

Understanding Healthcare Value:  
Overuse of Imaging for the Evaluation  
of Primary Headache



CMS Qualified Entity (QE) Program

Public Report

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## Trilliant Health

The health economy creates more data than any other part of the U.S. economy, but healthcare stakeholders, from system operators to policymakers, have been challenged to interpret the data quickly enough to adapt to the constant change. As a result, the \$4.5T health economy is built on a foundation of decisions that are “directionally correct.” The delivery of effective and efficient healthcare requires precision. Trilliant Health combines healthcare industry expertise, market research, and predictive analytics to inform Evidence-Based Strategy for Healthcare. No two patients, health systems, or markets exhibit the same pattern of healthcare use or need. Data-based strategy is needed to survive in a negative-sum game.

## Objective

Trilliant Health is a certified national Qualified Entity (QE), which enables us to receive Medicare Fee-for-Service (FFS) claims data. The Center for Medicare and Medicaid Services (CMS) QE program requires us to use these data to evaluate and publicly report on provider performance. This report presents a summary of our findings on overuse of imaging for the evaluation of primary headache for 2019, 2020, and 2021 using a standardized measure developed by the American Academy of Neurology.

## Measure and Methods

Trilliant Health measures and quantifies healthcare utilization, efficiency and provider performance across the country. For this report, we used a standardized, CMS program measure that was developed by experts at the American Academy of Neurology. The standard measure included in this report is:

Quality ID #419: Overuse of Imaging for Evaluation of Primary Headache

National Quality Strategy Domain: Efficiency and Cost Reduction

Meaningful Measure Area: Appropriate Use of Healthcare

It is important to study low-value care to reduce the use of unnecessary tests and treatment, reduce costs, and improve patient safety by reducing exposure to unnecessary side effects and possible incidental findings. In a study of low-value care in Medicare, it was estimated that \$8.2 billion, or 2.7% of total annual spending on services covered by Parts A and B of Medicare, was spent on a sample of 26 low-value services (Schwartz, 2014).

Imaging of headache patients absent specific risk factors for structural disease is unlikely to change management or improve patient outcomes. To date, there is a growing but limited literature on low-value neuroimaging for headache. In a pediatric population, a retrospective cross-sectional analysis found that 45% of patients underwent low-value neuroimaging for

non-acute headache (Graf, 2008). An analysis of low-value service use among Medicare beneficiaries found that imaging for headache ranged from 0.0-14.2% across health systems, with an average of 5.1% (Ganguli, 2021). Larger studies that span diverse patient populations are needed to better understand the extent of unnecessary neuroimaging for primary headache. The potential harms and costs of unnecessary imaging underscore the need for continuous measurement and analysis to detect and/or monitor improvement over time. These types of analyses may identify opportunities to improve quality and reduce healthcare costs.

We applied the standard measure specification to all patients, regardless of age, enrolled in any of the following types of health insurance categories: Commercial, Medicaid, Medicare Advantage, and Medicare FFS. Table 1 summarizes the numerator, denominator, and exclusions that were applied. A higher percentage indicates worse performance, with more patients receiving unnecessary imaging.

**Table 1.**

Measure Description	Percentage of patients for whom imaging of the head Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) is obtained for the evaluation of primary headache when clinical indications are not present.
Measure Steward	American Academy of Neurology
Denominator	All patients seen for evaluation of primary headache (G43.001, G43.009, G43.011, G43.019, G43.101, G43.109, G43.111, G43.119, G43.4, G43.401, G43.409, G43.41, G43.411, G43.5, G43.501, G43.509, G43.511, G43.519, G43.6, G43.601, G43.609, G43.611, G43.619, G43.701, G43.709, G43.711, G43.719, G43.8, G43.801, G43.809, G43.811, G43.819, G43.821, G43.829, G43.831, G43.839, G43.901, G43.909, G43.911, G43.919, G44.019, G44.029, G44.039, G44.1, G44.209, G44.219, G44.221, G44.229, G44.52, G44.59, G44.81, G44.82, G44.89, R51.0, R51.9, G44.009, G44.049, G44.059, G44.099, G44.51, G44.53, G44.83, G44.84, G44.85)
Numerator	Patients for whom imaging of the head (CT or MRI) is obtained for the evaluation of primary headache when clinical indications are not present
Exclusions	Patients with clinical indications for imaging of the head: head trauma (G2187), new or change in headache above 50 years of age (G2188), abnormal neurological exam (G2189), headache radiating to the neck (G2190), positional headaches (G2191), temporal headaches in patients over 55 years of age (G2192), new onset headache in pre-school children or younger (G2193), new onset headache in pediatric patients with disabilities for which headache is a concern as inferred from behavior (G2194), occipital headache in children (G2195), thunderclap headache (G44.53), trigeminal pain (G50.0), persistent headaches (G44.52)

