BRIEF REPORTS

Physicians' Perceptions About Managed Care Restrictions on Antibiotic Prescribing

Michael Hasty, Jason Schrager, Keith Wrenn, MD

The purpose of this study was to compare physicians' perceptions about managed care restrictions on drug prescribing with objective measures of the restrictions' effects. When asked a general question, 17 emergency medicine physicians in one urban, university hospital answered that they had to prescribe an antibiotic that was not their first choice because of managed care restrictions 32% of the time. The actual frequency of prescribing other than first-choice antibiotics, which was determined by asking the same physicians about the prescription of specific antibiotics for specific patients seen recently in the emergency department, was 6% ($p < .0001$). We conclude that emergency medicine physicians treating patients in one managed care system significantly overestimated the restrictions imposed by managed care formularies on their antibiotic prescribing practices. Additional studies are warranted to measure the extent of this bias.

KEY WORDS: antibiotics; managed care; prescription.
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In January 1994, Tennessee implemented a managed care system to provide health care to its Medicaid-eligible population and previously uninsured individuals. TennCare presently covers 1.2 million Tennessee residents.^{1,2}

Managed care systems have not been favorably received by many physicians. For example, a recent survey found that 85% of Tennessee physicians felt that TennCare's overall effect on quality of care was either poor or fair.³ Also, 97% of the respondents felt that access to needed medications was a problem.⁴ The goal of this study was to compare physicians' perceptions about TennCare's restrictions on drug prescribing with objective measures of the restrictions' effects. Antibiotic prescribing was chosen for this study because antibiotics are among the most commonly prescribed drugs, and there is large variability in cost and practice.⁵

METHODS

This study involved all faculty physicians and their patients in the emergency department (ED) of an urban university hospital with an annual volume of 50,000 visits. The Committee for the Protection of Human Subjects approved this study. Faculty physicians completed a survey gauging their opinion about the effect of TennCare and managed care in general on the quality of patient care. A 100-mm visual analog scale was used, with 100 mm representing "markedly improves quality of care" and 0 mm representing "markedly decreases quality of care." Physicians were also asked to estimate how often they had to change antibiotic prescriptions because of insurance status. Because these physicians knew which antibiotics TennCare would pay for, the decisions about prescription changes were made prior to the patient leaving the ED. Obtaining an override for a nonformulary drug required a call between 9:00 AM and 5:00 PM and a discussion of the reason for the nonformulary prescription.

Between January and May of 1999, cases were selected randomly from ED records by pulling charts of patients with a discharge diagnosis from the preceding day of an infection. Cases were included when the patient was insured through TennCare, received a prescription for an antibiotic, and was not admitted to the hospital. TennCare has a "closed" formulary, and there is no co-payment for formulary drugs for the vast majority of TennCare patients.

Demographic and medical data were collected from the ED chart. The attending physician for each case was consulted as soon as possible, always within 1 week from the time of visit. Physicians were asked whether the antibiotic prescribed was their first choice; if not, which choice it was; and the reason for substitution. None of this information was in any of the charts.

The difference between the physicians' stated and actual change in antibiotic prescribing was compared with logistic regression using the GENMOD procedure (SAS 6.12, SAS Institute, Cary, NC). A p -value $< .05$ was considered significant.

RESULTS

All 17 physicians responded to the survey. Fifteen were board-certified; nine in emergency medicine, two in

Received from the Department of Emergency Medicine, Vanderbilt University Medical Center, Nashville, Tenn (MH, JS, KW).

Address correspondence and reprint requests to Dr. Wrenn: 703 Oxford House, Vanderbilt University Medical Center, Nashville, TN 37232-4700.

emergency medicine and internal medicine, two in pediatrics, and two in internal medicine and pediatrics. Two physicians were board-eligible in emergency medicine. The average level of experience was 8.6 years in emergency medicine practice. The overall perception by the physicians was that TennCare decreased the quality of care (29 mm; range, 3–55 mm), and so did managed care in general (29 mm; range 1–69 mm). Eighty-two percent felt that TennCare had an overall negative effect on the quality of care. Physicians estimated that TennCare restrictions caused them to change their antibiotic prescriptions 32% of the time (range, 0–75%, 95% confidence interval [CI] 22%, 42%).

