



FACULTY OF MEDICINE | UNIVERSITY OF CALGARY

The Appropriateness of MRI of the Low Back

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Quality of Care Issues

- Underuse
- Overuse
- Misuse

Overuse

- Use of a health care service when the potential for harm exceeds the possible benefit (ie, *inappropriate*)

Example

- Antibiotic prescription for upper respiratory tract infection

Negative Consequences of Overuse

- Increased cost
- Increased delays in the system
- Increased adverse outcomes for therapeutic interventions
- Increased false positives for diagnostic procedures

Appropriateness

- Doing the right thing with a healthcare intervention (net positive effect)
- Measured by a process including best evidence, balanced expert opinion (panel), chart review of real cases
- Method developed at RAND/UCLA in 1980s
- Has been used to assess performance of many diagnostic and therapeutic interventions

RAND/UCLA APPROPRIATENESS METHOD

WHY?

- marked regional variation in procedure rate
 - suggests overuse or underuse
- high quality evidence is lacking for many indications for medical interventions
- method needed to blend best evidence with expert opinion
- provide a contemporary measure of what is appropriate treatment

Appropriateness Examples

- Coronary Angiography
- Coronary Artery Bypass Surgery
- Upper GI Endoscopy
- Carotid Endarterectomy
 - 10.3% inappropriate
- Intravenous Immunoglobulin (IVIg)
 - 28.5% inappropriate

The Appropriateness of Low Back MRI

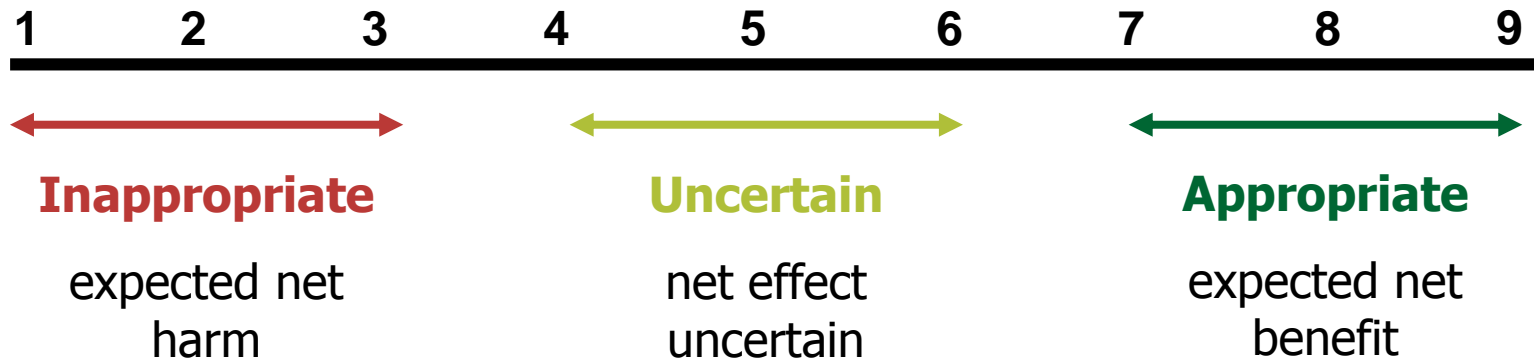
- RAND/UCLA method
- Canadian expert panel
- 100 scenarios rated
- reviewed 500 consecutive cases each in Ottawa and Edmonton

Panel Composition

- 2 neuroradiologists
- 2 spine surgeons (1 ortho and 1 neuro)
- 1 physiatrist
- 1 rheumatologist
- 1 neurologist
- 1 family physician
- 1 general internist

Appropriateness Scale

- Ordinal nine point scale
- Median ratings are used



Chronic LBP and Radiculopathy

Appropriate Uncertain Inappropriate

**Chronic
LBP**
(n=213)

17%

36%

47%

Radiculopathy
(n=296)

42%

23%

35%

The Appropriateness of Low Back MRI

Conclusion

- Most MRIs of the low back in radiculopathy and chronic low back pain are either of uncertain value or are inappropriate
- MRI scans in those with severe disability or muscle weakness are appropriate

Research Team

- Derek Emery, University of Alberta
- Alan Forster, University of Ottawa
- Kaveh Shojanian, University of Toronto

