



Bridges to Excellence - NCQA

NCQA Back Pain Recognition Program Analysis—Part 2

February 26, 2007

The NCQA has generated a set of practice metrics that seek to define and measure both appropriate and inappropriate back pain care

- As of October 2006, the measures of appropriate back pain care were as follows:
 - Documentation of physical exam; patient history, including red flags; assessment of prior treatment and response; and employment status
 - Mental health assessment
 - Appropriate Imaging for Acute Low Back Pain
 - Repeat Imaging Studies
 - Medical Assistance with Smoking Cessation
 - Advice for Normal Activities
 - Advice against Bed Rest
 - Recommendation for Exercise
 - Appropriate Use of Epidural Steroid Injections
 - Surgical Timing
 - Patient Re-Assessment
 - Shared Decision-Making
 - Evaluation of Patient Experience
 - Post-Surgical Outcomes
 - Patient Education

Bridges to Excellence (BTE) and NCQA retained Towers Perrin to evaluate the potential actuarial savings from a set of back pain care measures

- BTE asked Towers Perrin to perform similar valuations for the Diabetes and Cardiac Care Link programs, and in these projects, we subjected all metrics to actuarial valuation
- Specifically, “ground-up” models were built for each measure, based on cost and efficacy data
- In contrast, in the ABIM Practice Improvement Module (PIM) project, Towers Perrin pursued a two-part valuation process
 - Rank quality measures according to clinical and health economic evidence to identify those measures most likely to yield actuarial savings if implemented (Part 1)
 - Subject the most highly ranked measures to actuarial valuation (Part 2)
- With the back pain care program, Towers Perrin followed a similar, sequential methodology
 - This document presents the results of the Part 2 work*

*The Part 1 work for the back pain care project was conducted using the original (and not revised) SCRP metric list

Based on the Part 1 work and subsequent revisions of the measures by the NCQA, we were asked to estimate financial impact

- Models were attempted for the following metrics:
 - Appropriate Use of Epidural Steroid Injections
 - Appropriate Imaging for Acute Low Back Pain
 - Repeat Imaging Studies
 - Post-Surgical Outcomes
 - Advice against Bed Rest
- For the first four metrics, there was a general absence of literature addressing their economic effect, but we were able to construct actuarial models using the MedStat claims database
- For the fifth metric, the absence of definitive linkage between advice against bed rest and clinical outcomes—and the fact that “advice” is not generally codable and therefore not amenable to MedStat analysis—made construction of an actuarial model impossible
 - This illustrates the more general point that claims data without clinical information will ultimately be suboptimal in pay-for-performance management
- Although our models could not in every case duplicate the exact specification of the NCQA’s back pain care metrics, due to their complexity, most elements of the metrics were replicated in the models

For each of the four models, we present the financial impact results in the form of a standard Actuarial Cost Model (ACM)

- An ACM follows the following general formula:

$$\begin{array}{ccc} \boxed{\text{Services Per Member}} & \times & \boxed{\text{Cost per Service}} = \boxed{\text{Cost Per Member}} \\ \text{Annual Services Per 1000 Members} & & \text{Per Member Per Month (PMPM)} \end{array}$$

- Cost per member allows for a scalable healthcare burden estimate
 - For illustration, we've shown the annual cost of a 100,000 member population throughout the presentation
- All costs shown:
 - Reflect gross allowable costs (i.e. plan sponsor plus patient costs)
 - Are expressed in 2006 dollars (medical CPI used as trend)
 - Were derived from MedStat's MarketScan dataset reflecting:
 - Experience data in 2003, 2004 and 2005 for 6.8M, 11.1M and 11.4M members, respectively
 - An active employee population with dependents and a standard benefit design

In the following pages, we present the results

Inappropriate Use of Epidural Steroid Injections—Background

- Although there is some evidence that epidural steroid injections reduce radicular pain, there is little evidence that they reduce non-radicular pain^{1,2}
 - There is also little evidence to suggest that epidural steroid injections cause serious complications¹
- The NCQA therefore defines as inappropriate all epidural steroid injections that are used for non-radicular pain
- As there is no data in the literature describing the incidence of epidural steroid injections for radicular vs. non-radicular pain, we used the MedStat database to develop the model
- Model duration was one year, and only direct medical costs were considered
- The full MedStat query instructions are presented in the appendix

¹Pain (1995); 63: 279-288. ²Institute of Clinical Systems Improvement. *Health Care Guidelines: Adult Low Back Pain*. 2005.

