

Low Back Pain and Best Practice Care

A Survey of General Practice Physicians

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Background: Acute low back pain (LBP) is primarily managed in general practice. We aimed to describe the usual care provided by general practitioners (GPs) and to compare this with recommendations of best practice in international evidence-based guidelines for the management of acute LBP.

Methods: Care provided in 3533 patient visits to GPs for a new episode of LBP was mapped to key recommendations in treatment guidelines. The proportion of patient encounters in which care arranged by a GP aligned with these key recommendations was determined for the period 2005 through 2008 and separately for the period before the release of the local guideline in 2004 (2001-2004).

Results: Although guidelines discourage the use of imaging, over one-quarter of patients were referred for

imaging. Guidelines recommend that initial care should focus on advice and simple analgesics, yet only 20.5% and 17.7% of patients received these treatments, respectively. Instead, the analgesics provided were typically non-steroidal anti-inflammatory drugs (37.4%) and opioids (19.6%). This pattern of care was the same in the periods before and after the release of the local guideline.

Conclusions: The usual care provided by GPs for LBP does not match the care endorsed in international evidence-based guidelines and may not provide the best outcomes for patients. This situation has not improved over time. The unendorsed care may contribute to the high costs of managing LBP, and some aspects of the care provided carry a higher risk of adverse effects.

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LOW BACK PAIN (LBP) continues to be a major burden for individuals and society. With a point prevalence of 25%¹ and half of those with LBP expected to seek care,² the economic burden is enormous. The direct costs of treatment in Australia are approximately A\$1 billion per annum (US \$927.7 million)³ with a further A\$8 billion spent on indirect costs. In the United States, the figure is over \$50 billion.⁴ Moreover, LBP problems are estimated to be the seventh most common reason for a general practitioner (GP) visit in Australia⁵ and the fifth most common reason in the United States.⁴

Clinical practice guidelines aim to provide the clinician with evidence-based recommendations for patient treatment. A “specific clinical enquiry” search on PubMed identifies more than 1200 published trials and systematic reviews on LBP therapy. Considering the overwhelming body of literature on the management of LBP, the use of practice guidelines provides a time-efficient way for clinicians to base their care on the best evidence. There

is proof that basing treatment on the best evidence is more cost-effective and results in better outcomes for patients with LBP.⁶

See Invited Commentary at end of article

Clinical practice guidelines for the management of LBP have been produced in many countries around the world.⁷⁻¹¹ Koes et al⁷ compared clinical guidelines published in 11 countries from 1994 to 2000 and concluded that the guidelines provided similar recommendations for assessment and management. Given the proliferation of clinical practice guidelines outlining best practice, it is timely to consider how closely usual care aligns with guideline recommendations.

Family physicians and GPs are the first port of call for the Australian population; they act as gatekeepers to the medical health care system. Payment is on a fee-for-service system, there being no patient lists or registration. There is a universal Australian government-funded medical insur-

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ance scheme (Medicare) that covers most direct costs of GP visits. In the 2005-2006 financial year, about 88% of the population visited a GP at least once¹² and the average person visited 5.5 times in the 2007-2008 financial year.¹³ General practice is therefore the ideal setting in which to examine the management of LBP in primary care.

We evaluated usual care provided by GPs for patients with acute LBP and compared how closely this aligns with the approach endorsed in clinical practice guidelines. We also investigated whether care provided to patients has become more aligned with guideline recommendations following the release of the local Australian guideline¹¹ in 2004.

METHODS

STUDY DESIGN

To evaluate usual care provided by GPs, we accessed data from the Bettering the Evaluation and Care of Health (BEACH) study.⁵ We compared these data with key messages in international guidelines. The BEACH study is a continuous national study of general practice activity in Australia that began in 1998. The methods have been described in detail elsewhere.^{5,14} In summary, each year, random samples of active GPs are drawn by the Australian government, from which approximately 1000 GPs¹⁵ are recruited to participate in the survey. Each GP completes a questionnaire about himself or herself and their practice, and records details for each of 100 consecutive GP-patient encounters on structured paper encounter forms. The GP-patient encounters in the BEACH data are representative of all GP patient encounters nationally.⁵ Data elements include the date and other details of the encounter; the patient's date of birth, sex, status to the practice (new vs seen before), indigenous status, postcode of residence; up to 3 reasons for the encounter; up to 4 problems managed, and the status of each problem to the patient (new vs old problem).

