

# Diagnostic Imaging Pathways - Sinusitis (Acute)

## Population Covered By The Guidance

This pathway provides guidance on the imaging of patients with acute sinusitis.

**Date reviewed: July 2014**

**Date of next review: 2017/2018**

**Published: October 2014**

## Quick User Guide

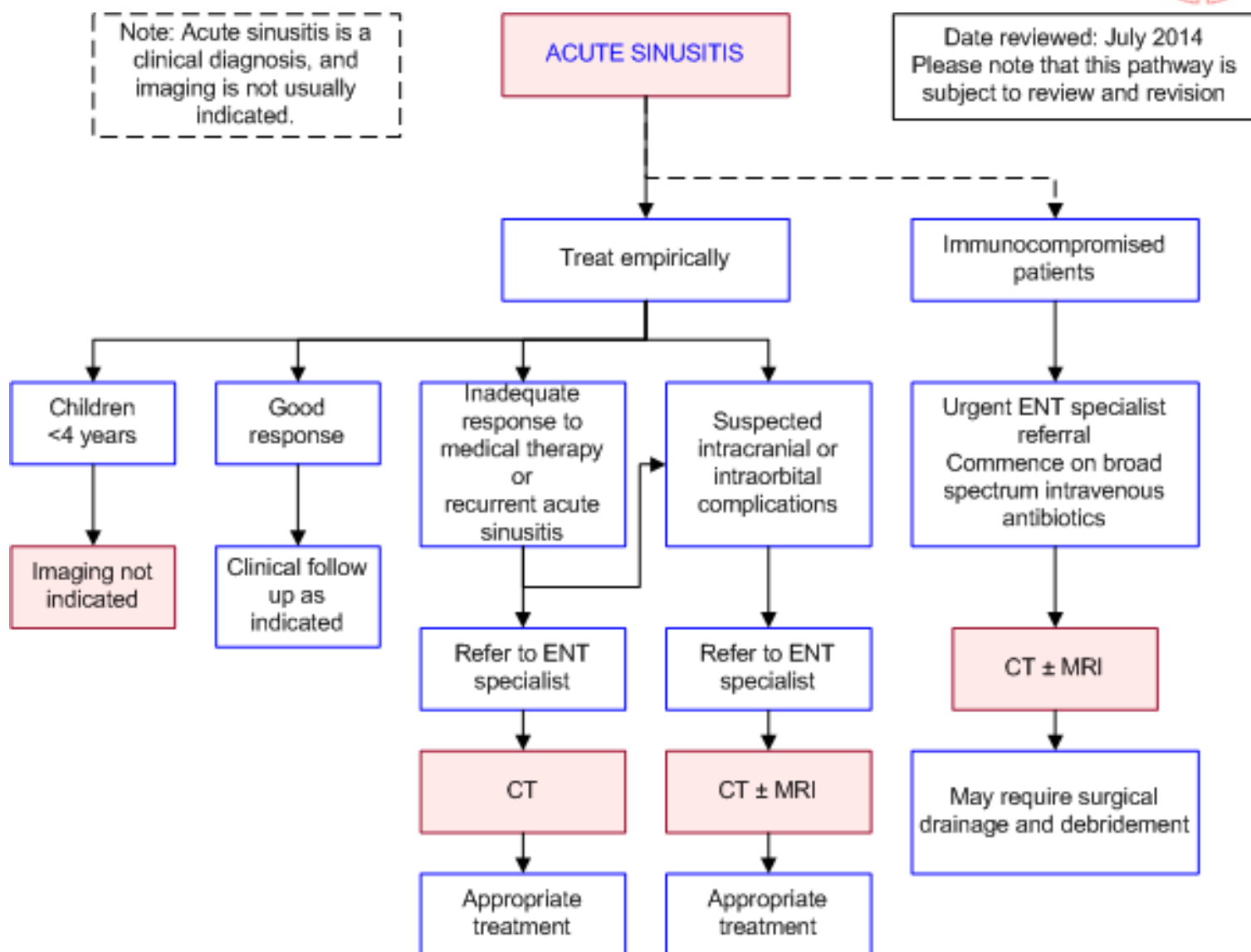
Move the mouse cursor over the **PINK** text boxes inside the flow chart to bring up a pop up box with salient points.

Clicking on the **PINK** text box will bring up the full text.

The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

## Pathway Diagram



## Image Gallery

*Note: These images open in a new page*

1a



### Pansinusitis with Preseptal Cellulitis and Septal Abscess

Image 1a, b ,c and d (Computed Tomography): Gross preseptal and subcutaneous oedema affecting the right upper cheek and periorbital tissues. Mild right proptosis. Post-septal abscess seen between the lateral rectus and the postero-lateral aspect of the right globe. Pansinusitis with fluid levels within each sinus group indicating active suppuration. Numourous locules of gas within the subcutaneous oedema, the right orbit, and tracking through the right optic canal.