Inappropriate Use of Epidural Steroid Injections—Results

Percent of Avoidable Epidural Steroid Injections 65.7%

| Service Category | Annual Claims per 1000 | 2006 Cost Per Service | 2006 PMPM |
|---|---------------------------|--------------------------|-----------|
| Total Epidural Steroid Injections | 16.3 | \$346.55 | \$0.47 |
| Epidural Steroid Injections Radicular Pain | 5.6 | \$346.55 | \$0.16 |
| Epidural Steroid Injections Non-Radicular Pain | 10.7 | \$346.55 | \$0.31 |
| Additional cost to system for a 100,000 member population | | | \$370,000 |

Inappropriate Use of Epidural Steroid Injections—Discussion

- Approximately two-thirds of epidural steroid injections are given in the absence of coded radicular pain diagnoses
- Because epidural steroid injections have only been shown to be effective for radicular pain, the epidural steroid injections given in the absence of such pain are ineffective and therefore inappropriate
- Because epidural steroid injections may have marginal effectiveness even for radicular pain, it is likely that the percentage of injections that are truly ineffective is significantly greater than two-thirds
 - This suggests that future iterations of the metric might make the definition of appropriate use even more strict
- Elimination of inappropriately performed epidural steroid injections would provide substantial savings to the system

Inappropriate Imaging for Acute Low Back Pain—Background

- There is consensus among experts that imaging is unnecessary for acute back pain of less than 6 weeks duration unless there are suggestions of systemic disease or progressive neurologic deficit³
 - Back pain of less than that duration may be self-limited
 - In addition, imaging may not reveal a specific cause for such short-lived pain
 - Irrelevant findings are common
- For the cut-off time for inappropriate imaging, the NCQA uses within six weeks of pain onset, or if the pain onset date is unknown, within four weeks of the initial visit
- Again, there is no literature on the temporality of imaging following the onset of back pain, and so therefore, we used the MedStat database to construct the model
- Model duration was one year, and only direct medical costs were considered
- The full MedStat query instructions are presented in the appendix
- Note that repeat images are excluded from this metric and are captured in the inappropriate repeat imaging model

³*Ann Intern Med.* 2002;137:586-597.

Inappropriate Imaging for Acute Low Back Pain—Results

Percent Inappropriate Imaging 42.0%

| Service Category | Annual Claims per 1000 | 2006 Cost Per Service | 2006 PMPM |
|---|------------------------|-----------------------|-----------|
| Total 72XXX Images (after exclusions) | 74.3 | \$197.92 | \$1.23 |
| Appropriate (> 30 days from initial diagnosis) | 43.1 | \$197.92 | \$0.71 |
| Inappropriate (< 30 days from initial diagnosis) | 31.2 | \$197.92 | \$0.51 |
| Additional cost to system for a 100,000 member population | | | \$617,000 |

Inappropriate Imaging for Acute Low Back Pain—Discussion

- According to the model, more than 40% of imaging appears to be inappropriate
 - This figure, however, may be overestimated because of limitations in our modeling approach
- Specifically, we were limited in that onset of back pain was not a “codable” event
 - Instead, we had to assume that the first coding of a back pain diagnosis represented the onset of pain and therefore the start of the 30 day “clock” for appropriate usage
- In reality, it is likely that many patients would have experienced back pain before actually visiting a physician
 - Thus, some of the imaging deemed as inappropriate may actually be appropriate
- As a result, our estimate for inappropriate usage should be considered as an upper bound, with the actual amount of inappropriate imaging somewhat lower
 - The true incidence of inappropriate usage cannot be known without a detailed chart review
 - Alternatively, an electronic medical record could be used to document and compile the date of pain onset

