

## 1.1 Meet Maxwell O'Shantee

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### Maxwell (Max) O'Shantee

Max (male, 14 months old) has been unwell for four days.

Mom's Concern Max's History Presentation

Moving Forward

### History (Slide Layer)

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### Maxwell (Max) O'Shantee

**History:**

- The daycare sent him home yesterday with a fever of 38.8°C (tympanic).
- Patty (Mother) has been giving him acetaminophen four times a day.
- Max was tested negative for COVID-19 yesterday.
- Max is otherwise healthy.

Mom's Concern Max's History Presentation

Moving Forward

## Symptoms (Slide Layer)

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### Maxwell (Max) O'Shantee

**Presentation:**  
Max's symptoms include rhinorrhea, mild non-productive cough, reduced eating, poor sleep and increased fussing/crying.

Mom's Concern Max's History Presentation

Moving Forward

The slide features a vertical sidebar on the left with icons for home, search, and user profile. The main content area has a title, a 'Presentation' box with a close button (X), and three navigation buttons: 'Mom's Concern', 'Max's History', and 'Presentation'. Below these is an orange 'Moving Forward' button. On the right, there is a large blue rectangular area containing an illustration of a young boy with orange hair, wearing a green shirt and dark shorts, holding a white teddy bear. A speech bubble icon is in the top right corner of this area.

## Patty (Slide Layer)

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### Maxwell (Max) O'Shantee

"Max has been rubbing his ears, I think he might have an ear infection"

Patty (Mother)

Mom's Concern Max's History Presentation

Moving Forward

notes that he has been rubbing his ears and suspects an ear infection.

This slide is similar to the previous one but features a different content box. The 'Presentation' box is replaced by a yellow speech bubble containing the text: "Max has been rubbing his ears, I think he might have an ear infection". Below the speech bubble, the text "Patty (Mother)" is displayed. The navigation buttons and 'Moving Forward' button remain the same. The illustration of the boy with the teddy bear is also present on the right side.

## 1.2 Question

(Sequence Drop-down, 10 points, 1 attempt permitted)

Rank the following criteria in the order of most helpful to least helpful for diagnosing acute otitis media:

Bulging tympanic membrane

Cloudy tympanic membrane

Distinctly impaired tympanic membrane mobility

Red tympanic membrane

Patient rubbing (pulling) the ear

Proceed

### 1.3 Signs and Symptoms of Otitis Media

**Review**

**Answer:** Signs and symptoms of otitis media ranked below (best is listed first)

Rank	Sign or Symptom	Likelihood Ratio
1	Bulging tympanic membrane	51
2	Cloudy tympanic membrane	34
3	Distinctly impaired tympanic membrane mobility	31
4	Red tympanic membrane	8.4
5	Patient rubbing (pulling) the ear	3.3


**Clinical Pearls**  
Click on the buttons for more information about likelihood ratios.

Moving Forward

## Tip #1 (Slide Layer)

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# Review



**Answer:** Signs and symptoms of otitis media ranked below (best is listed first)

Rank	Sign or Symptom	Likelihood Ratio
1	Bulging tympanic membrane	51
2	Cloudy tympanic membrane	34
3	Distinctly impaired tympanic membrane mobility	31
4	Red tympanic membrane	8.4
5	Patient rubbing (pulling) the ear	3.3

Pearl #1 Pearl #2

**Clinical Pearl #1**


Diagnostic findings with likelihood ratios greater than 10 are considered excellent in helping rule in a diagnosis.

Moving Forward

## Tip #2 (Slide Layer)

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# Review



**Answer:** Signs and symptoms of otitis media ranked below (best is listed first)

Rank	Sign or Symptom	Likelihood Ratio
1	Bulging tympanic membrane	51
2	Cloudy tympanic membrane	34
3	Distinctly impaired tympanic membrane mobility	31
4	Red tympanic membrane	8.4
5	Patient rubbing (pulling) the ear	3.3

Pearl #1 Pearl #2

**Clinical Pearl #2**

Findings with likelihood ratios of 5 to 10 are considered 'good' while those from 2 to 5 are only a moderate or small help for diagnosis.

Regardless, the otoscopic exam is key.

Moving Forward

## 1.4 Investigations

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### Investigations

Specific Exam	Finding
Temperature	38.2°C (acetaminophen two hours ago)
Lungs	Clear, breathing without difficulty
Otoscopy	See picture (bulging, slightly red)
Other (head/neck)	Throat clear, rhinorrhea, scattered soft cervical lymph nodes.

