

Why Don't Physicians Follow Clinical Practice Guidelines?

A Framework for Improvement

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CLINICAL PRACTICE GUIDELINES are “systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances.”¹ Their successful implementation should improve quality of care by decreasing inappropriate variation and expediting the application of effective advances to everyday practice.^{2,3}

Despite wide promulgation, guidelines have had limited effect on changing physician behavior.⁴⁻⁷ In general, little is known about the process and factors responsible for how physicians change their practice methods when they become aware of a guideline.^{8,9} Physician adherence to guidelines may be hindered by a variety of barriers. A theoretical approach can help explain these barriers and possibly help target interventions to specific barriers.

In this article, we review barriers to physician adherence to practice guidelines. Such knowledge can help developers of guidelines, practice directors, and health care services researchers design effective interventions to change physician practice.

Context Despite wide promulgation, clinical practice guidelines have had limited effect on changing physician behavior. Little is known about the process and factors involved in changing physician practices in response to guidelines.

Objective To review barriers to physician adherence to clinical practice guidelines.

Data Sources We searched the MEDLINE, Educational Resources Information Center (ERIC), and HealthSTAR databases (January 1966 to January 1998); bibliographies; textbooks on health behavior or public health; and references supplied by experts to find English-language article titles that describe barriers to guideline adherence.

Study Selection Of 5658 articles initially identified, we selected 76 published studies describing at least 1 barrier to adherence to clinical practice guidelines, practice parameters, clinical policies, or national consensus statements. One investigator screened titles to identify candidate articles, then 2 investigators independently reviewed the texts to exclude articles that did not match the criteria. Differences were resolved by consensus with a third investigator.

Data Extraction Two investigators organized barriers to adherence into a framework according to their effect on physician knowledge, attitudes, or behavior. This organization was validated by 3 additional investigators.

Data Synthesis The 76 articles included 120 different surveys investigating 293 potential barriers to physician guideline adherence, including awareness ($n = 46$), familiarity ($n = 31$), agreement ($n = 33$), self-efficacy ($n = 19$), outcome expectancy ($n = 8$), ability to overcome the inertia of previous practice ($n = 14$), and absence of external barriers to perform recommendations ($n = 34$). The majority of surveys (70 [58%] of 120) examined only 1 type of barrier.

Conclusions Studies on improving physician guideline adherence may not be generalizable, since barriers in one setting may not be present in another. Our review offers a differential diagnosis for why physicians do not follow practice guidelines, as well as a rational approach toward improving guideline adherence and a framework for future research.

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METHODS

Data Sources

We conducted a systematic review of the literature to identify barriers to

guideline adherence. We searched all articles, limited to the English language and human subjects, published from January 1966 to January 1998

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using the MEDLINE, Educational Resources Information Center (ERIC), and HealthSTAR databases. To find candidate titles that describe barriers to adherence, we included titles that appeared in 2 searches. The first used medical subject heading (MeSH) descriptors *clinical practice guidelines* or *physicians' practice patterns*. The second used the descriptors *behavior*, *knowledge*, *attitudes*, and *practice*, *attitude of health personnel*, *guideline adherence*, or the text words *behavior change*. We also examined candidate titles of papers describing theories of physician behavior change to find constructs useful in describing barriers. We used candidate titles with the MeSH descriptor or text words *behavior* and 1 of the following terms: "model, organizational," "model, theoretical," "model, psychological," or "model, educational." We identified additional candidate articles by reviewing the bibliographies of articles from the search; contacting experts in psychology, management, and sociology; and reviewing bibliographies of textbooks of health behavior and public health.

Data Selection

We included articles that focused on clinical practice guidelines, practice parameters, clinical policies, national recommendations or consensus state-

ments, and that examined at least 1 barrier to adherence. A *barrier* was defined as any factor that limits or restricts complete physician adherence to a guideline. We focused on barriers that could be changed by an intervention. As a result, we did not consider age, sex, ethnic background, or specialty of the physician as barriers. In many of the articles, respondents indicated barriers via responses to survey questions. For qualitative studies, major themes from focus groups or interviews identified barriers.

One investigator (M.D.C.) screened titles and/or full bibliographic citations to identify candidate articles. Two investigators (M.D.C. and P.-A.C.A.) then independently reviewed the full text to exclude articles that did not fulfill our criteria. Differences were resolved by consensus with a third investigator (H.R.R.).

