

Quality improvement in neurology

Universal neurology quality measurement set: Executive summary

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The American Academy of Neurology (AAN) formed a work group to evaluate quality measures applicable to a general neurologist. Currently available general measurement options—such as smoking, immunization, and weight—although relevant to a wide patient population, do not, for the most part, reflect the practice of neurology. Rather than developing quality measures specific to one neurologic subspecialty, the goal of this project was to develop quality measures that are universally applicable to neurology.

Quality measures use clinical practice guideline recommendation statements and research to generate a measurable action a provider may perform. Quality measures do not generate new evidence or recommendations. Quality measures are one way that guideline recommendations are operationalized for use in clinical practice.

Eight quality measure groups were determined to have relevance across the practice of neurology.

Falls outcome and plan of care

Falls are a leading cause of death in persons aged 65 years and older.¹ In addition, multiple neurologic conditions increase the risk of falling in younger persons. In persons who do fall and who require hospitalization, the cost is approximately \$39,000 per patient.² This quality measure addresses the percentage of patients who reported a fall during the measurement and who had a plan of care documented.

Activity counseling for back pain

Back pain is a frequent cause of sick days for those in the workforce and a frequent complaint in neurologic practice.³ In 1990, it was reported that low back pain was the fifth most common reason to see a physician.⁴ A 2002 National Health Interview Survey indicated that one fourth of US adults reported back pain in the last 3-month period.⁵ A 2006 socioeconomic study showed total costs attributable to low back pain in the United States were estimated at \$100 billion, two-thirds of which were indirect costs of lost wages and productivity.⁶

This quality measure addresses the percentage of adults between 18 and 65 years of age with back pain who were either counseled to remain active or referred to physical therapy.

Maltreatment screening and action

Maltreatment is a national priority. In children, maltreatment is associated with increased medical costs, approximating 9% of all Medicaid expenditures for children.⁷ It is estimated that approximately 10% of older adults experience maltreatment or abuse.⁸ Maltreatment of patients is reported at a higher frequency in patients with neurologic conditions that involve functional

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impairment.⁹ This quality measure addresses the percentage of persons who were screened for maltreatment, and if the screening was positive, documentation of a follow-up plan.

Overuse of imaging in primary headache

Headache is one of the most common reasons to seek medical care. There are studies indicating that there is a low yield and high cost associated with nonselective imaging of primary headache disorders.¹⁰ Most patients with uncomplicated primary headache do not require imaging.¹¹ In addition to cost, there is a risk of creating morbidity by uncovering incidental or nonsignificant imaging findings.¹² This quality measure documents the percentage of persons who underwent CT or MRI of the brain for primary headache but did not have clinical indications for imaging.

Medication reconciliation

The concept of medication reconciliation was developed by a nurse in the Mayo Healthcare System, Jane Justeson, as an aspect of an Institute for Healthcare Improvement initiative.¹³ Reconciliation has been defined as the process by which an accurate list of medications that the patient is taking, with details including name of the medication, dosage, and frequency of administration, is compiled. This medication list is then used throughout the health care system.¹⁴ The WHO's definition indicates that this process is a partnership with patients to ensure that appropriate medication history is obtained at care interfaces¹⁵ while The Joint Commission defines the process as a comparison of patient's recorded medication orders and the actual medicines that the patient is taking.¹⁶

This quality measure documents the percentage of patients who had the medication reviewed at each encounter.

Pain assessment and plan of care

Pain is an important clinical condition, afflicting up to 43% of the American population and 30% of the population of Western nations.^{17,18} Pain may cost approximately \$635 billion and over a lifetime afflicts 85% of people.¹⁷ Both acute and chronic pain should be assessed appropriately and this is essential for both patient care and research.¹⁹ The Joint Commission mandates that pain assessment and pain management must be an institutional priority. Clinicians should assess patients' pain appropriately and minimize the risk associated with treatment.²⁰ Acute pain associated with spinal

and musculoskeletal issues should be assessed with tools that examine the effect of chronic pain on the physical, social, and emotional aspects of patients' lives. Documentation of chronic pain may include a pain history, physical examination, and other more appropriate diagnostic tests.¹⁹

This quality measure documents the discussion of pain and potential follow-up if pain is present.

