WHAT YOU SHOULD KEEP IN MIND AS YOU READ THIS ARTICLE
Extremity injuries are common among children, and are the chief complaint in 10-20% of pediatric emergency department (ED) visits. In addition to soft tissue injuries and fractures of the bone, children are at risk for fractures to their open epiphyseal plates (i.e. growth plates).

The Ottawa Knee Rules are 100% sensitive for detecting significant fractures in adults. These rules would mandate a knee x-ray series for children with an acute knee injury and any of the following:

1) isolated tenderness of the patella (i.e. no other tenderness anywhere in the knee);
2) tenderness at the head of the fibula;
3) inability to flex to 90°;
4) inability to bear weight immediately or in the ED (4 steps).

This article reports a multi-center prospective validation study of the Ottawa Knee Rules for children aged 2-16 years of age, and concludes that these rules are sensitive for detecting significant fractures in children.

INTRODUCTION
• Over 90% of children presenting to the ED with an extremity injury receive x-rays
• Clinical decision rules can reduce the number of radiographic studies obtained in adults
• If validated, these rules might reduce the number of studies obtained in children

METHODS
• Prospective, multi-center validation study of Ottawa Knee Rules in children 12-16 years with knee injury in last 7 days and evidence of knee bony injury on physical examination
• Exclusion criteria: isolated skin injury, referred with known fracture, returning for reassessment of same injury, altered level of consciousness, multiple distracting injuries, metabolic bone disease, underlying disease with sensory abnormalities.
• Radiographs were reviewed by radiologists blinded to the Ottawa Knee Rules clinical criteria results
• Study clinicians used the four applicable Ottawa Knee Rules to categorize patients as “positive” or “negative”
  o “Positive”: any fracture
  o “Negative”: no fracture on radiograph; if no radiograph was obtained, child must have been asymptomatic after 14 days as determined by a structured phone interview.

RESULTS
• 750 children enrolled, mean age 11.8 years; 70 fractures, 680 soft tissue injuries
• Ottawa Knee Rules 100% sensitive and 42.8% specific at determining fractures
  o Therefore, all children with knee fractures would have been identified using these rules
• Inter-observer reliability (measures repeatability of diagnosis) for entire group was high (0.85)
  o Highest in older (13-16 years) subgroup: 1.0
  o Lower in younger subgroup (2-5 years): 0.62
• 670 radiographs (89% of patients) were performed in this study; only 460 would have been required based on the Ottawa Knee Rules, a reduction of 31.2%

DISCUSSION
• The use of clinical decision rules might decrease radiography utilization and ED waiting times
• The inter-observer reliability was excellent when looking at the pool of all patients
  o Reliability was lower in younger patients (2-5 years)
  o There were less patients aged 2-5 years than in other groups; the smaller sample size further limits the applicability of the rules to this group.
• This study is the largest prospective validation of the Ottawa Knee rules in children, and shows these rules to have a high sensitivity for identifying patients with knee fractures
VALIDATION OF THE OTTAWA KNEE RULE IN CHILDREN: A MULTICENTER STUDY, continued

TAKE HOME POINTS FROM THIS ARTICLE

- The Ottawa Knee rules are highly sensitive and reliable for detecting knee fractures in acutely injured children
- These rules may be less reliable in children aged 2-5 years
- This article suggests that the use of these rules could lead to a more focused approach in ordering radiographic evaluation for knee injuries, potentially decreasing both costs and ED waiting times.