Pent-Up Demand for Cervical and Lumbar Fusion before Medicare Eligibility at Age 65

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INTRODUCTION: Rising utilization rates for cervical and lumbar fusion paired with an aging US population herald an increased future economic burden. Insurance status changes are often accompanied by unintended economic consequences. Previous research has demonstrated evidence of “pent-up demand” in health care (delaying medical care until financially able). The purpose of this study was to determine pent-up demand for cervical and lumbar fusion in the years leading up to Medicare coverage at age 65.

METHODS:

Incidence rates of cervical and lumbar fusion were evaluated using the 2019 National Inpatient Sample (NIS) database. Observed increases in incidence between the ages of 64 (pre-Medicare) and 65 (post-Medicare) were compared to the expected increase in incidence rates. The expected frequency of cervical and lumbar fusions was subtracted from the observed frequency of spine fusion to calculate pent-up demand. Excess cost was calculated by multiplying pent-up demand by the median cost of cervical and lumbar fusions.

RESULTS:

There were 15,665 total cervical fusion and 37,725 lumbar fusion procedures included. Overall, combining both public and private insurance, there was no significant difference between observed and expected incidence rates from age 64 to 65 for either cervical or lumbar fusion. Stratifying by public versus private insurance revealed significant differences in observed and expected incidence rates at the Medicare threshold.

The observed incidence rate in public insurance cervical fusion procedures from age 64 to 65 increased by 116% compared to an expected 19% increase ($p<0.001$). The 116% increase represented a sharp jump in comparison to the 8% annual growth rate between ages 65 and 77. This resulted in pent-up demand of 756 cervical fusion procedures and an excess cost of $15.5 million. The observed incidence rate in public insurance lumbar fusion procedures from age 64 to 65 increased by 155% compared to an expected 25% increase ($p<0.001$). The 155% increase represented a sharp rise in comparison to the 6% annual growth rate between ages 65 and 77. This resulted in pent-up demand of 1,979 lumbar fusion procedures and an excess cost of $58.7 million.

The observed incidence rate in private insurance cervical fusion procedures from age 64 to 65 decreased by 53% compared to an expected 19% decrease ($p<0.001$). The -53% change represented a sharp decrease in comparison to the -5% annual growth rate between ages 65 and 77. This resulted in pent-up demand of -411 cervical fusion procedures and an excess cost of -$8.4 million. The observed incidence rate in private insurance lumbar fusion procedures from age 64 to 65 decreased by 54% compared to an expected 17% decrease ($p<0.001$). The -54% change represented a sharp decrease in comparison to the -6% annual growth rate between ages 65 and 77. This resulted in pent-up demand of -1,470 fusion procedures and an excess cost of -$43.6 million.

DISCUSSION AND CONCLUSION: Patients with public insurance likely delay elective spine fusion until reaching Medicare eligibility at age 65, resulting in a substantial added financial burden to the healthcare system. As US healthcare costs continue to rise, it will be crucial for orthopedic providers and policymakers to be aware of pent-up demand for cervical and lumbar spine fusion.

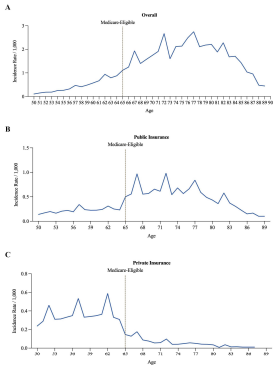

Figure 1. Cervical Fusion Incidence Rate per 1,000 Population. Incidence rate of cervical fusion per 1,000 population by age between ages 50 and 89 for A) overall, B) public insurance, and C) private insurance. Dashed line at age 65 indicates Medicare-eligible age.

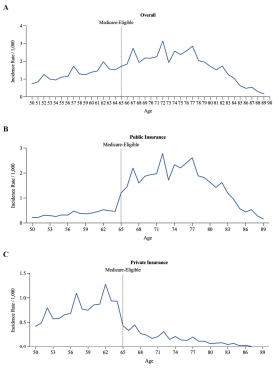

Figure 2. Lumbar Fusion Incidence Rate per 1,000 Population. Incidence rate of lumbar fusion per 1,000 population by age between ages 50 and 89 for A) overall, B) public insurance, and C) private insurance. Dashed line at age 65 indicates Medicare-eligible age.

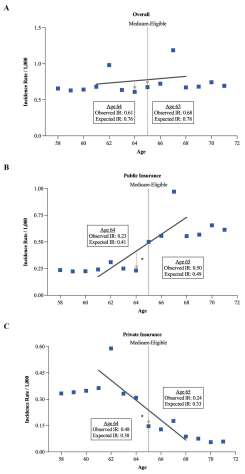

Figure 3. Observed and Expected Incidence Rates of Cervical Fusion Pre- and Post-Medicare Eligibility. A) Observed and expected incidence rates of cervical fusion for overall population. B) Observed and expected incidence rates for public insurance population. C) Observed and expected incidence rates for private insurance population. Blue squares represent observed incidence rate at each age. Trendline represents the expected incidence rates between ages 61 and 68, calculated from the incidence rate trend between ages 61 and 68. Dashed line at age 65 indicates Medicare-eligible age. Asterisk (*) represents a significant difference between observed and expected incidence rates at the Medicare cutoff between ages 64 and 65.

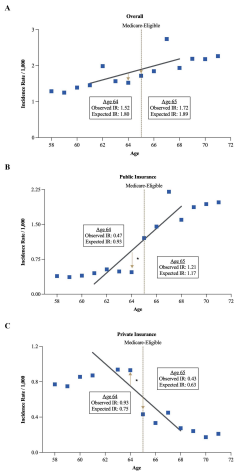

Figure 4. Observed and Expected Incidence Rates of Lumbar Fusion Pre- and Post-Medicare Eligibility. A) Observed and expected incidence rates of lumbar fusion for overall population. B) Observed and expected incidence rates for public insurance population. C) Observed and expected incidence rates for private insurance population. Blue squares represent observed incidence rate at each age. Trendline represents the expected incidence rates between ages 61 and 68, calculated from the incidence rate trend between ages 61 and 68. Dashed line at age 65 indicates Medicare-eligible age. Asterisk (*) represents a significant difference between observed and expected incidence rates at the Medicare cutoff between ages 64 and 65.