Advance care planning (ACP)

Many neurologic patients have serious illness and advance care plans allow these patients to express their care desires. Elderly patients who did have advance care plans were found to receive care that was consistent with what was expressed in the advanced directive.²¹ ACP has been defined as a "process of discussion about goals of care and means of setting on record for preferences for care of patients who may lose capacity or communicating ability in the future"²² and includes decisions about ventilator use, cardiopulmonary resuscitation, artificial nutrition and hydration, and comfort care. ACP includes the process of discussions with patient, family, and caregivers and is not merely limited to the completion of specified forms. Steps in ACP include assessing patient readiness, identification of suitable surrogate decision-makers, understanding patients' quality of life beliefs, documentation of ACP plans, and finally translating these decisions into appropriate clinical care plans.²³ ACPs are associated with less spending, reduced in-hospital death, and increased hospice care.²⁴ This quality measure documents the presence of an advance care plan.

Driving risk discussion and referral

Driving conducted by patients with seizures and dementia poses specific public health and personal risks and counseling in this regard is important. While considerable heterogeneity underlies studies of driving in patients with epilepsy, a meta-analysis by the US Department of Transportation²⁵ did find that patients with epilepsy had a motor vehicle accident record up to 2.6 times that of normal individuals. In the case of epilepsy, most if not all states in the United States have legal restrictions on driving in patients with epilepsy, though laws may vary from state to state. Many states in the United States may hold physicians liable for advice regarding driving that they provided to patients with seizures.²⁶⁻²⁸ In the case of dementia, both the Clinical Dementia Rating Scale and the Mini-Mental State Examination (score less than or equal to 24) were useful in predicting the risk of motor vehicle accidents in patients with dementia, as was a caregiver's rating that a patient was unsafe to drive. Risk factors for accidents in this group of patients includes history of citations and crashes, situational driving avoidance, history of driving less than 60 miles per week, and increased aggression and impulsivity. The AAN guideline recommended that intervention in these patients could be predicted using the Clinical Dementia

+ Supplemental Data Full measurement set

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Rating Scale and examining how many risk factors patients met.²⁹

This quality measure addresses the conversation about driving risks and the potential action implemented after that discussion.

Opportunities for improvement

This measure set focuses on measures of universal importance for clinical neurology across the inpatient and outpatient aspects of patient care. We identified numerous areas for quality improvement based on literature reviews that demonstrated gaps in quality.

Falls outcome and plan of care

Many existing AAN measures cover screening and plan of care for falls, as well as a variation of a current National Quality Forum–endorsed measure, all for adult neurologic patients. However, patients with neurologic conditions are often younger and are at an increased risk of falling due to their disease symptomology. A total of 127,457,106 nonfatal falls were recorded from 2001 to 2015.² Harmonizing all these existing measures into a more comprehensive one for all neurologic patients is warranted.

Activity counseling for back pain

The work group debated how best to define counseling for this measure. Despite many studies recommending counseling patients on the use of heat and against the use of bed rest, these were removed from consideration based on this measure's focus on remaining active. In addition, bed rest may be appropriate in some cases for a limited time.

Of note, this is a variation of the Institute for Clinical Systems Improvement (ICSI)³⁰ measure on back pain. The modified measure was created to account for the role of neurologists in dealing with all types of back pain, not just low back and sciatica.

Maltreatment screening and action

Many specialty societies have recommendations related to maltreatment, including the American College of Obstetrics and Gynecologists, American College of Emergency Physicians, Emergency Nurses Association, American Academy of Family Physicians, American Dental Association, American College of Nurse Midwives, and the American Nursing Association.

There is evidence showing that patients with neurologic conditions that involve functional impairment report maltreatment at a higher frequency.⁹ Consistent application of screening and reporting maltreatment will improve the health status of patients with neurologic conditions.³¹

This is a variation of the Centers for Medicare & Medicaid Services (CMS) elder maltreatment quality measure (Merit-based Incentive Payment System [MIPS] #181). A new

measure was needed to capture the younger population that neurology providers encounter.