Click the circle on the figure to see exam findings

Moving Forward

## Button 2 (Slide Layer)

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### Investigations

Specific Exam	Finding
Temperature	38.2°C (acetaminophen two hours ago)
Lungs	Clear, breathing without difficulty
Otoscopy	See picture (bulging, slightly red)
Other (head/neck)	Throat clear, rhinorrhea, scattered soft cervical lymph nodes.

Moving Forward

## 1.5 Question

(Multiple Choice, 10 points, 1 attempt permitted)

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## True or False?

If Max cries during his exam, the crying will also cause his ear to be red.

True

False

Submit

### 1.6 Review: Likelihood Ratios

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## Review: Likelihood Ratios

Answer: False

Crying before or during the exam is unlikely (less than 3%) to cause the tympanic membrane to look distinctly red in healthy children.

**Prevalence of Otitis Media**  
In children presenting similarly, the prevalence of acute otitis media in Max's age group is approximately 17%.

Ear Rubbing

Bulging tympanic membrane


Practice Pearl

Moving Forward

## Bulging TM (Slide Layer)

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### Review: Likelihood Ratios



**Answer:** False

Crying before or during the exam is unlikely (less than 3%) to cause the tympanic membrane to look distinctly red in healthy children.

**Ear Rubbing**

**Bulging tympanic membrane**

**Practice Pearl**

**Bulging Tympanic Membrane**


The bulging tympanic membrane further increases the probability of acute otitis media to 97%.

**Moving Forward**

## Pearl (Slide Layer)

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### Review: Likelihood Ratios



**Answer:** False

Crying before or during the exam is unlikely (less than 3%) to cause the tympanic membrane to look distinctly red in healthy children.

**Ear Rubbing**

**Bulging tympanic membrane**

**Practice Pearl**

**Practice Pearl**

We don't do this math in practice, but it helps to understand the power of diagnostic features.

**Moving Forward**

## Ear Rub (Slide Layer)

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### Review: Likelihood Ratios

Answer: False

Crying before or during the exam is unlikely (less than 3%) to cause the tympanic membrane to look distinctly red in healthy children.

**Ear Rubbing**

Although ear rubbing is not very reliable, Max's mom was concerned about this. The ear rubbing likelihood ratio of 3.3 on a 17% baseline risk gives a probability of AOM of 40%.

Moving Forward

## 1.7 Question

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### Choosing Wisely recommends antibiotics if there is a bulging tympanic membrane in children older than six months, in addition to which of the following criteria:

Select all that apply.

- Fever equal to or higher than 39°C
- Bilateral otitis media
- Moderately or severely ill
- Otorrhea (ear discharge)
- Significant symptoms lasting more than 48 hours


Submit



## 1.8 Multiple Answer Question: Explanation

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### Review



**Answer: (\*indicates correct answer)**

1. **Fever equal to or higher than 39C\***
2. Bilateral otitis media
3. **Moderately or severely ill\***
4. Otorrhea (ear discharge)
5. **Significant symptoms lasting more than 48 hours\***

This was a bit of a trick question. Two features not listed by Choosing Wisely Canada (Cold Standard 2.0) that may be relevant and increase the decision to treat with antibiotics are:

- Bilateral otitis media
- Otorrhea (ear discharge)


**Clinical Pearl**

Moving Forward

### Pearl (Slide Layer)

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### Review



**Answer: (\*indicates correct answer)**

1. **Fever equal to or higher than 39C\***
2. Bilateral otitis media
3. **Moderately or severely ill\***
4. Otorrhea (ear discharge)
5. **Significant symptoms lasting more than 48 hours\***

This was a bit of a trick question. Two features not listed by Choosing Wisely Canada (Cold Standard 2.0) that may be relevant and increase the decision to treat with antibiotics are:

- Bilateral otitis media
- Otorrhea (ear discharge)

**Clinical Pearl**

Bilateral otitis media and Otorrhea were identified in a 2006 Lancet systematic review. Patients with either of these two features are more likely to benefit from antibiotics.

**Clinical Pearl**

Moving Forward

## 1.9 Antibiotics: Benefit

Antibiotics for Otitis Media

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Natural Course of Otitis Media

Max's symptoms: summary

Benefit of Antibiotics

Click on the hints to the left to gain more insight

Moving Forward

This screenshot shows the main interface for the 'Antibiotics for Otitis Media' module. It features a blue header with the title and a navigation sidebar on the left with icons for home, hints, list, and profile. Three blue buttons are visible in the main area: 'Natural Course of Otitis Media', 'Max's symptoms: summary', and 'Benefit of Antibiotics'. A text prompt on the right says 'Click on the hints to the left to gain more insight'. At the bottom right, there is an orange 'Moving Forward' button. A circular profile picture of a child is also present in the top right corner.