All management actions are linked directly to a problem. The recording form provides structured labeled sections linked to each problem managed for the following:

- Medications (up to 4 per problem) prescribed, advised for purchase or provided directly by the GP (with dose and regimen);
- Clinical treatments such as advice, education, and counseling (up to 2 per problem);
- Therapeutic procedures (up to 2 per problem);
- Pathology tests ordered (up to 5 per encounter), imaging, and other tests ordered (up to 3 per encounter);
- Referrals (up to 2) made to specialists and allied health professionals.

The GP completes the encounter form at the time of the encounter. All reasons for the encounter, problems managed, and treatments provided are recorded in free text. Completed forms are returned to the research team and secondarily coded and classified by a trained team of Health Information Management students. Checks of coding accuracy are made by senior staff of 1 in 10 medical records, and further accuracy checks are performed using SAS statistical software (version 9.13; SAS Inc, Cary, North Carolina).

The BEACH study has to date involved about half of all practicing GPs in the country, and the database holds records for about 1.1 million GP-patient encounters. The data are used by government, researchers, industry, and the profession of general practice to measure quality of care and changes over time in response to changes in population demographics and policy.⁵

To establish the approach endorsed in LBP guidelines, we critically appraised the European,⁸ US,⁹ United Kingdom,¹⁰ and Australian¹¹ guidelines, and a systematic review of guidelines,⁷ and extracted key messages for clinical management of acute LBP. There was a general consensus within the guidelines with 5 key messages identified:

1. Use a diagnostic triage as a basis for management decisions and perform a more extensive examination if the medical history indicates possible serious disease or nerve root compromise.
2. Do not routinely order radiological or ancillary investigations.
3. Educate the patient; provide assurance of a favorable prognosis and encouragement to remain active and avoid bed rest.
4. Regular acetaminophen (paracetamol) is the first choice of analgesics. When this provides insufficient analgesia, regular nonsteroidal anti-inflammatory drugs (NSAIDs) may be tried. (Some guidelines recommend medicines containing opioids when NSAIDs provide insufficient analgesia.)
5. Review the patient's progress.

STUDY POPULATION

We identified all patient-physician encounters for new LBP that were included in the BEACH study in an 8-year period (2001-2008). A new LBP problem is defined as the first presentation of LBP to any GP, including the first presentation of a recurrence of an old problem. Only problems with a diagnosis or coding of a health problem pertaining to nonspecific LBP were used in the analysis. We used data from the period 2005 to 2008 to determine current usual care provided to patients with new LBP. We also compared data from two 3-year periods; before the release of the National Health and Medical Research Council (NHMRC) guidelines for acute musculoskeletal pain¹¹ (April 2001 to March 2004) and after the release of the guidelines (April 2005 to March 2008). Data collected in the 6-month period before or after the guideline publication date were excluded to allow for uptake of the guideline in the later period.

DATA INTERPRETATION

Data on patients and the treatments provided by the GP in the management of LBP were extracted. Data on diagnostic triage and patient follow-up were not captured by the BEACH study, and alignment with these aspects of care could not be determined. Patient reasons for the encounter, problems managed, clinical and therapeutic treatments, referrals, tests, and investigations were classified according to the *International Classification of Primary Care, Second Edition*,¹⁶ but are coded more specifically with an Australian interface terminology called ICPC-2-Plus.¹⁷ Pharmaceuticals are classified to the Anatomic Therapeutic Chemical Classification¹⁸ and coded more specifically (by brand, dose, regimen) in an in-house classification known as the Coding Atlas for Pharmaceutical Substances (CAPS). However, for the purposes of this study, we grouped the generics into logical groupings for comparison of practice with guidelines. Clinical treatments provided by the GP (advice, education, and counseling), referrals to other health care providers (eg, physical therapist, medical specialist), and pathology and imaging test orders were also investigated. These data on usual care were used to assess alignment with 3 key guideline messages for the initial management of a new episode of LBP: provide the patient with advice, begin with regular simple analgesics, and do not routinely order imaging.

