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A Large State Medicaid Outpatient Advanced Imaging Utilization Management Program: Substantial Savings Without the Need for Denials

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Abstract

A decade of rapidly rising outpatient advanced imaging utilization ended toward the end of the past decade, with slow growth since. This has been attributed to repetitive reimbursement cuts, medical radiation exposure concerns, increasing deductibles and patient copayments, and the influence of radiology benefit management companies. State Medicaid programs have been reluctant to institute radiology benefit management preauthorization programs since the time burden for obtaining test approval could cause providers to drop out. Also, these patients may lack the knowledge to appeal denials, and medically necessary tests could be denied with adverse outcomes. Little data exist demonstrating the efficacy of such programs in decreasing utilization and cost. We report a 2-year experience with an outpatient advanced imaging prior notification program for a large state Medicaid fee-for-service population. The program did not allow any denials, but nevertheless the data reveal a large, durable decrease in advanced imaging utilization and cost.

Keywords

health insurance, Medicaid, radiology benefits manager, utilization, MRI, CT

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Introduction

Between 2000 and 2007, increasing advanced imaging utilization resulted in its being the most rapidly rising expense for all physician services for Medicare (Duszak & Berlin, 2012; Iglehart, 2009) as well as causing a marked increase in the medical radiation exposure to patients, primarily from computed tomography (Brenner & Hall, 2007). There is widespread acceptance in the medical community of the importance of advanced imaging in patient diagnosis and treatment, but there is also general acknowledgement that medically inappropriate and unnecessary exams are ordered for various reasons. These include fear of malpractice litigation, patient request, self-referral financial motives, and the inability of providers to remain current with the latest literature. This led to advent of radiology benefit management (RBM) companies.

RBMs control imaging utilization by implementing prior authorization programs which serve as a barrier for an ordering provider to obtain a test for their patient, and many RBMs deny exams judged to be unneeded or inappropriate. Both factors make them unpopular with physicians.

Although RBMs are widely used by commercial insurers, state and federal governments have been reluctant to institute RBM preauthorization programs for five reasons. First, obtaining approval for an advanced imaging test is a burdensome time commitment for the ordering physician's office, and there is concern that the time burden for obtaining test approval could cause providers to drop out. Second, it is viewed as an intrusion into the physician–patient relationship, since the physician needs to obtain approval from a third party for a test he feels is medically indicated based on his patient evaluation. Third, there are not significant cost savings to medicine as a whole. Instead, cost shifting is occurring, with added costs to the ordering provider to obtain approval and to the payor for retaining the services of the RBM (Lee, Rawson, & Wade, 2011). Fourth, the approval criteria employed by RBMs are variable, may not be transparent or reproducible, and may not be based on the latest peer-reviewed literature (Kyes, 2010). Finally, with denial programs, medically necessary tests could be denied for various reasons, including incorrect approval criteria as well as financial incentives to the RBM to decrease costs. These patients may lack the knowledge and means to appeal denials, and medically necessary tests could be denied with adverse outcomes. This final reason was an important concern to officials in our state.

Herein we report a 2-year experience with an outpatient advanced imaging utilization management program for a large state Medicaid fee-for-service (FFS) population. The RBM program was unique in not using denial of care. Instead, it used prior notification and educational efforts only. Our purpose was to determine if this nondenial program was effective in decreasing utilization.

New Contribution

Denial of care is a major objection to preauthorization for diagnostic imaging, with the potential to deny medically necessary tests particularly among the vulnerable such as

Medicaid patients. This study is a retrospective analysis to determine the effectiveness of an RBM program that did not use denial of care to decrease utilization and cost in a large state FFS Medicaid population. It is the first such study of which we are aware that explicitly focuses on state Medicaid patients.

Method

Data and Setting

HealthHelp (the company), one of the five major national RBMs, began a utilization management program in April 2011 for a large state Medicaid FFS plan for advanced imaging, including computerized tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), and cardiac nuclear medicine (CNM). Previously, no utilization management program was in effect. The program was mandatory for all providers; however, it was a notification-only program for which there were no denials. Our study is a retrospective analysis of the first 2 years of the program, from April 2011 through March 2013, with a 1-year baseline (preimplementation) prior to the RBM program, from April 2010 to March 2011.

