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# LUMBAR IMAGING IN ACUTE NON-SPECIFIC LOW BACK PAIN

A summary of best available  
evidence and information on  
current clinical practice

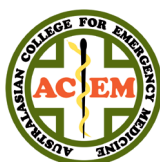
Emergency Care  
Evidence in Practice Series 2008

National Institute of Clinical Studies  
Emergency Care  
Community of Practice

## About this brochure

This brochure was developed for clinicians by the NHMRC's National Institute of Clinical Studies Emergency Care Community of Practice. It aims to highlight best available evidence to inform best practice and identify potential opportunities to improve the quality of care. The content of this brochure is based on published information available at May 2007. For information on how we developed the content of this brochure, see [www.nhmrc.gov.au/nics](http://www.nhmrc.gov.au/nics) and follow the links to Emergency Care Community of Practice.

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## Why this is important

In Australia, it is estimated that four out of every five adults will have an episode of low back pain at some point in their lives and each year approximately 1 in 12 people will experience low back pain for the first time.<sup>(1)</sup> It is a common condition for people seeking care in emergency departments,<sup>(2)</sup> and the second most common clinical complaint leading Australians to seek care in general practice.<sup>(3)</sup>

Routine imaging tests are not recommended in acute non-specific low back pain. (Level III-2 evidence)

Most people who develop acute low back pain experience rapid improvements in pain and function within one month, with further improvement for up to three months. However, recurrences are common.<sup>(4)</sup>

Acute low back pain is typically defined as pain of less than six weeks duration, and sub-acute as six to 12 weeks.<sup>(5)</sup> Most cases of acute back pain are 'non-specific' in that they have no identifiable cause, and serious pathologies are rare. Patient history and physical examination are used to differentiate non-serious from possible serious conditions such as fracture and tumour.

Table 1 lists 'red flags' which are indicators of a higher probability of a serious underlying condition.

Table 1. Red flag indicators of potentially serious underlying conditions in acute low back pain presentations

Condition	Alerting features associated with condition
Infection	<ul style="list-style-type: none"><li>• Symptoms of infection (e.g. fever)</li><li>• Risk factors for spinal infection (e.g. underlying disease, immunosuppression, penetrating wound, intravenous drug use)</li></ul>
Fracture	<ul style="list-style-type: none"><li>• Major trauma</li><li>• Minor trauma, if &gt;50 years old, with a history of osteoporosis, and/or taking corticosteroids</li></ul>
Malignancy	<ul style="list-style-type: none"><li>• History of malignancy</li><li>• &gt;50 years old</li><li>• Unexplained weight loss (e.g. &gt;4.5kg in &lt;6 months)</li><li>• Pain at multiple sites</li><li>• Pain at rest</li></ul>
Aortic aneurysm, leak or rupture	<ul style="list-style-type: none"><li>• Sudden onset</li><li>• Associated collapse/hypotension</li><li>• Pain not aggravated by spinal movement</li><li>• Abdominal pain radiating to back</li></ul>
Cauda Equina Syndrome	<ul style="list-style-type: none"><li>• Saddle anaesthesia</li><li>• Urinary and/or faecal incontinence or retention, of recent onset</li><li>• Widespread motor and/or sensory weakness</li></ul>
Adapted from <i>Evidence-Based Management of Acute Musculoskeletal Pain</i> , <sup>(6)</sup> <i>Therapeutic Guidelines: Rheumatology</i> <sup>(7)</sup> and Refshauge. <sup>(8)</sup>	

## Best available evidence

The Australian guideline *Evidence-Based Management of Acute Musculoskeletal Pain*<sup>(6)</sup> recommends against routine use of plain x-rays or other imaging tests such as magnetic resonance imaging (MRI) or computerised tomography (CT) in the absence of red flags in non-specific low back pain of less than 12 weeks duration. This guideline states that x-rays are unhelpful in identifying the cause of pain and do not contribute to greater improvement in a patient's physical function, pain or disability. Numerous other international clinical practice guidelines also recommend against imaging for acute non-specific low back pain.<sup>(9-11)</sup>

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A 2007 Australian review found there was limited recent evidence about whether imaging has an effect on clinical management or outcomes for acute non-specific low back pain.<sup>(9)</sup> One recent randomised controlled trial found that referral for x-ray on initial presentation for acute non-specific low back pain was associated with a small increase in patients' psychological well-being at six weeks and one year, but had no effect on physical functioning, pain, disability, further consultation or referral.<sup>(12)</sup>