A total of 250 patients (40% male, 60% female, 46% pediatric, and 54% adult) were selected for chart review, and 25 prescriptions were for other than first-choice antibiotics. In 19 (7.6%) of the 250 cases, antibiotics were changed because of TennCare restrictions, and the mean percentage change per physician was 6% (range, 0–18%, 95% CI 2%, 10%). The difference between the physicians' stated and actual rates of changing prescriptions because of TennCare restrictions was large (26%) and statistically

significant ($p < .0001$). The difference between individual stated changes and actual changes in prescriptions is shown in Figure 1. Twelve physicians overstated, two understated, and one accurately stated TennCare's effect on their antibiotic choices. Drug allergies caused six prescription changes, and pregnancy caused two prescription changes. In two cases, allergy was the cause for not using the first-choice antibiotic, and TennCare restrictions caused the physician not to use the second-choice antibiotic. The diagnosis, first-choice, and final prescribed medications for patients with changes due to TennCare restrictions are listed in Table 1.

DISCUSSION

The effect of TennCare on physicians' ability to prescribe antibiotics was surprisingly small. Over 92% of TennCare patients in this study actually received a prescription for the antibiotic that the physician felt was best. Changes due to TennCare status did, however, occur twice as often as changes due to allergy or pregnancy.

FIGURE 1. Comparison of predicted percentage change and observed percentage change of prescriptions due to TennCare for-mulary restrictions.

Table 1. Prescriptions Changed from First Choice and Reason for Change*

Pt. Age	Diagnosis	Prescribed Drug	First Choice	Reason for Change	Second Choice	Reason for Change
11 mo	Otitis media	TMP-SX	Amoxicillin, CP	TennCare restriction		
1 y	Diaper rash	Bacitracin ointment	Mupirocin	TennCare restriction		
4 y	Otitis media	Erythromycin-sulfisoxazole	Azithromycin	TennCare restriction		
5 y	Impetigo	Dicloxacillin	Mupirocin	TennCare restriction		
15 y	Pneumonia	Erythromycin	Azithromycin	TennCare restriction		
16 y	Pneumonia	Erythromycin	Azithromycin	TennCare restriction		
17 y	Bronchitis	Erythromycin	Azithromycin	TennCare restriction		
23 y	URI/acute bronchitis	Erythromycin	Azithromycin	TennCare restriction		
25 y	Bronchitis	TMP-SX	Azithromycin	TennCare restriction		
25 y	Otitis externa	Cephalexin	Ciprofloxacin	TennCare restriction		
25 y	Pharyngitis/otitis media	Erythromycin	Azithromycin	TennCare restriction		
33 y	Bronchitis/chest pain/asthma	Erythromycin	Azithromycin	TennCare restriction		
37 y	Possible yeast infection	TMP-SX	Ciprofloxacin	TennCare restriction		
38 y	Asthma	Erythromycin	Azithromycin	TennCare restriction		
45 y	Diverticulitis	TMP-SX/metronidazole	Ciprofloxacin	TennCare restriction		
27 y	URI	Cephalexin	TMP-SX	Allergy	Azithromycin	TennCare restriction
31 y	UTI (diabetic)	Nitrofurantoin	TMP-SX	Allergy	Ciprofloxacin	TennCare restriction

*TMP indicates trimethoprim; SX, sulfamethoxazole; CP, clavulanate potassium; UTI, urinary tract infection; URI, upper respiratory infection.

In addition, when changes occurred because of TennCare, one can argue that the antibiotic therapy ultimately prescribed either was not needed or was not below the standard of care. For the six cases of upper respiratory infection, asthma, or bronchitis, it is unclear that antibiotics are routinely indicated, and trimethoprim-sulfamethoxazole and erythromycin, the second-line agents that were given, are reasonable alternatives.^{6,7} For the three cases of otitis media, trimethoprim-sulfamethoxazole and erythromycin-sulfisoxazole, which were the second-line antibiotics given, are also adequate agents.⁷ In addition, for the one case of impetigo and the one case of diaper rash, one could argue that mupirocin is not the best choice. For uncomplicated otitis externa, it is unclear whether oral antibiotics are better than topical treatments.⁷ Conversely, for the two cases of urinary tract infections, quinolones may have become the first choice because of increasing resistance to trimethoprim-sulfamethoxazole.⁷

Because this study examined the opinion of only 17 emergency physicians at one institution, the external validity of our observations may be limited. The opinions of the doctors in this sample, however, were similar to those of doctors in statewide surveys. The retrospective accrual of cases might have introduced bias, but patients were chosen randomly and before it was known whether a change in prescribing choice had occurred. It is possible, but unlikely, that limiting the study to antibiotic prescribing

may have eliminated a large group of drugs for which changes in prescribing were more likely to occur.

Despite these limitations, we believe that the emergency medicine physicians at our hospital significantly overestimated the restrictions imposed by the TennCare formulary on their antibiotic-prescribing practices. Because of these results, we think that further studies are warranted to measure the extent of bias.

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