INTRODUCTION:
Lumbar Spinal Stenosis (LSS) is a degenerative disease of aging that is prevalent in the elderly population. The management of LSS varies significantly due, in part, to a lack of clinical consensus in choice of treatment options. While studies have examined the outcomes of surgical and nonsurgical management, few have focused on surgical treatment patterns in actual clinical practices. This study sought to examine surgical treatment volumes, types, time to treat, and patient characteristics that affect treatment in the US elderly with newly-diagnosed LSS.

METHODS:
We analyzed the Medicare Physician/Supplier Procedure Summary (PSPS) Master File, a file containing 100% of claims for all physician and supplier services, to identify the total national volumes for LSS-related surgical treatments. We also analyzed the Medicare Standard Analytic File (SAF), a 5% national sample of Medicare fee-for-service beneficiaries, to identify: (1) newly-diagnosed LSS patients; and (2) treatment patterns in the three years following the initial LSS diagnosis. We identified a “de novo” LSS patient cohort by selecting claims with a primary ICD-9-CM diagnosis code of 724.02 from Jan to Mar 2003. We excluded patients without any claims in 2002 and patients with prior LSS diagnoses in 2002. We divided the study population into two mutually exclusive cohorts—surgery and non-surgery—based upon the CPT and ICD-9-CM procedure codes billed. The surgery cohort was further subdivided into three groups: (1) laminectomy or laminotomy, (2) fusion, or (3) fusion with laminectomy or laminotomy. We followed all patients for three years through Dec 2005, and compiled all Medicare claims for these patients across different settings of care to examine treatment patterns, total Medicare costs, and LSS-related costs defined as claims with a primary diagnosis of LSS (724.02).

RESULTS:
In sum, we identified a total of 106,588 laminectomies, 60,975 laminotomies, and 83,304 fusion procedure service units paid in 2003. In the first quarter of 2003, we identified 6,265 de novo LSS patients out of a total sample of 1.7 million patients in the SAF file or roughly a rate of 4 per 1,000 Medicare patients. Mean age was 74, 37% of the sample was male, and 90.1% was Caucasian. Among these patients, 42.8% had more than one comorbid disease. Of these patients, 21% underwent surgical treatment for LSS between 2003 and 2005; the remainder did not receive laminectomy, laminotomy, or fusion. Of those who underwent surgery, laminectomies or laminotomies were performed on 61% of these patients, fusion procedures on 16%, and fusion procedures with a laminectomy or laminotomy on the remaining 23%. The average Medicare payment for the surgery cohort from 2003-2005 was $46,765 in comparison to $32,838 for the non-surgery cohort. The average total Medicare payment for the surgery cohort from 2003-2005 was $6,971 in comparison to $619 for the non-surgery cohort (P<0.01). LSS-related Medicare costs varied from time of surgery. Between 2003 and 2005, patients who received their surgeries in the first year of diagnosis had significantly lower LSS-related payments as well as total Medicare payments compared to those who received surgeries in the later years (Table 1).

DISCUSSION:
Overall, 78% of LSS surgeries were performed in the year of diagnosis, 13% in the second, and 9% in the third. More than 95% of the surgeries performed took place in the inpatient setting. The type of surgical treatments varied from time of surgery (Figure 2). While laminectomies and laminotomies were the most frequently performed procedure regardless of the year of the surgeries performed, a higher percentage of fusion with laminectomy or laminotomy was performed in the second or third years after diagnosis than those in the first year after diagnosis. An examination of age, gender, ethnicity and comorbidities of patients did not reveal any significant differences among patients receiving surgeries in different years.

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<table>
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<tr>
<th>Time of LSS Surgery</th>
<th>LSS-related Payments</th>
<th>P Value</th>
<th>Total Medicare Payments</th>
<th>P Value</th>
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Table 1: Associated Medicare Payments by Year of Surgeries Performed Following LSS Diagnosis

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