



UpToDate®

Confident, clinical decision-making

Chiara Taiana  
International Training Consultant

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# What is UpToDate?

An electronic evidence-based clinical decision support tool  
designed by expert physicians for clinicians to:

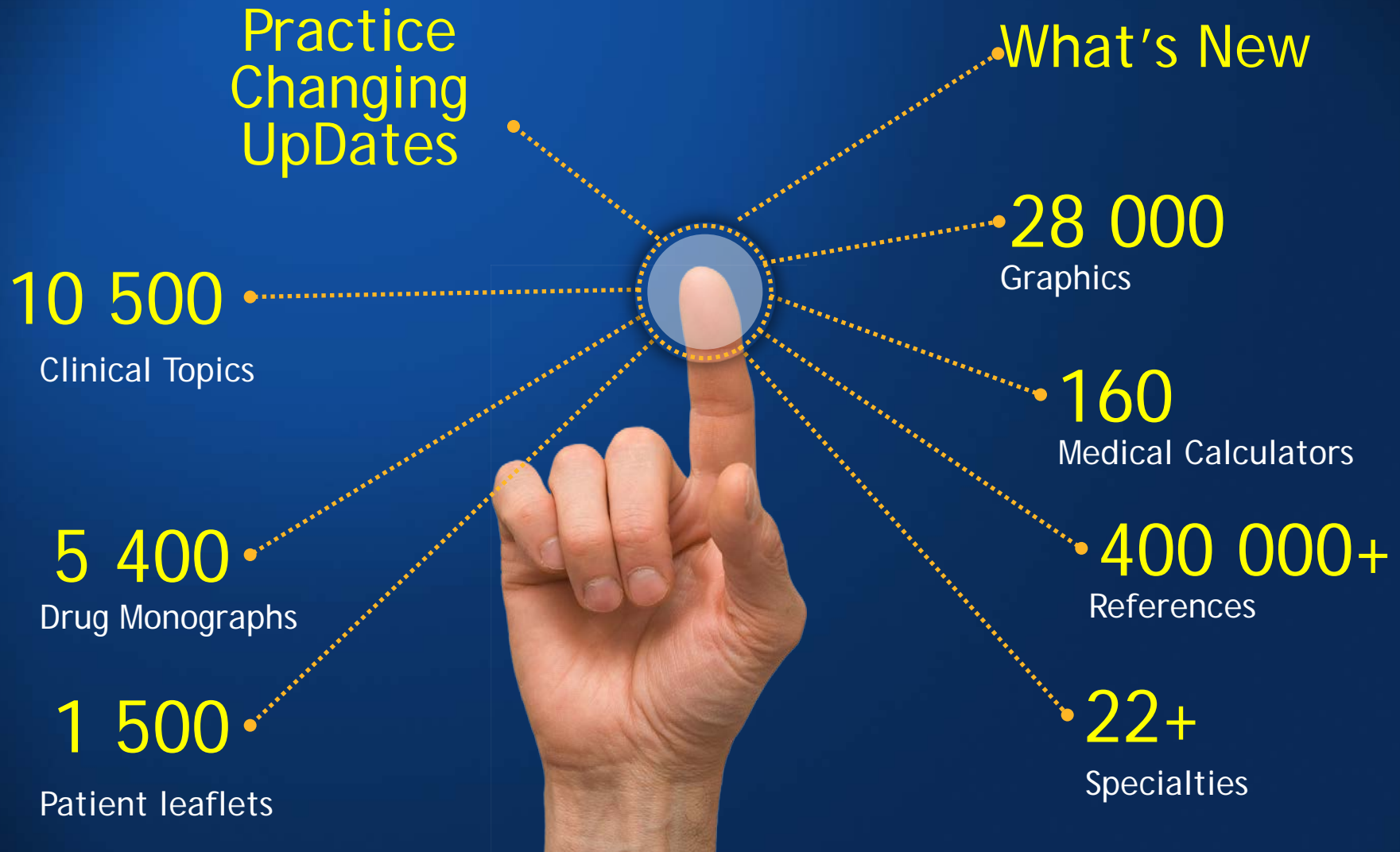
Answer your clinical questions

Increase your clinical knowledge

Improve patient care



# The trusted way to practice medicine



# Our Editorial Board

## 1. Authors

- Clinically active
- World-renown physician topic experts
- Have an academic affiliation

## 2. Editors

- Clinically active
- Specialty experts
- Trained to use EBM

## 3. Peer Reviewers

- Clinically active
- Specialists in their field
- Anonymous to the author





# How to change the language

UpToDate®

Languages Help

Welcome, Chiara Taiana | My Account | CME 139,0 | Log Out

Contents

Patient Info | What's New | PCUs | Calculators | Drug Interactions

New Search:

Search in another language

You can launch a search in one of the 10 languages available.

After choosing your favorite language, all the tabs will be in that language, and you will be able to type your question in that language.

Search in your own language:

UpToDate allows you to search in the languages below. Please select your preference. Topics will continue to be in English.

- ☐ 简体中文
- ☐ 繁體中文
- ☐ Deutsch
- ☒ English
- ☐ Español
- ☐ Français
- ☒ Italiano
- ☐ 日本語
- ☐ 한국어 \*
- ☐ Português

\*Currently in beta testing.

2 Submit

Cancel

# How to launch a search and answer your clinical questions

The screenshot shows the UpToDate website's search page. The browser address bar displays 'www.uptodate.com/contents/search'. The page header includes the UpToDate logo, a user profile for 'Chiara', and navigation links for 'Languages' and 'Help'. A secondary navigation bar shows 'Welcome, Chiara Taiana', 'My Account', 'CME 237.0', and 'Log Out'. Below this, a menu lists 'Contents', 'Patient Info', 'What's New', 'PCUs', 'Calculators', and 'Drug Interactions'. The main search area features a 'New Search:' label, a search input field, a link to 'Search in another language', a dropdown menu for 'All Topics', and a search button. A blue callout box on the left lists search criteria: symptoms, diseases, lab abnormalities, procedures, drugs, and medical abbreviations, and states that multiple terms can be mixed. A green banner at the bottom indicates that results are always in English.

**You can type:**

- symptoms
- diseases
- lab abnormalities
- procedures
- drugs
- medical abbreviations

**You can also mix them by typing more than 1 search term**

**The results will be always and only in English**

Subscription and License Agreement | Policies | Support Tag

# A clinical question

## ER - Pediatrics

Infant (girl) 9 months, asymptomatic

High fever > 39°C for 3 days

She wasn't in contact with sick people

She's partially immunized (2 doses: 2 - 4 months)

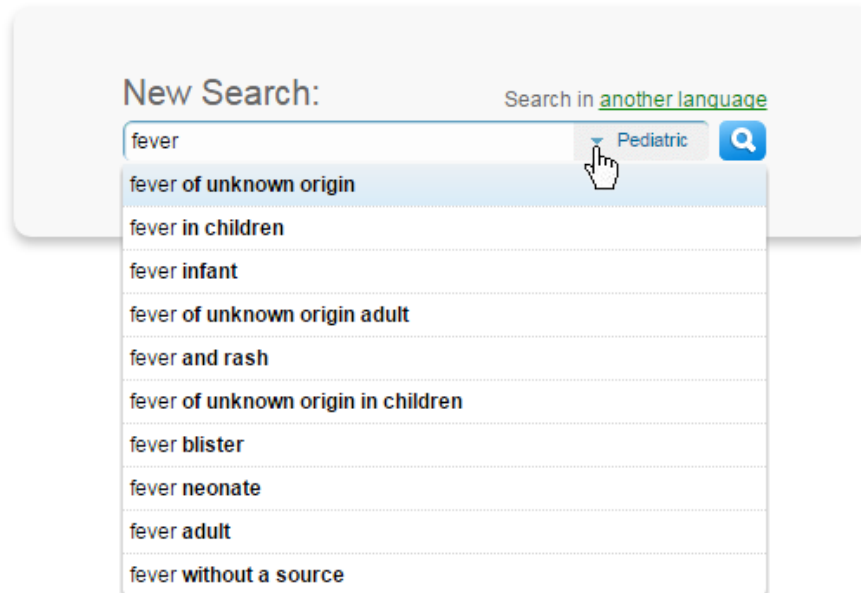
She doesn't look ill. The source of the fever is not known.

She seems in good condition and the source of the fever is not clear.

Is it the case to do some laboratory tests?