Inappropriate Repeat Imaging Studies—Background

- It is generally agreed that repeat additional imaging in absence of “red flags” or progressive symptoms does not contribute to effective treatment and adds to unnecessary costs⁴
 - This is in part because there is little correlation between radiological degenerative change and symptoms
- The NCQA defines 12 months as the period during which repeat imaging would be inappropriate in the absence of red flags or progressive symptoms
- Again, there is no literature regarding the frequency of repeat imaging, and so we used the MedStat database to construct the model
- Model duration was one year, and only direct medical costs were considered
- The full MedStat query instructions are presented in the appendix

⁴*Rheumatology* 2002;41:1–5

Inappropriate Repeat Imaging Studies—Results

Percent Inappropriate Reimaging 93.6%

| Service Category | Annual Claims per 1000 | 2006 Cost Per Service | 2006 PMPM |
|---|------------------------|-----------------------|-----------|
| Repeat 72XXX Images (after exclusions) | 34.9 | \$197.92 | \$0.58 |
| Appropriate (> year from initial diagnosis) | 2.2 | \$197.92 | \$0.04 |
| Inappropriate (< year from initial diagnosis) | 32.7 | \$197.92 | \$0.54 |
| Additional cost to system for a 100,000 member population | | | \$646,000 |

Inappropriate Repeat Imaging Studies—Discussion

- We estimate that more than 90% of reimaging is inappropriate
- Reimaging is appropriate with red flag conditions or progressive symptoms, and our model excludes those with red flag conditions in either 2003 and 2004
 - Similarly, we excluded those with myelopathy ICD-9 codes to account for many of the individuals with “progressive symptoms”
 - Nevertheless, there may be some individuals with progressive symptoms who are not excluded for the population
- As a result, it is possible that the 93.6% rate of inappropriate reimaging may somewhat overestimate the true rate of inappropriate imaging
 - Nevertheless, the overestimation is likely to be slight, as undercoding of progressive symptoms will probably be minimal
- It is clear that the vast majority of reimaging is inappropriate, and that elimination of this inappropriate usage would provide substantial savings to the system

Post-Surgical Outcomes—Background

- Complications after spinal surgery have significant morbidity and mortality effects, and the rate of complication increases with age^{5,6}
- As complications are by definition bad outcomes, reducing complications is a key element in the back pain care program
- Although Deyo et al. examined the incidence and cost of back pain complications in their classic 1992 *Journal of Bone and Joint Surgery* paper, there has been little subsequent literature addressing the issue
- Therefore, we used the MedStat database to construct the model, which compares total claim costs by age of those with back surgery and complications with costs of those with back surgery and no complications
- Model duration was one year, and only direct medical costs were considered
- The full MedStat query instructions are presented in the appendix

⁵*Journal of Bone and Joint Surgery* 1992;74-A (4): 536-543. ⁶*Spine* 1993;18(11):1463-1470

Post-Surgical Outcomes—Results

Percent of Surgery Patients With Complications 1.9%

| Service Category | Annual Surgeries per 1000 | 2006 Cost Per Episode | 2006 PMPM |
|---|---------------------------|-----------------------|-----------|
| With Complications | 0.003 | \$22,558.01 | \$0.006 |
| Without Complications | 0.170 | \$15,274.97 | \$0.216 |
| Excess Complication Cost | 0.003 | \$7,283.04 | \$0.002 |
| Additional cost to system for a 100,000 member population | | | \$2,000 |

Post-Surgical Outcomes—Conclusions

- For the population under 65, the incremental claims cost of patients with complications was only slightly higher than the claims cost of those patients without complications
- The lack of difference appears to be due to two factors:
 - Complications were exceedingly rare
 - When they did occur, total claims costs did not increase significantly
- It is possible that physicians and hospitals may be undercoding complications, but this seems unlikely, as complications would lead to higher acuity and thus higher charges
- According to our model, preventing complications would be unlikely to lead to significant savings