Imaging findings from both plain x-rays and advanced imaging studies are not strongly associated with acute low back pain symptoms.<sup>(13)</sup> X-rays for non-specific back pain have been shown to demonstrate no abnormality or minor degeneration for 95 per cent of primary care and 86 per cent of emergency care presentations.<sup>(14, 15)</sup> Imaging studies in patients without back pain show a similar prevalence of degenerative changes to those found in patients with low back pain.<sup>(13,16,17)</sup>

Imaging tests carry some inherent risks for the patient. A lumbar spine x-ray series delivers a radiation dose of approximately 1.30 millisievert (mSv), equivalent to 65 chest x-rays, while a CT of the lumbar spine (3.30 mSv) is equivalent to as many as 165 chest x-rays, depending on equipment and scanning parameters.<sup>(18)</sup> Both tests expose sensitive reproductive tissues to radiation.

## Current practice

Despite long-standing recommendations against using plain radiographs in acute low-back pain without red flags, the frequency of imaging tests ordered varies substantially between different locations and practitioner specialties, and overuse of imaging has been identified in a number of settings.<sup>(14,19-22)</sup>

In emergency care practice, an analysis of over 3 million emergency department back pain presentations in the United States between 1998 and 2000 found x-rays were ordered in 18 per cent of cases (over 540,000), despite the absence of red flags.<sup>(2)</sup> Clinicians reported patient reassurance as the reason for ordering 33 per cent of lumbosacral x-rays in one American emergency department alone.<sup>(15)</sup> Australian data for emergency departments has not been published on this issue.

In Australia, low back pain is the most common reason for imaging test requests by general practitioners.<sup>(3)</sup> Data from 2000 showed that 29 per cent of all first presentations for back pain led to lumbar or lumbosacral imaging, 54 per cent of which were x-rays and 15 per cent CTs.<sup>(23)</sup> Information on the presence or absence of red flags was not available for these presentations. Another study examining usual general practice care for acute back pain found that 30 per cent of cases received imaging tests.<sup>(21)</sup>

Improving the appropriateness of imaging test ordering practice for low back pain has been the focus of several trials and programs,<sup>(14,24-27)</sup> and a number of barriers to appropriate imaging ordering have been identified. These barriers include system issues related to test ordering procedures and availability; misconceptions by both health practitioners and patients about the usefulness of imaging and desire for an explanation of pain symptoms; overestimation by doctors of patients' expectations of imaging; and doctors' fear of prosecution.<sup>(28)</sup>

Deciding when an imaging test will, or will not, be helpful is the first step in ensuring appropriate use of imaging for acute low back pain.

## Implications for practice

- Imaging tests are not recommended in acute non-specific low back pain in the absence of clinical 'red flags'. (Level III-2 evidence)<sup>(6)</sup>
- The majority of imaging tests for acute low back pain presentations find no abnormalities, or only minor changes. Imaging findings are not strongly associated with acute low back pain symptoms.
- Unnecessary x-rays and CTs subject the patient to risks of radiation exposure.

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### Levels of evidence

- I Evidence obtained from a systematic review of all relevant randomised controlled trials
- II Evidence obtained from at least one properly-designed randomised controlled trial
- III-1 Evidence obtained from well-designed pseudorandomised controlled trials
- III-2 Evidence obtained from comparative studies
- III-3 Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group
- IV Evidence obtained from case series, either post-test or pre-test/post-test
- CPP Recommended best practice based on clinical experience and expert opinion

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NICS supports the Emergency Care Community of Practice for all individuals and organisations involved in the delivery of emergency care to share their knowledge and expertise in implementation of best practice to improve patient care

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### Acknowledgements

This brochure was prepared by Michaela Willet, NICS, with support from NICS colleagues and the Centre for Clinical Effectiveness. Thank you to the following people for their helpful contributions and suggestions, and/or for reviewing this document: Rachelle Buchbinder, Wendy Fenton, Margaret Ferma, Simon French, Margaret Fry, Stacey Goergen, Claire Harris, Anna Holdgate, Kerri Holzhauser, Megan Hosken, Sue Ieraci, Anne-Maree Kelly, Jonathan Knott, Marian Lee, Ramon Shaban, Lynton Stacey, Michael Yeoh.

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### Suggested citation

National Institute of Clinical Studies, *Lumbar imaging in acute non-specific low back pain*. Canberra: National Health and Medical Research Council; 2008

ISBN: I 86496 391 3

ISBN Online: I 86496 397 2

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