## TYPE IN THE SEARCH BOX:

Fever without a source or fever of unknown origin and filter for Pediatric



New Search: Search in [another language](#)

fever Pediatric

- fever of unknown origin
- fever in children
- fever infant
- fever of unknown origin adult
- fever and rash
- fever of unknown origin in children
- fever blister
- fever neonate
- fever adult
- fever without a source

NB: the system is predictive



# Conducting a Search

The screenshot shows the UpToDate website's search page. The browser address bar displays [www.uptodate.com/contents/search](http://www.uptodate.com/contents/search). The UpToDate logo is in the top left, and navigation links like 'Languages' and 'Help' are in the top right. A user profile bar shows 'Welcome, Chiara Taiana' with links to 'My Account', 'CME 237.0', and 'Log Out'. A secondary navigation bar includes 'Contents', 'Patient Info', 'What's New', 'PCUs', 'Calculators', and 'Drug Interactions'.

The main search area is titled 'New Search:'. It features a search input field containing the text 'fever without a source'. Below the input field, a dropdown menu lists search suggestions: 'fever without a source', 'fever without a source children', and 'fever without a source in children 3 36 months'. A red box labeled '1' highlights the third suggestion, and a hand cursor icon is positioned over it.

To the right of the search input field, there is a dropdown menu for 'Search in another language' with 'Pediatric' selected. A red box labeled '2' highlights the search button (a magnifying glass icon) next to this dropdown. A blue callout box points to this button with the text 'CLICK on the magnifier or PRESS ENTER'.

Below the search input field, there is a filter menu with radio buttons for 'All Topics', 'Adult', 'Pediatric', 'Patient', and 'Graphics'. A red box labeled '1' highlights the 'Pediatric' option, and a blue callout box points to it with the text 'Toggle buttons to filter your results'.

The footer of the page contains links for 'Subscription and License Agreement', 'Policies', and 'Support Tag', along with social media icons for Facebook, Twitter, LinkedIn, and YouTube.

# List of topics ranked by relevance to your search terms

UpToDate®

fever without a source Pediatric Contents

Hover your mouse on a topic title: the topic outline will appear on the right

Search Results for "fever without a source"

- ☐ All Topics
- ☐ Adult
- ☒ Pediatric
- ☐ Patient
- ☐ Graphics

You can still filter your results

## Fever without a source in children 3 to 36 months of age

- Initial approach
- Summary and recommendations
- Blood culture followup in children 3 to 36 months of age (Algorithms)

## Strategies for the evaluation of fever in neonates and infants (less than three months of age)

- Traditional strategies
- Problems with these approaches
- Summary
- Clinical guidelines
- Management of febrile infants 29 to 90 days (Algorithms)

## Fever of unknown origin in children: Evaluation

- Summary and recommendations
- Diagnostic testing
- Examination
- Empirical treatment
- Outcome

## Fever in human immunodeficiency virus-infected infants and children

- Summary and recommendations
- Empiric and expectant antibiotic therapy
- Diagnostic evaluation
- Duration of treatment
- Specific therapy

Under the title, there are the most commonly referenced sections

Completely clickable

### Topic Outline Show Graphics (4)

#### SUMMARY AND RECOMMENDATIONS

##### INTRODUCTION

##### BACKGROUND

- Fever of concern
- Population of interest
- Immunization status
  - Complete immunization
  - Incomplete immunization

##### CAUSES OF FEVER

##### OCCULT SOURCES OF INFECTION

- Pneumonia
- Urinary tract infection
- Bacteremia
  - Predictors
  - Impact of vaccines

##### EVALUATION

- History
- Physical examination
- Laboratory testing
  - WBC and ANC counts
  - Urine tests
  - Cultures
- Chest radiograph
- Inflammatory mediators
  - Molecular assays

# Topic: Fever without a source in children 3 to 36 months of age

This is one in 10.500 topics in 22 specialties.

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Welcome, Chiara Taiana | My Account | CME 237.5 | Log Out

fever without a source Pediatric Search Contents

Patient Info | What's New | PCUs | Calculators | Drug Interactions

fever without a source Find Patient Print Email

## Fever without a source in children 3 to 36 months of age

Topic Outline

**SUMMARY & RECOMMENDATIONS** ➔

INTRODUCTION

BACKGROUND

- Fever of concern
- Population of interest
- Immunization status
  - Complete immunization
  - Incomplete immunization

CAUSES OF FEVER

OCCULT SOURCES OF INFECTION

- Pneumonia
- Urinary tract infection
- Bacteremia
  - Predictors
  - Impact of vaccines

EVALUATION

- History
- Physical examination
- Laboratory testing
  - WBC and ANC counts
  - Urine tests
  - Cultures
- Chest radiograph
- Inflammatory mediators
  - Molecular assays

INITIAL MANAGEMENT

### Fever without a source in children 3 to 36 months of age

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**Disclosures:** Coburn H Allen, MD Nothing to disclose. Gary R Fleisher, MD Nothing to disclose. Sheldon L Kaplan, MD Grant/Research/Clinical Trial Support: Lab [antibiotic (Ceftaroline)]; Optimizer [antibiotic (fidaxomicin)]. Consultant/Advisory Boards: Pfizer [vaccine (PCV13)]. James F Wiley, II, MD, MPH Nothing to disclose. Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process.

All topics are updated as new evidence becomes available and our [peer review process](#) is complete.  
**Literature review current through:** Jun 2015. | **This topic last updated:** Jun 29, 2015.

**INTRODUCTION** — Fever is a common symptom among children seeking medical care. Most children undergo evaluation for a febrile illness and nearly one-third of pediatric outpatient visits are for fever [1-3].

When the history and physical examination cannot identify a specific source of fever in an acutely ill, nontoxic-appearing child less than 36 months of age, the diagnosis is fever without a source (FWS). Alternative terms are fever without localizing signs (FWLS) or fever without a focus.

This topic will review the etiology, evaluation, and management of the otherwise healthy child 3 to 36 months of age with fever of less than 5 days. Fever in newborns, infants younger than three months, fever in immunocompromised patients, and fever of unknown origin (≥7 days) are reviewed separately.

- (See "[Evaluation and management of fever in the neonate and young infant \(younger than three months of age\)](#)".)
- (See "[Fever in children with chemotherapy-induced neutropenia](#)" and "[Evaluation and management of fever in children with non-chemotherapy-induced neutropenia](#)".)
- (See "[Management of fever in sickle cell disease](#)".)
- (See "[Fever of unknown origin in children: Evaluation](#)" and "[Etiologies of fever of unknown origin in children](#)".)

**BACKGROUND**

**Fever of concern** — In children 3 to 36 months of age, the diagnosis of fever is based upon core temperature, which is measured most accurately rectally. The history of

**TOPIC REVIEW**  
The format is always the same: plan on the left, topic review on the right

TOPIC OUTLINE entirely clickable

Topic Feedback

# Summary and Recommendations

fever without a source Pediatric Contents Patient Info What's New PCUs Calculators Drug Interactions

Fever without a source in children 3 to 36 months of age Beyond the Basics topic (see 'Patient information: Fever in children (Beyond the Basics)')

fever without a source Find Patient Print Email

Topic Outline

**SUMMARY & RECOMMENDATIONS**

INTRODUCTION

BACKGROUND

- Fever of concern
- Population of interest
- Immunization status
  - Complete immunization
  - Incomplete immunization

CAUSES OF FEVER

OCCULT SOURCES OF INFECTION

- Pneumonia
- Urinary tract infection
- Bacteremia
- Predictors
- Impact of vaccines

EVALUATION

- History
- Physical examination
- Laboratory testing
  - WBC and ANC counts
  - Urine tests
  - Cultures
  - Chest radiograph

## SUMMARY AND RECOMMENDATIONS

### General issues

- The following recommendations apply to well-appearing children 3 to 36 months of age, with fever  $\geq 39^{\circ}\text{C}$  ( $102.2^{\circ}\text{F}$ ), who have no underlying medical condition that would alter susceptibility to infection, and no focus of infection identified by a complete physical examination, hereafter referred to as children with fever without a source (FWS). (See 'Background' above.)
- The majority of children with fever have either a self-limited viral infection or a recognizable source of bacterial infection. (See 'Occult sources of infection' above.)
  - Serious bacterial infections that occur in children 3 to 36 months of age include meningitis, pneumonia, and focal skin infections.
  - Subtle sources of infection, such as pneumonia or osteomyelitis, can sometimes be identified with a careful history and physical examination.
  - Relatively common occult sources of infection include pneumonia and urinary tract infections (UTIs), with occasional cases of bacteremia.
- A thorough history, including immunization status and complete physical examination, should be performed in all febrile children to identify obvious and subtle focuses of infection. (See 'History' above and 'Physical examination' above.)