Data Extraction

Two investigators (M.D.C. and P.-A.C.A.) then abstracted the following information from each article: description of barrier, description of the guideline, the percentage of respondents describing the barrier, demographics of the respondents, and study characteristics. If possible, we calculated the percentage of respondents affected by a barrier as the difference

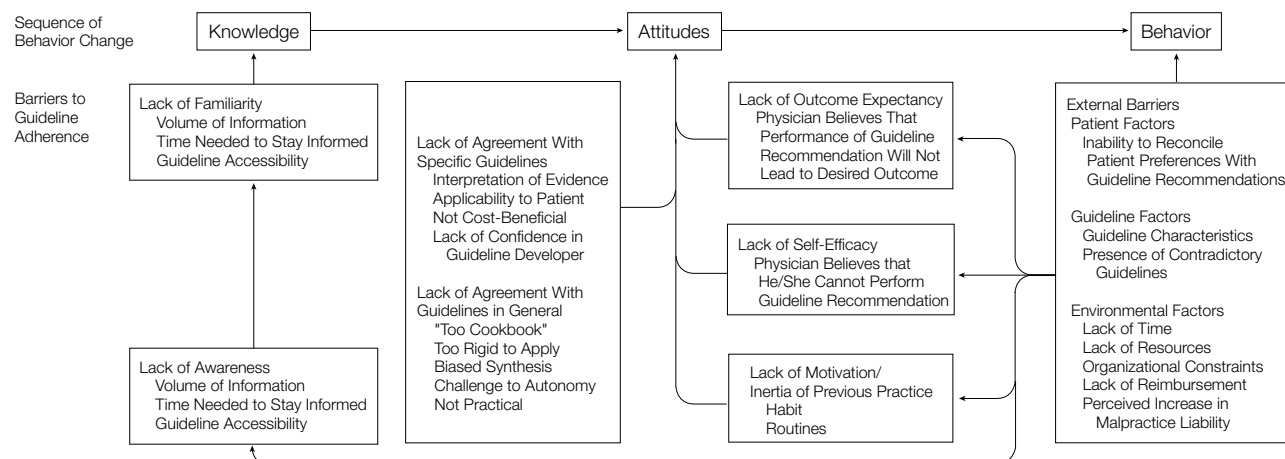
between 100% and the sum of the percentage with no opinion and those not affected.

All barriers abstracted from the articles were grouped into common themes, then further organized into groups based on whether they affected physician knowledge, attitude, or behavior. The organization of these categories was validated by 3 additional investigators (A.W.W., N.R.P., and C.S.R.) and was based on a model that describes an ideal, general mechanism of action for guidelines, the knowledge, attitudes, behavior framework⁶ (FIGURE). Before a practice guideline can affect patient outcomes, it first affects physician knowledge, then attitudes, and finally behavior. Although behavior can be modified without knowledge or attitude being affected, behavior change based on influencing knowledge and attitudes is probably more sustainable than indirect manipulation of behavior alone.

Factors limiting adherence through a cognitive component were considered barriers affecting knowledge, through an affective component were considered barriers affecting attitude, and through a restriction of physician ability were considered barriers affecting behavior.

Based on previous work by Davis and Taylor-Vaisey,¹⁰ the following terms were used: *adoption* refers to a provid-

Figure. Barriers to Physician Adherence to Practice Guidelines in Relation to Behavior Change



er's commitment and decision to change practice, *diffusion* is the distribution of information and the unaided adoption of recommendations, *dissemination* is more active than diffusion and is the communication of information to improve knowledge or skills, and *implementation* refers to active dissemination, involving strategies to overcome barriers.

Lack of familiarity included the inability of a physician to correctly answer questions about guideline content, as well as self-reported lack of familiarity. When studies reported the percentage of physicians answering questions incorrectly, the highest percentage of incorrect answers was used to measure lack of familiarity. Lack of awareness was the inability to correctly acknowledge a guideline's existence.

RESULTS

Search Yield

We found 5658 candidate titles possibly examining barriers to adherence. We excluded 5235 titles after examination of the bibliographic citation. After examining the full text of 423 articles or chapters, 76 articles fulfilled our criteria. The κ to measure interrater reliability for article selection was 0.93.

The 76 accepted articles included 5 qualitative studies and 120 different surveys asking a total of 293 questions addressed to physicians regarding possible barriers to guideline adherence. A survey was defined as at least 1 question to a group of physicians about barriers to adherence for a unique guideline recommendation.

