, Shah SS, Pediatric Infectious Diseases Society, Infectious Diseases Society of America, et al. The management of community-acquired pneumonia in infants and children older than 3 months of age: clinical practice guidelines. *Clin Infect Dis*. 2011 Oct;53(7):e25-76.
4. Chang AB, Glomb WB. Guidelines for evaluating chronic cough in pediatrics: ACCP evidenced-based clinical practice guidelines. *Chest* 2006;129:260S.
5. Chang AB. American College of Chest Physicians cough guidelines for children. *Chest* 2008;134(6):1111-1112.

6. Cohen HA, Rozen J, Kristal H, et al. Effect of honey on nocturnal cough and sleep quality: a double-blind, randomized, placebo-controlled study. *Pediatrics*. 2012;130(3):465-471.
7. Cromer BA, Goydos J, Hackell J, et al. Unrecognized pertussis infections in adolescents. *Am J Dis Child*. 1993;147:575.
8. Ebell MH, Lundgren J, Youngpairoj S. How long does a cough last? Comparing patients' expectations with data from a systematic review of the literature. *Ann Fam Med*. 2013 Jan;11(1):5-13.
9. Guilbert TW, Taussig LM. "Doctor, he's been coughing for a month. Is it serious?" *Contemp Pediatr*. 1998;15(3):155-172.
10. Hampton LM, Nguyen DB, Edwards JR, et al. Cough and cold medication adverse events after market withdrawal and labeling revision. *Pediatrics*. 2013 Dec;132(6):1047-1054.
11. Hersh AL, Jackson MA, Hicks LA, and the AAP Committee on Infectious Diseases. Principles of judicious antibiotic prescribing for upper respiratory tract infections in pediatrics. *Pediatrics*. 2013 Dec;132(6):1146-1154.
12. Kelly LF. Pediatric cough and cold preparations. *Pediatr Rev*. 2004;25(4):115-123.
13. Kompare M, Weinberger M. Protracted bacterial bronchitis in young children: association with airway malacia. *J Pediatr*. 2012 Jan;160(1):88-92
14. Lowry JA, Leeder JS. Over-the-counter medications: update on cough and cold preparations. *Pediatr Rev*. 2015 Jul;36(7):286-297.
15. Marchant JM et al. What is the burden of chronic cough for families? *Chest* 2008;134(2):303.
16. Margolis P and Gadomski A. Does this infant have pneumonia? *JAMA*. 1998; 279:308-314.
17. Mazer-Amirshahi M, Rasooly I, Brooks G, et al. The impact of pediatric labeling changes on prescribing patterns of cough and cold medications. *J Pediatr* 2014 Nov;165:1024-1028.
18. Neuman MI, Monuteaux MC, Scully KJ, et al: Prediction of pneumonia in a pediatric emergency department. *Pediatrics* 2011;128:246-253.
19. Olsen SJ, Swerdlow DL. Risk of infant botulism from corn syrup. *Pediatr Infect Dis J*. 2000;19:584.
20. Paul IM, Beiler JS, King TS, et al.: Vapor rub, petrolatum, and no treatment for children with nocturnal cough and cold symptoms. *Pediatrics* 2010;126:1092-1099.
21. Paul IM, Beiler JS, Vallati JR, et al. Placebo effect in the treatment of acute cough in infants and toddlers: a randomized clinical trial. *JAMA Pediatr*. 2014 Dec 1;168(12):1107-1113.
22. Paul IM; Beiler J, McMonagle A, et al. Effect of honey, dextromethorphan and no treatment on nocturnal cough and sleep quality for coughing children and their parents. *Arch Pediatr Adolesc Med*. 2007;161(12):1140-1144.
23. Paul, IM, Yoder KE, Crowell KR, et al. Effect of Dextromethorphan, Diphenhydramine, and placebo on nocturnal cough and sleep quality for coughing children and their parents. *Pediatrics*. 2004;114:e85-e90.
24. Schaefer MK, Shehab N, Cohen AL, et al. Adverse events from cough and cold medications in children. *Pediatrics*. 2008;121(4):783-787.

25. Shah S, Bachur R, Kim D, Neuman MI. Lack of predictive value of tachypnea in the diagnosis of pneumonia in children. *Pediatr Infect Dis J*. 2010 May;29(5):406-409.
26. Taylor JA, Novack AH, Almquist JR, Rogers JE. Efficacy of cough suppressants in children. *J Pediatr*. 1993;122:799-802.
27. Thompson M, Vodicka TA, Blair PS, et al. Duration of symptoms of respiratory tract infections in children: systematic review. *BMJ*. 2013;347:f7027.
28. Tobias JD, Green TP, Coté CJ; AAP Section on Anesthesiology and Pain Medicine, AAP Committee on Drugs. Codeine: Time to say "no". *Pediatrics*. 2016 Oct;138(4). pii: e20162396.
29. Traisman ES. Clinical evaluation of chronic cough in children. *Pediatr Ann*. 2015 Aug;44(8):303-307.
30. Vo P, Kharasch VS. Respiratory failure. *Pediatr Rev*. 2014 Nov;35(11):476-486.
31. Wagner JB, Pine HS. Chronic cough in children. *Pediatr Clin North Am*. 2013 Aug;60(4):951-967.
32. Woods C. Acute bacterial pneumonia in childhood in the current era. *Pediatr Ann*. 2008;37(10):694-702.
33. Zgherea D, Pagala S, Mendiratta M, et al. Bronchoscopic findings in children with chronic wet cough. *Pediatrics*. 2012;129:e364-e369.

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