Advice Against Bed Rest

- We had hypothesized from the Phase 1 spine work that advice against bed rest would potentially yield actuarial savings
 - Specifically, we had hoped that there would be literature linking bed rest to complications of lack of mobility, such as deep venous thrombosis and pulmonary embolism
- The most recent meta-analytic review of the literature illustrated that the only major effect of advice to avoid bed rest was in the reduction of pain and improvement of function, two items which are not easily economically quantifiable⁷
 - For those with low back pain, staying in bed appears to cause somewhat increased pain and less recovery whereas for those with sciatica, pain and function do not appear to vary significantly depending on whether the patient is treated with bed rest or not
- Because advice for and bed rest itself are not codable, we were unable to use MedStat to build a model

⁷Spine 2005;30:542–46

Financial Impact Summary

| Service Category | 2006 PMPM | 2006 Annual Cost for 100,000 Member Population |
|------------------------------------|---------------|--|
| Inappropriate Epidural Steroid Use | \$0.31 | \$370,000 |
| Inappropriate Imaging | \$0.51 | \$617,000 |
| Inappropriate Reimaging | \$0.54 | \$646,000 |
| Post Surgical Complications | \$0.00 | \$2,000 |
| Total | \$1.36 | \$1,635,000 |

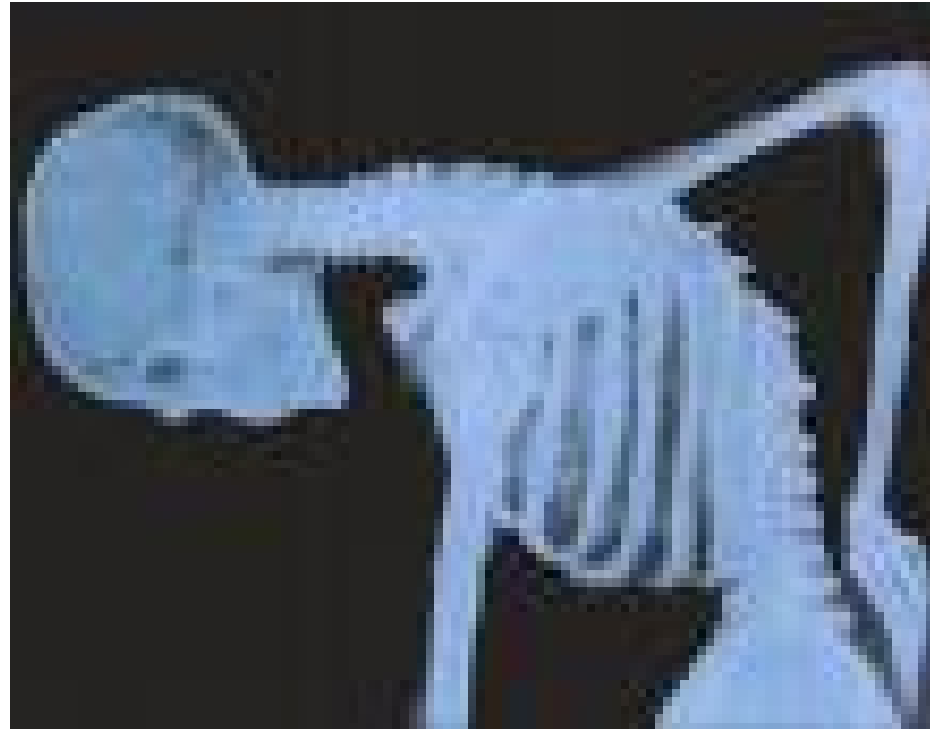
- Assuming total medical and prescription drug per member per month for an active population is \$398⁸, reducing inappropriate epidural steroid injections, imaging, repeat imaging, and surgical complications could reduce overall spend by 0.3%
- This is a significant number given the relatively narrow scope of these services

⁸Average PMPM from 2005 Tillinghast HealthMaps inflated by Medical CPI

In summary, we conclude that three of the five metrics are likely to yield significant savings, but two of them are unlikely to provide savings

- Our modeling suggests that eliminating inappropriate epidural steroid injections, inappropriate imaging, and inappropriate reimaging would yield significant savings
 - It is possible that we may have significantly overestimated the incidence of inappropriate imaging for reasons discussed in the previous pages, but even given this overestimation, savings is likely
- In contrast, we conclude that eliminating post-surgical complications would produce little economic savings
 - As a result, the effort required to eliminate such complications would likely be associated with a low return on investment
- There is no evidence to suggest that advice for elimination of bed rest would reduce costs
- These results suggest a significant variance in return on investment for the five metrics studied

With these results in mind, what are our next steps?