Type of Barriers

After classifying possible barriers into common themes, we found that the 293 questions about barriers included 7 general categories of barriers (Figure). The barriers affected physician knowledge (lack of awareness or lack of familiarity), attitudes (lack of agreement, lack of self-efficacy, lack of outcome expectancy, or the inertia of previous practice), or behavior (external barriers).

Comprehensiveness of Surveys

We examined how often surveys considered the full variety of barriers to physician adherence. Theoretically, a survey could examine up to 7 different types of barriers to adherence. Of the 120 surveys, 70 (58%) examined only 1 type of barrier, and the average number examined was 1.67 (median, 2). Of the remaining surveys, 30 (25%) examined 2, 11 (9%) examined 3, 8 (7%) examined 4, and 1 (0.8%) examined 5. None examined 6 or more types of barriers.

Characteristics of Physician Surveys

The number and characteristics of the surveys examining each barrier are listed in Table 1, which is not included in the print version of this article but is available at <http://www.jama.com>. We found that the surveys used a heterogeneous variety of physician populations (based on specialty or location of practice) and investigated guidelines on a variety of subjects (immunization, preventive care, or treatment). The surveys also displayed a wide range of the percentage of respondents reporting each barrier. A description of each category of barriers and the surveys that investigated these barriers, which are not included in the print version of this article but are available online, are listed in Tables 2 through 11 and are discussed below. Table 2 is available at <http://www.jama.com> and Tables 3 through 11 are available at <http://www.ped.med.umed.edu/RESEARCH/cabana/tables.htm> or on request from the authors.

Adherence Barriers Identified by Studies

Lack of Awareness. Forty-six surveys^{5,11-40} measured lack of awareness as a possible barrier (Table 2). Sample size ranged from 69 to 2860 (median, 392), and the response rate ranged from 26% to 95% (median, 54.5%). The sample size and response rate were not reported in 1 of the studies.¹⁹ The per-

centage of respondents identifying lack of awareness as a barrier was as high as 84% (United States Preventive Services Task Force [USPSTF] guidelines¹⁶) and as low as 1% (asthma guidelines³⁰ and measles immunization guidelines⁴⁰) with a median of 54.5%. In 36 (78%) of the 46 surveys, at least 10% of the respondents were not aware of the guideline.

Lack of Familiarity. Thirty-one surveys^{12-15,41-50} measured lack of familiarity as a possible barrier. Sample size ranged from 69 to 1513 (median, 326), and the response rate ranged from 49% to 98% (median, 60%). The percentage of respondents suggesting lack of familiarity as a barrier was as high as 89% (American College of Physicians exercise stress testing guidelines⁴¹) and as low as 0% (asthma guidelines⁴⁶) with a median of 56.5%. In 28 (90%) of the 31 surveys, at least 10% of the respondents were not familiar with guideline recommendations.

Lack of Agreement. Thirty-three surveys^{15,16,28,38,40,41,43,48,51-64} investigated 47 possible reasons for lack of agreement as a barrier to adherence to specific guidelines. At least 10% of the respondents disagreed with a guideline due to differences in interpretation of the evidence (2/2 cases), the belief that the benefits were not worth patient risk, discomfort, or cost (9/11 cases), applicability to the practice population (5/7 cases), that guidelines were oversimplified or "cookbook" (5/5 cases), or that guidelines reduced autonomy (1/1 case). In 18 cases, a reason for disagreement was not specified. In 8 of these cases, disagreement was reported by at least 10% of the respondents. Finally, 2 surveys investigated disagreement due to lack of credibility by guideline authors and 1 investigated the perception that the authors were biased. In all 3 cases, disagreement was less than 10%.

The percentage of respondents identifying lack of agreement as a barrier for a specific guideline was as high as 91% (American Academy of Pediatrics ribavirin recommendations³⁷) and as low as 1% (American Cancer Society Clinical Breast Examination⁵³ and USPSTF

counseling of fat and cholesterol intake⁵⁶). In 29 (62%) of the 47 cases, at least 10% of the respondents reported lack of agreement.

Fifteen surveys^{5,15,17,20,41,65-74} investigated 43 possible examples of lack of agreement as a barrier to adherence to guidelines in general. At least 10% of the respondents disagreed with a guideline due to the perception that guidelines were oversimplified or "cookbook" (9/9 cases), would reduce autonomy (10/12 cases), were not practical (3/3 cases), were biased (4/4 cases), would decrease physicians' self-respect (1/1 case), were not applicable to a practice population (3/3 cases), would decrease flexibility (7/7 cases), lacked credible authors (1/1 case), or would make the patient-physician relationship impersonal (1/1 case). Thirty-eight percent of respondents reported a lack of agreement in 1 case for which a reason for disagreement was not specified.