The Medicaid FFS beneficiary count was 1,013,269 in April 2011, declining to 714,402 in March 2013, an average of 900,169 lives per month. These individuals were dispersed across the state with a large portion of members located in densely populated urban areas. Unfortunately, no further description of the reasons for inclusion in a FFS program rather than health maintenance organization, nor the demographics of the population, are available.

In advance of the start of the program, providers were notified via letters, newsletters, and webinars and were provided with books which contained the company's evidence-based appropriateness criteria. The specific details of the company's program have been previously described (Levin, Bree, Rao, & Johnson, 2010). In requesting one of the aforementioned imaging tests through the company's program, ordering clinicians could either fax in the patient information or call a contact center. Web access was not available per request of the state. The requests went through three tiers. At Tier I, requests were reviewed by a customer service representative (CSR), an employee at the call center with at least a high school diploma and 6 weeks of training. The CSRs used computerized clinical rules to determine if the request met appropriateness criteria. If criteria were met, an approval number was issued. If not, and the study was still desired, the request advanced to Tier II, at which the clinical information was reviewed by phone with a nurse. If the nurse determined that the criteria were met, an approval number was issued. If not, and the test was still desired, the request went to Tier III, at which the request was reviewed by an appropriate subspecialty radiologist. For example, a request for an MRI of the brain would be reviewed by a fellowship-trained neuroradiologist. Generally this involved a "peer-to-peer" phone discussion between the neuroradiologist and the ordering provider. If criteria were met, in the opinion of the radiologist, an approval number was issued. If not, the provider had the option to withdraw the request or order a different, more appropriate

study recommended by the radiologist. But if the original test was still wanted, the radiologist and ordering clinician "agreed to disagree," and an approval number was issued. This was considered an educational process and there were never any denials. Additionally, at each level, if the company representative suggested a more appropriate test based on its appropriateness criteria, the provider had the opportunity to switch to the recommended test.

Analysis

The company (HealthHelp) reported the volume of high-technology imaging procedures each month, broken down into CT, MRI, PET, and CNM categories. The state Medicaid agency reported the FFS beneficiary count for each month. The procedure count was divided by the beneficiary count for each month multiplied by 1,000 to present rates per 1,000, and then each 3 months were averaged to produce quarterly utilization rates. For the baseline preimplementation year, the state agency did the rate calculation and supplied only the rates, not the denominator or volume. Any decline in utilization could be the result of either decreased ordering or withdrawn requests.

Differences between quarters were tested using two proportion *z* tests. We were most interested, of course, in the difference between first- and last-quarters preimplementation, last-quarter preimplementation versus first-quarter postimplementation, and first-quarter postimplementation versus fourth- and eighth-quarter postimplementations. Because of the multiple comparisons, we chose a conservative p value $< .0001$, for significance. Because the samples were so large, approximately 900,000 per month, any pair of utilization proportions that differed by more than .002 were significant at this level, two-tailed. We utilized the *z*-test calculator at http://epitools.ausvet.com.au/content.php?page=z-test-2. Because the cost-savings analysis is simply a different weighting of the same underlying numbers, we did not compute *z* tests for these values.

Because bundling of the codes for CT of the abdomen and CT of the pelvis occurred on January 1, 2011, and led to a 20% decline in the overall utilization of CT that year, compared with 2010 (Levin, Rao, & Parker, 2014; unpublished Medicare data), any decline for CT must be interpreted in light of this change in coding and counting.

Quarterly cost savings across all modalities were calculated based on aggregate charges actually paid compared with expected aggregate payments based on preimplementation utilization rates. Utilization-based savings were calculated using the average cost of the procedure multiplied by the number of units reduced.

Combined cost savings were calculated in aggregate across all modalities, using the same quarter in the previous year as the baseline. This method for calculating savings is the industry standard. For the first year of the program, the baseline was preimplementation. For the program's second year, the first year of the program served as the baseline. Cost savings were calculated each quarter by the decreased utilization rate, multiplied by the number of members, and then multiplied by the global Medicaid payment per procedure.