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Appendix

Appropriate Use of Epidural Steroid Injections—Query

- Population comes from MedStat 2005 data
- Although **62289** was the original CPT code for lumbar steroid injections, this appears to have been retired since 2000 in favor of **62311** (Spine_Modeling_3)
- Both codes are used in the query
- BOTH **724.3** (sciatica) and **724.4** (neuritis, lumbosacral NOS) are used, representing the ICD-9 codes used for radiculopathy
- Thus, we get the percentage of inappropriate steroid injections by the following formula:

$$1 - \frac{(\mathbf{62289 \text{ and } 62311 \text{ episodes coded with } 724.3 \text{ or } 724.4})}{\mathbf{(All 62289 \text{ and } 62311 \text{ episodes})}}$$

(All 62289 and 62311 episodes)

- **62289** or **62311** must be coded with **724.3** or **724.4** in the same visit in order to qualify as being for radicular pain
- This percentage is then multiplied by the per capita **62289** and **62311** claim cost in a given year to yield the per capita cost of inappropriate epidural steroid injections

Appropriate Imaging for Acute Low Back Pain—Query

- Population comes from MedStat 2003 and 2004 data
- Start with the total number of unique individuals who have an ICD code of **721 (spondylosis), 722 (intervertebral disc disorders), or 724 (other back disorders) at any time in 2004 BUT NOT 2003**
- Thus, we exclude someone with a **721/722/724** code in **2004 and 2003**; in contrast, we include someone with a **721/722/724** code in **2004 but not 2003**
- From this group, as per the measure specifications, we **EXCLUDE those with any code in 2003 or 2004 of:**
 - **140 through 239 inclusive**, which represents history of cancer of any kind, a “red flag exclusion”
 - **324**, which represents intracranial and intraspinal abscess, another “red flag exclusion”
 - **344.6** (Cauda Equina Syndrome). This is a specified “red flag exclusion”
 - **721.4** (Thoracic or Lumbar Spondylosis with Myelopathy) This addresses many of the individuals with “progressive symptoms”
 - **722.7** (Intervertebral Disk Disorder with Myelopathy). This addresses many of the individuals with “progressive symptoms”

Appropriate Imaging for Acute Low Back Pain—Query (cont.)

- **805** (Fracture of vertebral column without spinal cord injury) **or 806** (Fracture of the vertebral column with spinal cord injury). This eliminates those with fracture, a specified exclusion group.
- CPT **63XXX**, i.e., a CPT starting with 63 and then any subsequent numbers. This includes most if not all laminectomies
- After the exclusion process, we have all unique individuals with back pain in 2004 (but not 2003) who do not have a “red flag exclusion” and who have not had surgery.
- For these individuals, we then find those with a CPT code of **72XXX in 2004 but not in 2003**. We obtain the number of these individuals
- Those with the CPT code of **72XXX** greater than 30 days after the **initial 721, 722, or 724** code in **2004** are said to have appropriate imaging
- Those with the CPT code of **72XXX** less than or equal to 30 days after the **initial 721, 722, or 724** code in **2004** are said to have inappropriate imaging
- The percentage of inappropriate imaging is determined as:

Total Initial 72XXX claims less than 30 days after initial 2004 721, 722, or 724 claims

Total initial 72XXX claims both less than and greater than 30 days after initial 2004 721, 722, or 724 claim

- We then multiply this % by the total amount of claims to get the amount of inappropriate usage

