Thomas Jefferson University
Jefferson Digital Commons

School of Population Health Lectures, Presentations, Workshops

Jefferson School of Population Health

2-2012

Utilization of CT Scans and MRIs in an Insured Population with Migraine

Neil I. Goldfarb
Jefferson School of Population Health

Valerie Pracilio, MPH
Jefferson School of Population Health, valerie.pracilio@jefferson.edu

Daisy Ng-Mak, PhD
Global Health Outcomes, Merck Sharp & Dohme Corp

Joe Couto, PharmD, MBA
Jefferson School of Population Health, joseph.couto@jefferson.edu

Cary Sennett, MD, PhD
MedAssurant, Inc.

See next page for additional authors

Let us know how access to this document benefits you

Follow this and additional works at: http://jdc.jefferson.edu/hplectures

Part of the Health and Medical Administration Commons, Neurology Commons, and the Public Health Commons

Recommended Citation

Goldfarb, Neil I.; Pracilio, MPH, Valerie; Ng-Mak, PhD, Daisy; Couto, PharmD, MBA, Joe; Sennett, MD, PhD, Cary; Hopkins, RN, Mary; Bumbaugh, Jon; and Silberstein, MD, Stephen, "Utilization of CT Scans and MRIs in an Insured Population with Migraine" (2012). *School of Population Health Lectures, Presentations, Workshops.* Paper 24.
http://jdc.jefferson.edu/hplectures/24

This Article is brought to you for free and open access by the Jefferson Digital Commons. The Jefferson Digital Commons is a service of Thomas Jefferson University's Academic & Instructional Support & Resources Department (AISR). The Commons is a showcase for Jefferson books and journals, peer-reviewed scholarly publications, unique historical collections from the University archives, and teaching tools. The Jefferson Digital Commons allows researchers and interested readers anywhere in the world to learn about and keep up to date with Jefferson scholarship. This article has been accepted for inclusion in School of Population Health Lectures, Presentations, Workshops by an authorized administrator of the Jefferson Digital Commons. For more information, please contact: JeffersonDigitalCommons@jefferson.edu.

Authors
Neil I. Goldfarb; Valerie Pracilio, MPH; Daisy Ng-Mak, PhD; Joe Couto, PharmD, MBA; Cary Sennett, MD, PhD; Mary Hopkins, RN; Jon Bumbaugh; and Stephen Silberstein, MD

This presentation is available at Jefferson Digital Commons: http://jdc.jefferson.edu/hplectures/24

Utilization of CT Scans and MRIs in an Insured Population with Migraine

Neil I. Goldfarb[1], Valerie P. Pracilio, MPH[1], Daisy Ng-Mak, PhD[2], Joseph Couto, PharmD, MBA[1], Cary Sennett, MD, PhD[3], Mary Hopkins, RN[4], Jon Bumbaugh[3], and Stephen Silberstein, MD[4]

[1]Jefferson School of Population Health, Philadelphia, PA, USA
[2]Global Health Outcomes, Merck Sharp & Dohme Corp., West Point, PA, USA
[3]MedAssurant, Inc., Bowie, MD, USA, [4]Jefferson Headache Center, Philadelphia, PA, USA

FPO

Background

- Neuroimaging is a diagnostic tool that may be used to rule out a serious condition when a patient presents with head pain. It is not typically warranted for patients who have a normal neurologic exam, and may be over-utilized despite established practice parameters set by the American Academy of Neurology.[1,2]
- A decision to use neuroimaging should consider the type of headache and presence of any clinical features that suggest a serious condition.[3]
- Over-utilization of neuroimaging has cost and safety implications.[4-6]
- The United States Headache Consortium, a panel of experts on migraine, set the guidelines for diagnosis and treatment in 2000. In alignment with these guidelines, the Migraine Quality of Care Measurement Set seeks to reveal patterns in CT and MRI utilization for migraine sufferers, which may inform future policy decisions at the health plan-level.[7]

Migraine Quality of Care Measurement Set

- The Migraine Quality of Care Measurement Set was developed to examine utilization of services within a health plan to identify potential quality and safety concerns associated with care for the population identified with migraine.
- A set of measures were originally developed in 2007,[8,9] by the Jefferson School of Population Health and the Jefferson Headache Center, with input from a national panel of advisors with clinical expertise in migraine.
- The measures and measurement specifications were updated in 2010 to align with current evidence.
- A pilot test of the 2010 measures was then conducted, using data from 10 health plans.