### Ill-appearing child

- Children who are ill-appearing or have unstable vital signs require full evaluation for serious infection. A chest radiograph should be obtained in patients who have tachypnea  $\geq 20,000/\text{microL}$ , even in the absence of physical findings of pneumonia. (See 'Ill-appearing' above.)
- Previously healthy children who are ill-appearing or have unstable vital signs should receive parenteral antibiotic therapy pending culture results (*S. pneumoniae*, *S. aureus* [including methicillin-resistant *S. aureus*], *N. meningitidis*, *H. influenzae*). (See 'Ill-appearing' above.)

### Well-appearing child

#### Incompletely immunized

- For children with FWS who have not been completely immunized, we suggest the following tests:
  - CBC with differential: A blood culture should be sent for those with WBC  $\geq 15,000/\text{microL}$ . Some clinicians may choose to send a blood culture for all patients. (See 'Immunization incomplete' above.)
  - Urinalysis and urine culture by bladder catheterization or, in exceptional cases (eg, tight phimosis or severe labial adhesions), suprapubic aspiration. (See 'Urine tests' above and 'Immunization incomplete' above.)
  - Chest radiograph when WBC  $\geq 20,000/\text{microL}$ . (See 'Immunization incomplete' above.)
- We recommend that incompletely immunized children with FWS and WBC  $\geq 15,000/\text{microL}$  receive parenteral antibiotic therapy pending culture results (**Grade 1B**). A single dose of intramuscular ceftriaxone (50 mg/kg) is preferred because of its antimicrobial spectrum and duration of action. (See 'Immunization incomplete' above.)
- These patients should be seen for follow-up by their primary care provider within 24 hours. An alternative is to follow-up in the emergency department if a regular source of primary care is unavailable. (See 'Follow-up' above.)

In the **Summary & Recommendations** paragraph, there is a summary of the topic, with recommendations for the screening and for the treatment:  
**Here is the answer!**

# Graded Recommendations

## Well-appearing child

### Incompletely immunized

- For children with FWS who have not been completely immunized, we suggest the following tests:
  - CBC with differential: A blood culture should be sent for those with WBC  $\geq 15,000/\text{microL}$ . Some clinicians may choose to send a blood culture for all patients. (See '[Immunization incomplete](#)' above.)
  - Urinalysis and urine culture by bladder catheterization or, in exceptional cases (eg, tight phimosis or severe labial adhesions), suprapubic aspiration. (See '[Urine tests](#)' above and '[Immunization incomplete](#)' above.)
  - Chest radiograph when WBC  $\geq 20,000/\text{microL}$ . (See '[Immunization incomplete](#)' above.)
- We recommend that incompletely immunized children with FWS and WBC  $\geq 15,000/\text{microL}$  receive parenteral antibiotic therapy pending culture results ([Grade 1B](#)). A single dose of intramuscular [ceftriaxone](#) (50 mg/kg) is preferred because of its antimicrobial spectrum and duration of action. (See '[Immunization incomplete](#)' above.)
- These patients should be seen for follow-up by their primary care provider within 24 hours. An alternative is to follow-up in the emergency department if a regular source of primary care is unavailable. (See '[Follow-up](#)' above.)

Based on the body of evidence,  
and the expertise of the leading  
specialty experts,  
we make graded recommendations  
on the next course of action

# Grade working group



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 Wolters Kluwer  
Health

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 Print

## Grade 1B recommendation

**A Grade 1B recommendation is a strong recommendation, and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.**

### Explanation:

A Grade 1 recommendation is a strong recommendation. It means that we believe that if you follow the recommendation, you will be doing more good than harm for most, if not all of your patients.

Grade B means that the best estimates of the critical benefits and risks come from randomized, controlled trials with important limitations (eg, inconsistent results, methodologic flaws, imprecise results, extrapolation from a different population or setting) or very strong evidence of some other form. Further research (if performed) is likely to have an impact on our confidence in the estimates of benefit and risk, and may change the estimates.

### Recommendation grades

1. Strong recommendation: Benefits clearly outweigh the risks and burdens (or vice versa) for most, if not all, patients
2. Weak recommendation: Benefits and risks closely balanced and/or uncertain

### Evidence grades

- A. High-quality evidence: Consistent evidence from randomized trials, or overwhelming evidence of some other form
- B. Moderate-quality evidence: Evidence from randomized trials with important limitations, or very strong evidence of some other form
- C. Low-quality evidence: Evidence from observational studies, unsystematic clinical observations, or from randomized trials with serious flaws

For a complete description of our grading system, please see the UpToDate editorial policy.



# Drug information: over 5400 unique drug entities with Lexicomp

## Well-appearing child

### Incompletely immunized

- For children with FWS who have not been completely immunized, we suggest the following tests:
  - CBC with differential: A blood culture should be sent for those with WBC  $\geq 15,000/\text{microL}$ . Some clinicians may choose to send a blood culture for all patients. (See '[Immunization incomplete](#)' above.)
  - Urinalysis and urine culture by bladder catheterization or, in exceptional cases (eg, tight phimosis or severe labial adhesions), suprapubic aspiration. (See '[Urine tests](#)' above and '[Immunization incomplete](#)' above.)
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- These patients should be seen for follow-up by their primary care provider within 24 hours. An alternative is to follow-up in the emergency department if a regular source of primary care is unavailable. (See '[Follow-up](#)' above.)

The drugs are  
hyperlinks  
conducting to the drug  
database Lexicomp,  
(sister company of  
UpToDate - Wolters  
Kluwer)

# Drug database: vital information on the drug

UpToDate®

Welcome, Chiara Taiana | My Account | CME 249.5 | Log Out

fever without a source

Pediatric

Contents

Patient Info | What's New | PCUs | Calculators | Drug Interactions

fever without a source Find Print

**Ceftriaxone: Pediatric drug information**

**Topic Outline**

- Brand Names: US
- Brand Names: Canada
- Therapeutic Category
- Dosing: Neonatal
- Dosing: Usual
- Dosage Forms: US
- Generic Equivalent Available: US
- Administration
- Compatibility
- Storage/Stability
- Use
- Medication Safety Issues
- Adverse Reactions
- Contraindications
- Warnings/Precautions
- Metabolism/Transport Effects
- Drug Interactions
- Pregnancy Risk Factor
- Pregnancy Implications
- Monitoring Parameters
- Mechanism of Action
- Pharmacokinetics (Adult data unless noted)
- Additional Information
- REFERENCES

**Ceftriaxone: Pediatric drug information** Lexicomp®

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(For additional information see ["Ceftriaxone: Drug information"](#) and see ["Ceftriaxone: Patient drug information"](#))

For abbreviations and symbols that may be used in Lexicomp ([show table](#))

**Brand Names: US** Rocephin

**Brand Names: Canada** Ceftriaxone for Injection; Ceftriaxone for Injection USP; Ceftriaxone Sodium for Injection; Ceftriaxone Sodium for Injection BP

**Therapeutic Category** Antibiotic, Cephalosporin (Third Generation)

**Dosing: Neonatal** Note: Use cefotaxime in place of ceftriaxone if hyperbilirubinemia is present or if patient is receiving calcium-containing intravenous solutions

**General dosing, susceptible**

**Gonococcal infections (Inc**

Prophylaxis: 25-50 mg/kg

Treatment: 25-50 mg/kg

**Meningitis, non-gonococ**

nonpseudomonal third-g

71 patients (age range:

(n=12 neonates; includi

Yogev, 1986). IV:

PNA <14 days: 50 mg/kg

single dose: 125 mg

IDSA guidelines suggest cefotaxime as the preferred

el, 2004). Dosing based on an open-label prospective trial of

and a pharmacokinetic analysis of 20 neonates and infants

ate CSF penetration and favorable response (Martin, 1984;

Full prescription guidance available, and vital information about dosing, administration, compatibility and more.



# A tool to assess the drug interactions

fever without a source Pediatric Contents Patient Info What's New PCUs Calculators **Drug Interactions**

Ceftriaxone: Pediatric drug information

Metabolism/Transport Effects None known

fever without a source Find Print

**Topic Outline**

- Brand Names: US
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- Pregnancy Risk Factor
- Pregnancy Implications
- Monitoring Parameters
- Mechanism of Action
- Pharmacokinetics (Adult data unless noted)
- Additional Information
- REFERENCES

**Drug Interactions**

(For additional information, [Launch Lexi-Interact™ Drug Interactions Program](#) Lexicomp®)

Aminoglycosides: Cephalosporins (3rd Generation) may enhance the nephrotoxic effect of Aminoglycosides. *Risk C: Monitor therapy*

BCG: Antibiotics may diminish the therapeutic effect of BCG. *Risk X: Avoid combination*

BCG (Intravesical): Antibiotics may diminish the therapeutic effect of BCG (Intravesical). *Risk X: Avoid combination*

BCG Vaccine (Immunization): Antibiotics may diminish the therapeutic effect of BCG Vaccine (Immunization). *Risk C: Monitor therapy*

Calcium Salts (Intravenous): May enhance the adverse/toxic effect of Ceftriaxone. Ceftriaxone binds to calcium forming an insoluble precipitate. Management: Use of ceftriaxone with calcium-containing solutions should be avoided. (In patients of age or younger). In older patients, flush lines with compatible fluid between administrations.

