Potential Cost Savings to Medicare Through the Use of Musculoskeletal Ultrasound for Lower Extremity Injuries

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Summary
Musculoskeletal Ultrasound (MUS) is a cost-effective, realtime imaging technique that can be used to diagnose some pathologies traditionally diagnosed with MRI. Potential savings MUS could create for Medicare were calculated by mining the Medicare BESS database for CPT-code frequencies for pathologies that could imaged by MUS in lieu of MRI. Ten-year Medicare savings were then calculated and are up to $154MM for lower-extremity pathologies. This may be an underestimate as nonoperative patients were not included in the analysis.

Introduction
With the passage of healthcare reform, there is increasing pressure to adopt lower-cost technologies that preserve diagnostic power. The goal of this study was to quantify the potential financial impact of substituting Musculoskeletal Ultrasound (MUS), a cost-effective, interactive, realtime imaging technique and physical diagnosis tool, for MRI to diagnose soft tissue pathologies leading to orthopaedic surgery of the lower extremity.

Methods
CPT code billing frequencies derived from the National BESS Medicare Database years 2000-2008 were used to determine frequencies of procedures whose associated pathologies can be diagnosed by either MRI or MUS. Cost analysis assumed that for each procedure, a MUS examination could substitute for one MRI examination and followup clinical visit. Eligible pathologies had at least one level I or level II study in the orthopaedic literature supporting the use of MUS for its diagnosis.

Results
Twenty-one CPT codes used to bill for procedures for diagnoses traditionally imaged by MRI but could be imaged with MUS were identified that represented between 26,000-34,000 procedures/year from 2000-2008. Because it may not be appropriate to image all patients with MUS, a sensitivity analysis varying the proportion of examinations eligible for substitution showed that projected savings to Medicare in the next ten years are $69MM, $97MM, $125MM, or $154MM by substituting 25%, 50%, 75%, and 100% of imaging examinations respectively.

Conclusions
This study suggests that MUS has the potential to save Medicare between $69MM to $154MM in lower extremity diagnostic imaging costs over the next 10 years. This may be an underestimate as nonoperative patients were not included in the analysis. This study provides a framework to quantify reduction in diagnosis-related costs using MUS. MUS should be evaluated as a technology that preserves quality of care while reducing costs to avoid rationing of care in the US healthcare system.
Figure 1: Comparison of MRI costs and associated with diagnosing the conditions leading to procedures that could be diagnosed with MUS.

Figure 2: Reimbursement rates over time for MRI examinations, office visits, and musculoskeletal ultrasound examination.

Figure 3: Sensitivity analysis and projected costs associated with substituting diagnostic MRI with musculoskeletal ultrasound. This analysis is relevant as it may not be appropriate to image all patients with MUS, a sensitivity analysis varying the portion of examinations eligible for substitution showed that projected savings to Medicare in the next ten years are $69MM, $97MM, $125MM, or $154MM for substituting 25%, 50%, 75%, and 100% of imaging examinations respectively.