- The measurement set covers five areas of migraine diagnosis and treatment:
  1. Establishment of Diagnosis
  2. Utilization of Radiologic Services
  3. Utilization of Physician Services
  4. Utilization of Urgent and Emergent Services
  5. Utilization of Migraine Medications
- The intent of the measures is to allow plans to examine their utilization over time, and in relation to national benchmarks.

Study Aims

- As part of the 10-plan pilot test of the measures, the aims of this study were:
  1. To examine the current utilization rates for CT scans and MRIs in the insured migraine population.
  2. To examine variability in CT and MRI utilization rates across health plans and establish national utilization benchmarks.

Methods: Study Population

- Ten representative commercial and/or Medicaid health plans in the MedAssurant Medical Outcomes Research for Effectiveness and Economics Registry (MORE^2 Registry™) were included in the study.
- The reporting year (the year of claims data on which measurement was based) was 2009.
- Only adult members between ages 18 and 64, with medical benefits, were eligible for inclusion (N ≈ 2.9 million, across the 10 plans).
- The migraine population was identified through claims (ICD-9 and UB-04 codes) and pharmacy data (where available) as patients having at least one of the following criteria:
  - 1 or more claim(s)/encounter(s) for migraine, or
  - 2 or more "episodes" of headache reflected by multiple claims/encounters ("recurrent headache") ≥7 days apart, or
  - 1 or more prescription(s) for a triptan or migraine analgesic
- Individuals with a diagnosis of subarachnoid hemorrhage, brain tumor, and/or intracranial bleed were excluded.

Identification of the Migraine Population

Migraine Population identified:	Members (n)
Criterion 1: 1 or more claim(s)/encounter(s) for migraine	36,579
Criterion 2: 2 or more "episodes" of headache reflected by multiple claims/encounters ("recurrent headache") ≥7 days apart	21,718
Criterion 3: 1 or more prescription(s) for a migraine drug or migraine analgesic	36,223
Met more than one criteria	43,484
Total identified population	138,004

Measures on Utilization of Radiologic Services

Measure*	Numerator	Denominator
RA.1 A CT scan of the head and/or sinuses for migraine	All patients with one or more CT scans of the head and/or sinuses for migraine.	All patients in the Migraine Population.
RA.2 A CT scan of the head and/or sinuses associated with an ED visit	All CT scans of the head and/or sinuses for migraine within 48 hours of an ED visit.	All CT scans of the head and/or sinuses for migraine.
RA.3 A CT or MRI scan of the head and/or sinuses for migraine not associated with an ED visit	All CT or MRI scans of the head and/or sinuses for migraine not occurring on the same date as an ED visit.	All CT or MRI scans of the head and/or sinuses for migraine.
RA.4 An MRI of the head and/or sinuses for migraine	All patients with an MRI of the head and/or sinuses for migraine.	All patients in the Migraine Population.
RA.5 Multiple CT or MRI scans for migraine	All patients with more than one CT or MRI scan for migraine.+	All patients in the Migraine Population.

*RA is the code applied to the radiology utilization subset of the Migraine Quality of Care Measurement Set

+Any combination of CT and MRI scans are captured by this measure (i.e. multiple CT scans, multiple MRI scans or a combination of the two)