Probenecid: May increase the serum concentration of Ceftriaxone.

Ringer's Injection (Lactated): May enhance the adverse/toxic effect of Ceftriaxone. Ceftriaxone binds to calcium forming an insoluble precipitate. Management: Use of ceftriaxone with calcium-containing solutions should be avoided. (In patients of age or younger). In older patients, flush lines with compatible fluid between administrations.

Sodium Picosulfate: Antibiotics may decrease the effectiveness of Sodium Picosulfate. Management: Use an alternative product for bowel cleansing prior to colonoscopy in patients who are taking antibiotics.

Typhoid Vaccine: Antibiotics may decrease the effectiveness of Typhoid Vaccine. Management: Vaccination with live attenuated typhoid vaccine (Ty21a) should be delayed for at least 3 days after cessation of antibiotics.

Vitamin K Antagonists (eg, warfarin): Ceftriaxone may decrease the effectiveness of Vitamin K Antagonists. Management: Monitor INR closely.

**Pregnancy Risk Factor** B (Based on animal data)

**Pregnancy Implications** Ceftriaxone crosses the placenta and distributes to amniotic fluid. An increase in most types of birth defects was not found following first trimester exposure to cephalosporins. Pregnancy was found to influence the single dose pharmacokinetics of ceftriaxone when administered prior to delivery. The pharmacokinetics of ceftriaxone following multiple doses in the third trimester are similar to those of nonpregnant patients. Ceftriaxone is recommended for use in pregnant women for the treatment of gonococcal infections, Lyme disease, and may be used in certain situations prior to vaginal delivery in women at high risk for endocarditis (consult current guidelines).

**GRAPHICS** View All

**TABLES**

- Lexicomp clinical abbreviations

# Check for any negative interactions

A tool to check the interactions between an unlimited number of drugs, over the counter drugs, herbs and food.

Lexicomp® Lexi-Interact™  
Lookup  
Enter item name to lookup.

## TYPE:

- Name of the molecule
- Brand name (US)
- Herb
- Food

THE SYSTEM IS PREDICTIVE, you can type only the first letters and click on "Lookup"

## Welcome to Lexi-Interact™ Online

Lexi-Comp's Comprehensive Drug-to-Drug, Drug-to-Herb and Herb-to-Herb Interaction Analysis Program

**Lexi-Interact does not address chemical compatibility related to I.V. drug preparation or administration.**

Lexi-Interact combines the world's literature and scientific understanding of drug interactions with a state-of-the-art electronic platform, providing an efficient way to check for potential drug events that don't compromise the care of your patients.

Users can select a medication or enter a patient specific regimen to analyze for potential interactions. Additionally, you may select a drug interaction to view detailed information on Patient Management, Interacting Members, Risk Rating, References and more.

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# Lexi-Interact Online

Lexicomp® Lexi-Interact™

Lookup   
Enter item name to lookup.

Click on desired item.

CefTRIAXone  
Ceftriaxone for Injection...  
Ceftriaxone Sodium for In...  
Ceftriaxone Sodium for In...

By typing the first letters and clicking on "Lookup" the system suggests the items beginning with those letters

## Welcome to Lexi-Interact™ Online

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...es the world's literature and scientific understanding of drug interactions with a state-of-the-art electronic platform, providing an efficient way ... events don't compromise the care of your patients.

...selected medication or enter a patient specific regimen to analyze for potential interactions. Additionally, you may select a drug interaction ... Patient Management, Interacting Members, Risk Rating, References and more.

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Lexicomp® Lexi-Interact™

Lookup   
Enter item name to lookup.

Analyze New List

☒ Ceftriaxone  
☒ Paracetamol (INT)  
☒ Typhoid Vaccine

When your list is complete, Click on "Analyze"

If you want to see all interactions of a drug, herb, food, click directly on its name

- Display complete list of interaction... an individual item by clicking item na...
- Add another item(s) [Lookup] to Anal... for potential interactions between item... the list.
- Remove item from the list by clicking... check mark next to the item name.

## Welcome to Lexi-Interact™ Online

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...medication or enter a patient specific regimen to analyze for potential interactions. Additionally, you may select a drug interaction ... Patient Management, Interacting Members, Risk Rating, References and more.

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# Drug interactions results:

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### CefTRIAXone

[D] [Typhoid Vaccine](#) (Typhoid Vaccine)

### Paracetamol (INT) (Acetaminophen)

[D] [Typhoid Vaccine](#) (Vaccines)

### Typhoid Vaccine

[D] [CefTRIAXone](#) (Antibiotics)

[D] [Paracetamol \(INT\)](#) (Acetaminophen)

LIST OF THE KNOWN INTERACTIONS between the items listed and analyzed. Notice the letter in front of each interaction. This is the risk rating. To view the definition of each risk rating, click on the hyperlinked phrase "RISK RATING."

**Date** February 28, 2015

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# Risk rating

## Lexi-Interact™ Online

### Interaction Monograph Field Information

**Title:** Designates the agents or agent groups (categories) involved in the described interaction. The members of an agent category are listed in the Interacting Members section of the monograph.

**Risk Rating:** Rapid indicator regarding how to respond to the interaction data. Each Interact monograph is assigned a risk rating of A, B, C, D, or X. The progression from A to X is accompanied by increased urgency for responding to the data. In general, A and B monographs are of academic, but not clinical concern. Monographs rated C, D, or X always require the user's attention. The text of the Patient Management section of the monographs will provide assistance regarding the types of actions that could be taken. The definition of each risk rating is as follows:

Risk Rating	Action	Description
A	No Known Interaction	Data have not demonstrated either pharmacodynamic or pharmacokinetic interactions between the specified agents
B	No Action Needed	Data demonstrate that the specified agents may interact with each other, but there is little to no evidence of clinical concern resulting from their concomitant use.
C	Monitor Therapy	Data demonstrate that the specified agents may interact with each other in a clinically significant manner. The benefits of concomitant use of these two medications usually outweigh the risks. An appropriate monitoring plan should be implemented to identify potential negative effects. Dosage adjustments of one or both agents may be needed in a minority of patients.
D	Consider Therapy Modification	Data demonstrate that the two medications may interact with each other in a clinically significant manner. A patient-specific assessment must be conducted to determine whether the benefits of concomitant therapy outweigh the risks. Specific actions must be taken in order to realize the benefits and/or minimize the toxicity resulting from concomitant use of the agents. These actions may include aggressive monitoring, empiric dosage changes, choosing alternative agents.
X	Avoid Combination	Data demonstrate that the specified agents may interact with each other in a clinically significant manner. The risks associated with concomitant use of these agents usually outweigh the benefits. These agents are generally considered contraindicated.

# Drug Interaction Monograph

## Lexi-Comp Online™ Interaction Analysis

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CefTRIAXone  
[D] Typhoid Vaccine (Typhoid Vaccine)  
Paracetamol (INT) (Acetaminophen)  
[D] Typhoid Vaccine (Vaccines)  
Typhoid Vaccine  
[D] CefTRIAXone (Antibiotics)

## Lexi-Comp Online™ Interaction Monograph

## Drug Interaction Monograph

Title Typhoid Vaccine / Antibiotics

### Dependencies:

- **Route (oral):** Only the live typhoid vaccine (oral product) is subject to this potential interaction.

**Risk Rating D:** Consider therapy modification

**Summary** Antibiotics may diminish the therapeutic effect of Typhoid Vaccine. Only the live attenuated Ty21a strain is affected. **Severity Major Reliability Rating Fair**

**Patient Management** Vaccination with live attenuated typhoid vaccine (Ty21a) should be avoided in patients being treated with systemic antibacterial agents. Use of this vaccine should be postponed until at least 24 hours after cessation of antibacterial agents.