Overuse of imaging in primary headache

Migraine care alone accounts for approximately \$1 billion per year.³² One analysis indicated that between \$146 and \$211 million was spent on low-value care by imaging the head³³ with analyses indicating that the abnormal finding yield for CT is around 2% and about 5% for MRI.³⁴ Incidental findings on scans can also result in patient anxiety and leads to “practical and ethical dilemmas with regard to management.”³⁵

Of note, this measure work group discussed excluding patients who request imaging, but it was agreed upon that those patients should be included. The AAN will review any implementation data and the effect this decision had on performance rates, including unintended consequences, when this measure is due for updating.

This is a variation of the Q-METRIC measure.³⁶ A new measure was needed to capture a wider range of ages.³⁷

Medication reconciliation

Care transitions remain important areas where patient safety may be compromised by medication errors. Boockvar et al.³⁸ report that a mean of 3 medications were altered in patient transition from nursing home to hospital and a mean of one medication altered in transition from hospital to nursing home with adverse events from medication errors in 20% of patients. Cornish et al.,³⁹ evaluating general medicine admissions, reported that 53% of such patients had at least one error, typically the omission of a commonly used medication. In a third of patients, this was a serious error. In reporting to a large medication database, the most common errors were improper medication dose or quantity, omission, and prescription errors.⁴⁰ Repeatedly clarifying patients' most current medication list at each contact with the health care system facilitates medication safety and reduces error.

This is a variation of the National Committee for Quality Assurance measure on medication review for adults 66 years of age and older.⁴¹ A modification is needed to take neurology patients into account who are generally younger but still have complicated conditions with comorbidities and polypharmacy. In addition, many measures in CMS' MIPS payment program include similar measures for those age 18 and above. The work group considered it necessary to include children, as many pediatric neurologic conditions also involve polypharmacy.

Pain assessment and plan of care

Pain affects not just the patient but family and friends as well. Therefore, an important gap in the care of patients with pain is the need to document a pain assessment and a plan of care that assesses multiple domains including biomedical, behavioral, and psychosocial issues.¹⁸ While self-report is a “reliable indicator of the existence and intensity of pain,” it also may be

appropriate to utilize tools that are patient-centric, multidimensional, and address a variety of pain variables. Evidence-based guidelines also recommend that a written plan of care be created for patients with pain that address personal goals, sleep improvement, improved physical activity, stress management, and pain reduction.⁴²

Advance care planning

ACP provides patients the ability to exercise a degree of autonomy and control over their health care, particularly at the end of life, by communicating their decisions when they are of sound mind.⁴³ A gap in care exists: one study found that, in 1995, only 20% of hospitalized patients had an ACP directive and only 12% had been counseled in this regard.⁴⁴ Therefore a discussion with the patient regarding ACP and possibly the creation of ACP documentation is important.

Driving risk discussion and referral

Various states and locales have laws regarding driving with certain diseases, such as epilepsy. However, dementia,⁴⁵ parkinsonism,⁴⁶ and other neurologic conditions are associated with impaired driving. There is currently no unifying measure that addresses driving safety in these neurologic conditions.

Methods

The AAN formed a work group of key stakeholders from AAN committees. Details of the full measure development process are available online.⁴⁷ This work group used a modified approach to development by reviewing existing measures on the topics included in this measurement set and using many as the basis for the measures. The formation of the work group began with a nomination process from the AAN, which led to a 5-member work group, which is listed in the conclusion of the article.

All work group members were required to disclose potential conflicts of interest and completed applications summarizing experiences and interests. The facilitator independently selected members from the pool of qualified specialists and expert nominees. The selection was based on the nominee's experience in performance measures, quality improvement, and clinical activities.

The measure development process included the following: (1) evidence-based literature search, (2) establishing a multidisciplinary work group adhering to the AAN conflict of interest policy, (3) drafting candidate measures and technical specifications, (4) convening the work group virtually to review candidate measures, (5) refining and discussing the candidate measures, (6) soliciting public comments on approved measures during a 21-day period, (7) refining the final measures according to input received during the public comment period and corresponding technical specifications, and (8) obtaining approvals from the work group, AAN Quality and Safety Subcommittee, AAN Practice Committee, and AAN Institute Board of Directors.

The work group sought to develop evidence-based measures to support the delivery of high-quality care and to improve patient outcomes. The work group, guided by a medical librarian, conducted a comprehensive literature search identifying 2,201 abstracts relevant to the potential measures. This yielded 23 guidelines to represent a core feature of the evidence base for the measures developed.