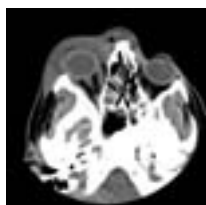
1b



1c



1d



## Teaching Points

- Imaging is indicated in acute sinusitis if
  - There is inadequate response to medical therapy
  - There are numerous episodes of acute bacterial sinusitis in a year
  - There is a clinical suspicion of intracranial or intraorbital complications
  - The patient is immunocompromised
- A CT scan of the sinuses is the recommended imaging modality if indicated

## Acute Sinusitis

- Acute sinusitis is a clinical diagnosis and is defined as a rhinosinusitis that has persisted for between 7 and 28 days, with the presence of two or more major sinus symptoms or at least one major and two minor sinus symptoms [5](#)
- Acute sinusitis is normally diagnosed on clinical grounds, and imaging is not usually required. However, there are a number of scenarios in which imaging is indicated if
  - There is inadequate response to medical therapy, or
  - There are numerous episodes of acute bacterial sinusitis in a year, or
  - There is a clinical suspicion of intracranial or intraorbital complications, or
  - The patient is immunocompromised
- Major symptoms: facial pain/pressure, facial congestion/fullness, nasal obstruction/blockage, nasal discharge, hyposmia/anosmia, purulence in the nasal cavity on examination and fever [5](#)
- Minor symptoms: headache, halitosis, fatigue, dental pain, cough and ear pain/pressure/fullness [5](#)
- Symptoms in children are more non-specific with cough and nasal discharge being the most common presentations. Facial pain and headache are not usually present [6](#)
- Streptococcus pneumoniae, Haemophilus influenzae and Moraxella catarrhalis account for the majority of acute bacterial sinusitis in adult and paediatric populations [6,7](#)
- Mixed microorganisms cultured from intranasal swabs do not usually correlate with the pathologic source [6,7](#)
- Specialist ENT referral is warranted in the following situations [6,8](#)
  - Suspected complications (subperiosteal, intradural, and brain abscesses)
  - No response to 2nd line antibiotic therapy
  - Recurrent disease ( >3 acute episodes per year)
- Use of plain radiography for diagnosis of inflammatory sinus disease is not recommended [1-4,9,21,22](#)

## Coronal Computed Tomography

- Coronal CT is not a routine investigation in the diagnosis of acute bacterial sinusitis and is indicated only for non-responsive or recurrent acute sinusitis, pre-surgical planning and for evaluating suspected complications [1-4,6,8](#)
- Coronal plane optimally displays [9,10](#)
  - The ostiomeatal unit and relationship of the brain and roof of the ethmoid sinus
  - The relationship of the orbits to the paranasal sinuses
- For patients requiring sinus imaging evaluation, consensus in North America and Europe currently recommends CT in preference to plain film radiography which are insensitive and non-specific [1-4](#)
- There have been no studies comparing CT to sinus puncture and aspiration
- CT has low specificity for diagnosis of acute sinusitis, thus clinical correlation is essential [11](#)
- Features of acute sinusitis on CT include: mucosal thickening, presence of air/fluid levels, enhancing pockets with non-enhanced central zone (pus) and complete sinus opacification [12,13](#)
- For anatomical evaluation including pre-surgical planning, a non-contrast scan is adequate
- If complications are suspected, then the scan is usually performed before and after administration of contrast
- Multidetector CT enables fast scan times, and may reduce the need for sedation in young children
- Low-dose CT protocols can effectively reduce the radiation dose without significantly affecting diagnostic quality [14,15](#)

## Magnetic Resonance Imaging

- For intracranial complications of acute sinusitis, MRI is more accurate than CT and is considered by some to be the initial diagnostic modality of choice [16,17](#)
- MRI and MR Venography (MRV) are more sensitive than CT for the diagnosis of cavernous sinus thrombosis [18,19](#)
- Limitations: expensive, not available at all centres, long scan times [20](#)

## References

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. [Download the document](#)

1. McAlister WH, Strain JD, Cohen HL, et al. **The American College of Radiology: ACR appropriateness criteria: sinusitis - child**. 2012 [cited 2014 December 8]. (Guidelines). [View the reference](#)
2. Fokkens W, Lund V, Bachert C, et al. **EEACI Position paper on rhinosinusitis and nasal polyps: executive summary**. Allergy. 2005;60:583-601. (Guidelines)
3. European Academy of Allergology and Clinical Immunology. **European position paper on rhinosinusitis and nasal polyps**. Rhinology. 2005;18:S1-87. (Review article)
4. Slavin RG, Spector SL, Bernstein IL, et al. **The diagnosis and management of sinusitis: a practice parameter update**. J Allergy Clin Immunol. 2005;116:S13-47. (Review article)
5. Lanza DC, Kennedy DW. **Adult rhinosinusitis defined**. Otolaryngol Head Neck Surg. 1997;117(3):S1-S7. (Review article)
6. Brook I, Gooch WM 3rd, Reiner SA, et al. **Medical management of acute bacterial Sinusitis**. Ann Otol Rhinol Laryngol. 2000;109:1-17. (Clinical decision rule)
7. Evans KL. **Diagnosis and management of sinusitis**. BMJ. 1994;309:1415-22. (Review article)