**Antibiotics Interacting Members** Amikacin; Amoxicillin; Ampicillin; Azithromycin (Systemic); Aztreonam; Bedaquiline; Cefaclor; Cefadroxil; CeFAZolin; Cefcapene; Cefdinir; Cefepime; Cefixime; Cefminox; Cefotaxime; CefoTetan; CefOXitin; Cefpodoxime; Cefprozil; Ceftaroline Fosamil; CefTAZidime; Ceftibuten; Ceftolozane; CefTRIAXone; Cefuroxime; Cephalixin; Chloramphenicol; Ciprofloxacin (Systemic); Clarithromycin; Clindamycin (Systemic); Cloxacillin; Colistimethate; CycloSERINE; Dalbavancin; Dapsone (Systemic); Demeclocycline; Dicloxacillin; Doripenem; Doxycycline; Ertapenem; Erythromycin (Systemic); Flomoxef; Flucloxacillin; Fosfomycin; Fusidic Acid (Systemic); Gemifloxacin; Gentamicin (Systemic); Imipenem; Ivermectin (Systemic); Kanamycin; Levofloxacin (Systemic); Lincomycin; Linezolid; Lomefloxacin; Meropenem; Methenamine; MetroNIDAZOLE (Systemic); Minocycline; Moxifloxacin (Systemic); Mupirocin; Nafcillin; Nalidixic Acid; Nitrofurantoin; Norfloxacin; Ofloxacin (Systemic); Oritavancin; Oxacillin; Penicillin G (Parenteral/Aqueous); Penicillin G Benzathine; Penicillin G Procaine; Penicillin V Potassium; Pentamidine; Piperacillin; Rifabutin; Rifampin; Sparfloxacin; Spiramycin; Streptomycin; SulfADIAZINE; Sulfadoxine; Sulfamethoxazole; SulfSOXAZOLE; Tedizolid; Teicoplanin; Telavancin; Telithromycin; Tetracycline; Ticarcillin; Tobramycin (Systemic, Oral Inhalation); Trimethoprim; Vancomycin **Exceptions** Acetic Acid; Aluminum Acetate; Azithromycin (Ophthalmic); Bacitracin (Ophthalmic); Bacitracin (Systemic); Bacitracin (Topical); Benzoin; Capreomycin; Ciprofloxacin (Ophthalmic); Clindamycin (Topical); Dapsone (Topical); Erythromycin (Ophthalmic); Erythromycin (Topical); Fidaxomicin; Fusidic Acid (Ophthalmic); Fusidic Acid (Topical); Gatifloxacin; Gentamicin (Ophthalmic); Gentamicin (Topical); Gentian Violet; Hexachlorophene; Mafenide; MetroNIDAZOLE (Topical); Neomycin; Oxychlorosene; Polymyxin B; Povidone-Iodine (Topical); Rifaximin; Silver Nitrate; Silver Sulfadiazine; Sulfacetamide (Ophthalmic); Sulfacetamide (Topical); Tobramycin (Ophthalmic)

**Discussion** The prescribing information for the live attenuated typhoid vaccine (Ty21a) warns that it should not be administered to individuals who are being treated with antibacterial agents.<sup>1</sup> An informational brochure from the CDC advises patients that the oral typhoid vaccine should not be given within 24 hours of selected antibiotics.<sup>2</sup> These recommendations are consistent with the concern regarding the potential for some antibacterial agents to interfere with the replication of and resultant immune response to the live bacterial strain used in the live vaccine.<sup>1,3</sup>

### Footnotes

1. Prescribing information. Vivotif (Typhoid vaccine live oral Ty21a). Coral Gables, FL: Berna Biotech Ltd, August 2006.
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## Fever without a source in children 3 to 36 months of age

**Topic Outline**

- SUMMARY & RECOMMENDATIONS
- INTRODUCTION
- BACKGROUND
  - Fever of concern
  - Population of interest
  - Immunization status
    - Complete immunization
    - Incomplete immunization
- CAUSES OF FEVER
- OCCULT SOURCES OF INFECTION
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  - Urinary tract infection
  - Bacteremia
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- EVALUATION
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  - Physical examination
  - Laboratory testing
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    - Urine tests
    - Cultures
  - Chest radiograph
  - Inflammatory mediators
    - Molecular assays
- INITIAL APPROACH

**Fever without a source in children 3 to 36 months of age**

Author	Section Editors	Deputy Editor
Coburn H Allen, MD	Gary R Fleisher, MD Sheldon Ismail, MD	James F Wiley, II, MD, MPH

**Disclosures:** Coburn H Allen, MD Nothing to disclose. Gary R Fleisher, MD Nothing to disclose. Sheldon Ismail, MD Nothing to disclose. James F Wiley, II, MD, MPH Trial Support: Pfizer [vaccine (PCV13)]; Forest Lab [antibiotic (Ceftaroline)]; nothing to disclose. Contributor disclosures are listed in the review process, and through requirements for

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**Literature review current**

**INTRODUCTION —** Fever without a source (FWS) is a common clinical problem. It is defined as a fever of less than seven days duration in an otherwise healthy child 3 to 36 months of age. Fever of less than seven days duration in newborns, infants younger than three months, fever in immunocompromised patients, and fever of unknown origin ( $\geq 7$  days) are reviewed separately as follows:

- (See "[Evaluation and management of fever in the neonate and young infant \(younger than three months of age\)](#)".)
- (See "[Fever in children with chemotherapy-induced neutropenia](#)" and "[Evaluation and management of fever in children with non-chemotherapy-induced neutropenia](#)".)
- (See "[Management of fever in sickle cell disease](#)".)
- (See "[Fever of unknown origin in children: Evaluation](#)" and "[Etiologies of fever of unknown origin in children](#)".)

**BACKGROUND**

**Fever of concern —** In children 3 to 36 months of age, the diagnosis of fever is based upon core temperature, which is measured most accurately rectally. The history of

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Fever without a source in children 3 to 36 months of age

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Fever without a source in children 3 to 36 months of age

Topic Outline

SUMMARY & RECOMMENDATIONS

INTRODUCTION

BACKGROUND

- Fever of concern
- Population of interest
- Immunization status
  - Complete immunization
  - Incomplete immunization

CAUSES OF FEVER

OCCULT SOURCES OF INFECTION

- Pneumonia
- Urinary tract infection
- Bacteremia
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EVALUATION

- History
- Physical examination
- Laboratory testing
  - WBC and ANC counts
  - Urine tests
  - Cultures
- Chest radiograph
- Inflammatory mediators
  - Molecular assays

INITIAL APPROACH

Fever without a source in children 3 to 36 months of age

Author  
Coburn H Allen, MD

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**Disclosures:** Coburn H Allen, MD Nothing to disclose. Gary R Fleisher, MD Nothing to disclose. Sheldon L Kaplan, MD Grant/Lab [antibiotic (Ceftaroline)]; Optimizer [antibiotic (fidaxomicin)]. Consultant/Advisory Boards: Pfizer [vaccine (PCV13)]. James F Wiley, II, MD, MPH Nothing to disclose. Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting the content.

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**Literature review current through: Jun 2015. | This topic last updated: Jun 29, 2015.**

**INTRODUCTION** — Fever is a common symptom among children seeking medical care. Most children under 3 years of age who have a fever without a source are healthy and have a self-limited illness. In contrast, a fever without a source in a toxic-appearing child less than three years of age, the illness is more serious. For children 3 to 36 months of age, the illness is more serious. For children 3 to 36 months of age, the illness is more serious. For children 3 to 36 months of age, the illness is more serious.

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**BACKGROUND**

**Fever of concern** — In children 3 to 36 months of age, the diagnosis of fever is based upon core temperature, which is measured most accurately rectally. The history of



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Fever without a source in children 3 to 36 months of age

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**INFORMATION FOR PATIENTS**

**SUMMARY AND RECOMMENDATIONS**

- General issues
- Ill-appearing child
- Well-appearing child
  - Incompletely immunized
  - Completely immunized
- Clinical follow-up
  - Urine cultures
  - Blood cultures

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**ALGORITHMS**

- Male infants UTI
- Blood culture followup in children 3 to 36 months of age

**TABLES**

- Prevalence of UTI in febrile infants and children
- Tests to diagnose UTI in children

**RELATED TOPICS**

- Anatomy and development of the teeth
- Bacterial meningitis in children older than one month: Clinical features and diagnosis
- Cellulitis and erysipelas
- Clinical manifestations and diagnosis of enterovirus and parechovirus infections
- Community-acquired pneumonia in children: Clinical features and

**Fever without a source in children 3 to 36 months of age**

**Author**  
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**Disclosures:** Coburn H Allen, MD Nothing to disclose. Gary R Fleisher, MD Nothing to disclose. Sheldon L Kaplan, MD Grant/Research/Clinical Trial Support: Pfizer [vaccine (PCV13)]; Forest Lab [antibiotic (Ceftaroline)]; Optimer [antibiotic (fidaxomicin)]. Consultant/Advisory Boards: Pfizer [vaccine (PCV13)]. James F Wiley, II, MD, MPH Nothing to disclose. Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for

All topics are updated as new evidence becomes available and our [peer review process](#) is complete.  
Literature review current through: Jun 2015. | This topic last updated: Jun 29, 2015.