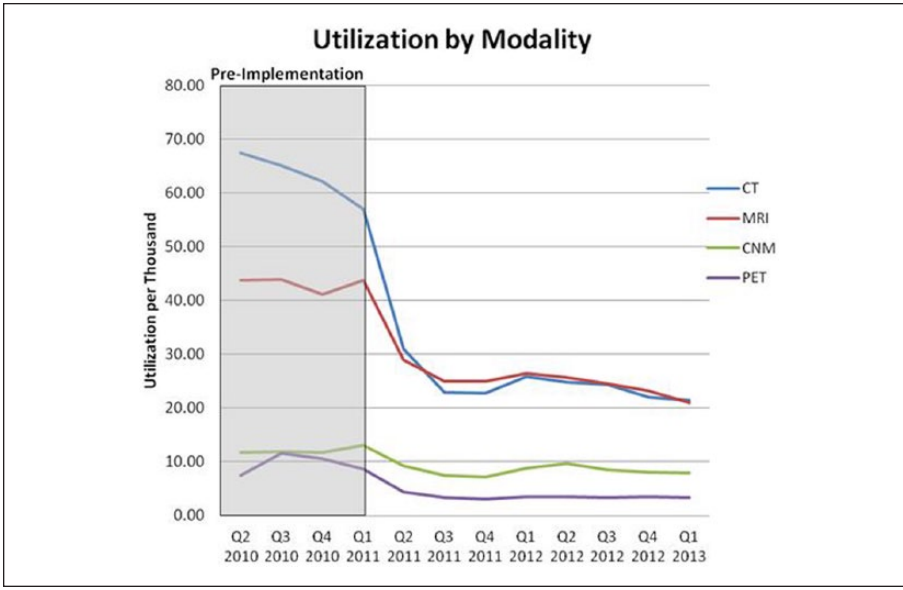

Figure 1. Utilization by modality, in units per 1,000 members based on membership information provided to the company.
Note: Bundling of codes for CT of the abdomen and CT of the pelvis, as described in Analysis and Results sections, occurred January 1, 2011 and accounts for one third of the decline in CT utilization after 2010.

We also collected data on the following: average time to answer calls, average length of calls, which tier of the program led to resolution of calls, the number of participating providers, the number of complaints from providers, and the number of providers who dropped out of the program because of concerns about it.

Results

We identified a progressive, sustained decrease in utilization across all modalities (Figures 1 and Table 1), with a similar trend for each. After implementation, utilization declined substantially in the first quarter followed by a smaller drop in the second quarter. During the following six quarters, overall utilization continued to decline at a slower rate.

Annualized MR utilization in the quarter prior to implementation was 43.8 units per 1,000 members. After 2 years, it declined to 21.0 per 1,000, a decrease of 52% ($p < .0001$). For CT, utilization declined from 57 to 21.5 per 1,000, 2 years later, a decrease of 62% ($p < .0001$). Accounting for the code bundling described in the Analysis section, about one third of the 62% decrease in CT utilization after 2010 is attributable to bundling of those two codes, with the remaining two thirds attributable to the program described herein. For CNM, utilization declined from 13.0 to 8.0 per

