

How Well Do the HEDIS Asthma Inclusion Criteria Identify Persistent Asthma?

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Objectives: (1) To determine if the Health Plan Employer Data and Information Set (HEDIS) asthma inclusion criteria consistently identify persistent asthma on a year-to-year basis and (2) to explore whether variation in the number of years of qualification is associated with medication and resource utilization outcomes.

Study Design: Retrospective observational study.

Methods: We identified 132 414 patients in a large healthcare program who were included in 1 or more HEDIS persistent asthma cohorts between 1999 and 2002 and who had continuous insurance and pharmacy benefit coverage for the entire 4-year observation period. Medication, emergency department, and hospital use in 2002 was identified using electronic claims and pharmacy information.

Results: Overall, 47.9% of the patients were identified as having persistent asthma in only 1 of 4 years, 40.8% had at least 2 consecutive years, and 28.2% had at least 3 consecutive years. In bivariate and multivariate analyses, more consecutive years of HEDIS persistent asthma qualification significantly increased the likelihood of frequent short-acting β -agonist use, inhaled anti-inflammatory corticosteroid use, at least 1 emergency department visit, and at least 1 hospitalization. The strongest relationship was for 3 or more consecutive years of HEDIS qualification.

Conclusions: A significant portion of the HEDIS persistent asthma cohort does not qualify on a year-to-year basis, suggesting that the current 1-year qualification period or the underlying administrative case definition for persistent asthma may be suboptimal. Further clinical validation studies are needed to determine the optimal criteria for a more useful HEDIS persistent asthma case definition.

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Asthma is a chronic inflammatory lung disease.¹ There is no gold standard test for the diagnosis of asthma. It is typically based on clinical symptoms and is ideally confirmed by the demonstration of reversible airway obstruction or bronchial hyperreactivity.² Clinical audits of asthma diagnoses have consistently demonstrated significant underdiagnosis and overdiagnosis.³⁻⁶ The ability of administrative data systems of most health plans to identify the diagnosis of asthma is still unknown.

The current Health Plan Employer Data and Information Set (HEDIS) measure for asthma uses administrative data collected during 1 year to identify

patients with presumed persistent asthma and evaluates controller therapy during the next year. It has been reported that this asthma case identification using administrative data in children cannot distinguish persistent asthma from transient wheezing syndromes.⁷ It is also difficult to determine asthma severity using administrative data.⁸

One of the historical limitations of administrative data from a single treatment center or healthcare network is migration of patients into and out of the healthcare plan.⁹ Kaiser Permanente Health Care Program cares for a large group of patients year after year and can provide multiyear data to evaluate asthma prevalence and persistence. Vollmer and coworkers,¹⁰ in the Kaiser Permanente Northwest Region, recently published an article on asthma prevalence using multiple clinical information systems. They found that asthma case identification based on 1 year of pharmacy data would capture only 61% of the prevalent asthma cases and that the electronic health record alone would identify only 66% of the total asthma cases.

Despite the clinical limitations of administrative data to define persistent asthma, such data are available to most health plans and are potentially useful from a quality of care perspective. Identifying poor performance on the HEDIS measure for asthma can be used to target quality improvement and outreach efforts.

Because few reliable and valid assessment tools exist to diagnose persistent asthma, further efforts are needed to improve administrative methods to define persistent asthma. A limitation of the current HEDIS asthma inclusion criteria is the inclusion of a significant portion of patients with intermittent asthma, based on a 2-year

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analysis.¹¹ As a result, it will be important to develop more robust administrative measures so that chronic treatment can be directed to those who will benefit from it and so that health plans that provide the best care are rewarded.¹²

With this background in mind, the present study has the following 2 general objectives: (1) to evaluate the occurrence of persistent asthma on a year-to-year basis as defined by the current HEDIS measure for asthma and (2) to explore whether alteration of the administrative definition of persistent asthma results in the identification of a population that uses more asthma-related healthcare, including medication use and resource utilization, which are likely markers of persistent asthma.