**INTRODUCTION** — Fever is a common symptom among children seeking medical care. Most children undergo evaluation for a febrile illness before their third birthday, and nearly one-third of pediatric outpatient visits are for fever [1-3]. When the history and physical examination cannot identify a specific source of fever in an acutely ill, nontoxic-appearing child less than three years of age, the illness is often called fever without a source (FWS). Alternative terms are fever without localizing signs (FWLS) or fever without a focus.

This topic will review the etiology, evaluation, and management of the otherwise healthy child 3 to 36 months of age with fever of less than seven days duration. Fever in newborns, infants younger than three months, fever in immunocompromised patients, and fever in children with underlying medical conditions are not covered.

- (See "[Evaluation and management of fever in the neonate and young infant \(younger than 3 months\)](#)".)
- (See "[Fever in children with chemotherapy-induced neutropenia](#)" and "[Evaluation and management of fever in children with cancer](#)".)
- (See "[Management of fever in sickle cell disease](#)".)
- (See "[Fever of unknown origin in children: Evaluation](#)" and "[Etiologies of fever of unknown origin in children](#)".)

**BACKGROUND**

**Fever of concern** — In children 3 to 36 months of age, the diagnosis of fever is based upon core temperature, which is measured most accurately rectally. The history of an elevated temperature recorded at home should be considered equivalent to that taken in a medical facility. Fever 39°C (102.2°F) or higher is the threshold above which evaluation for a source of occult infection, including urinary tract infection (UTI), may be warranted [4]. (See "[Occult sources of infection](#)" below.)

The majority of children with fever have either a self-limited viral infection or a recognizable source of bacterial infection. However, research in the 1970s identified a population of well-appearing febrile young children who had occult bacteremia [5,6]. Subsequent studies demonstrated that some of these children went on to develop serious focal bacterial infections, such as pneumonia and meningitis [7,8]. Although laboratory testing identified a group of children at an increased risk for occult

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Fever without a source in children 3 to 36 months of age

Positive urine culture

INFORMATION FOR PATIENTS

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- General issues
- Ill-appearing child
- Well-appearing child
  - Incompletely immunized
  - Completely immunized
- Clinical follow-up
- Culture follow-up
  - Urine cultures
  - Blood cultures

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Bacterial meningitis in children older than one month: Clinical features and diagnosis

Cellulitis and erysipelas

Clinical manifestations and diagnosis of enterovirus and parechovirus infections

Community-acquired pneumonia in children

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Finkelstein JA, Christiansen  
Pediatrics. 2000;105(1 Pt 3):260-6.

OBJECTIVE: To describe the epidemiology, management, and outcomes of children with fever in pediatric primary care practice.

PATIENTS: A cohort of 20 585 children 3 to 36 months of age cared for in 11 pediatric offices of a health maintenance organization between 1991 and 1994.

METHODS: Using automated medical records we identified all office visits with temperatures  $\geq 38$  degrees C for a random sample of 5000 children, and analyzed diagnoses conferred, laboratory tests performed, and antibiotics prescribed. We also determined the frequency of in-person and telephone follow-up after initial visits for fever. Finally, we reviewed hospital claims data for the entire cohort of 20 585 to identify cases of

RESULTS: Among 3819 in-laboratory testing. Almost all meningococcal sepsis. Five

CONCLUSION: The major recommendations, and should be unlikely to affect population

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### Fever in pediatric primary care: occurrence, management, and outcomes.

Finkelstein JA<sup>1</sup>, Christiansen CL, Platt R.

Author information

#### Abstract

OBJECTIVE: To describe the epidemiology, management, and outcomes of children with fever in pediatric primary care practice.

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## Fever without a source in children 3 to 36 months of age

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**Disclosures:** Coburn H Allen, MD Nothing to disclose. Lab [antibiotic (Ceftaroline)]; Optimer [antibiotic (fidaxomicin)]. Contributor disclosures are reviewed for conflicts of interest.

All topics are updated as new evidence becomes available. Literature review current through: Jun 2015.

**INTRODUCTION** — Fever is a common symptom and nearly one-third of pediatric outpatient visits. When the history and physical examination cannot identify a source, the fever is often called fever without a source (FWS). All

This topic will review the etiology, evaluation, and management of fever in newborns, infants younger than three months of age.

(See "Evaluation and management of fever in children with chemotherapy."

**with chemothera**

**fever in sickle cell**

**in origin in childre**

**BACKGROUND**

**Male infants UTI**

**Blood culture followup in children 3 to 36 months of age**

**Prevalence of UTI in febrile infants and children**

**Tests to diagnose UTI in children**

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Fever without a source in children 3 to 36 months of age

Topic Outline

**SUMMARY & RECOMMENDATIONS** ➔

INTRODUCTION

BACKGROUND

- Fever of concern
- Population of interest
- Immunization status

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Topic Outline

**SUMMARY & RECOMMENDATIONS** ➔

INTRODUCTION

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- Fever of concern
- Population of interest
- Immunization status

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- Adult
- Pediatric
- Patient
- Graphics

Acute dysphagia in children with fever

Pediatric tachycardia without shock

Pediatric sore throat initial approach

Export to PowerPoint | Print | Email | Full View | Feedback

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## Acute dysphagia in children with fever

Life-threatening hypoxemia, upper airway obstruction, and/or respiratory failure

Yes → Oxygenate with 100 percent inspired oxygen, secure airway, and assist breathing

No → Fever?

Yes → Acute onset of aphonia, drooling, severe respiratory distress, tripod position?

No → Go to algorithm, "Acute dysphagia in children and no fever"

Yes → Epiglottitis

No → Trismus, unilateral peritonsillar swelling?

Yes → Peritonsillar abscess

No → Neck pain?

Yes → Drooling, neck stiffness, or worse pain on extension?

No → Oropharyngeal and/or mucosal lesions?

Yes → Retropharyngeal abscess

No → CNS infection

Severe neck or chest pain after retained foreign body, caustic ingestion, or esophageal procedure?

Pseudomembrane of the oropharynx?

Yes →

No →

Graphics can be:

- Exported to Power Point
  - Printed
  - Sent by email
  - Seen in format Full screen
- You can send a feedback or ask a question



# Tool bar

fever without source   All Topics   Contents   Patient Info   What's New   PCUs   Calculators   Drug Interactions

Fever without a source in children 3 to 36 months of age

therapy   Find   Patient   Print   Email

**Topic Outline**

**SUMMARY & RECOMMENDATIONS**

**INTRODUCTION**

**BACKGROUND**

- Fever of concern
- Population of interest
- Immunization status
  - Complete immunization
  - Incomplete immunization

**CAUSES OF FEVER**

**OCCULT SOURCES OF INFECTION**

- Pneumonia
- Urinary tract infection
- Bacteremia
  - Predictors
  - Impact of vaccines

**EVALUATION**

- History
- Physical examination
- Laboratory testing
  - WBC and ANC counts
  - Urine tests
  - Cultures
- Chest radiograph
- Inflammatory mediators
  - Molecular assays

**INITIAL APPROACH**

- Ill-appearing
- Well-appearing
  - Immunization incomplete
  - Immunization complete

**FOLLOW-UP**

- Positive blood cultures

**INFORMATION FOR PATIENTS** — UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5<sup>th</sup> to 6<sup>th</sup> grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10<sup>th</sup> to 12<sup>th</sup> grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s)

- Basics topic (see "[Patient information: Fever in children \(The Basics\)](#)")
- Beyond the Basics topic (see "[Patient information: Fever in children \(Beyond the Basics\)](#)")

**SUMMARY AND RECOMMENDATIONS**

**General issues**

- The following recommendations apply to well-appearing children 3 to 36 months of age who have fever without a source (FWS), and no focus of infection identified by a complete blood count (CBC) and urine analysis (UA). (See '[Background](#)' above.)
- The majority of children with fever have either a self-limited viral infection or a recognized bacterial infection.
  - Serious bacterial infections that occur in children 3 to 36 months of age include bacteremia, meningitis, pneumonia, urinary tract infection, and osteomyelitis.
  - Subtle sources of infection, such as pneumonia or osteomyelitis, can sometimes be missed.
  - Relatively common occult sources of infection include pneumonia and urinary tract infections (UTIs), with occasional cases of bacteremia.
- A thorough history, including immunization status and complete physical examination, should be performed in all febrile children to identify obvious and subtle focuses of infection. (See '[History](#)' above and '[Physical examination](#)' above.)

