

Quality improvement in neurology

Primary headache quality measures

Stephen Ross, MD
Eric Wall, MD, MPH
Becky Schierman, MPH
J. Mark Bailey, DO, PhD
Eric Cheng, MD, MS
Charles Flippen II, MD
Shannon Petersen,
DScPT
Amy Sanders, MD, MS
David Seidenwurm, MD
M. Cristina Victorio, MD

Correspondence to
American Academy of Neurology:
quality@aan.com

Headache and migraine are common, debilitating, and costly. Headaches are among the most prevalent neurologic disorders. In US studies, somewhere between 12% and 23% of adults over the age of 18 have had a migraine headache in the past 3 months.¹ In fact, the WHO ranks migraine headache in the top 20 of the world's most disabling medical illnesses.² Frequent headache or migraine can significantly and negatively impact an individual's quality of life, family interactions, and ability to work.^{3,4} Hawkins et al.⁵ found that nationally, migraine-associated expenditures include outpatient care costs of \$5.21 billion; prescription costs of \$4.61 billion; inpatient care costs of \$0.73 billion; and emergency department care costs of \$0.52 billion. At work, people with migraine have higher levels of lost productivity and reduced performance, and more absences from work.⁶

In 2013, the American Academy of Neurology (AAN) formed a multidisciplinary headache measurement workgroup (HMWG) to identify and define quality measures aimed at improving care delivery and outcomes for patients with headache and migraine. The HMWG represented academic institutions, national health care providers, and advocacy organizations concerned with the care of patients with headache. The AAN led this effort, facilitated the process, and convened the meetings. The American Academy of Family Physicians and the American Medical Association (AMA)-convened Physician Consortium for Performance Improvement (PCPI) also partnered with the AAN and nominated representatives and attended the HMWG meeting.

The details of the full AAN measure development process are available online.⁷ The AAN headache quality measurement set could support quality improvement initiatives, public reporting, payment for quality, and maintenance of certification.

OPPORTUNITIES FOR IMPROVEMENT Based on the literature, there are several gaps in the quality of care for people with headache and migraine.

Overutilization of neuroimaging. There are opportunities to increase provider implementation of practice guidelines, patient education, and shared decision-making in order to decrease inappropriate neuroimaging across all practice settings. Evidence suggests increasing overutilization of neuroimaging (CT or MRI) in the evaluation of patients with atraumatic headache⁸ and in children and adolescents with headache who have otherwise normal examination.⁸⁻¹⁰ Although most headaches in children and adolescents are due to benign conditions, such as migraine and tension-type headache, parents and physicians are often concerned about serious underlying diseases, such as brain tumor. In adults, recurrent headaches without red flags and fitting a typical pattern of migraine or tension-type headaches, particularly in the context of a history of medication overuse/rebound, do not require neuroimaging. The etiology of headaches can most often be determined in children, adolescents, and adults by a thorough and precise history and a comprehensive neurologic examination. Neuroimaging is rarely necessary unless the history or neurologic examination suggests other causes.

Underuse of preventive therapies. Efforts to increase the utilization of preventive therapies in patients with migraine could greatly decrease unnecessary headache-related disability in these patients. Migraine prevention is essential in the effective management of migraine patients; however, preventive therapies remain underused. Although 38% of migraine patients would benefit from a preventive therapy, only 13% of identified migraine patients are on preventive therapy.^{11,12} Preventive therapies can decrease the occurrence of migraines by 50%–80% and reduce their severity and duration when they do occur.² After considering comorbidities, affordability, and patient preferences, physicians should offer preventive therapy to patients whose migraine frequency is 4 or more attacks per month or attacks on 8 or more days per month.

From the Department of Neurology (S.R.), Penn State University College of Medicine, Milton S. Hershey Medical Center, Hershey, PA; Qualis Health (E.W.), Seattle, WA; American Academy of Neurology (B.S.), Minneapolis, MN; University of Alabama at Birmingham (J.M.B.); University of California Los Angeles (E.C., C.F.); Des Moines University (S.P.), IA; SUNY Upstate Medical Center (A.S.), Syracuse, NY; Sutter Medical Group (D.S.), Sacramento, CA; and the NeuroDevelopmental Science Center (M.C.V.), Akron Children's Hospital, OH.

The AAN Board of Directors approved the Headache Measurement Set on June 9, 2014, and the full membership of the American Medical Association-convened Physician Consortium for Performance Improvement approved the measures on June 26, 2014.

Go to Neurology.org for full disclosures. Funding information and disclosures deemed relevant by the authors, if any, are provided at the end of the article.