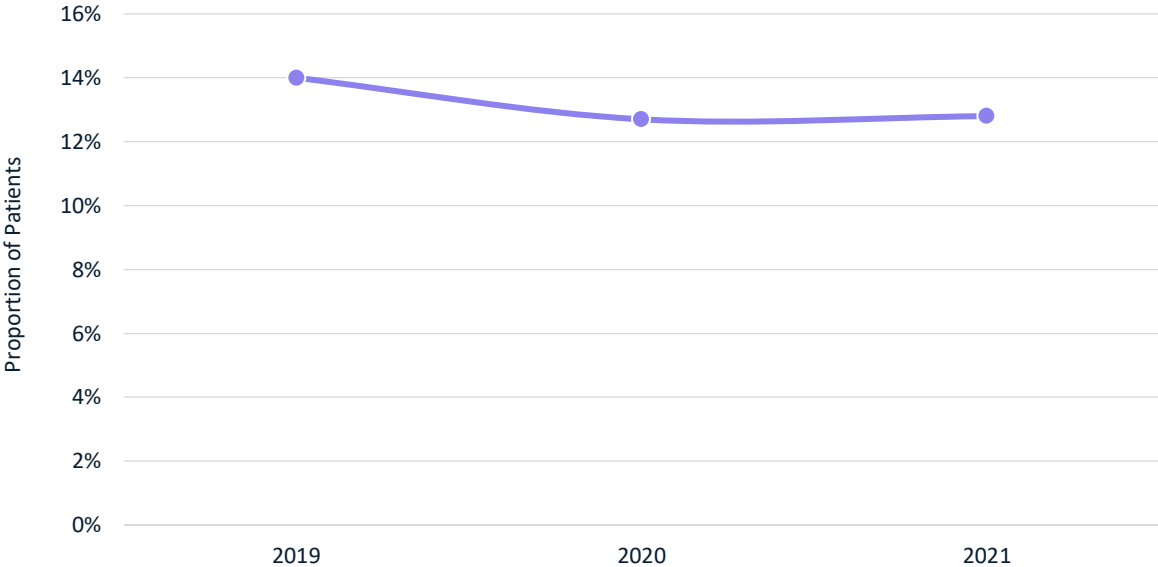
# Data

Overuse of imaging for primary headache was calculated using a combined dataset containing the CMS QE data and the Trilliant Health national all-payer claims data. The QE data, referred to as the Medicare FFS data in this report, includes 100 percent of Medicare Parts A and B claims data and Part D prescription drug event data for all 50 states and the District of Columbia. The Trilliant Health claims data includes data for Commercial, Medicaid and Medicare Advantage patients across all 50 states, the District of Columbia, and U.S. territories. The combined data is reported at the national level, by age group, and by sex. To measure provider performance, we also compare overuse of imaging for primary headache for Medicare FFS vs. the other payer data found in the Trilliant Health national all-payer claims dataset. The other payer data combines data from all payer types; the data are not weighted to reflect the distribution of insurance coverage across the U.S. population.