Following the development of draft measure concepts, a public comment period resulted in over 167 comments from 45 individuals. The majority of comments received were centered around the confusion between a guideline and a quality measure, as well as the mandatory requirement to report these measures. In response to commenters, the work group explained the difference between a guideline and a quality measure as well as clarified the mandatory reporting of measures through CMS. The work group also received measure-specific feedback, which drove refinement of the measures. For example, one comment suggested the age range be increased to 18 years for the Falls Outcome measure. The work group changed the specification from all patients regardless of age to only patients over the age of 18.

The AAN plans to provide resources to update these measures every 3 years. Thus, this measure set aims to provide a working framework for measurement, rather than a long-term mandate.

Results

The work group approved 12 measures in 8 measure groups (tables 1 and 2). Measure groups contain more than one measure. The full specifications for each measure are available at aan.com/practice/quality-measures/ and in appendix e-1, available at links.lww.com/WNL/A841.

Falls outcome and plan of care

This measure was expanded from prior falls-related measures to fill a gap for the younger neurology patient population. The current CMS measure is for patients 65 years and older. Many patients with neurologic disorders experience falls earlier in life due to their impaired motor function.

This concept of improving falls outcomes has been developed as a paired outcome measure. The first component includes the percentage of patients who report a fall. The follow-up component involves developing a plan of care for those patients who had a fall. The measure stipulates that the plan of care should consider balance, strength, and gait training, or a referral to physical therapy.

Of note, there is evidence that vitamin D supplementation may play a role in preventing falls or preventing fractures. However, there is not enough evidence to support it for all neurologic patients. As such, the work group believed a recommendation could not be included at this time.

Table 1 2018 American Academy of Neurology universal neurology measurement set

Title	Numerator	Denominator	Exclusions
Falls outcome	Patients who report a fall occurred during the measurement period	Patients aged 18 years and older with a neurologic condition	Patient is bedridden, immobile, not ambulatory
			No documentation of falls inquiry or discussion during patient visit
Falls plan of care	Patients with a plan of care for falls documented (including plans created by another provider) in the measurement period	Patients aged 18 and older with a neurologic condition who reported a fall during the measurement period	Patient is bedridden, immobile, not ambulatory
			No documentation of falls inquiry or discussion during patient visit
Activity counseling for back pain	Patients who were counseled to remain active and exercise or were referred to physical therapy at initial visit for diagnosis of back pain	Patients aged 18–65 years seen for an initial visit for diagnosis of back pain	Patients with existing diagnosis of back pain
			Comorbid condition that deems the patient unfit to participate in physical activity
			Patient has a history of cancer
			Patient is on immunosuppression medications
			Patient has signs or symptoms of cauda equina syndrome
			Patient has risk factors for fractures
Maltreatment screening	Patients screened for maltreatment at least once in the measurement period	All patients with a neurologic condition	Patient refuses
			Patient is in an urgent or emergent situation where time is of the essence and to delay treatment would jeopardize the patient's health status
			Patients who are nonverbal
Maltreatment action	Patients who had documentation that follow-up action was taken at the visit where maltreatment screening is positive	All patients with a neurologic condition who screened positive for maltreatment	None
Overuse of imaging in primary headache	Patients for whom imaging of the head (CT or MRI) is obtained for the evaluation of primary headache when clinical indications are not present during the measurement period	All patients seen for evaluation of primary headache	None
Medication reconciliation	Medication review conducted at every encounter during the measurement year and the presence of a medication list in the medical record	All patients	Patient or caregiver is unable or unwilling to do this activity
			Procedure visit (i.e., EEG, nerve conduction study) where no sedation occurs
Pain assessment	Patient pain assessment is documented through discussion with the patient or caregiver and may include the use of standardized tools or by health care provider observation at least once during the measurement period	All patients with a neurologic condition	Severe mental or physical incapacity where the person is unable to express himself/herself in a manner understood by others; for example, cases where pain cannot be accurately assessed through use of nationally recognized standardized pain assessment tools
			Patient or caregiver refuses to participate
Pain plan of care	Patients who have a follow-up plan documented (including created by another provider) when pain is present at the visit where pain assessment is positive	All patients who have a positive pain assessment	Severe mental or physical incapacity where the person is unable to express himself/herself in a manner understood by others; for example, cases where pain cannot be accurately assessed through use of nationally recognized standardized pain assessment tools