Inappropriate acute treatment. By reducing the use of barbiturates and opioids for primary headache disorders, there is the potential to decrease chronic daily headache, improve quality of life, and reduce headache-associated disability. Triptans and ergots are guideline-recommended acute treatments specifically for migraine; yet opioid- and barbiturate-containing drugs are frequently overprescribed. In one study of 8,373 adolescents with headache, 46% (3,859 patients) received an opioid prescription.⁹ DeVries et al.⁹ conclude that emergency department visits for headache were strongly correlated with opioid use after adjusting for other covariates. Another study noted that barbiturates or opioids are more likely to be overused among those patients presenting to a tertiary headache center.¹³ The use of barbiturates increases the risk of chronic daily headache and drug-induced hyperalgesia.¹⁴ In addition, medication overuse headache (MOH) is an underdiagnosed condition. Abortive medications are appropriate for most patients with a primary headache disorder; however, when they are used too frequently, these medications can cause MOH.²

Undertreatment of comorbidities. Assessing, discussing, and acting on patients' comorbid conditions allows for better management of migraine. Migraine is often accompanied by other medical, neurologic, or psychiatric disorders that can have a negative impact on a patient's health-related quality of life (HRQOL), or their physical, mental, emotional, and social functioning.^{15,16} When left untreated or

inadequately treated, reduced HRQOL can result in increased medical costs and decreased productivity. Motivational or behavioral interventions along with preventive drug therapies can greatly improve a patient's quality of life.

METHODS The headache quality measure development process followed the AAN's measure development process.⁷ The AAN's process entails an evidence-based literature search, drafting preliminary measures by the leadership team, convening the workgroup to finalize a set of candidate measures, soliciting public comments during a 30-day period, and refining the final measures with their corresponding technical specifications. The HMWG, the AAN Quality and Safety Subcommittee, the AAN Practice Committee, and the AAN Board of Directors approved the final set of measures. In addition, the measurement set was approved by the full membership of the AMA PCPI.

HEADACHE MANAGEMENT QUALITY MEASURES

The workgroup sought to develop measures to support the delivery of high-quality care and to improve patient outcomes. They focused on gaps in care in need of improvement and based the measures on available clinical evidence. The AAN 2014 Headache Quality Measures (table) apply to patients with a diagnosis of migraine headache, cluster headache, or primary headache disorders. The measures address appropriate medication use, overuse, patient-reported outcomes, and care coordination. The workgroup considered several other important constructs in headache care, though ultimately determined that the evidence was too weak, the gap in care was too small, or the opportunity for improvement was too low to continue with the development of the measure. All but one measure in this measurement set (migraine headache-related functional disability status) are designed for individual practitioner level measurement. However, the measure data may be aggregated across individual practitioners to demonstrate the quality of care in the clinic or health system level. Unless otherwise indicated, the measures are appropriate for use in public reporting and accountability programs if the appropriate methodologic, statistical, and implementation rules are followed.

DISCUSSION Measuring and improving health care quality is essential. Quality measurement is happening at the facility, state, national, and private and public payer level, leading to increased efforts to hold health care providers accountable for the quality of their care. Fundamental to these efforts are meaningful, actionable, and feasible quality measures. Measuring health care quality is a complex and challenging process. Although the AAN has made progress in measure development—authoring several well-specified measures—much work needs to be done

Table American Academy of Neurology headache measures (2014)

Appropriate medication use (process measures)
1. Medication prescribed for acute migraine attack
2. Medication prescribed for acute cluster headache
3. Preventive migraine medication prescribed
Overuse measures (process measures)
4. Overuse of barbiturate-containing medications for primary headache disorders
5. Overuse of opioid-containing medications for primary headache disorders
6a. Assessment of medication overuse headache in the treatment of primary headache disorders (paired measure with 6b)
6b. Plan of care or referral for possible medication overuse headache (paired measure with 6a)
7. Overuse of neuroimaging for patients with a primary headache and a normal neurologic examination
Outcome measures
8. Quality of life assessment for patients with primary headache disorders
9. Migraine headache-related functional disability status
Patient engagement and care coordination
10. Plan of care for migraine headache developed or reviewed

to advance quality measurement in neurology. Measurement science is moving rapidly from measuring processes of care to measuring improved patient outcomes. Neurology must also move in that direction. The AAN's Headache Measurement Set represents the AAN's first effort to incorporate measures of patient-reported quality of life and functional outcomes. The literature supporting patient quality of life and function is strong for migraine, but limited for many other headache types. Literature is also inadequate for best practices for health system interventions and coordination of care across providers. The intent of this measure set is to help neurologists measure and improve patient migraine symptom control, the impact of comorbidities, and function in their patient population. These measures could greatly improve the care and outcomes for patients with headache if implemented in conjunction with quality improvement initiatives.