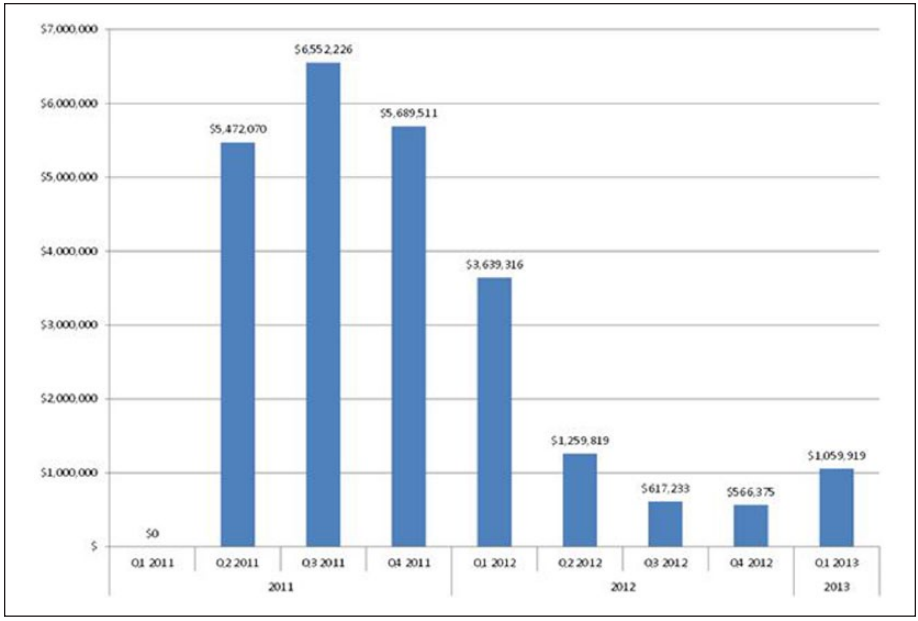

Figure 2. Combined quarterly cost savings for all advanced imaging modalities.
Note: Quarterly cost savings in Year 1 are obtained by comparing each quarter with the comparable quarter in the year before implementation. Year 2 quarterly cost savings are significantly lower because they represent only the additional savings realized over and above those in Year 1.

Table 1. Utilization by Modality, in Units per 1,000 Members Based on Membership Information Provided to the Company.

	Q2 2010	Q3 2010	Q4 2010	Q1 2011	Q2 2011	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012	Q1 2013
CT	67.4	65.1	62.1	57.0*	31.0*	22.9	22.8	25.9*	24.8	24.5	22.0	21.5*
MRI	43.8	43.9	41.1	43.8	28.9*	25.0	25.0	26.5*	25.7	24.5	23.2	21.0*
CNM	11.8	12.0	11.8	13.0*	9.3*	7.5	7.2	8.9	9.7	8.5	8.1	8.0*
PET	7.5	11.6	10.6	8.6*	4.4*	3.4	3.2	3.6*	3.6	3.4	3.5	3.4

Note: Q = quarterly; CT = computerized tomography; MRI = magnetic resonance imaging; CNM = cardiac nuclear medicine; PET = positron emission tomography. Q2 2010 through Q1 2011 (preimplementation) and Q2 2011 through Q1 2013 (postimplementation) data reflect utilization per 1,000 by modality. The asterisks indicate a two-tailed *z* test, $p < .0001$ for the comparisons, Q2 2010 vs. Q1 2011, Q1 2011 vs. Q2 2011, Q2 2011 vs. Q1 2012, and Q1 2012 vs. Q1 2013. Bundling of codes for CT of the abdomen and CT of the pelvis, as described in Analysis and Results sections, occurred January 1, 2011 and accounts for one third of the decline in CT utilization after 2010.

1,000, a decrease of 38% ($p < .0001$). For PET, utilization declined from 8.6 to 3.4 per 1,000, a decrease of 60% ($p < .0001$). Overall, utilization of advanced imaging declined from 122.4 to 53.9 per 1,000, a decrease of 56% ($p < .0001$). After accounting for CT

bundling described above, an overall decrease of 46.3% ($p < .0001$) in advanced imaging occurred during the 2-year time period analyzed.

The total savings to the state over the 2-year period was $24,856,469 (Figure 2). The total cost to the State Medicaid Agency for the company's services was $2,472,994. Regarding the cost to the providers, if we estimate the time it takes for offices to obtain authorization based on the number of calls and average time (199,991 assessments performed multiplied by 6 minutes = 11,999 hours), and then multiply it by estimated salaries ($40/hour), that amounts to $479,964 dollars. Thus, the combined cost of the RBM program to the Medicaid program and to providers was 11.9% of the savings to health care as a whole.

After implementation, the contact center answered calls in under 10 seconds on average and completed conversations in under 6 minutes on average. Ninety-six percent of all requests were resolved in Tiers I and II. The number of participating providers generally remained stable with a range of 5,250 to 6,416 distinct providers requesting authorizations each quarter. There was a slight downward trend of distinct providers over the 2 years of the study, which could be related to the number of physicians accepting Medicaid in the state. The company received very few complaints from providers, and is not aware of any providers who dropped out of the state Medicaid program due to concerns about the prenotification imaging program.

