

## Educational Reminder Messages Can Prevent Overutilization

*Eccles M, Steen N, Grimshaw J, et al. Effect of audit and feedback, and reminder messages on primary care radiology referral: a randomised trial. Lancet 2001;357:1406-9.*

### Study Overview

**Objective.** To determine whether unnecessary lumbar spine and knee radiography can be reduced by providing various types of information to primary care providers.

**Design.** Randomized controlled study with a  $2 \times 2$  factorial design done in clusters. The unit of study was individual practices (not practitioners). Analysis was by intention to treat. There was no apparent blinding, but researchers did not have any contact with ordering practitioners.

**Setting and participants.** 247 general practices referring to 6 radiology departments in northeast England and Scotland.

**Intervention.** All practices received referral guidelines covering the utility of lumbar spine and knee radiographs. Half of the practices were provided with audit data from the preceding 6 months that included number of radiographs ordered by each practice individually and by the remaining practices in the study. Another half received educational messages attached to all knee and lumbar spine radiograph reports (for lumbar radiographs: "in either acute [less than 6 weeks] or chronic back pain, radiograph is not routinely indicated"; for knee radiographs: "in adults with knee pain, without serious locking or restriction in movement, radiograph is not routinely indicated"). Some practices received both audit data and educational messages.

**Main outcome measures.** The main outcome was number of knee and lumbar radiographs ordered per 1000 patients per year in each practice.

**Main results.** Three practices were excluded before analysis, leaving 60 to 62 practices per study group. One quarter were solo practices, and a third had 2 or 3 physicians. At baseline, the various study groups ordered 7.31 to 8.30 lumbar and 6.67 to 9.34 knee radiographs per 1000 patients. These initial

figures were significantly different ( $P < 0.05$ ). Because of this baseline imbalance, a weighted least-squares procedure was used to analyze practice rates. The analysis showed a significant effect of educational reminder messages ( $-1.53$  lumbar and  $-1.61$  knee radiographs per 1000 patients [95% confidence intervals,  $-2.5$  to  $-0.57$  and  $-2.6$  to  $-0.62$ , respectively]), for a relative reduction of about 20%. A nonsignificant reduction was associated with the audit and feedback intervention, and no advantage was noted when audit and feedback were combined with reminder messages. Further analysis showed that, according to guideline criteria, only 22% to 44% of radiograph orders were definitely indicated. No significant difference was observed between intervention groups.

**Conclusion.** Messages reminding practitioners of situations in which routine lumbar and knee radiographs are not indicated can reduce total lumbar and knee radiographs ordered by general practitioners.

### Commentary

This was a generally well-done study that specifically addressed utilization outcomes. The lack of blinding was a minor problem that may have biased the study toward a type II error (false-positive result). An important question raised by this study is why the total number of radiographs decreased in 1 group relative to the others without an increase in appropriateness (or concordance) of ordering. Such findings suggest a worrisome outcome: some physicians may have ordered fewer tests in general instead of limiting their orders to necessary testing. Because no clinical outcome measures were reported, the impact of these interventions on patients cannot be determined.

### Applications for Clinical Practice

This study demonstrated a promising intervention to decrease practitioner-generated utilization. However, such interventions should not be widely implemented until they are shown not to negatively impact clinically important outcomes.

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