

Dr Cochrane

Stridor at night

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Dr Cochrane is a unique self-learning experience – the integration of Cochrane evidence with a quirky fictional story and multiple-choice questions provides readers with the opportunity to explore and understand the applicability of a Cochrane Review or Overview in a new way. In this series of fictional clinical vignettes, **Dr Cochrane** travels across time from the past century to the present day, to solve clinical problems using evidence from Cochrane Reviews. Read the associated article and/or listen to the Evidence-Based Child Health podcast available online at www.cochrane.org/podcasts/ and then test your knowledge with six multiple choice questions. You can find the answers to the questions on page 276.

Based on:

Candice Bjornson, Kelly Russell, Michelle Foisy, David W Johnson *The Cochrane Library* and the Treatment of Croup in Children: An Overview of Reviews.

Hartling L, Scott S, Pandya R, *et al.*: Storytelling as a communication tool for health consumers: development of an intervention for parents of children with croup. Stories to communicate health information. *BMC Pediatrics* 2010 10:64.



The ambulance runs through the city by night, quickly passing Oxford's neo-Gothic cathedral, directed to the Emergency Department. For a second Bryony was distracted, looking out of the ambulance window: a gargoyle flash-lit by the red and blue lights of the emergency vehicle loomed down from the roof of the cathedral over her and her child, Erik. The vision aggravated Bryony's worries. "Did I lose vital time before I called for an ambulance? Why did the doctor say that this is only a mild case of asthma and now Erik is so sick?"

The paramedics' tension was tangible. Transporting a sick child is different from an adult. They were going over in their heads exactly how they would intubate the child if necessary, calculating on their own the complicated dosages and tube sizes in their heads based on intricate formulas and assumptions about a child's weight and size. "Patient is a two-year old male, agitated", Bryony heard the paramedic speaking into the radio. "Pulse and breathing rate both high, lips cyanotic. Mother heard "wheezing" at home".

"OK. We'll have a doctor standing by," the female voice replied.

Question 1: Which of the following statements describing croup (laryngotracheobronchitis) is true?

[More than one answer may be correct]

1. A very small minority of children present with symptoms of severe croup, requiring hospital admission. Of those admitted, 1–3% are subsequently intubated.
2. Cough, rhinorrhea and fever can precede symptom onset with croup.
3. The absolute majority of children with mild and moderate croup present no signs of distress or agitation.
4. Sudden onset of the illness is typical, often beginning at night. Characterised by seal-like or barking cough, hoarse voice, stridor, and/or respiratory distress.
5. It affects approximately 3% of children under six years of age per year with a prevalence peak in the second year of life.

Dr Cochrane was standing by the ambulance entrance to the Accident & Emergency (A & E) Department. The wind coming in through an open door

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blew his hair around. The medical student on the right of **Dr Cochrane** was, Charlize Harris, who went on to study to become an emergency physician. The lights flashed in the distance.

Dr Cochrane: “Be ready”.

As the paramedics carried the child in, **Dr Cochrane** walked purposefully beside them, eyes and ears open to catch any useful information. Before the triage station **Dr Cochrane** was already able to put his stethoscope on the child’s chest and cut out the emergency department noises: stridor in the inspiratory phase. The baby was alert, with moderate respiratory distress, and clear rhinorrhea.

Dr Cochrane quickly asked to triage nurse: “Which room is free?”

The triage nurse: “Number three. Do you need any support?”

Dr Cochrane: “No thanks, except a coffee for me and Charlize and a tea for this baby’s mum.”

The triage nurse and Charlize asked together: “Which mum?”

Suddenly a visibly anxious young lady entered the A & E Department and was taken to the triage station.

Question 2: Cochrane systematic reviews often use statistical methods to summarize and combine the results of independent studies. Some of the following statements describe how to interpret the effect sizes for independent studies and meta-analysis.

[One correct answer]

1. For measures of effect sizes based on ratios (e.g., relative risk) or on differences (e.g. standardized mean differences) a ratio of 1.0 indicates no difference between groups.
2. None of these answers.
3. For measures of effect sizes based on ratios (e.g., relative risk) a ratio of 1.0 indicates no difference between groups whereas for measures based on differences (e.g. standardized mean differences), a difference of 0.0 represents no difference.
4. A risk ratio of 0.0 would mean that the risk of the event (i.e. return visit after croup episode) is the same in the intervention and control groups.
5. All the above.