**Ill-appearing child**

- Children who are ill-appearing or have unstable vital signs require full evaluation for serious infection with cultures of blood, urine, and when meningitis is suspected, cerebrospinal fluid (CSF). A chest radiograph should be obtained in patients who have tachypnea or respiratory distress and is warranted for those with WBC  $\geq 20,000/\text{microL}$ , even in the absence of physical findings of pneumonia. (See '[Ill-appearing](#)' above.)
- Previously healthy children who are ill-appearing or have unstable vital signs should receive parenteral antibiotic therapy targeting the likely pathogens in this age group (*S. pneumoniae*, *S. aureus* including methicillin-resistant *S. aureus*, *M. meningitidis*, *H. influenzae* type b) and be admitted to the hospital. (See '[Ill-appearing](#)' above.)

4 Topic tools to spot rapidly some info within a Topic:

-Find (one or more words in the topic)

-Patient Info (when available within the topic)

-Print

-E-mail

# Patient Info

The screenshot shows the UpToDate web interface. At the top, there's a search bar with 'fever without source' and a 'Contents' link. The toolbar includes tabs for 'Patient Info', 'What's New', 'PCUs', 'Calculators', and 'Drug Interactions'. The 'Patient Info' tab is highlighted with a red box, and a green arrow points to it from a text box. The main content area shows a topic outline on the left and a summary of patient education materials on the right.

When on the toolbar there is the tab "Patient", it means that within the topic, the Patient Info is available

**INFORMATION FOR PATIENTS** — UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5<sup>th</sup> to 6<sup>th</sup> grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10<sup>th</sup> to 12<sup>th</sup> grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topic (see "[Patient information: Fever in children \(The Basics\)](#)")
- Beyond the Basics topic (see "[Patient information: Fever in children \(Beyond the Basics\)](#)")

- Urine tests
- Cultures
- Chest radiograph
- Inflammatory mediators
- Molecular assays

#### INITIAL APPROACH

- Ill-appearing
- Well-appearing
- Immunization incomplete
- Immunization complete

#### FOLLOW-UP

- Positive blood cultures

- Relatively common occult sources of infection include pneumonia and urinary tract infections (UTIs), with occasional cases of bacteremia.

- A thorough history, including immunization status and complete physical examination, should be performed in all febrile children to identify obvious and subtle foci of infection. (See 'History' above and 'Physical examination' above.)

Search specifically for patient education

Print or email the information to your patient

# 1500 Patient Support Leaflets

## The Basics

1 to 3 page long

Written in plain language.

Best for a general overview

Answer the 4 or 5 most important questions

## Beyond the Basics

5 - 10 pages long

More detailed than "The Basics"

Better for readers who are comfortable with some technical medical terms.



**IMPORTANT** - All leaflets  
are written by the same  
editorial experts

# The navigation bar

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fever without a source Pediatric Contents

Patient Info | What's New | PCUs | Calculators | Drug Interactions

fever without a source Find Patient Print Email

## Fever without a source in children 3 to 36 months of age

### Topic Outline

**SUMMARY & RECOMMENDATIONS**

INTRODUCTION

BACKGROUND

- Fever of concern
- Population of interest
- Immunization status
  - Complete immunization
  - Incomplete immunization

CAUSES OF FEVER

OCCULT SOURCES OF INFECTION

- Pneumonia
- Urinary tract infection
- Bacteremia
  - Predictors
  - Impact of vaccines

EVALUATION

- History
- Physical examination
- Laboratory testing
  - WBC and ANC counts
  - Urine tests
  - Cultures
- Chest radiograph
- Inflammatory mediators
  - Molecular assays

**Fever without a source in children 3 to 36 months of age**

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**Disclosures:** Coburn H Allen, MD Nothing to disclose. Gary R Fleisher, MD [antibiotic (Ceftaroline)]; Optimer [antibiotic (fidaxomicin)]. Consultant/Advisor. Contributor disclosures are reviewed for conflicts of interest by the editorial board. James F Wiley, II, MD, MPH Nothing to disclose. Clinical Trial Support: Pfizer [vaccine (PCV13)]; Forest Laboratories [vaccine (PCV13)].

All topics are updated as new evidence becomes available and our recommendations are based on the current literature review current through: Jun 2015. | This topic last updated: Jun 29, 2015.

**INTRODUCTION** — Fever is a common symptom among children seeking medical care. Most children undergo evaluation for a febrile illness before their third birthday, and nearly one-third of pediatric outpatient visits are for fever [1-3].

When the history and physical examination cannot identify a specific source of fever in an acutely ill, nontoxic-appearing child less than three years of age, the illness is often called fever without a source (FWS). Alternative terms are fever without localizing signs (FWLS) or fever without a focus.

This topic will review the etiology, evaluation, and management of the otherwise healthy child 3 to 36 months of age with fever of less than seven days duration. Fever in newborns, infants younger than three months, fever in immunocompromised patients, and fever of unknown origin ( $\geq 7$  days) are reviewed separately as follows;

- (See "[Evaluation and management of fever in the neonate and young infant \(younger than three months of age\)](#)".)
- (See "[Fever in children with chemotherapy-induced neutropenia](#)" and "[Evaluation and management of fever in children with non-chemotherapy-induced neutropenia](#)".)
- (See "[Management of fever in sickle cell disease](#)".)
- (See "[Fever of unknown origin in children: Evaluation](#)" and "[Etiologies of fever of unknown origin in children](#)".)

**BACKGROUND**

**Fever of concern** — In children 3 to 36 months of age, the diagnosis of fever is based upon core temperature, which is measured most accurately rectally. The history of

The TOOL BAR has some rapid links to some important features

# Patient Info

CLICK on "Patient Info" on the navigation bar, to access all the Patient Info.

Patient Info

## Contents: Patient Information

UpToDate offers different levels of patient education materials to meet the varying information needs of your patients.

### The Basics

"The Basics" are short (1 to 3 page) articles written in plain language. They answer the 4 or 5 most important questions a person might have about a medical problem. These articles are best for people who want a general overview.

[View all The Basics](#)

### Beyond the Basics

"Beyond the Basics" articles are 5 to 10 pages long and more detailed than "The Basics". These articles are best for readers who want a lot of detailed information and who are comfortable with some technical medical terms.

[View all Beyond the Basics](#)



This site complies with the HONcode standard for trustworthy health information: verify here.

## Patient Info per health category

To view a list of all available topics, click on the appropriate health category below.

Allergies and asthma  
Arthritis  
Autoimmune disease  
Blood disorders  
Bones, joints, and muscles  
Brain and nerves  
Cancer  
Children's health  
Diabetes  
Diet and weight

Ear, nose, and throat  
Eyes and vision  
Gastrointestinal system  
General health  
Heart and blood vessel disease  
HIV and AIDS  
Hormones  
Infections and vaccines  
Kidneys and urinary system  
Liver disease

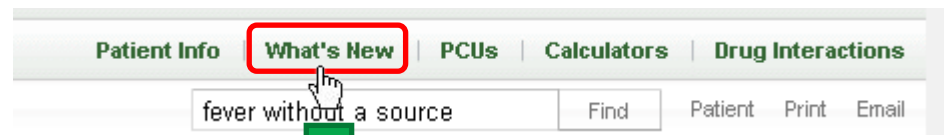
Lung disease  
Men's health issues  
Mental health  
Pregnancy and childbirth  
Senior health  
Skin, hair, and nails  
Sleep  
Surgery  
Travel health  
Women's health issues

You can also find patient information topics through the normal search mechanism (e.g. search "patient info asthma").  
All patient information topics can be printed or emailed.

[Learn more about our patient information.](#)



# Check out what is new in your specialty



## Contents: What's New

Our editors select a small number of the most important updates and after you have logged in to UpToDate.

UpToDate editors highlight the most important changes and updates, within each specialty, over the last 6 months.