METHODS

Case Identification

We identified 132 414 patients with persistent asthma aged 5 to 56 years who qualified in at least 1 of 4 HEDIS persistent asthma cohorts identified from 1999 through 2002. The sample was drawn from patients receiving care from Kaiser Permanente Health Care Program, a large vertically integrated staff-model healthcare system. Computerized data from patients with persistent asthma were drawn from the following 4 geographic regions: northern California, southern California, Colorado, and the Pacific Northwest (northwest Oregon and southwest Washington).

Patients were selected based on 3 inclusion criteria. First, patients had to meet 1 or more of the following current HEDIS criteria for persistent asthma case identification during at least 1 of the years observed: (1) at least 4 asthma medication–dispensing events, (2) at least 2 asthma medication–dispensing events and 4 asthma-related outpatient visits, (3) at least 1 asthma-related hospitalization, or (4) at least 1 asthma-related emergency department (ED) visit. Second, patients were required to maintain continuous insurance and pharmacy benefit coverage during the entire study period (January 1, 1999, through December 31, 2002). Third, patients had to stay within the HEDIS-eligible age range of 5 to 56 years for the entire duration of the study. If patients aged out during the 4-year observation period, they were excluded from the study population.

Primary Independent Variable of the Number of Years of HEDIS Qualification

The number of years of HEDIS qualification was the primary independent variable. This variable was categorized into the following 6 mutually exclusive groups: 1

year only, 2 nonconsecutive years, 2 consecutive years, 3 nonconsecutive years, 3 consecutive years, and 4 consecutive years.

Outcome Measures of Medication Use and Resource Utilization

Medication and resource utilization data were evaluated during 2002. Data on the use of weighted canister equivalents of inhaled anti-inflammatory corticosteroids and short-acting β -agonists were collected from electronic pharmacy databases. The calculation of weighted canister equivalents was based on drug potency and doses per canister (available from the author). Resource utilization included 1 or more asthma-related ED visits and hospitalizations during 2002. Both measures were collected from electronic databases.

Statistical Analysis

All analyses were conducted using the Statistical Package for the Social Sciences (SPSS version 11.1; SPSS Inc, Chicago, Ill). Descriptive statistics were calculated overall and stratified by pediatric and adult populations for demographic variables, number of years of HEDIS qualification, medication use, and resource utilization. We then examined the method of entry into the HEDIS persistent asthma cohort by the number of years of HEDIS qualification. Next, we examined the bivariate association of consecutive years of HEDIS qualification with medication and resource utilization, using the χ^2 test. Finally, logistic regression models were constructed to examine the independent association of the number of consecutive years of HEDIS qualification with medication and resource utilization, adjusting for age, sex, and geographic region.

RESULTS

A total of 216 025 patients had membership in at least 1 HEDIS persistent asthma cohort between 1999 and 2002. Of those, 146 531 (67.8%) maintained continuous insurance and pharmacy benefit coverage for the entire 4-year observation period (data not shown). There were 132 414 patients (90.4%) with continuous insurance and pharmacy benefit coverage who remained within the HEDIS-eligible age range for the entire observation period. The total health plan population within the age cutoffs with continuous insurance and pharmacy benefit coverage was 2 224 804 patients. The HEDIS-defined patients with persistent asthma thus accounted for 6.0% of the health plan population.

Overall, the study population included slightly more females (55.0%), with less female representation in the

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Table 1. Demographic and Enrollment Characteristics for the Pediatric and Adult Study Populations*

Characteristic	Overall (n = 132 414)	Pediatric (n = 45 215)	Adult (n = 81 536)	Both (n = 5663) [†]
Sex				
Male	59 641 (45.0)	27 123 (60.0)	29 540 (36.2)	2978 (52.6)
Female	72 773 (55.0)	18 092 (40.0)	51 996 (63.8)	2685 (47.4)
Years of HEDIS qualification				
1	63 461 (47.9)	23 129 (51.2)	37 309 (45.8)	3023 (53.4)
2 Nonconsecutive	8751 (6.6)	3621 (8.0)	4770 (5.9)	360 (6.4)
2 Consecutive	16 696 (12.6)	6083 (13.5)	9888 (12.1)	725 (12.8)
3 Nonconsecutive	6181 (4.7)	2316 (5.1)	3646 (4.5)	219 (3.9)
3 Consecutive	12 311 (9.3)	3852 (8.5)	7908 (9.7)	551 (9.7)
4 Consecutive	25 014 (18.9)	6214 (13.7)	18 015 (22.1)	785 (13.9)

*Data are given as number (percentage).