Results

Radiology Utilization Across 10 Health Plans

Measure	Overall finding (%)	Median value across 10 health plans (%)	Range across 10 health plans (%)
RA.1 CT Scan (Patients with ≥1 CT Scan/Migraine Population)	12.47	11.18	7.71 – 24.50
RA.2 CT Scan associated with an ED visit* (CT Scan for migraine within 48 hours of an ED All CT Scans)	73.21	74.02	58.68 – 86.18
RA.3 CT Scan or MRI not associated with an ED visit* (CT or MRI Scan not during an ED visit/All CT or MRI scans)	53.02	55.58	37.70 – 66.78
RA.4 MRI Scan (Patients with an MRI Scan/Migraine Population)	8.27	8.77	6.02- 10.72
RA.5 Multiple Scans (Patients with >1 CT or MRI Scans/Migraine Population)	2.23	1.83	1.07 – 6.00

*Percentage represents scans rather than patients

Key Findings

- Twelve percent of the Migraine Population had a CT scan for migraine during the measurement year, and 8% had an MRI. While some variation in the utilization rate for MRIs was observed across the 10 plans (6-11%), far greater variation was seen for CT scans (8-25%).
- Seventy-three percent of all CT scans for migraine were completed within 48 hours of an emergency department (ED) visit, but again, significant variation across plans was noted.
- More than half of all neuroimaging tests (CT scans and MRIs) were not associated with an ED visit.
- A small portion of the Migraine Population (2%) had multiple CT and/or MRI scans during the one year examined.

Discussion: The Migraine Quality of Care Measurement Set

- This examination of the radiologic services utilization measures included in the Migraine Quality of Care Measurement Set demonstrates the potential value of the measures to identify utilization trends.
- In addition to identifying a general concern about potential over-utilization of neuroimaging in the population with migraine, the pilot test demonstrates significant variation in the measures across health plans.
- The measures can be of value to health plans in identifying potential quality and safety issues and comparing their performance with national benchmarks.

References

1. Friedman D, Feldon S, Holloway R, Fisher S. Utilization, diagnosis, treatment and cost of migraine treatment in the emergency department. *Headache*. 2009;49(8):1163-1173. 10.1111/j.1526-4610.2009.01506.x.
2. Silberstein S. Practice parameter: Evidence-based guidelines for migraine headache (an evidence-based review). *Neurology*. 2000;55:754-763.
3. Detsky ME, McDonald DR, Baerlocher MO, Tomlinson GA, McCrory DC, Booth CM. Does This Patient With Headache Have a Migraine or Need Neuroimaging? *JAMA: The Journal of the American Medical Association*. 2006;296(10):1274-1283. 10.1001/jama.296.10.1274.
4. Lipton RB, Bigal ME, Rush SRLP, et al. Migraine practice patterns among neurologists. *Neurology*. 2004;62(11):1926-1931.
5. Detsky ME, McDonald DR, Baerlocher MO, Tomlinson GA, McCrory DC, Booth CM. Does This Patient With Headache Have a Migraine or Need Neuroimaging? *JAMA: The Journal of the American Medical Association*. 2006;296(10):1274-1283. 10.1001/jama.296.10.1274.
6. Reiner BI. Quantifying Radiation Safety and Quality in Medical Imaging, Part 2: The Radiation Scorecard. *JACR Journal of the American College of Radiology*. 2009;6(9):615-619. Accessed 27 April 2011.
7. Polizzotto MJ. Evaluation and Treatment of the Adult Patient With Migraine. *J Fam Practice*. 2002;51(2):161-167.
8. Gagne JJ, Leas B, Lofland JH, Goldfarb N, Freitag F, Silberstein S. Quality of care measures for migraine: a comprehensive review. *Dis Manag*. 2007;10(3):138-146. 10.1089/dis.2007.103639.
9. Leas BF, Gagne JJ, Goldfarb NI, Rupnow MF, Silberstein S. Assessing quality of care for migraineurs: a model health plan measurement set. *Popul Health Manag*. 2008;11(4):203-208. 10.1089/pop.2007.0020.

Acknowledgements

- This study was funded by Merck Sharp & Dohme Corp.
- The authors also want to acknowledge the intellectual capital contributed by the following advisors:

Roger Cady, MD
David Dodick, MD
Fred Freitag, DO
Christopher Goff, JD, MA
Richard Lipton, MD, FAAN
Walter "Buzz" Stewart, PhD