- Practice Changing UpDates
- What's new in adult and pediatric emergency medicine
- What's new in adult primary care internal medicine
- What's new in allergy and immunology
- What's new in cardiovascular medicine
- What's new in dermatology
- What's new in drug therapy
- What's new in endocrinology and diabetes
- What's new in family medicine
- What's new in gastroenterology and hepatology
- What's new in general surgery
- What's new in geriatrics
- What's new in hematology
- What's new in hospital medicine
- What's new in infectious diseases
- What's new in nephrology and hypertension
- What's new in neurology
- What's new in obstetrics and gynecology
- What's new in oncology
- What's new in palliative care
- What's new in pediatrics**
- What's new in psychiatry
- What's new in pulmonary and critical care medicine
- What's new in rheumatology

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fever without a source | All Topics | Contents

What's new in pediatrics

**Topic Outline**

- GENERAL PEDIATRICS AND ADOLESCENT MEDICINE
  - Breastfeeding and childhood leukemia risk (July 2015)
  - Improving uptake of long-acting reversible contraceptives (July 2015)
  - Updated recommendations for pediatric head lice (May 2015)
  - Warning about use of non-prescription asthma treatments (April 2015)
  - National and ethnic variability in head circumference standards (March 2015)
  - Light-emitting e-readers delay normal circadian rhythms and interfere with sleep (February 2015)
  - Bronchodilators not routinely recommended for bronchiolitis in infants and children (January 2015)
- NEONATOLOGY
  - Universal versus selective screening for patent ductus arteriosus in preterm infants (July 2015)
  - Effect of active resuscitation on survival at borderline viability (June 2015)
  - Endotracheal suctioning may not benefit nonvigorous neonates with

**What's new in pediatrics**

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**Disclosures:** Alison G Hoppin, MD Nothing to disclose. Melanie S Kim, MD Nothing to disclose. Elizabeth TePas, MD, MS Nothing to disclose. Mary M Torchia, MD Nothing to disclose. Carrie Armsby, MD, MPH Nothing to disclose.  
Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for

All topics are updated as new evidence becomes available and our [peer review process](#) is complete.

**Literature review current through:** Jun 2015. | **This topic last updated:** Jul 24, 2015.

The following represent additions to UpToDate from the past six months that were considered by the editors and authors to be of particular interest. The most recent What's New entries are at the top of each subsection.

**GENERAL PEDIATRICS AND ADOLESCENT MEDICINE**

**Breastfeeding and childhood leukemia risk (July 2015)**

Several studies have suggested that breastfeeding is associated with a modest reduction in childhood cancers. Now, a meta-analysis of case-control studies has found that breastfeeding for six months or more is associated with a 19 percent reduction in the risk of childhood leukemia [1]. A smaller protective effect also was detected for shorter durations of breastfeeding. Possible mechanisms for the observed association include enhancement of the immune system or modification of the infant's microbiome. (See ["Infant benefits of breastfeeding", section on 'Cancer'](#).)

**Improving uptake of long-acting reversible contraceptives (July 2015)**

Long-acting reversible contraceptives (LARC), which include implants and intrauterine devices, are the most effective reversible methods to prevent pregnancy. Interventions

# "PCUs": Practice Changing Updates

"Practice Changing Updates" highlights significant changes that our authors and editors feel will change usual clinical practice.

The screenshot shows the UpToDate website interface. At the top, there is a navigation bar with tabs: Patient Info, What's New, PCUs (highlighted with a red box), Calculators, and Drug Interactions. Below this, there is a search bar with the text "fever without a source" and buttons for Find, Patient, Print, and Email. A green arrow points from the PCUs tab to the "Practice Changing Updates" section. On the left side, there is a "Topic Outline" section with a list of topics: INTRODUCTION, CARDIOVASCULAR MEDICINE (JULY 2015), HEMATOLOGY (JULY 2015), INFECTIOUS DISEASES - ADULT, PRIMARY CARE, PEDIATRICS, ALL, IMMUNOLOGY (JULY 2015), ONCOLOGY (MAY 2015), and PULMONARY AND CRITICAL CARE MEDICINE (MAY 2015). The "Practice Changing Updates" section is highlighted in green. It includes a "Topic Outline" on the left, a "Summary of the PCU in paragraph format" on the right, and a "Practice Changing Updates" section in the center. The "Practice Changing Updates" section includes a "Topic Outline" on the left, a "Summary of the PCU in paragraph format" on the right, and a "Practice Changing Updates" section in the center. The "Practice Changing Updates" section includes a "Topic Outline" on the left, a "Summary of the PCU in paragraph format" on the right, and a "Practice Changing Updates" section in the center.

**Practice Changing Updates**

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**Disclosures:** H Nancy Sokol, MD Nothing to disclose. David M Rind, MD Employee of UpToDate, Inc. Equity Ownership/Stock Ownership. Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate policy.

**Conflict of interest policy**

All topics are updated as new evidence becomes available and our [peer review process](#) is complete.

**Literature review current through:** Jun 2015. | **This topic last updated:** Jul 21, 2015.

**INTRODUCTION** — This section highlights selected specific new recommendations and/or updates that will change usual clinical practice. Practice Changing Updates focus on changes that may have significant and broad impact on practice, and therefore are presented chronologically. Practice Changing Updates, reflecting important changes to UpToDate over the past year, are presented chronologically in this section.

**CARDIOVASCULAR MEDICINE (JULY 2015)**

**Ivabradine for heart failure with reduced ejection fraction**

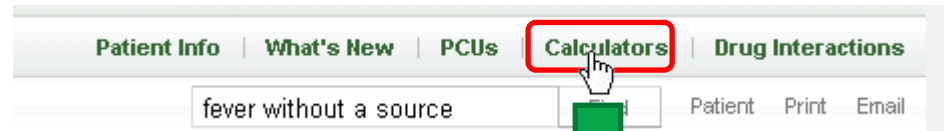
- For patients with chronic stable heart failure with LVEF  $\leq 35$  percent, in sinus rhythm with a resting heart rate  $\geq 70$  beats per minute (bpm), and who are either on a maximum tolerated dose of a beta blocker or who have a contraindication to beta blocker use, we suggest treatment with ivabradine, as approved in the United States [1] and previously approved in Europe. In such patients, ivabradine has been shown to reduce the risk of hospitalization for worsening heart failure. (See "[Use of beta blockers and ivabradine in heart failure with reduced ejection fraction](#)", section on "[Our recommendations](#)".)

**Summary of the PCU in paragraph format. To get more information, click on the hyperlink to go to the full topic.**

**Information is arranged in chronological order, (the most recent at the top)**

# Calculators

Calculators can also be searched from the main search box (for example type "Apgar Score") and are also available as a link within the topics



Do a quick check on medical calculations (over 160)

## Contents: Calculators

You receive the entire UpToDate library of specialties with your subscription. Click on a section below to view a detailed list of topics associated with that particular section. If you'd like to see the table of contents for other specialties, click [here](#).

Adult and Pediatric Emergency Medicine Calculators  
Adult Primary Care and Internal Medicine Calculators  
Allergy and Immunology Calculators  
Cardiovascular Medicine Calculators  
Endocrinology and Diabetes Calculators  
Gastroenterology and Hepatology Calculators

Patient Information

General Surgery Calculators  
Hematology Calculators  
Hospital Medicine Calculators  
Infectious Diseases Calculators  
Nephrology and Hypertension Calculators  
Neurology Calculators

Medical  
calculators per  
specialty

Obstetrics, Gynecology and Women's Health Calculators  
Oncology Calculators  
Pediatrics Calculators  
Psychiatry Calculators  
Pulmonary, Critical Care, and Sleep Medicine Calculators  
Rheumatology Calculators

# Medical calculators

Calculator: Apgar score

More than 160 medical calculators to help you quickly and accurately calculate many different medical measurements. Calculators are fully referenced and continually updated.

Total Criteria Point Count:

## Strength and regularity of heart rate

- ☐ 100 beats/minute or more (2 points)
- ☒ Less than 100 (1 point)
- ☐ None (0 points)

## Lung maturity

- ☒ Regular breathing (2 points)
- ☐ Irregular (1 point)
- ☐ None (0 points)

## Muscle tone and movement

- ☒ Active (2 points)
- ☐ Moderate (1 point)
- ☐ Limp (0 points)

## Skin color / oxygenation

- ☐ Pink (2 points)
- ☒ Bluish extremities (1 point)
- ☐ Totally blue (0 points)

## Reflex response to irritable stimuli

- ☒ Crying (2 points)
- ☐ Whimpering (1 point)
- ☐ Silence (0 points)

Apgar Score

7-10 Points: Normal

0-6 Points: Distress

## References

1. Apgar V. A proposal of a New Method of Evaluation of the Newborn Infant. *Current Researches in Anesthesia and Analgesia*. 1953, 32: 261-267.
2. Apgar V, Holaday DA, James LS, et al. Evaluation of the newborn Infant. *JAMA*. 1958, 168: 1985-1988.
3. Casey BM, McIntire DD, Leveno KJ. The continuing value of the Apgar score for the assessment of newborn infants. *N Engl J Med*. 2001 Feb 15;344(7):467-71.



# Thank you!

If you would like to have a 1-2-1 live demonstration of UpToDate, or would like to present this tool to your team, please contact out dedicated trainer from UpToDate who will be happy to work with you.

Chiara Taiana - UpToDate  
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