# Results

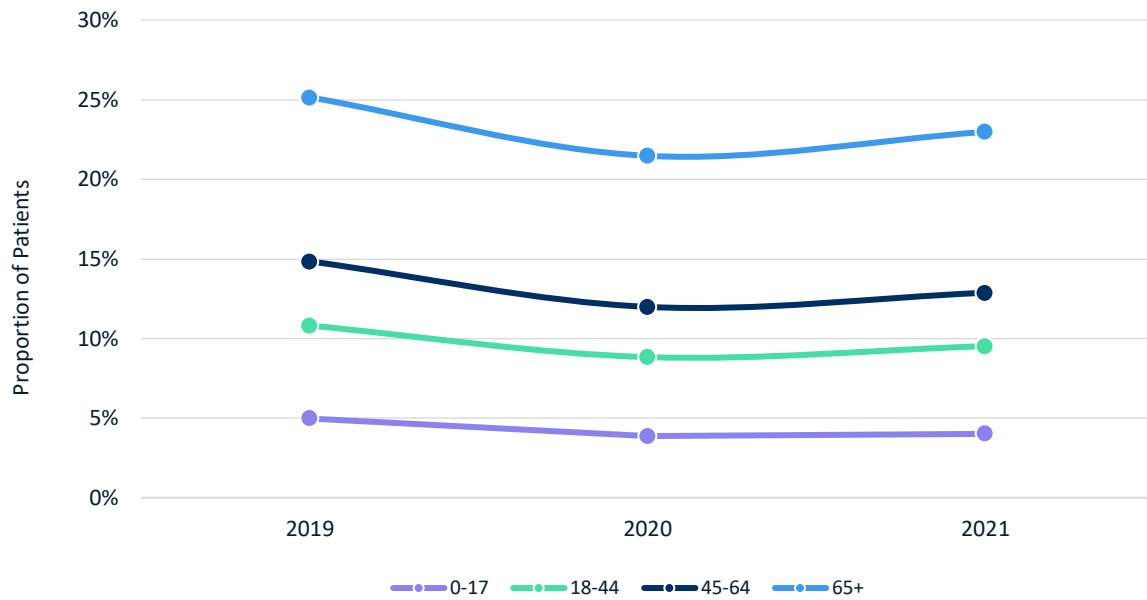
Using the combined data, between 2019 and 2021, the overall proportion of patients who experienced overuse of imaging for primary headache slightly decreased, from 14.0% in 2019 to 12.7% and 12.8% in 2020 and 2021, respectively (Figure 1).

**Figure 1.** Overuse of imaging for evaluation of primary headache by year, combined data, 2019-2021.



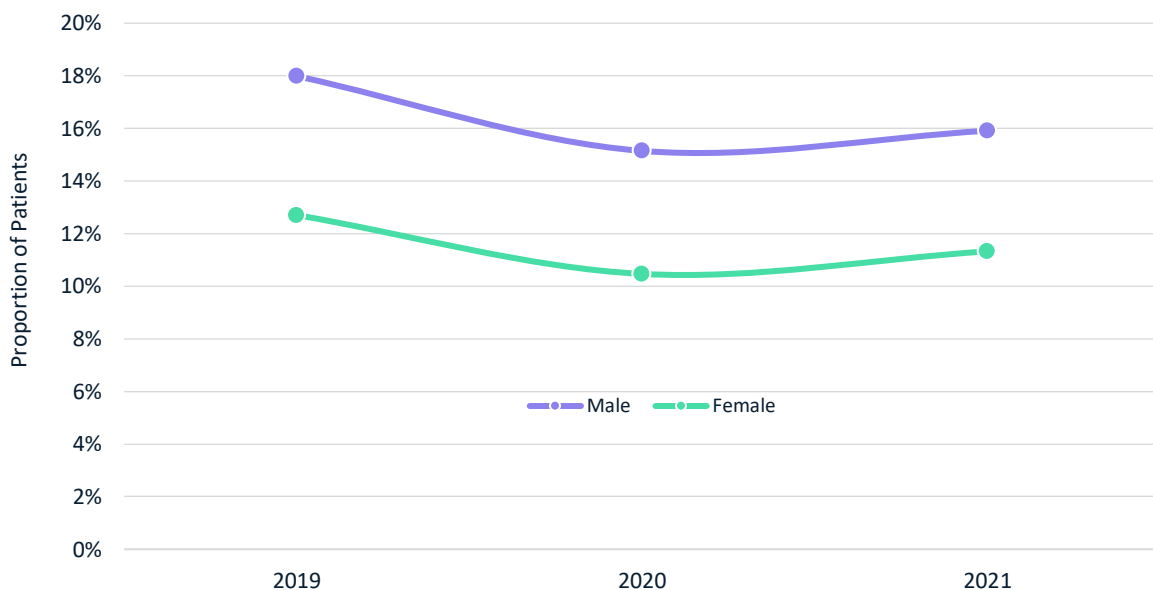
This longitudinal trend is consistent across age groups (Figure 2). However, the rate of overuse of imaging for evaluation of primary headache differs between groups; the rate of overuse increases with older age. In 2021, overuse of imaging occurred in 23% of people aged 65+ but only in 9.5% in those 18–44 years old.