[†]Includes patients who started in the pediatric cohort but aged into the adult cohort during the 4-year observation period.

pediatric population and greater female representation in the adult population (Table 1). About half of the study population qualified during only 1 of the 4 years observed, slightly more for the pediatric population and slightly less for the adult population. Overall, 40.8% had at least 2 consecutive years of HEDIS qualification, and 28.2% qualified during 3 or more consecutive years. A higher proportion of adults maintained 2 or more years of HEDIS qualification compared with children.

Within the pediatric population, most patients entered the HEDIS persistent asthma cohort each year through medication use alone (range, 71.3%-79.9%) or through medication use in combination with 1 or more of the other entry criteria (range, 91.9%-94.3%). A slightly higher proportion of the adult population qualified through medication use alone (range, 78.7%-85.5%), while a similar proportion qualified by medication use in combination with other entry criteria (range, 93.9%-96.6%).

The number of consecutive years of HEDIS qualification was strongly associated with medication use in bivariate analysis (Table 2) and in multivariate analysis (Table 3) for the pediatric and adult populations. In both populations, those with 2 or more consecutive years of HEDIS qualification were more likely to use 1 or more canister equivalents of inhaled anti-inflammatory corticosteroids and to overuse short-acting β -agonists (≥ 14 canister equivalents). As might be expected, in the multivariate comparison, those with 4 consecutive years of HEDIS qualification were the most likely to use inhaled anti-inflammatory corticosteroids and to overuse short-acting β -agonists, with those with only 1 year of HEDIS qualification as the referent group (Table 3).

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The number of years of HEDIS qualification was significantly associated with resource utilization, although this association was not as strong as that found for medication use (Tables 2 and 3). For the pediatric and adult populations, those with 3 or more consecutive years of HEDIS qualification were significantly more likely to have asthma-related ED visits and hospitalizations compared with those with 1 year of HEDIS qualification (Table 3). Utilization of asthma-related ED visits and hospitalizations did not differ for those with 2 consecutive years of qualification compared with those with only 1 year of qualification.

DISCUSSION

This study found that the current 1-year HEDIS qualification period does not consistently capture the persistent asthma cohort on a year-to-year basis. About half of children and adults qualified for the persistent asthma cohort for only 1 of the 4 years observed. However, our results suggest that the manner in which patients entered the HEDIS persistent asthma cohort does not vary over time, with most children and adults entering through the use of asthma medications.

Our findings suggest that at least 2 consecutive years of HEDIS qualification comprise a better qualification period to identify persistent asthma. For the pediatric

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and adult populations, patients with 2 or more consecutive years of HEDIS qualification were significantly more likely to use any inhaled anti-inflammatory corticosteroids and to overuse short-acting β -agonists, which are likely markers of persistent asthma. The overall relationship with the number of years of HEDIS qualification and the occurrence of adverse events was consistent with medication use, but the critical point was 3 or more consecutive years of qualification, rather than 2 consecutive years. In addition, the multivariate results suggest that medication use is a more sensitive indicator to detect differences in the number of consecutive years of HEDIS qualification compared with asthma-related ED visits or hospitalizations.

These findings have implications for the manner in which the quality of asthma care is measured in the United States. Results indicate that a change from a 1-

year qualification period in the HEDIS measure for asthma to a 2-year qualification period may be warranted. Such a change would likely reduce the number of false-positive results in the current HEDIS denominator, which in turn would affect performance on the HEDIS numerator. With a more accurate denominator that reflects true persistent asthma, it is likely that the rate of long-term controller use will increase and that there will be less variation in the HEDIS measure for asthma overall. The change to a 2-year qualification

Table 2. Bivariate Analysis of the Association of the Number of Years of HEDIS Qualification With Medication and Resource Utilization*