Table 1. Characteristics of Encounters and Patients

Characteristic	2001-2004		2005-2008	
	Number	Percentage (95% CI)	Number	Percentage (95% CI)
GPs recording in period	2991	NA	2900	NA
All encounters recorded in period	299 100	NA	290 000	NA
All LBP problems (% of all encounters)	6728	2.3 (2.2-2.3)	6296	2.2 (2.1-2.2)
New LBP encounters				
New LBP encounters (% of all LBP encounters)	1827	27.2 (25.9-28.5)	1706	27.1 (25.8-28.3)
Encounter type				
Cases with missing data	108	NA	115	NA
Standard surgery consultation	1189	69.2 (66.5-71.8)	1113	70.0 (67.4-72.5)
Long surgery consultation	259	15.1 (13.1-17.0)	239	15.0 (13.1-16.9)
Workers compensation consult	131	7.6 (6.2-9.0)	137	8.6 (7.1-10.1)
Other types of consultation	140	8.1 (6.3-10.0)	102	6.4 (5.1-7.8)
New patient to practice	264	14.8 (12.5-17.0)	215	12.8 (11.0-14.7)
Place of residence ^a				
Cases with missing data	47	NA	41	NA
Major cities	1269	71.3 (68.4-74.1)	1186	71.2 (68.5-74.0)
Regional	450	25.3 (23.4-27.4)	445	26.7 (24.6-28.9)
Remote	61	3.4 (2.7-4.4)	34	2.0 (1.4-2.9)
Patient sex				
Cases with missing data	17	NA	21	NA
Male	818	0.7 (0.6-0.7)	729	0.6 (0.6-0.7)
Female	992	0.6 (0.5-0.6)	956	0.6 (0.5-0.6)
Patient age, y				
Cases with missing data	10	NA	8	NA
<25	256	0.4 (0.3-0.5) ^b	183	0.3 (0.3-0.3) ^b
25-44	604	0.8 (0.7-0.9) ^b	511	0.7 (0.7-0.8) ^b
45-64	605	0.8 (0.7-0.8) ^b	628	0.8 (0.7-0.8) ^b
65-74	199	0.6 (0.5-0.6) ^b	195	0.6 (0.5-0.6) ^b
≥75	153	0.4 (0.3-0.4) ^b	181	0.4 (0.4-0.5) ^b

Abbreviations: CI, confidence interval; GPs, general practitioners; LBP, low back pain; NA, not applicable.

^aPlace of residence coded with Australian Standard Geographical Classification.

^bAge/sex-specific incidence of presentations.

STATISTICAL ANALYSIS

The BEACH study has a cluster design, with the GP as the primary sample unit and the GP-patient encounter as the unit of analysis. Procedures using SAS software were used to calculate robust proportions and 95% confidence intervals (CIs) that took into account the cluster design of the BEACH study. Differences between results were regarded as statistically significant through nonoverlapping CIs around the estimates.

RESULTS

SCOPE OF LBP IN AUSTRALIA

In the period 2005 to 2008 there were 290 000 encounter records supplied to the BEACH study⁵ by 2900 GPs. Low back pain was managed at 6296 (2.2%) encounters by 2372 GPs (81.8%). Of these, 1706 new LBP presentations were managed (27.1% of all LBP encounters and 0.6% of all encounters). Most new LBP problems (69.2%) were seen in standard GP consultations lasting less than 20 minutes. The age-specific incidence of new LBP presentations was significantly higher among 25- to 44-year-olds and 45- to 64-year-olds than among younger and older adults and marginally higher among male patients than among female. There were no significant differences between the preguideline and postguideline periods in the overall incidence of new LBP presentations or

in the characteristics of new LBP encounters and patients (see Table 1 for CIs). In each time period (2001-2004 and 2005-2008, respectively), 71.3% and 71.2% of patients with new LBP resided in capital cities, 10.3% and 9.8% were from a non-English-speaking background, 2.0% and 1.1% were indigenous Australians, and 40.3% and 35.7% held an Australian Government health care concession card.

CURRENT USUAL CARE OF NEW LBP

Table 2 provides a comparison of usual care for new LBP before and after the release of Australian evidence-based guidelines for LBP management.¹¹ The postrelease data are used to describe current usual care.

Medications

Nearly two-thirds of patients (65.2%) received a medication for a new LBP problem; 46.7% were prescribed at least 1 medicine, 17.8% were recommended 1 or more over-the-counter (OTC) medicines, and 5.0% received medicine(s) supplied directly by the GP. Grouping generic medications revealed a pattern contrary to recommendations in most guidelines. The most common types of medication recommended or prescribed by GPs were NSAIDs (37.4%), followed by opioids (19.6%), and then

Table 2. Comparison of Usual Care Before and After Release of the National Health and Medical Research Council Guideline^a

