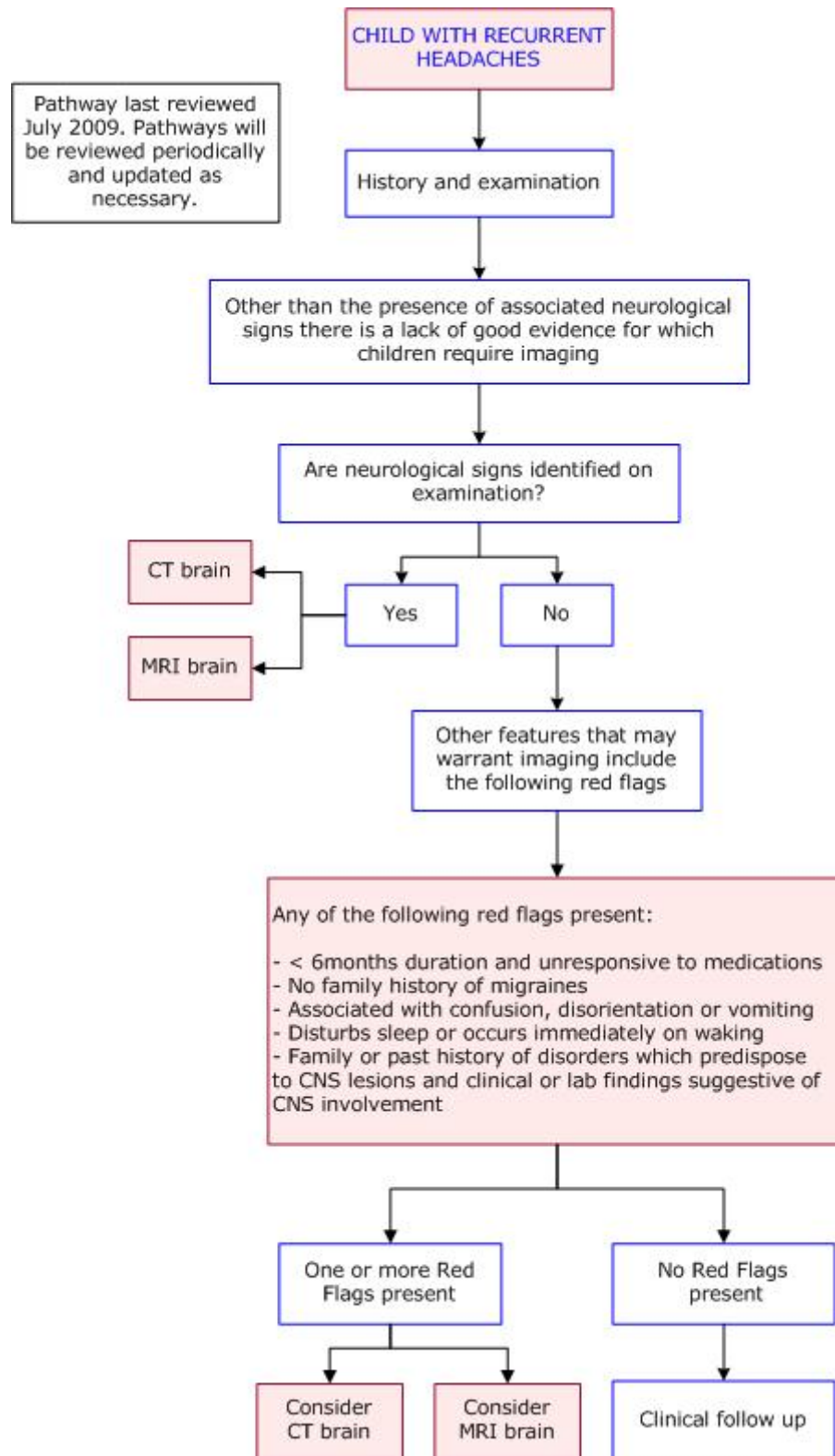




DIAGNOSTIC IMAGING PATHWAYS

www.imagingpathways.health.wa.gov.au



INTRODUCTION

- Headaches are common in childhood affecting up to 90% of school aged children. [7](#)
- Upper respiratory tract viral infections, psychosocial problems, migraines and cluster headaches are among the most common causes. [8](#)
- In one meta-analysis, brain tumours were detected in 1.5% of children who had neuroimaging performed. [9](#) All children who had a treatable surgical cause for their headaches had abnormal findings on neurological exam.