Continued

Table 1 2018 American Academy of Neurology universal neurology measurement set (continued)

Title	Numerator	Denominator	Exclusions
			Patient or caregiver refuses to participate
			Patient is in palliative care
Advance care planning	Patients who have documentation of advance care plan or documentation of a conversation to determine advance care plan once during the measurement period	Patients aged 18–64 years diagnosed with a neurologic condition	Patients with a new diagnosis at the time of visit
			Patients unable to participate in the conversation and do not have a caregiver present
			Patient or caregiver declines
Driving risk	Patients for whom there was a conversation documented about driving risks at least once every 24 months	All patients age 14 years and older with a diagnosis of seizures or dementia	Provider documents patient's neurologic condition is adequately controlled and does not have symptoms that warrant discussion
			Another provider has documented this discussion in the measurement period
			Patients who do not drive or no longer drive
			Patient refuses
Driving referral	Patients who were referred for a driving fitness evaluation or who were advised to no longer operate a motor vehicle at the visit where driving risk is positive	Patients age 14 years and older who were identified as at risk for impairment during motor vehicle operation conversation	Patients who do not drive or no longer drive
			Patient refuses

Activity counseling for back pain

Back pain is one of the most frequent causes for missed work and a prominent condition that gets referred to neurologists for management. This measure used the ICSI measure on sciatica and low back pain as a base. The wording was changed to account for the role of neurologists in dealing with all types of back pain.

This measure was specified at the provider, practice, and system level of measurement, which means in addition to individual providers using the measure, practice teams and hospital systems could pool patients into the denominator and numerator to understand their performance rate. The work group believed this was important as future iterations of this measure set would most likely develop an accompanying outcome measure. By looking at practice and

systems level data, improvements could be made cutting across multiple providers or specialties resulting in more standardized care for patients with back pain.

Maltreatment screening and action

Abuse and violence have been national priorities for over a decade. Health care providers are required to report maltreatment in children and vulnerable adults. CMS has a measure for elder maltreatment that entails a screen and follow-up plan. The work group made every effort to harmonize the language of the measure to match CMS's measure. A tweak was made to the age range to include all patients, not only those over age 65 years.

Overuse of imaging for the evaluation of headache

Headache is a common problem seen in primary care and emergency departments and is often referred to neurologists for management. The AAN has an existing measure on neuroimaging for headache that is included in the headache specialty measurement set that was published in 2015. The work group believed that it was important to capture this concept in this measurement set as headache has a very large patient population and this measure would apply to most, if not all, neurologists.

The measure was based off the current measure in the headache measurement set as well as a measure created by Q-Metric. The work group harmonized the language to match the Q-Metric

Table 2 Additional relevant measures

Preventive care and screening: Screening for clinical depression and follow-up plan

Available at qualityforum.org/QPS/0418

Closing the referral loop: Receipt of specialist report

Available at ecqi.healthit.gov/ecqm/measures/cms050v3

Physical activity in older adults

Available at qualityforum.org/QPS/0029

measure and only changing the age range to also include adult patients. This measure will be implemented in AAN's Axon Registry and CMS's Quality Payment Program (QPP).

Medication reconciliation

Medication reconciliation has been a mainstay measure concept in various CMS payment programs. One measure in QPP is for medication reconciliation within 30 days of discharge for those 18 years of age and older. A second measure is for patients age 18 years of age and older who had a list of current medications documented on the date of the encounter. The work group believed this concept was exactly what they were looking for; however, it did not include the pediatric population. The work group created a new measure to capture this important concept but also to include children with neurologic conditions as they experience polypharmacy to manage their disorders.

Pain assessment and follow-up

Pain can be a chronic symptom of many neurologic disorders. Assessing pain symptoms and managing it with a care plan will help improve outcomes.

This measure was based off CMS's pain assessment measure for those over the age of 18. The work group created a variation to include the pediatric population. They also modified the numerator definition of assessment so a practitioner could use a standardized tool or conduct the assessment through observation and discussion. The work group made this change to account for nonverbal patients, like those with dementia, who may not have a caregiver to help provide answers to questionnaires.