Treatments and Referrals	Before Guideline Release, 2001-2004 (n=1830)	After Guideline Release, 2005-2008 (n=1706)
Treatments		
Advice ^b	24.7 (22.5 to 26.9)	20.5 (18.4 to 22.6)
Physical treatments ^c	21.1 (18.7 to 23.5)	15.8 (13.8 to 17.7)
Medication source (total)	64.9 (62.2 to 67.7)	65.2 (62.8 to 67.6)
Prescribed by GP	47.1 (44.1 to 49.9)	46.7 (44.2 to 49.3)
Advised to purchase OTC	13.4 (11.6 to 15.3)	17.8 (15.8 to 19.8)
Supplied by GP	7.2 (5.8 to 8.5)	5.0 (3.9 to 6.1)
Medication type		
NSAIDs	41.1 (38.4 to 43.7)	37.4 (34.9 to 39.9)
Acetaminophen	15.5 (13.7 to 17.3)	17.7 (15.7 to 19.7)
All medications containing opioids ^d	17.2 (15.3 to 19.1)	19.6 (17.6 to 21.6)
Acetaminophen/opioid combination medication	12.7 (11.0 to 14.3)	13.7 (12.0 to 15.4)
NSAID/opioid combination medication	0.1 (0.0 to 0.3)	0.5 (0.2 to 0.9)
Single opioid medications	4.8 (3.8 to 5.9)	5.7 (4.5 to 7.0)
Referrals		
Imaging	23.9 (21.8 to 26)	25.3 (23.0 to 27.5)
Diagnostic radiology	20.2 (18.2 to 22.1)	19.6 (17.6 to 21.7)
Computed tomography	3.7 (2.8 to 4.5)	6.2 (5.0 to 7.4)
Magnetic resonance imaging	0.2 (0.0 to 0.3)	0.1 (-0.1 to 0.2)
Ultrasonography	0.6 (0.2 to 1.0)	1.1 (0.4 to 1.7)
Nuclear medicine imaging	0.7 (0.3 to 1.0)	0.1 (-0.1 to 0.2)
Specialist	1.5 (0.9 to 2.0)	1.5 (0.9 to 2.1)
Allied health	13.4 (11.6 to 15.5)	17.2 (15.3 to 19.1)
Pathology testing	7.2 (5.0 to 9.4)	4.9 (3.9 to 6.0)

Abbreviations: GP, general practitioner; NSAID, nonsteroidal anti-inflammatory drug; OTC, over the counter.

^aData are given as percentage of encounters (95% confidence interval).

^bIncludes advice, education, counseling, reassurance.

^cIncludes manual therapy, injection, and splinting.

^dIncludes acetaminophen/opioid and NSAIDs/opioid.

acetaminophen (17.7%). Interestingly, less than a third of patients (33%) prescribed acetaminophen received the recommended dose of 4 g/d.

Advice and Education

All guidelines suggest that patients should be provided with advice and education and reassurance of a favorable prognosis. These data from GPs indicate that only about one-fifth of people with new LBP problems (20.5%) are provided with advice and education.

Referrals

While the guidelines caution against the routine use of imaging, imaging was requested for 25.3% of patients with new LBP problems. Pathology tests were ordered for 4.9% of cases. All guidelines recommend that LBP should be typically managed in primary care, and referral to a specialist is required only for the rare cases of serious disease. Guidelines give inconsistent messages on referral to allied health. In this study we found that GPs refer 17.2% of new cases to allied health practitioners and 1.5% to specialists.

Medications

In the period following the release of the guidelines there was no statistically significant change in the proportion of new LBP problems for which medication was pre-

scribed or recommended and no changes in the types of medications as evidenced by overlapping 95% CIs (Table 2). The most widely prescribed medication group continued to be NSAIDs. The use of the endorsed first-line medication for LBP, acetaminophen, did not increase and remained in relatively low use, with fewer than 1 in 5 patients receiving this medicine.

Advice/Education and Referrals

There was no significant difference in the proportion of encounters in which advice/education was provided following the release of the guidelines: preguideline proportion was 24.7% (95% CI, 22.5%-26.9%); postguideline proportion was 20.5% (95% CI, 18.4%-22.6%). Referrals for computed tomography rose significantly, from 3.7% (95% CI, 2.8%-4.5%) to 6.2% (95% CI, 5.0%-7.4%), but referrals for other imaging remained unchanged. Referrals to allied health, pathology testing, and specialists were unchanged.