RED FLAGS

- The following Red Flags may warrant further investigation:
 - Persistent headaches of less than 6 months duration that do not respond to medical treatment.
 - Persistent headaches associated with an absent family history of migraine.
 - Persistent headaches associated with substantial episodes of confusion, disorientation, or emesis.
 - Headaches that awaken the child repeatedly from sleep or occur immediately on waking.
 - Family or medical history of disorders that may predispose to CNS lesions and clinical or laboratory findings suggestive of CNS involvement.
- There is sufficient evidence to suggest that the presence of associated neurological signs is a definite indication for imaging. Among children with brain tumours, over 94% had an abnormal neurological exam. [3,4](#)
- The other red flags which may suggest a space occupying lesion were derived from a retrospective study on 315 children with headache. The study found that sleep-related headache and no family history of migraine were the strongest predictors of a space occupying lesion. The features have not however been prospectively validated. [5](#)
- Imaging is generally not recommended for children with migraine headaches and a normal neurological exam. However, atypical features or children who do not fulfil the strict definition for migraine may reduce the threshold for imaging. [11](#)

COMPUTED TOMOGRAPHY

- Computed tomography offers a widely available, quick and inexpensive imaging modality.
- It is typically performed in acute situations in which haemorrhage is suspected or for the rapid diagnosis of a space occupying lesion.
- The main disadvantage is the use of ionising radiation. CT is also inferior to MRI for assessment of the posterior cranial fossa, white matter and sellar lesions.
- There are few studies which have directly compared the sensitivity of CT and MRI for the investigation of paediatric headache. In one study there was no significant difference between the two for the detection of surgical space occupying lesions. [5](#)

MAGNETIC RESONANCE IMAGING

- If available, MRI is generally preferred for the neuroimaging of children as it does not involve ionising radiation. Compared to CT, it allows for superior visualisation of the posterior cranial fossa, white matter and sellar lesions.
- However, it is more expensive and can be time consuming. Sedation or general anaesthesia is generally necessary in children under 6 years old.
- In terms of cost-effectiveness, MRI has been shown to be the most effective strategy for children at high risk of serious pathology (abnormal neurological exam or the presence of red flags). [10](#)

REFERENCES

1. Chu ML, Shinnar S. **Headaches in children younger than 7 years of age.** Arch Neurol 1992;49:79-82. (Level III evidence)
2. Maytal J, Bienkowski RS, Patel M, Eviator L. **The value of brain imaging in children with headaches.** Pediatrics 1995;96:413-6. (Level IV evidence)
3. The Childhood Brain Tumor Consortium. **The epidemiology of headache among children with brain tumor.** Headache in children with brain tumours J Neurooncol 1991;10:31-46. (Level II evidence). [Click here to view reference](#)
4. Honig PJ, Charney EB. **Children with brain tumor headaches.** Am J Dis Child 1982;136:121-4. (Level IV evidence)
5. Medina LS, Pinter JD, Zurakowski D, et al. **Children with headache: clinical predictors of surgical space-occupying lesions and the role of neuroimaging.** Radiology 1997;202:819-24. (Level IV evidence)
6. Alehan FK. **Value of neuroimaging in the evaluation of neurologically normal children with recurrent headache.** J Child Neurol 2002;17:807-9. (Level III evidence)
7. Barea LM; Tannhauser M; Rotta NT. **An epidemiologic study of headache among children and adolescents of southern Brazil.** Cephalalgia 1996 Dec;16(8):545-9; discussion 523. (Level II evidence)
8. Burton LJ; Quinn B; Pratt-Cheney JL; Pourani M. **Headache etiology in a pediatric emergency department.** Pediatr Emerg Care 1997 Feb;13(1):1-4. (Level II evidence)
9. Lewis DW; Ashwal S; Dahl G; Dorbad D; Hirtz D; Prensky A; Jarjour I. **Practice parameter: evaluation of children and adolescents with recurrent headaches: report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society.** Neurology 2002 Aug 27;59(4):490-8. (Guidelines) [Click here to view article](#)
10. Medina LS; Kuntz KM; Pomeroy S. **Children with headache suspected of having a brain tumor: a cost-effectiveness analysis of diagnostic strategies.** Pediatrics 2001 Aug;108(2):255-63. (Level II evidence)
11. Silberstein SD; Rosenberg J. **Multispecialty consensus on diagnosis and treatment of headache.** Neurology 2000 Apr 25;54(8):1553. (Guidelines) [Click here to view article](#)

Website

For more information go to www.imagingpathways.health.wa.gov.au

Copyright

© Copyright 2009, 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.