Years of HEDIS Qualification	Frequent Short-acting β -Agonist Use	Any Inhaled Anti-inflammatory Corticosteroid Use	≥ 1 Emergency Department Visits	≥ 1 Hospitalizations
Aged 5 to 17 y				
1 year	1.6	21.6	3.6	0.4
2 Consecutive years	9.3	49.8	3.6	0.5
3 Consecutive years	25.5	71.7	4.5	1.0
4 Consecutive years	48.4	86.8	8.3	1.7
Aged 18 to 56 y				
1 year	1.9	24.0	3.7	0.4
2 Consecutive years	13.7	57.9	3.6	0.4
3 Consecutive years	34.4	72.2	4.6	1.0
4 Consecutive years	54.1	83.7	5.9	1.3

*Data are given as percentages. $P < .001$ for all comparisons.

Table 3. Multivariate Analysis of the Association of the Number of Consecutive Years of HEDIS Qualification With Medication and Resource Utilization*

Consecutive Years of HEDIS Qualification	Frequent Short-acting β -Agonist Use	Any Inhaled Anti-inflammatory Corticosteroid Use	≥ 1 Emergency Department Visits	≥ 1 Hospitalizations
Ages 5 to 17 y				
1 year	1.00	1.00	1.00	1.00
2 years	6.25 (5.46-7.15)	3.84 (3.61-4.09)	0.99 (0.84-1.15)	1.27 (0.84-1.92)
3 years	21.37 (18.83-24.26)	10.53 (9.72-11.41)	1.26 (1.07-1.49)	2.41 (1.64-3.54)
4 years	60.15 (53.60-67.51)	29.65 (26.27-32.23)	2.35 (2.09-2.63)	4.64 (3.49-6.17)
Ages 18 to 56 y				
1 year	1.00	1.00	1.00	1.00
2 years	8.07 (7.35-8.86)	4.58 (4.36-4.80)	1.05 (0.93-1.18)	1.03 (0.72-1.48)
3 years	26.15 (23.95-28.56)	9.29 (8.78-9.83)	1.32 (1.17-1.49)	2.46 (1.85-3.26)
4 years	66.19 (61.07-71.73)	18.40 (17.54-19.31)	1.74 (1.60-1.89)	3.51 (2.84-4.33)

*Data are given as odds ratio (95% confidence interval). Models adjusted for age, sex, and geographic region.

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period would not require additional resources from a health plan perspective, because the current window examines medication and resource utilization during a 2-year period. Further analysis (data not shown) found that the HEDIS persistent asthma cohort would be reduced by about 30% when changing from the 1-year qualification period to a 2-year qualification period. Therefore, it is likely that most health plans would be able to continue participating in the HEDIS measure for asthma and would not be affected by the reduction in the persistent asthma cohort size.

Furthermore, if healthcare programs are encouraged to provide inhaled anti-inflammatory corticosteroids to patients with chronic asthma symptoms, there needs to be a corresponding effort to ensure that these patients actually have a condition that would be helped by regular use of this therapy. Further random audits of actual lung function and bronchial hyperreactivity of patients selected by the various current and future proposed administrative measures for asthma are essential.⁶

This study had several limitations. First, the quality and reliability of administrative pharmacy and resource utilization data can vary across geographic regions and facilities. Furthermore, the use of asthma qualification medications may also vary widely, affecting selection of asthma patients in the HEDIS persistent asthma cohort. However, adjusting for geographic region in the multivariate analysis in this study did not alter the results (Table 3). Second, no clinical assessments of asthma were measured (eg, symptoms and forced expiratory volume in 1 second). Therefore, it is not entirely clear whether the number of years of HEDIS qualification is associated with clinically defined persistent asthma. Third, results can only be definitely applied to insured populations receiving care in a large staff-model health-care program, rather than to other delivery systems.

Future research is needed to validate the findings of this study. Specifically, further studies are needed to

examine the association of the number of years of HEDIS qualification with clinical assessments of persistent asthma. Such work will further clarify the appropriate number of years of the qualification period that assesses persistent asthma. Finally, further work is needed to examine the effect of modifications to the duration of the HEDIS qualification period on overall performance on the HEDIS measure for asthma and whether findings are consistent across delivery systems.

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