### Natural Course (Slide Layer)

Antibiotics for Otitis Media

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Natural Course of Otitis Media

Max's symptoms: summary

Benefit of Antibiotics

Natural Course of Otitis Media

Up to 70% of children will have resolution of acute otitis media within seven to 14 days without antibiotics.

Moving Forward

This screenshot shows the 'Natural Course of Otitis Media' slide layer. The layout is similar to the previous screenshot, but a light blue slide is open over the 'Natural Course of Otitis Media' button. The slide has a title 'Natural Course of Otitis Media' with a close button (X) in the top right corner. The main text on the slide reads: 'Up to 70% of children will have resolution of acute otitis media within seven to 14 days without antibiotics.' The 'Moving Forward' button remains visible at the bottom right.

## Symptom summary (Slide Layer)

The screenshot shows a slide titled "Antibiotics for Otitis Media" with a blue header. On the left, there is a vertical navigation menu with icons for information, a list, a document, and a person. The main content area has three blue buttons: "Natural Course of Otitis Media", "Max's symptoms: summary", and "Benefit of Antibiotics". The "Max's symptoms: summary" button is selected, and a light blue callout box is open over it. The callout box contains the following text:

**Max's Symptoms: Summary**  
Max has a bulging tympanic membrane. He also has a moderate level of symptoms and has been ill for four days (exact duration of acute otitis media unclear).

Although his fever has not exceeded 39°C (that we know), it has been in the 38°C range on acetaminophen.

At the bottom right of the callout box is a "Moving Forward" button.

## Benefit of antibiotics (Slide Layer)

The screenshot shows the same slide titled "Antibiotics for Otitis Media". The "Benefit of Antibiotics" button is selected, and a light blue callout box is open over it. The callout box contains the following text:

**Benefit of Antibiotics for Max**  
Children like Max (< 2 years old, with features listed on previous slides and daycare attendance) are likely to benefit more from antibiotics, with good numbers needed to treat of 3 or 4 for treatment success at days eight to 12.


At the bottom right of the callout box is a "Moving Forward" button.

### **1.10 What is the first line therapy for acute otitis media for Max (no allergies)?**

*(Multiple Choice, 10 points, 1 attempt permitted)*

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## What is the first line therapy for acute otitis media for Max (no allergies)?




- Clarithromycin 15 mg/kg per day divided BID for 10 days.
- Cefuroxime 30 mg/kg per day divided BID for 10 days.
- Amoxicillin 80-90 mg/kg per day divided BID (or TID) for 10 days.
- Amoxicillin 80-90 mg/kg per day divided BID (or TID) for 5 days.
- Amoxicillin-clavulanate (7:1) 45 mg/kg (amoxicillin) per day divided BID for 5 days.

Submit

### 1.11 Antibiotics: Details

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## Treatment Details



**Answer:** Amoxicillin 80-90 mg/kg per day divided BID (or TID) for 10 days.

- Amoxicillin: Standard Dose
- Amoxicillin: Higher Dose
- Duration of Treatment
- Options: Penicillin Allergy
- Adverse Effects



Click on the buttons to reveal information.

Lets Make a Plan

## Amox Stnd Dose (Slide Layer)

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### Treatment Details



**Answer:** Amoxicillin 80–90 mg/kg per day divided BID (or TID) for 10 days.

- Amoxicillin: Standard Dose
- Amoxicillin: Higher Dose
- Duration of Treatment
- Options: Penicillin Allergy
- Adverse Effects

#### Amoxicillin Standard Dosing


Amoxicillin at 40mg/kg per day for five days would generally be reasonable for children two years of age or older.

Lets Make a Plan

## Amox Higher Dose (Slide Layer)

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### Treatment Details



**Answer:** Amoxicillin 80–90 mg/kg per day divided BID (or TID) for 10 days.

- Amoxicillin: Standard Dose
- Amoxicillin: Higher Dose
- Duration of Treatment
- Options: Penicillin Allergy
- Adverse Effects

#### Amoxicillin: Higher Doses

[Bugs and Drugs](#) suggests a higher dose of amoxicillin (90mg/kg) for children:

- Younger than two years old, or
- Attending daycare, or
- Who have recently (in the last three months) taken antibiotics



Max meets the first two of these criteria.

Lets Make a Plan

## Duration (Slide Layer)

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### Treatment Details



**Answer:** Amoxicillin 80-90 mg/kg per day divided BID (or TID) for 10 days.

- Amoxicillin: Standard Dose
- Amoxicillin: Higher Dose
- Duration of Treatment
- Options: Penicillin Allergy
- Adverse Effects

#### Duration of Treatment

[Bugs and Drugs](#) also recommends 10 days over five days for children:



- younger than two years old or
- with a perforated eardrum.