8. Low DE, Desrosiers M, McSherry J. **A practical guide for the diagnosis and treatment of acute sinusitis.** CMAJ. 1997;156(6S):S1-14. (Review article)
9. Yousem DM. **Imaging of sinonasal inflammatory disease.** Radiology. 1993;188:303-14. (Review article)
10. Zinreich SJ. **Rhinosinusitis: radiologic diagnosis.** Otolaryngol Head Neck Surg. 1997;117(3):S27-S34. (Review article)
11. Gwaltney JM, Phillips CD, Miller RD, Riker DK. **Computed tomographic study of the common cold.** N Engl J Med. 1994;330:25-30. (Level IV evidence)
12. Lindbaek M, Johnsen U, Kaastad E, et al. **CT Findings in general practice patients with suspected acute sinusitis.** Acta Radiologica. 1996;37:708-13. (Level IV evidence)
13. Eustis HS, Mafee MF, Walton C, Mondonca J. **MR imaging and CT of orbital infections and complications in acute rhinosinusitis.** Radiol Clin North Am. 1998;36:1165-83. (Review article)
14. Tack D, Widelec J, De Maertelaer V, Bailly J-M, Delcour C, Gevenois PA. **Comparison between low-dose and standard-dose multidetector CT in patients with suspected chronic sinusitis.** AJR Am J Roentgenol. 2003;181:939-44. (Level III evidence)
15. Hagtvedt T, Aalokken TM, Notthellen J, Kolbenstvedt A. **A new low-dose CT examination compared with standard-dose CT in the diagnosis of acute sinusitis.** Eur Radiol. 2003;13:976-80. (Level III evidence)
16. Younis RT, Anand VK, Davidson B. **The role of computed tomography and magnetic resonance imaging in patients with sinusitis with complications.** Laryngoscope. 2002;112:224-9. (Level IV evidence)
17. Hahnel S, Ertl\_Wagner B, Tasman A-J, Forsting M, Jansen O. **Relative value of MR imaging as compared with CT in the diagnosis of inflammatory paranasal sinus disease.** Radiology. 1999;210:171-6. (Level IV evidence)
18. Lee SK, Terbrugge KG. **Cerebral venous thrombosis in adults: the role of imaging evaluation and management.** Neuroimag Clin N Am. 2003;13:139-152. (Review article)
19. Tsai FY, Wang AM, Matovich VB, et al. **MR staging of acute dural sinus thrombosis: correlation with venous pressure measurements and implications for treatment and prognosis.** AJNR Am J Neuroradiol. 1995;16:1021-9. (Level III evidence)
20. McAlister WH, Kronemer K. **Imaging of sinusitis in children.** Pediatr Infect Dis J. 1999;18:1019-20. (Review article)
21. Konen E, Faibel M, Kleinbaum Y, et al. **The value of the occipitomeatal (waters') view in diagnosis of sinusitis: a comparative study with computed tomography.** Clin Radiol. 2000;55:856-60. (Level II/III evidence)
22. Davidson TM, Brahme FJ, Gallagher ME. **Radiographic evaluation for nasal dysfunction: computed tomography versus plain films.** Head and Neck. 1989;11:405-9. (Level III evidence)

## Information for Consumers

Information from this website	Information from the Royal Australian and New Zealand College of Radiologists' website
<a href="#">Consent to Procedure or Treatment</a> <a href="#">Radiation Risks of X-rays and Scans</a>	<a href="#">Computed Tomography (CT)</a> <a href="#">Contrast Medium (Gadolinium versus</a>

[Sinusitis \(Acute\)](#)

[Computed Tomography \(CT\)](#)

[Magnetic Resonance Imaging \(MRI\)](#)

[Iodine](#)

[Gadolinium Contrast Medium](#)

[Iodine-Containing Contrast Medium](#)

[Magnetic Resonance Imaging \(MRI\)](#)

[Radiation Risk of Medical Imaging During Pregnancy](#)

[Radiation Risk of Medical Imaging for Adults and Children](#)

## Copyright

© Copyright 2015, Department of Health Western Australia. All Rights Reserved. This web site and its content has been prepared by The Department of Health, Western Australia. The information contained on this web site is protected by copyright.

## Legal Notice

Please remember that this leaflet is intended as general information only. It is not definitive and The Department of Health, Western Australia can not accept any legal liability arising from its use. The information is kept as up to date and accurate as possible, but please be warned that it is always subject to change

## File Formats

Some documents for download on this website are in a Portable Document Format (PDF). To read these files you might need to download Adobe Acrobat Reader.



[Legal Matters](#)