AUTHOR CONTRIBUTIONS

Stephen C. Ross: drafting/revising the manuscript, study concept or design, analysis or interpretation of data, accepts responsibility for conduct of research and final approval, study supervision. Eric Wall: drafting/revising the manuscript, study concept or design, accepts responsibility for conduct of research and final approval. Becky Schierman: drafting/revising the manuscript, accepts responsibility for conduct of research and final approval. J. Mark Bailey: drafting/revising the manuscript, accepts responsibility for conduct of research and final approval. Eric M. Cheng: drafting/revising the manuscript, study concept or design, analysis or interpretation of data, accepts responsibility for conduct of research and final approval. Charles Flippen III: drafting/revising the manuscript, accepts responsibility for conduct of research and final approval. Shannon Petersen: drafting/revising the manuscript, accepts responsibility for conduct of research and final approval, acquisition of data, involved in online/telephone and in-person meetings used to discuss the content, participated in a subgroup focused on writing a specific section of the document, read and provided feedback on drafts of the document. Amy E. Sanders: drafting/revising the manuscript, accepts responsibility for conduct of research and final approval. David Seidenwurm: analysis or interpretation of data, accepts responsibility for conduct of research and final approval. M. Cristina Victorio: drafting/revising the manuscript, study concept or design, accepts responsibility for conduct of research and final approval, acquisition of data, study supervision.

ACKNOWLEDGMENT

The authors thank the Headache Measure Development Workgroup members for their contributions and work that supported the development of this manuscript: Stephen Ross, MD (Neurology); Eric Wall, MD (Family Medicine); Wayne Anderson, MD (Neurology); David Roeltgen, MD (Neurology); Stephen Silberstein, MD (Neurology); Amy Schneider, MD (Family Medicine); Thomas K. Koch, MD (Pediatrics); Thomas Watanabe, MD (Physical Medicine and Rehabilitation); Robert P. Wahl, MD (Emergency Medicine); Andy Jagoda, MD (Emergency Medicine); James Foody, MD (Internal Medicine); David Seidenwurm, MD (Radiology); J. Mark Bailey, DO, PhD (Osteopathy); Shannon Petersen, PT (Physical Therapy); Jon Streltzer, PhD (Psychiatry); Robert Nicholson, PhD (Psychology); M. Cristina Victorio, MD (Child Neurology); William B. Young, MD (Alliance for Headache Disorders Advocacy); Elizabeth Loder, MD (American Headache Society); Mary Franklin (National Headache Foundation); Charles Flippen II, MD (Neurology); Eric Cheng, MD, MS (Neurology); Amy Sanders, MD, MS (Neurology); Elvia Chavarria, MPH (American Medical Association Physician Consortium for Performance Improvement);

Judy Burleson (American College of Radiology); Colleen Tallant (American College of Radiology); Samantha Shugarman (American Psychiatric Association); Robert Plovnick (American Psychiatric Association); Staci Jones (American College of Emergency Physicians); Diane Crowley (American College of Emergency Physicians); Dainsworth Chambers (American College of Emergency Physicians); Rebecca J. Swain-Eng, MS, CAE (American Academy of Neurology); Gina Gjorvad (American Academy of Neurology); Becky Schierman, MPH (American Academy of Neurology).

STUDY FUNDING

No targeted funding reported.

DISCLOSURE

S. Ross, E. Wall, B. Schierman, J. Bailey, E. Cheng, C. Flippen, S. Petersen, and A. Sanders report no disclosures relevant to the manuscript. D. Seidenwurm has financial interests or serves in key positions for Impact Core Labs, Inc., DSI Pharmaceuticals, Akken Labs, and California Managed Imaging. M. Victorio reports no disclosures relevant to the manuscript. Go to Neurology.org for full disclosures.

Received July 8, 2014. Accepted in final form September 22, 2014.