Lets Make a Plan

## Pen aller (Slide Layer)

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### Treatment Details



**Answer:** Amoxicillin 80-90 mg/kg per day divided BID (or TID) for 10 days.

- Amoxicillin: Standard Dose
- Amoxicillin: Higher Dose
- Duration of Treatment
- Options: Penicillin Allergy
- Adverse Effects

#### Options: Penicillin Allergy

Cefuroxime can be considered in non-severe penicillin allergy or trimethoprim-sulfamethoxazole (TMP/SMX) at 8-12 mg/kg of TMP per day divided BID for five days.

If TMP/SMX resistance is high (greater than 20%), consider levofloxacin.

Using clarithromycin is often discouraged, as resistance is common.

Lets Make a Plan

## AE (Slide Layer)

**Treatment Details**

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Answer: Amoxicillin 80-90 mg/kg per day divided BID (or TID) for 10 days.

Amoxicillin: Standard Dose

Amoxicillin: Higher Dose

Duration of Treatment

Options: Penicillin Allergy

Adverse Effects

**Adverse Effects**

The most common adverse effect with antibiotics is diarrhea, with a number needed to harm of 5 to 14 over placebo rates.

Lets Make a Plan

## 1.12 Create a Plan

**Let's Make a Plan**

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Using what you have learned write a plan for Max. It can include any/all of the following: lifestyle intervention(s), prescription intervention(s), lab(s)/test(s) required, follow up appointment time frame, and referral required.

Fill in your plan for the patient here

See how your plan compares

## 1.13 Plan Answers

Max O'Shantee

This is the proposed plan for Max. How does your plan compare?

Click on the categories to the left to see possible answers

Prescription

Monitoring Advice

Fever Management

What's in a name?

Next Patient

Back to Day Sheet

## Prescription (Slide Layer)

Max O'Shantee

This is the proposed plan for Max. How does your plan compare?

Click on the categories to the left to see possible answers

Prescription

Monitoring Advice

Fever Management

What's in a name?

Next Patient

Back to Day Sheet

**Prescription**

Max weighs 10kg and therefore needs amoxicillin 450mg BID (or 300mg TID) for 10 days.



## Monitor (Slide Layer)

The interface displays the patient name 'Max O'Shantee' and a navigation sidebar with icons for information, a home-like icon, a list, and a user profile. A central text prompt asks, 'This is the proposed plan for Max. How does your plan compare?'. Three blue buttons are stacked vertically: 'Prescription', 'Monitoring Advice', and 'Fever Management'. A green button labeled 'What's in a name?' is positioned below them. On the right, a light blue callout box titled 'Monitoring Advice' contains the text: 'You advise Patty to follow up if Max's condition worsens.' and 'You also advise Patty that if adverse effects occur, she should contact your office.' At the bottom right, there are two orange buttons: 'Next Patient' and 'Back to Day Sheet'.

## Fever management (Slide Layer)

The interface displays the patient name 'Max O'Shantee' and a navigation sidebar with icons for information, a home-like icon, a list, and a user profile. A central text prompt asks, 'This is the proposed plan for Max. How does your plan compare?'. Three blue buttons are stacked vertically: 'Prescription', 'Monitoring Advice', and 'Fever Management'. A green button labeled 'What's in a name?' is positioned below them. On the right, a light blue callout box titled 'Fever Management' contains the text: 'Advise Patty that she can continue to give Maxwell doses of acetaminophen:' followed by a bulleted list: '• 10 to 15 mg/kg every 4-6 hours if it appears to be helping' and '• Maximum: 4 doses per 24 hours.' At the bottom right, there are two orange buttons: 'Next Patient' and 'Back to Day Sheet'.

## Name (Slide Layer)

The screenshot shows a user interface for a patient named Max O'Shantee. On the left is a vertical sidebar with icons for information, a clipboard, a list, and a person. The main area features the patient's name 'Max O'Shantee' and a circular profile picture of a child. Below the name is a question: 'This is the proposed plan for Max. How does your plan compare?'. Three blue buttons are stacked vertically: 'Prescription', 'Monitoring Advice', and 'Fever Management'. A light blue callout box titled 'Meaning Behind the Name: Maxwell O'Shantee' contains the text: 'This case starts as "Max is unwell" so the goal is to get Max-Well.'. At the bottom, there is a green button 'What's in a name?' and two orange buttons: 'Next Patient' and 'Back to Day Sheet'.

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### Max O'Shantee

This is the proposed plan for Max. How does your plan compare?

**Prescription**

**Monitoring Advice**

**Fever Management**

**Meaning Behind the Name: Maxwell O'Shantee**

This case starts as "Max is unwell" so the goal is to get Max-Well.

**What's in a name?**

**Next Patient** **Back to Day Sheet**