- Supported by the Canadian Institutes of Health Research

Appropriateness of Low Back MRI

Appropriate Uncertain Inappropriate

Overall

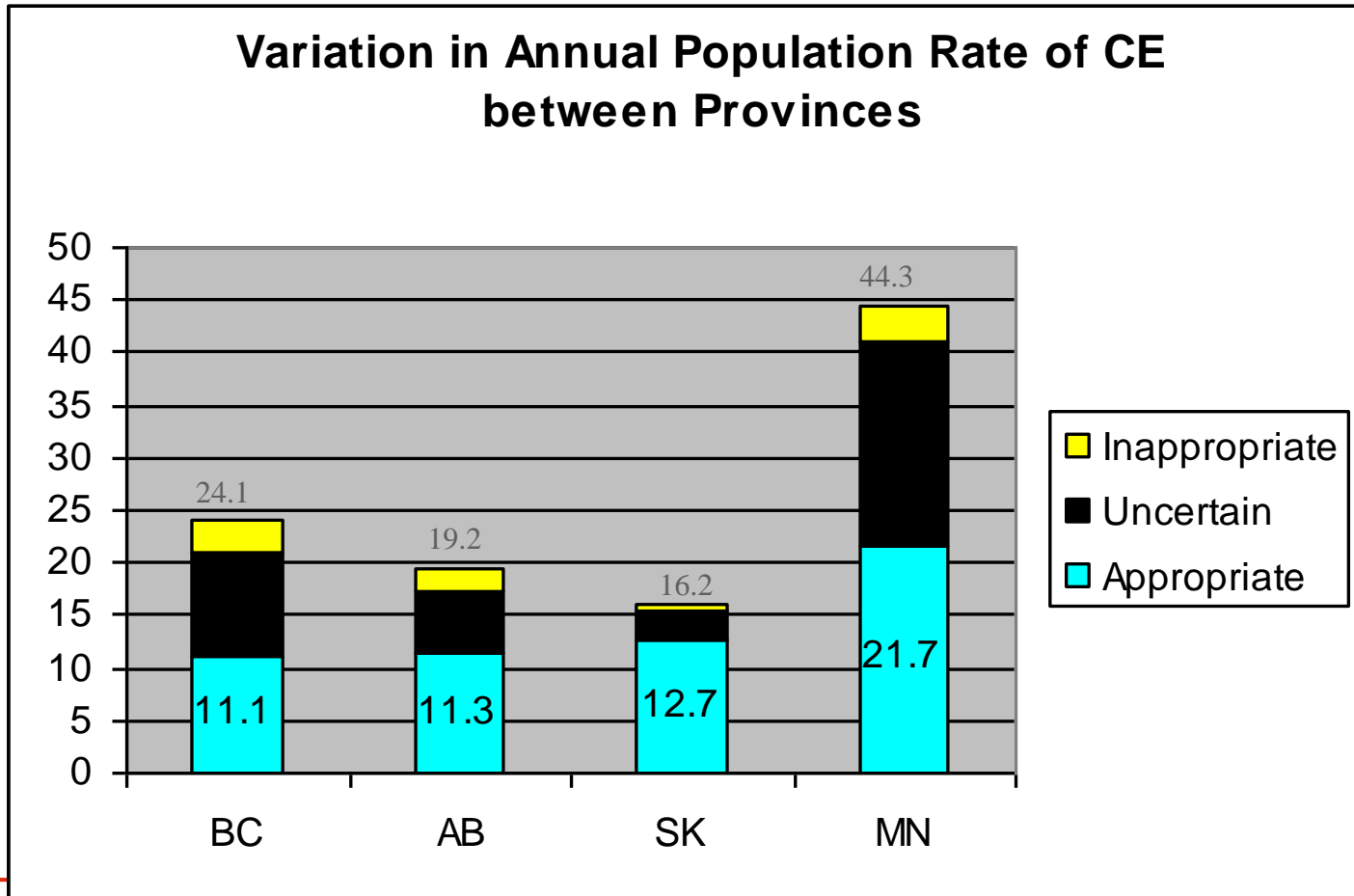
(n=1000)

Western Canada Carotid Endarterectomy Appropriateness Study

Overall Results

| | |
|---------------|--------------------------------------|
| Appropriate | 52.3% |
| Uncertain | 37.4% (mostly asymptomatic) |
| Inappropriate | 10.3% (minimal stenosis or occluded) |

Annual Population Rate of Appropriate, Uncertain and Inappropriate Carotid Endarterectomy per 100 000 Adults by Province



How Can We Improve Appropriateness

Regional Auditing of Carotid Endarterectomy

- Appropriateness measured in 4 sequential audits of regional performance over 7 years in Edmonton, Alberta, Canada
- feedback to the surgeons of individual and group results plus educational sessions and provision of guidelines

Carotid Endarterectomy Audit

| Year | '94-5 | '96-7 | '97-8 | '99-'00 |
|----------------------|------------|-----------|-----------|-----------|
| n = | 291 | 184 | 249 | 222 |
| Appropriate | 33% | 49% | 47% | 57% |
| Uncertain | 49% | 47% | 51% | 42% |
| Inappropriate | 18% | 4% | 2% | 0% |
| 30 day M/M | 5.2% | 4.9% | 4.4% | 2.3% |

The Appropriateness of Intravenous Immunoglobulin (IVIg)

- RAND method
- Over 3000 cases in Alberta and British Columbia in 2001 and 2003
- BC introduced an IVIG Management Program in 2002 with guidelines and the requirement of permission for IVIG use in cases without grade 1 evidence

Appropriateness IVIG Use by Province

| | Appropriate (%) | Uncertain (%) | Inappropriate (%) |
|----------------|----------------------------|--------------------------|------------------------------|
| AB | 45.4 | 18.8 | 35.8 |
| BC | 60.6 | 16.4 | 23.0 |
| Overall | 54.1 | 17.4 | 28.5 |

p,<0.0001

Appropriateness by Year

| | 2001 (%) | 2003 (%) |
|-----------|---------------------|---------------------|
| AB | 47.3 | 43.6 |
| BC | 61.1 | 60.7 |

AB vs BC ($p < 0.0001$)

2001 vs 2003 ($p = 0.3695$)

**The BC IVIG Management Program
was ineffective.**

Limitations of the RAND/UCLA Method

- Doesn't adequately measure underuse
- Relies upon efficacy not comparative effectiveness studies
- Does not incorporate patient preferences
- Does not incorporate societal perspectives (eg, limitation of healthcare resources)

Conclusion

- Appropriateness studies are critical to improve care and reduce unnecessary expenditure and morbidity
- Intense education and targeted feedback can improve appropriateness when CPGs are insufficient
- Different methods are required to measure underuse
- Future appropriateness studies should incorporate both patient and societal perspectives