Advance care planning

There are several measures that exist around the concept of care plans or advance care plans. The work group believed it was an important concept to include in this measurement set meant for all neurologists. Advance care plans are important through all stages of adulthood, especially in those who are terminally ill.

Many of the existing measures capture older populations, such as CMS's measure for those over the age of 65, or AAN's Inpatient and Emergency Care measure that captures inpatient populations. The work group believed that there was a gap for adults and thus specified this measure for those aged 18–64.

The work group realizes a practitioner might not consider it appropriate to implement this measure for all neurology patients, such as those with non-life-threatening conditions like headache. However, advance care planning importance is increasingly emphasized across medicine “regardless of age or health status,” as stated by the American Medical Association's Code of Medical Ethics Opinion 5.1.⁴⁸

Driving risk discussion and referral

The work group believed that a measure about driving risks was important for all neurologists given the motor dysfunction associated with many neurologic conditions. However, as driving

regulations vary from state to state, it was difficult to craft a measure around this concept. There is also very little literature about driving risks outside of epilepsy and dementia. The work group believes this was still an important concept and therefore specified it for only epilepsy and dementia.

This measure is a variation of the AAN's existing measure for those with dementia.

Discussion

This measurement set was created to reflect guidelines and standardized care practices that are common to neurologists universally. Quality measures are not guidelines. Quality measures strive to improve patient clinical outcomes by operationalizing evidence-based standards of care and helping us understand how often health care services are provided consistent with current medical knowledge. Clinical practice standards include documents like guidelines and systematic reviews, which provide recommendations intended to optimize patient care and form the denominator and numerator statements of quality measures. The AAN is committed to creating quality measures to assist in the delivery of the highest quality of care for patients with neurologic conditions that lead to improved outcomes. Ultimately, quality improvement can only be achieved through measurement techniques.

Many neurologists are asked by their health plans and other agencies to assess various health components at each encounter. Many neurologists have informed the AAN that the common quality measures, such as smoking cessation, tracking HbA1c, and blood pressure measurement, do not apply to general neurology. Therefore, the AAN has developed some optional quality measures that may better reflect the practice of general neurology.

AAN's Axon Registry—a separate entity—will consider implementation of measures from this measurement set to fill the need for general measures for general neurologists. Axon Registry is a useful tool for clinicians to review their data and improve care in their practice. It is the work group's intent that these incorporated measures be tested for reliability and validity so they can be considered for use in public reporting programs such as CMS' MIPS to allow more choices for reporting for neurology providers.

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The measures were approved by the work group. Providers are encouraged to identify the measures that would be most meaningful for their patient populations and implement these measures to drive performance improvement in practice.

Author contributions

Dr. Martello contributed to study concept and design, acquisition of data, analysis and/or interpretation of data, drafting/

revising the manuscript, critical revisions of the manuscript for important intellectual content, and study supervision including responsibility for conduct of research and final approval. Dr. Buchhalter contributed to study concept and design, acquisition of data, analysis and/or interpretation of data, critical revisions of the manuscript for important intellectual content, and study supervision including responsibility for conduct of research and final approval. Dr. Das contributed to study concept and design, acquisition of data, analysis and/or interpretation of data, drafting/revising the manuscript, critical revisions of the manuscript for important intellectual content, and study supervision including responsibility for conduct of research and final approval. E. Lee contributed to study concept and design, drafting/revising the manuscript, critical revisions of the manuscript for important intellectual content, and study supervision including responsibility for conduct of research and final approval. Dr. Dubinsky contributed to study concept and design, acquisition of data, analysis and/or interpretation of data, critical revisions of the manuscript for important intellectual content, and study supervision including responsibility for conduct of research and final approval. E. Lee contributed to study concept and design, drafting/revising the manuscript, critical revisions of the manuscript for important intellectual content, and study supervision including responsibility for conduct of research and final approval. Dr. Anderson contributed to study concept and design, acquisition of data, analysis and/or interpretation of data, drafting/revising the manuscript, critical revisions of the manuscript for important intellectual content, and study supervision including responsibility for conduct of research and final approval.

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