**Figure 2.** Overuse of imaging for evaluation of primary headache by age group, combined data, 2019–2021.



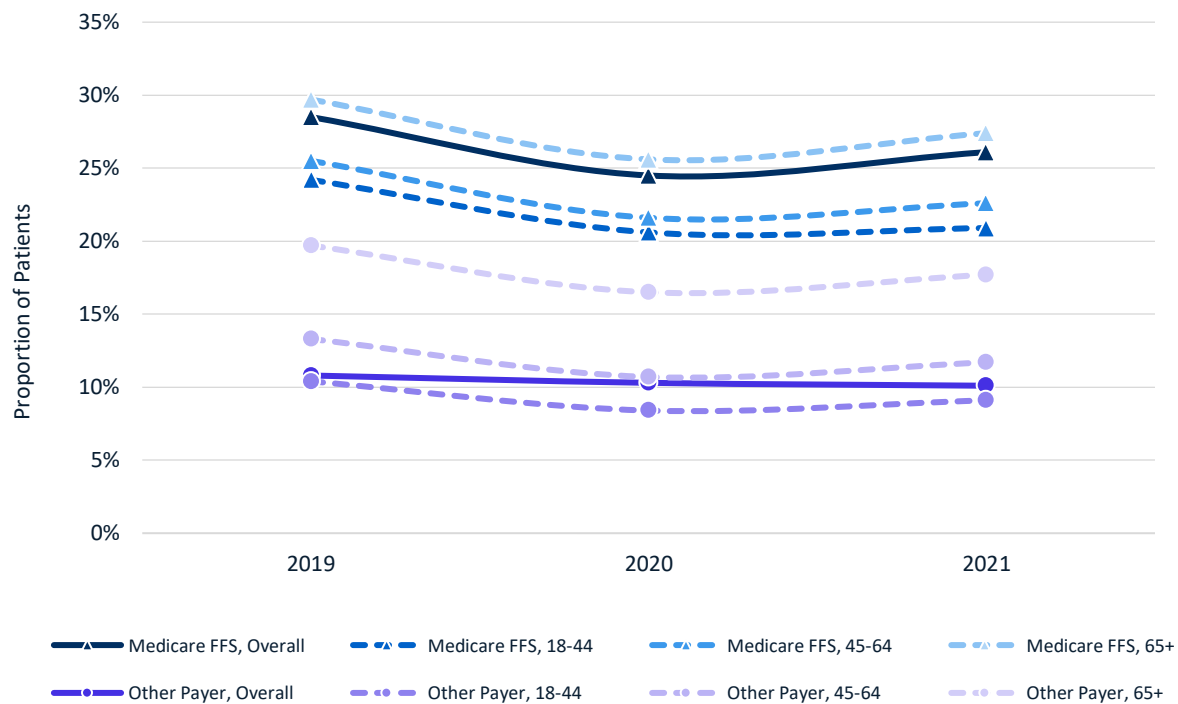
Despite a higher number of women suffering from primary headache, there is a higher rate of overuse among men, 15.9% vs 11.3% in 2021 (Figure 3).

**Figure 3.** Overuse of imaging for evaluation of primary headache by sex, combined data, 2019–2021.



In both Medicare FFS and the other payer data, the rate of overuse increases with older age. Overuse of imaging for evaluation of primary headache occurs at a higher rate in the Medicare FFS population compared to the other payers contained in the Trilliant Health all-payer claims dataset. Among patients 65 years and older, the rate of overuse was 9.7 percentage points higher (27.4% vs 17.7%) in the Medicare FFS population than in the other payer patients (i.e., Medicare Advantage).

**Figure 4.** Overuse of imaging for evaluation of primary headache, Medicare FFS vs other payer, overall and by age, 2019–2021.



## Conclusion

In this analysis, we evaluated overuse of imaging for the evaluation of primary headache for 2019, 2020, and 2021. It is important to study low-value care to reduce the use of unnecessary tests and treatment, reduce costs and improve patient safety by reducing exposure to unnecessary side effects and possible incidental findings. Using the combined data, overall rates for overuse fluctuated between 12.7–14.0% across the three-year period, with more overuse in older patients and a slightly higher male-to-female ratio. Overuse was also more common among Medicare FFS beneficiaries as compared to their non-FFS counterparts. It is unclear if overuse of imaging for evaluation of primary headache will continue to decrease or if it might “rebound” in future years. This highlights the need for continuous measurement and analysis to detect and/or monitor improvement over time and by provider.

## References

Schwartz AL, Landon BE, Elshaug AG, et al. Measuring low-value care in Medicare. *JAMA Intern Med.* 2014.

Graf WD, Kayyali HR, Alexander JJ, et al. Neuroimaging-use Trends in Nonacute Pediatric Headache Before and After Clinical Practice Parameters. *Pediatrics.* 2008.

Ganguli I, Morden NE, Yang CWW, et al. Low-value Care at the Actionable Level of Individual Health Systems. *JAMA Intern Med.* 2021.