Charlize started to assess Erik in the room. Respiratory rate was 36/minute and heart rate was 162/minute. Oxygen saturation was 97%. Erik still had mild inspiratory stridor even at rest, with it becoming much more noticeable with crying. Moderate chest wall indrawing was noted. Then the medical student examined him and the child developed expiratory stridor, worsening indrawing, and slightly cyanotic lips. A few minutes later, the child was back to baseline.

In the meantime **Dr Cochrane** asked Bryony what had happened in the few hours before, handing her a warm cup of tea.

Bryony: “In the last two days Erik had... a bad cold. Tonight he got worse and I took extra time to rock him to sleep. His breathing was unusual and I heard a strange sound...”

Dr Cochrane: “Bryony, Erik has croup. Croup is often caused by parainfluenza virus, which might have been the cause of the cold he had before the croup. The virus causes swelling of the upper part of his airway or breathing tube which is why his breathing is so noisy. I’m going to treat Erik with...”. **Dr Cochrane** reassured Bryony that even though Erik appeared very ill, croup is a very common condition and that he expected Erik to respond quickly to treatment.

Charlize was already anticipating **Dr Cochrane’s** instructions, preparing the treatment.

Question 3: From this overview, what treatment or combination of treatments is Charlize likely to be preparing?

[More than one answer may be correct]

1. Bronchodilators
2. Nebulized epinephrine (adrenalin)
3. Heliox
4. Glucocorticoids
5. Ribavirin

Question 4: Based on the discussion of this overview, what treatment or combination of treatments is Charlize likely to be preparing?

[More than one answer may be correct]

1. Racemic epinephrine administered with intermittent positive pressure breathing.
2. Dexamethasone at the dose of 0.6 mg/kg.
3. Dexamethasone at the dose of 1.5 mg/kg.
4. 30% humidified oxygen
5. Nebulized L-epinephrine

Dr Cochrane reviewed the treatments with Charlize. “Dexamethasone 0.6 mg/kg squirted quickly into the mouth followed immediately by a mask with nebulized L-epinephrine (1 : 1000) 5 mL” he said. “I expect that Erik will initially get more agitated but that within 10 minutes, his breathing will get better with the indrawing and the stridor almost resolving. We will reassess him in 30 minutes to see the effect, and continue as necessary. Symptoms commonly recur when children are only given epinephrine but dexamethasone usually prevents this.”

After 30 minutes **Dr Cochrane** and Charlize meet Bryony and Erik again. Bryony was very relieved: Erik was now asleep in his mother's arm, breathing normally.

Bryony: "The other morning my doctor said he had asthma. Why did he not say he had croup? I was not told that he was going to be seriously ill."

Dr Cochrane: "Croup is often mistaken for asthma, especially in young children, but croup affects the throat and the wind pipe instead of the lungs. With croup we often hear a sharp, barking cough and sometimes there is a high-pitched sound as the child breathes in. This sound is called stridor. When a child has asthma we hear wheezing sound as they breathe out. This is one way we can tell the difference between croup and asthma. Unluckily in the first phase of the disease, croup can easily be mistaken for some other respiratory process, especially in a young child like Erik."

Question 5: Based on the outcomes reported in Table 1 Description of Included Reviews, which is the only review (indicated by the first author and publication year) that considered parental anxiety among outcomes?

Question 5: (*Continued*)

[One correct answer]

1. Vorwerk C, 2009
2. Moore M, 2006
3. Russell K, 2010
4. Bjornson C, 2010
5. None

Dr Cochrane: "Bryony, you should stay here and keep an eye on Erik for two hours before we discharge you both home."

Dr Cochrane: "The newsagents are closed at this time. If you want... I'm writing a book. It will be entitled *Random Reflections on Health Services*. The draft may not be the best for a night's reading but I will happy to give it to you".

Bryony looked at this **Dr Cochrane** and nodded: "Yes. Thank you for your help. Reading the book will be a unique experience".