Discussion

At the outset, there were three major concerns regarding the institution of a mandatory utilization management program. First was the time burden placed on the ordering provider. The company minimized this by providing instruction and education about the program during the preimplementation phase. Postimplementation call center metrics were monitored to ensure efficiency and customer ordering provider satisfaction. Second, there was concern that any utilization management program, particularly a denial program, could result in medically necessary tests not being performed. The company is not aware of any case in which this may have occurred, because in its program, the final decision about whether to perform the test rested with the referring clinician. Third, there was concern that there would be minimal true savings because of the cost of the company's services and cost shifting related to the providers' cost to obtain prenotification. But as we have shown, the cost savings were considerable.

We believe there are four major categories of reasons for the success of the described utilization management program at decreasing outpatient advanced imaging utilization and cost in this large state Medicaid program. The first two apply generally to RBMs, while the second two are more applicable to this particular program.

First is the well-described sentinel effect (Friedman, Smith, Bree, & Rao, 2009; Koike, Klap, & Unutzer, 2000; Otero, Ondategui-Parra, Nathanson, Erturk, & Ross, 2006). When a provider's ordering patterns are monitored, they are less likely to order studies of questionable clinical benefit. In this program, providers are tracked by the number of instances when the final decision at Tier III is "agree to disagree."

Nonetheless, in such instances, the provider is still permitted to obtain the test despite not having supplied an appropriate indication to the reviewers at each of the three tiers of review.

Second is the barrier effect (Hillman, 2013). When a provider need not invest any effort to obtain a test, there is no downside to ordering it, and he may order it even when there is minimal or no patient benefit. This may occur with the practice of defensive medicine when a perceived risk of litigation exists, or as a result of patient expectation (Bernardy et al., 2009). Any type of prior approval program is a barrier since time is required from the provider or his or her office staff to obtain approval. Once a modest barrier exists, some tests, presumably those with the lowest yield, will not be ordered.

There has not been a large published experience on the effect of RBMs on advanced imaging utilization in managed commercial products. However, at a time when RBMs have been growing, Medicare data indicate a profound flattening in advanced imaging utilization growth (Levin, Rao, & Parker, 2010, 2012; Levin, Rao, Parker, Frangos, & Sunshine, 2011). This suggests that the RBMs have curtailed utilization by influencing the thinking and ordering patterns of physicians. The FFS sector, including Medicaid FFS which composes 25% of Medicaid nationwide, will transition into managed accountable care organization products in the near future. Therefore, we believe that RBMs will be an important component in controlling advanced imaging utilization in managed products.

Third, the program had an important educational component. Over several months prior to the program's start, letters were mailed to providers explaining the program, and a webinar was available to all providers. All offices were provided with a book transparently detailing the evidence-based appropriateness criteria used by the company. Ordering providers had these criteria reinforced by feedback from CSRs, nurses, and physicians during Tiers I, II, and III interactions, respectively.

Fourth, we believe that the company's representatives' recommendations during interactions at all three tiers were more accepted by ordering providers because the program did not issue denials. The ordering providers knew that ultimately if they wanted to obtain a study at the Tier III interaction, they would be able to do so, so they were more receptive to the radiologists' professional advice. This could be consensus, the withdrawal of a study, or a change to a more appropriate study.

Decreased utilization resulted in significant savings to the Medicaid program. Using the standard industry methodology described in Results, the summed quarterly savings amounts to $24,856,469 (Figure 2). During the same time interval, the total administrative fees paid to the company by the state Medicaid program were $2,472,994. Thus, the net savings to the Medicaid program was $22,383,475, and the cost of the program was 9.9% of the savings achieved. If the savings to the program were calculated by comparing both years to preimplementation, however, the savings would be $46,209,592, the administrative fees would be unchanged, and the cost of the utilization management program would be 5.4% of the savings achieved.

As the Affordable Care Act is progressively implemented, the number of people with new health care insurance will rise. Currently, there are approximately 7.3

million new enrollees (Condon, 2014). Between 2017 and 2024, the total additional insured lives is estimated to be about 25 million (Banthin & Masi, 2014). Many of these patients will be added to the Medicaid rolls, with its expanded eligibility. The annual outlay for Medicaid and Children's Health Insurance Program due to insurance coverage provisions of the Affordable Care Act has been projected to be $63 billion in 2016, rising to $106 billion in 2025, for a total cost of $846 billion over 10 years (Congressional Budget Office, 2015). In an era of state and federal budget deficits and rising medical expenditures, the savings achieved through decreasing inappropriate utilization are important.