REFERENCES

1. Smitherman TA, Burch R, Sheikh H, Loder E. The prevalence, impact, and treatment of migraine and severe headaches in the United States: a review of statistics from national surveillance studies. *Headache* 2013;53:427–436.
2. World Health Organization. Headache Disorders Fact Sheet. Available at: <http://www.who.int/mediacentre/factsheets/fs277/en/>. Accessed March 1, 2014.
3. National Headache Foundation Impact of Migraine: Evaluation Patient Disability. Available at: <http://www.headaches.org/pdf/Monograph12.pdf>. Accessed March 1, 2014.
4. Leonardi M, Steiner TF, Scher AT, Lipton RB. The global burden of migraine: measuring disability in headache disorders with WHO's classification of functioning disability and health (ICF). *J Headache Pain* 2007;6:429–440.
5. Hawkins K, Wang S, Rupnow M. Direct cost burden among insured US employees with migraine. *Headache* 2008;48:553–563.
6. Serrano D, Manack AN, Reed ML, Buse DC, Varon SF, Lipton RB. Cost and predictors of lost productive time in chronic migraine and episodic migraine: results from the American Migraine Prevalence and Prevention (AMPP) study. *Value Health* 2013;16:31–38.
7. Bever CT, Dubinsky R, Tonn S, Swain-Eng R; for the Quality Measures and Reporting Subcommittee. Quality Measure Development Process Manual, 2010 Edition. Available at: https://www.aan.com/uploadedFiles/Website_Library_Assets/Documents/3.Practice_Management/2.Quality_Improvement/1.Quality_Measures/2.About_Quality_Measures/AAN%20Measure.pdf. Accessed March 1, 2014.
8. Gilbert JW, Johnson KM, Larkin GL, Moore CL. Atraumatic headache in US emergency departments: recent trends in CT/MRI utilization and factors associated with severe intracranial pathology. *Emerg Med J* 2012;29:576–581.
9. DeVries A, Young PC, Wall E, et al. CT scan utilization patterns in pediatric patients with recurrent headache. *Pediatrics* 2013;132:e1–e8.
10. Pracilio VP, Silberstein S, Couto J, et al. Measuring migraine-related quality of care across 10 health plans. *Am J Manag Care* 2012;18:e291–e299. Available at: <http://www.ajmc.com/publications/issue/2012/2012-8-vol18-n8/Measuring-Migraine-Related-Quality-of-Care-Across-10-Health-Plans#sthash.64r21cqxdpuf>. Accessed April 1, 2014.

11. Lipton RB, Bigal ME, Diamond M, Freitag F, Reed ML, Stewart WF; The American Migraine Prevalence and Prevention Advisory Group. Migraine prevalence, disease burden, and the need for preventative therapy. *Neurology* 2007;68:343–349.
12. Estemalik E, Tepper S. Preventive treatment in migraine and the new US guidelines. *Neuropsychiatr Dis Treat* 2013;9:709–720.
13. Matchar DB, Young WB, Rosenberg JA, et al; US Headache Consortium. Evidence-based guidelines for migraine headache in the primary care setting: pharmacological management of acute attacks. Available at: <http://tools.aan.com/professionals/practice/pdfs/gl0087.pdf>. Accessed June 13, 2014.
14. Lipton RB, Buse DC, Serrano D, Holland S, Reed ML. Examination of unmet treatment needs among persons with episodic migraine: results of the American Migraine Prevalence and Prevention (AMPP) study. *Headache* 2013;53:1300–1311.
15. Buse DC, Rupnow MF, Lipton RB. Assessing and managing all aspects of migraine: migraine attacks, migraine related functional impairment, common comorbidities, and quality of life. *Mayo Clinic Proc* 2009;84:422–435.
16. Buse DC, Silberstein SD, Manack AN, Papapetropoulos S, Lipton RB. Psychiatric comorbidities of episodic and chronic migraine. *J Neurol* 2013;260:1960–1969.

Neurology[®]

Quality improvement in neurology: Primary headache quality measures

Stephen Ross, Eric Wall, Becky Schierman, et al.

Neurology 2015;84;200-203

DOI 10.1212/WNL.0000000000001134

This information is current as of January 12, 2015

Updated Information & Services	including high resolution figures, can be found at: http://n.neurology.org/content/84/2/200.full
Supplementary Material	Supplementary material can be found at: http://n.neurology.org/content/suppl/2017/08/07/WNL.0000000000001134.DC1
References	This article cites 12 articles, 3 of which you can access for free at: http://n.neurology.org/content/84/2/200.full#ref-list-1
Citations	This article has been cited by 5 HighWire-hosted articles: http://n.neurology.org/content/84/2/200.full##otherarticles
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): All Headache http://n.neurology.org/cgi/collection/all_headache All Health Services Research http://n.neurology.org/cgi/collection/all_health_services_research Health care reform http://n.neurology.org/cgi/collection/health_care_reform
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.neurology.org/about/about_the_journal#permissions
Reprints	Information about ordering reprints can be found online: http://n.neurology.org/subscribers/advertise

Neurology® is the official journal of the American Academy of Neurology. Published continuously since 1951, it is now a weekly with 48 issues per year. Copyright © 2015 American Academy of Neurology. All rights reserved. Print ISSN: 0028-3878. Online ISSN: 1526-632X.