COMMENT

We investigated usual care provided by GPs to patients presenting with a new episode of LBP. Our findings show that key aspects of the usual care provided to patients do not align with the care recommended in international evidence-based guidelines. General practitioners recommended NSAIDs in preference to the safer and

equally effective¹⁹ acetaminophen. When acetaminophen was recommended, the dose was typically suboptimal. Surprisingly, opioids were also medicines preferred to acetaminophen. This result has important implications for achieving quality use of medicines in safe and effective management of LBP. Most patients did not receive advice even though this treatment is inexpensive and universally recommended for all patients. Paradoxically, more patients were referred for imaging (which is not routinely recommended) than received advice. Furthermore, our data revealed that in the period following the release of the local guideline, care was not more aligned with recommended practice.

Other studies have compared the treatment of patients with LBP with guideline recommendations.²⁰⁻²⁴ While some of these studies enrolled small and potentially nonrepresentative samples, did not look at all aspects of care, and/or were based on surveys allowing idealized self-reporting, the results of these studies are generally consistent with our own. The usual care described in these studies seems to entail infrequent recommendation or prescription of acetaminophen (6%²⁴ to 19%²³) and high rates of referral for radiographs (up to 65%²⁴) at the initial visit. Prescription of NSAIDs is also commonly high (36%²¹ to >70%²²). Advice is infrequently given to patients (<8%^{20,21}); however, a Dutch study²³ reported that advice was provided to 76% of patients when clinicians were prompted by a computer. The available research suggests that most primary care management for LBP is not evidence based. It is likely that the preference for expensive management strategies instead of simple effective treatments contributes to the high costs associated with LBP.

Understanding why GPs do not follow key treatment recommendations of guidelines is an important prerequisite to improving this situation. A number of studies have reported that GPs' views about LBP influenced their treatment prescription.²⁵⁻²⁹ A Dutch qualitative study³⁰ of patients with LBP and their GPs determined that both parties, and perhaps miscommunication, contribute to departure from guideline-endorsed care. For example, GPs reported that while they agreed with the guideline advice on limiting imaging, they would order imaging if a patient requested it or if they were unable to explain to the patient that the radiograph was not necessary. Patients reported that they would not be satisfied with prescription of a simple analgesic because they viewed it as ineffective. Interestingly, GPs reported that they routinely advised their patients to stay active, whereas half the patients reported that they had been told to take it easy. Intriguingly, a recent Australian study³¹ reported that GPs with a stated special interest in LBP were more likely to hold erroneous beliefs about the management of LBP. Taken together, these results help explain why GP care is often not consistent with guideline-endorsed care and, more importantly, hint at ways to rectify the situation.

To our knowledge, only one other study³² has compared aspects of usual care before and after introduction of a national guideline for LBP. By analyzing a US national health survey, these researchers found that the US guideline did not have an impact on referral rates for

radiographs, which increased (before release of the guideline, 15.4%; after release, 19.3%) along with NSAID prescription (39% and 43%, respectively). While these authors found that acetaminophen recommendation increased (from 2.5% to 6.4%), the postrelease use of this treatment is still very low and inconsistent with the key message in guidelines. Even though this study does not differentiate between a new episode of LBP and an ongoing problem, the results are consistent with our findings showing that the management of new LBP has not become more aligned with evidence-based recommendations over time.

Our results are consistent with the prevailing view that passive release of treatment guidelines and brief workshops³³ are insufficient to change clinical practice. Additional strategies seem necessary to educate GPs in the use of the guidelines and how to provide guideline-based care. It has been demonstrated for other health conditions that educational outreach programs are effective in encouraging GPs to use the guidelines in their daily clinical practice.³⁴ There is also some evidence that promoting guideline-based care with educational outreach results in cost savings and improved patient outcomes.^{34,35} For LBP, however, educational outreach is not well researched, and the effectiveness of intensive programs remains unclear. A major challenge with this approach is how best to educate the large number of GPs. Population-based strategies may be a more meaningful and cost-effective option. An Australian study^{36,37} has demonstrated the effectiveness of a mass media campaign in terms of population beliefs about LBP, GP behaviors, and the number of workers compensation claims for LBP.

A strength of the study is that it is based on data from the BEACH study,⁵ and so our analyses are of a large and representative data set. Our analyses are based on prospectively recorded management data from 3533 encounters in which patients sought care for new LBP from more than 2000 GPs in the community. We were also able to compare 2 equal time periods, before and after release of NHMRC guidelines,¹¹ to assess the impact of the guidelines on the management approach of GPs for patients with new LBP.