Our study has several limitations. This is a retrospective study without a control arm, and just before the program's implementation, a nationwide slowdown in outpatient advanced imaging occurred. Lee and Levy (2012) demonstrated slowing between 2006 and 2009, with an average of 2% annual growth. Other studies revealed similar results (Levin et al., 2010; Levin et al., 2011). More recently, Levin et al. (2012) demonstrated a 3.6% drop in CT utilization in 2010 in hospital outpatient facilities and a 7.8% drop in private offices, while Sharpe, Levin, Parker, and Rao (2013) demonstrated that 2010 MR utilization decreased 3.1%. The slowing in utilization growth is attributed to RBMs, the Deficit Reduction Act of 2005 and subsequent reimbursement cuts, publicity regarding medical radiation risk, and the realignment of patient and provider financial incentives. Nationwide data from the years of our program are not yet published, but preliminary data indicate the slowdown has continued. Since the above articles have utilization declines of between 3.1% and 7.8% for advanced imaging, similar declines would reasonably be expected in the Medicaid program studied in this article. This, however, is substantially less than the 46.3% utilization decrease seen during this program.

Second, it is possible that to avoid the prenotification process, a provider could send a patient to the Emergency Department instead of ordering the test as an outpatient. In light of the efficient prenotification process and the paucity of provider complaints over 2 years, we believe that this rarely occurred.

Third, it is not clear whether the utilization reductions will persist long term. The data show a steep drop in utilization in the first quarter and a smaller drop the second quarter. During the next six quarters, there was an overall continued slow decline (Table 1). This pattern suggests that the providers are ordering exams in accordance with the appropriate criteria. However, the educational component of the program could be a double-edged sword. Ordering providers learn the appropriate indications for tests and hence utilization declines. However, this knowledge may allow them to "tell us what we want to hear" when requesting a test. We are optimistic that this will not occur, since as a nondenial program, the study can still be performed regardless of whether the indications are judged to be appropriate.

Fourth, we did not look at clinical decision support (CDS) linked to computerized physician order entry, the newest approach to utilization management. It has been utilized mostly for inpatient and Emergency Department patients, who continue to experience imaging growth (Korley, Pham, & Kirsch, 2010; Rao, Levin, Parker, Frangos, & Sunshine, 2011), while RBM authorization programs have addressed outpatient exams.

CDS is provided at the point of care, and initial reports are promising (Blackmore, Mecklenburg, & Kaplan, 2011; Bowen, Johnson, Reed, Zhang, & Curry, 2011; Lehnert & Bree, 2010; Sistrom et al., 2009; Vartanians, Sistrom, Weilburg, Rosenthal, & Thrall, 2010; Wiley, 2012; Zafar, Mills, Khorasani, & Langlotz, 2012). The Protecting Access to Medicare Act of 2014 includes a provision to require consultation with a computerized CDS program utilizing appropriateness criteria, starting 2017 for Medicare patients (Allen, 2014). However, commercial CDS systems do not easily interface with existing computerized physician order entry systems (Williams, Sachs, Cain, Pell, & Borgstede, 2014). CDS also removes the clinical interactions between the ordering provider and the radiologist (Jha, 2013), which may increase the likelihood of "gaming" the system. The personal interactions at each of the three tiers in the program described in this article may decrease that risk. Therefore, we believe that RBM programs are more appropriate for outpatients.

Conclusion

A retrospective review of the first 2 years of data from an RBM's nondenial advanced imaging utilization management program for a large state FFS Medicaid program reveals a substantial, progressive, and sustained reduction in utilization and cost of outpatient advanced imaging. The indications for and types of advanced imaging tests are the same nationwide, and there are many similarities between our state's Medicaid program and others throughout the country, such as serving similar lower economic status patients and having unmanaged radiology FFS programs. Therefore, in an era of growing Medicaid costs and expansion, state budget constraints, and concern about unnecessary medical radiation, state governments may wish to consider a similar program.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Robert Rapoport is a part-time Medical Director, David Levin is a consultant, and Mark Hiatt is formerly Chief Medical Officer for HealthHelp, Houston, TX, from which each author reports personal fees. Laurence Parker reports no conflicts.

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