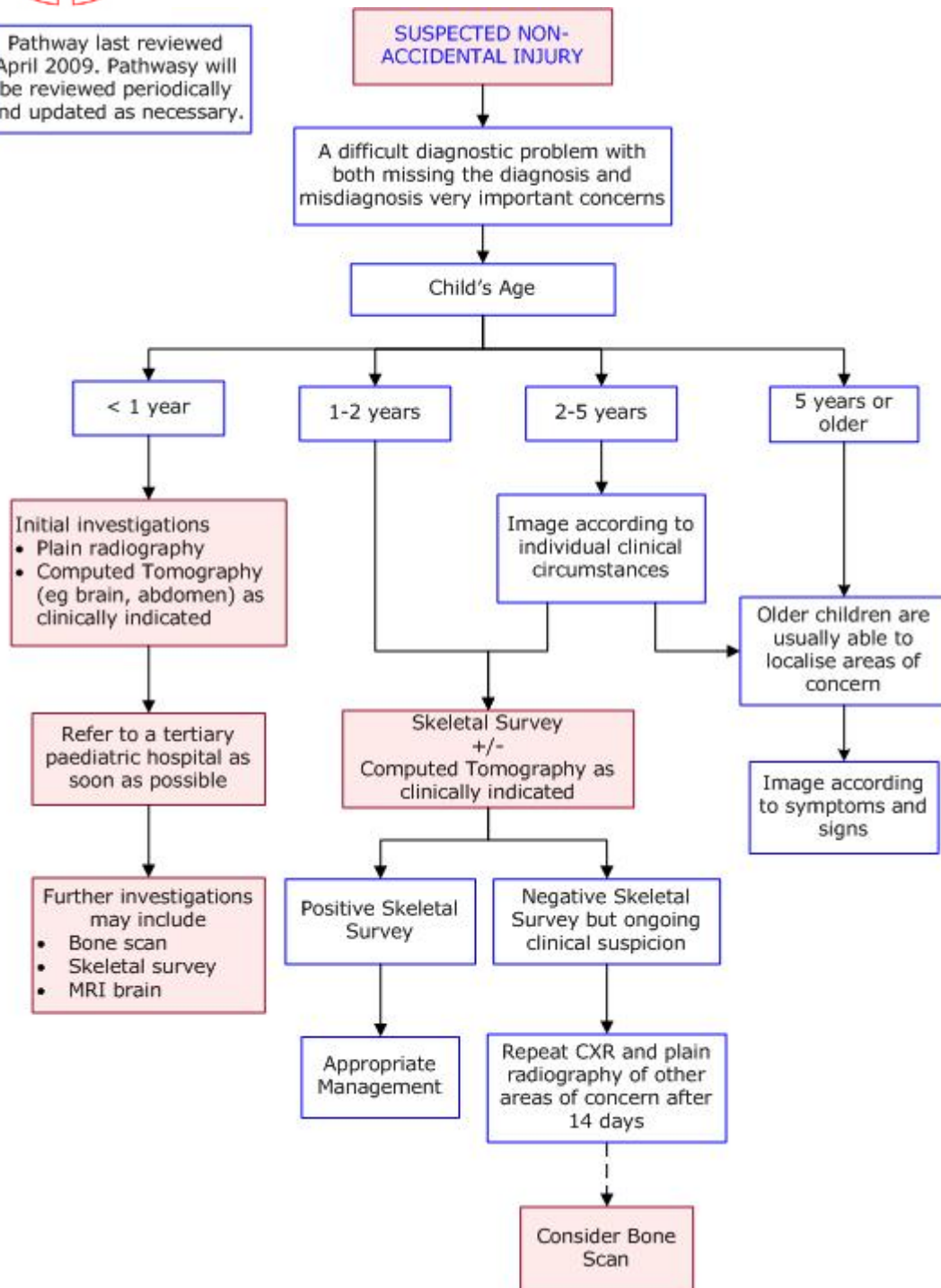




DIAGNOSTIC IMAGING PATHWAYS

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Pathway last reviewed April 2009. Pathway will be reviewed periodically and updated as necessary.



SUSPECTED NON-ACCIDENTAL INJURY

- Is a difficult diagnostic problem with both missing the diagnosis and misdiagnosis very important concerns. [1](#)

- Situations that evoke suspicion of non-accidental injury in children include: [1-5](#)
 - Fractures that are specific for non-accidental injury eg rib fractures in young children and metaphyseal, corner, or bucket handle fractures.
 - Skull fractures without a history of trauma.
 - Fractures of varying ages.
 - Injuries which are not consistent with the history proffered.
- Consideration of the differential diagnosis of non-accidental injury is important to avoid misdiagnosis. [6](#)

SKELETAL SURVEY

- Skeletal survey protocols vary slightly between centres but commonly comprise of: [16,17](#)
 - Skull - AP and lateral films. Additional views if needed eg. Townes film if occipital injury suspected.
 - Thorax - Routine AP. Oblique views of the ribs increase diagnostic yield of rib fractures.
 - Abdomen - AP film with pelvis and hips.
 - Cervical and lumbar spine - Lateral +/- AP film
 - Long bones of upper and lower limbs - Routine AP films. Additional views if required eg. views centred on joints or lateral views.
 - Hands and feet - PA hands. AP feet.
- The aim of the skeletal survey is to identify fractures that assist in making the diagnosis of non-accidental injury and to enable documentation of injuries.
- The skeletal survey is generally considered mandatory in all cases of suspected NAI for children younger than 2 but has little value in children over 5, who can normally localise areas of concern. Imaging of children aged between 2-5 should be handled on an individual basis. [7](#)
- "Babygrams" in which many bones are x-rayed on the one film is not recommended due to low sensitivity and high radiation dose.
- Repeating the skeletal survey two weeks after the initial study may increase the diagnostic yield, clarifies tentative findings on the first survey and gives additional information on the age of the fracture. [8,15](#)
- Skeletal surveys predominantly miss rib fractures, periosteal injury and rare fractures of the pelvis or foot. Hence, routine oblique views of the ribs has been recommended as part of a skeletal survey. [15](#)

BONE SCAN

- Has a complementary role with plain radiography in the evaluation of suspected non-accidental injury. [9](#)
 - Some injuries are shown on x-ray and not on bone-scan and vice-versa. [9-14](#)

- Although there is no gold standard investigation for comparison, it is generally considered that both skeletal survey and bone scan have a reasonably high sensitivity for non-accidental injury with the skeletal survey having a higher specificity compared to bone scan.
- If bone scan is performed as first line, confirmatory radiographs of abnormal areas on bone scintigraphy must be performed to rule out false-positive findings. [15](#)
- In general most cases of suspected non-accidental injury will initially have a skeletal survey followed by a bone scan if there is still diagnostic uncertainty and ongoing high suspicion.
- Some advocate that all children with suspected non-accidental injury should have both a skeletal survey and bone scan. [9](#)
- Limitations compared to skeletal survey:
 - Often requires sedation.
 - Higher cost.
 - Higher radiation exposure.
 - More limited availability.
 - Lower specificity compared to skeletal survey.
 - Higher incidence of false-negative results for skull fractures, metaphyseal and epiphyseal fractures. [15](#)
- Advantages:
 - Identifies rib fractures and acute fractures not easily seen visible on skeletal survey. [15](#)

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FURTHER READING

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Website

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