Repeat Imaging for Acute Low Back Pain—Query

- Start with the total number of unique individuals who have an ICD code of **721 (spondylosis), 722 (intervertebral disc disorders), or 724 (other back disorders)** at any time in **2003**. From this group, as per the measure specifications, we **EXCLUDE those with any code in 2003 or 2004 of:**
 - **140 through 239 inclusive**, which represents history of cancer of any kind, a “red flag exclusion”
 - **324**, which represents intracranial and intraspinal abscess, another “red flag exclusion”
 - **344.6** (Cauda equina syndrome). This is a specified “red flag exclusion”
 - **721.4** (Thoracic or lumbar spondylosis with myelopathy) This addresses many of the individuals with “progressive symptoms”
 - **722.7** (Intervertebral disk disorder with myelopathy). This addresses many of the individuals with “progressive symptoms”
 - **805** (Fracture of vertebral column without spinal cord injury) **or** **806** (Fracture of the vertebral column with spinal cord injury). This eliminates those with fracture, a specified exclusion group
 - **CPT 63XXX**, i.e., a CPT starting with **63** and then any subsequent numbers. This includes most if not all laminectomies

Repeat Imaging for Acute Low Back Pain—Query (cont.)

- After the exclusion process, we have all unique individuals with a back pain claim in **2003** who do not have a “red flag exclusion” or back surgeries in **2003 or 2004**
- For these unique individuals, we then find those with a CPT code of **72XXX** in **2003**. We obtain the number of individuals in this class
- We then narrow that population by finding those individuals who have two or more **72XXX codes** in **2003 and 2004**. We also obtain number of individuals in this class
- Of these individuals who have two or more **72XXX codes in 2003 or 2004**, some will represent inappropriate usage—if the additional code was within 12 months of the first
- To determine the breakdown between appropriate and inappropriate usage in the “repeaters,” we obtain all individuals who have an initial code of **72XXX in 2003** and then one or more additional **72XXX codes in 2003 and 2004**, with the date of the 72XXX claim shown in each case

Repeat Imaging for Acute Low Back Pain—Query (cont.)

- The percentage of individuals in the sample with two or more codes within a 12 month period in 2003 or 2004 will be used to calculate inappropriate usage
- The specific inappropriate will be as follows:

(Number of 72XXX repeater claims in 2003 and 2004)*(% of repeater claims that are inappropriate, i.e., <12 months apart)

Post-Surgical Outcomes—Query

- We start with the number of people in 2005 who had the following CPT codes denoting back surgery for back pain:
 - **63001 through 63200**
- We exclude from this group anyone in 2005 who has had other major surgery with the CPT codes:
 - **10021 through 69990 EXCLUDING 63001 through 63200**
- In this way we exclude the possibility that other procedures may have caused the complications listed below
- We then separate those remaining patients into two groups—those who HAVE or who DO NOT HAVE the following “complication” ICD-9 codes in the same year (2005) as the spinal procedure
 - **998.8, 998.9, 999.9, E878.8** (Unspecified or unclassified complications, reactions, misadventures)
 - **998.2, E870.0** (Accidental cut, puncture, or hemorrhage during a procedure)
 - **996.4, 996.6, 996.7** (Mechanical, infectious, inflammatory, or other complications or internal prosthetic device or graft)
 - **998.1** (Hemorrhage or hematoma complicating a procedure)

Post-Surgical Outcomes—Query (cont.)

- **997.4** (Gastrointestinal complications)
 - **997.5** (Urinary tract complications)
 - **997.3, 415.1** (Respiratory complications, pulmonary embolism)
 - **997.1, 410.0-410.9, 998.0** (Cardiac complications, acute myocardial infarction)
 - **998.5, 999.3** (Postoperative infections)
 - **997.0** (Central nervous-system complications)
 - **998.3** (Disruption of operative wound)
 - **997.2** (Peripheral vascular complications)
 - **999.8** (Other transfusion reaction)
- We then look at the average total 2005 claim cost for those patients who have the above codes and those who don't

Post-Surgical Outcomes—Query (cont.)

- Finally, as people who are older are more likely to have greater morbidity, we report averages by age as follows:

| Age | 2005 Total Claim Cost for those with Complications | 2005 # of Claimants without complications | 2005 Total Claim Cost for those without complications | 2005 # of Claimants with complications |
|-------|--|---|---|--|
| 55-64 | | | | |
| 45-54 | | | | |
| 35-44 | | | | |
| 25-34 | | | | |