

# Observational Study of the Downstream Consequences of Inappropriate MRI of the Lumbar Spine

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## Abstract

### Background

Contrary to guidelines, magnetic resonance imaging (MRI) is often ordered in the first 6 weeks of new episodes of uncomplicated non-specific low back pain.

### Objective

To determine the downstream consequences of early imaging.

### Design

Retrospective matched cohort study using data from electronic health records of primary care clinics of the U.S. Department of Veterans Affairs.

### Participants

Patients seeking primary care for non-specific low back pain without a red flag condition or an encounter for low back pain in the prior 6 months ( $N = 405,965$ ).

### Exposure

MRI of the lumbar spine within 6 weeks of the initial primary care visit.

### Main Measures

Covariates included patient demographics, health history in the prior year, and baseline pain. Outcomes were lumbar surgery, prescription opioid use, acute health care costs, and last pain score recorded within 1 year of the index visit.

### Key Results

Early MRI was associated with more back surgery (1.48% vs. 0.12% in episodes without early MRI), greater use of prescription opioids (35.1% vs. 28.6%), a higher final pain score (3.99 vs. 3.87), and greater acute care costs (\$8082 vs. \$5560),  $p < 0.001$  for all comparisons.

### Limitations

Reliance on data gathered in normal clinical care and the potential for residual confounding despite the use of coarsened exact matching weights to adjust for baseline differences.

## Conclusions

The association between early imaging and increased utilization was apparent even in a setting largely unaffected by incentives of fee-for-service care. Reduced imaging cost is only part of the motivation to improve adherence with guidelines for the use of MRI. Early scans are associated with excess surgery, higher costs for other care, and worse outcomes, including potential harms from prescription opioids.

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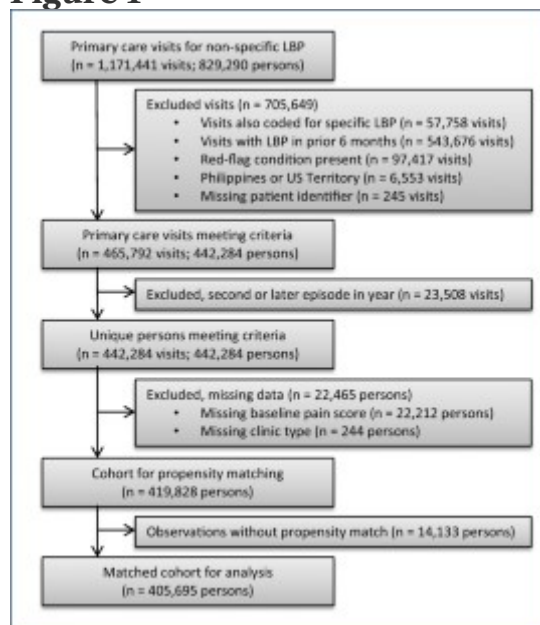
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**Figure 1**



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## Funding

The work was supported by VA Health Services Research & Development Service Merit Review Award I01-HX002016.

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## Ethics declarations

The study protocol was approved by the Administrative Panels for the Protection of Human Subjects of Stanford University.

## Conflict of Interest

The authors declare that they do not have a conflict of interest.

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Jacobs, J.C., Jarvik, J.G., Chou, R. *et al.* Observational Study of the Downstream Consequences of Inappropriate MRI of the Lumbar Spine. *J GEN INTERN MED* (2020). <https://doi.org/10.1007/s11606-020-06181-7>

### [Download citation](#)

- Received: 11 March 2020
- Accepted: 24 August 2020
- Published: 28 September 2020
- DOI: <https://doi.org/10.1007/s11606-020-06181-7>

## KEY WORDS

- inappropriate magnetic resonance imaging
- low back pain
- retrospective matched cohort study
- downstream consequences
- primary care providers