A limitation of the study is that specific data on diagnostic triage and patient review were not captured, so we could not compare the usual provision of these with respect to recommendations in the guidelines. Another limitation is that our data do not enable us to determine the appropriateness of treatment for any individual patient. We recognize that clinical guidelines are produced to guide clinicians on how patients should be treated in general but still enable clinicians to diverge from the recommendations for individual patients where indicated. However, the overall pattern of results raises concerns about patient treatment because of the high rates of departure from key messages from clinical practice guidelines.

Our data do not allow us to distinguish why aspects of guideline care were or were not used. While we acknowledge that some patients would have tried some treatments (particularly OTC medication) before consulting a GP, an Australian survey of care seeking for LBP re-

vealed that about 10% of people with LBP use nonprescription medication.² In Australia, medicines containing NSAIDs, opioids, and acetaminophen are all available OTC, so prior use of a medicine would not explain why GPs seem to favor other types of medications in their recommendations.

It is clear from this study that the usual care provided by GPs does not align with best practice recommendations. The results indicate that in most cases, usual care is not evidence-based care and so is not likely to provide the best outcomes. Given that usual care is the control treatment in many trials³⁸ evaluating new treatments for LBP, these trials may provide overly optimistic estimates of the effects of the new therapy. In our view, it would be more meaningful for future trials to use guideline-based care as the control treatment. This would have the advantage of being replicable and would provide an appropriate benchmark for comparison with new therapies. Moreover, while the focus in this study was the GP, it is unclear if other health care providers (eg, physiotherapists or chiropractors) who see patients with LBP are better in providing evidence-based care.

In the back pain field, there has been extensive activity in the past 2 decades focusing on the evaluation of new and existing therapies within clinical trials and systematic reviews. Arguably, we need a parallel line of research that focuses on how best to encourage provision of evidence-based treatments. Educational outreach with broader societal focus may enhance guideline dissemination and reduce the burden of LBP. Given the limited change of usual care of LBP in general practice toward evidence-based recommendations, continued appraisal of health services delivery for patients and the associated costs is warranted.

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INVITED COMMENTARY

Adherence, Not Just for Patients

Despite good intentions, patients do not always follow "doctor's orders." It turns out that physicians are not much better, at least when it comes to adherence to clinical practice guidelines.

Williams and coauthors present another compelling example. They analyzed 3533 patient visits to Australian general practitioners during the 3 years before and the 3 years after the publication of a clinical practice guideline for the treatment of low back pain.¹ The introduction of a local, evidence-based clinical practice guideline had no effect on physician treatment of low back pain as measured by the frequency of patient counseling, prescription of analgesics, and use of imaging.

These results are not an isolated finding. Less-than-optimal rates of physician adherence to back pain guidelines have been noted in the United States, Sweden, and Ireland.²⁻⁴ A systematic review of physician guideline adherence published a decade ago found that no specialty, practice location, or guideline topic is exempt from this observation.⁵

Given that clinical practice guidelines can lead to higher-quality care at a more predictable cost, how can we promote their use? Perhaps we should start by asking whose responsibility is it to ensure physician adherence to these guidelines.

The definition of professionalism implies that individual physicians will strive to stay up to date and apply the most current guidelines for providing quality care.⁶ In addition, self-evaluation of practice performance is now a routine component for maintenance of board certification for physicians in many specialties. However, it is not enough to rely on the best efforts of physicians. There

are many well-recognized barriers that prevent adherence, such as competing practice demands and the limited time to apply an increasing number of guideline recommendations.⁵

Professional organizations and guideline developers need to translate their work into practice. Guideline production is very resource intensive. Organizations and societies that develop clinical practice guidelines are recognizing the need to develop accompanying implementation strategies to increase the likelihood of adoption by end users.^{7,8} For example, the Bureau of Maternal and Child Health, in collaboration with the American Academy of Pediatrics, recently developed a comprehensive set of pediatric health supervision guidelines.⁹ In addition to guideline development, an implementation plan was developed to encourage physician adherence by identifying successful practice implementation examples, disseminating those models to stakeholders, and providing technical assistance for implementation.

Payment structure can play a role as well. Clinical practice guidelines may be more likely to be adopted if guideline recommendations are consistent with reimbursement arrangements. As a result, the development of evidence-based reimbursement policies by third-party payers may be just as important as the development of evidence-based guidelines. "Pay for performance" initiatives, in which an external payer rewards physicians for quality achievements such as guideline adherence, seem like a natural bridge; however, data on their effectiveness are not yet clear.¹⁰

Finally, patients may be helpful in enhancing physician guideline adherence through public education pro-