The percentage of respondents identifying lack of agreement as a barrier to adherence for guidelines in general was as high as 85% (lack of credibility) and as low as 7% (perceived reduction in autonomy). In 41 (95%) of the 43 cases, at least 10% of respondents reported lack of agreement as a barrier to adherence to guidelines in general.

Lack of Self-efficacy. Nineteen surveys^{18,21,51,62,63,75-77} measured lack of physician self-efficacy as a possible barrier. Sample size ranged from 23 to 941 (median, 633), and the response rate ranged from 53% to 85% (median, 63%). The response rate was not reported in 3 studies. The percentage of respondents identifying this barrier was as high as 65% (nutrition education¹⁸) and as low as 1% (general exercise counseling⁷⁶) with a median of 13%. In 15 (79%) of the 19 surveys, at least 10% of the respondents reported a lack of self-efficacy.

Lack of Outcome Expectancy. Eight surveys^{48,51,58,59,62,63,75,78} measured lack of outcome expectancy as a possible barrier. Sample size ranged from 97 to 480 (median, 237), and the response rate ranged from 47% to 85% (median, 69.5%). The percentage of respon-

dents identifying this barrier to adherence was as high as 90% (alcohol abuse prevention⁶⁶) and as low as 8% (clinical breast examination⁵¹) with a median of 26%. In 7 (88%) of the 8 surveys, at least 10% of the respondents reported a lack of outcome expectancy.

Inertia of Previous Practice. Fourteen surveys^{38,40,62,79} measured the inertia of previous practice as a possible barrier. Sample size ranged from 141 to 1421 (median, 745), and the response rate ranged from 66% to 81% (median, 67%). The percentage of respondents identifying this barrier was as high as 66% (infant sleeping position³⁸) and as low as 23% (immunizations⁴⁰) with a median of 42%. In all the surveys more than 10% of the respondents reported the inertia of previous practice as a barrier.

External Barriers. Thirty-four surveys* investigated 85 possible external barriers that affect the ability to perform a guideline recommendation. External barriers fell into 3 categories: guideline related (n = 23), patient related (n = 17), and environmental (n = 45). At least 10% of respondents described guidelines as not easy to use (1/2 cases), not convenient (6/11 cases), cumbersome (2/4 cases), and confusing (2/6 cases). In all surveys of patient-related factors, at least 10% of the respondents indicated that the factor was a barrier. In all surveys about environmental factors, at least 10% of respondents indicated that the environmental factors were barriers to adherence, except for lack of time (only 11/17 cases) and insufficient staff or consultant support (3/4 cases).

Qualitative Studies

Five qualitative studies⁸⁴⁻⁸⁸ investigated barriers adherence. Four^{84,85,87,88} of the 5 studies emphasized external barriers (patient characteristics or time constraints) as barriers to adherence. Lack of optimism in the success of counseling, which suggests poor outcome ex-

pectancy, was a major barrier for Agency for Health Care Policy and Research smoking cessation guidelines.⁸⁶

COMMENT

Physician adherence is critical in translating recommendations into improved outcomes. However, a variety of barriers undermine this process. Lack of awareness and lack of familiarity affect physician knowledge of a guideline. In terms of physician attitudes, lack of agreement, self-efficacy, outcome expectancy, and the inertia of previous practice are also potential barriers. Despite adequate knowledge and attitudes, external barriers can affect a physician's ability to execute recommendations.

Barriers to Physician Adherence

Lack of Awareness. The expanding body of research makes it difficult for any physician to be aware of every applicable guideline and critically apply it to practice.^{89,90} Although many guidelines have achieved wide awareness (ie, immunization guidelines, recommendations for infant sleeping position), for 78% of the guidelines, more than 10% of physicians are not aware of their existence.

Lack of Familiarity. Casual awareness does not guarantee familiarity of guideline recommendations and the ability to apply them correctly. Of 74 surveys that measured guideline awareness or familiarity, only 3 (4%) also measured both.¹²⁻¹⁴ In all cases, lack of familiarity was more common than lack of awareness.

Lack of Agreement. Physicians may not agree with a specific guideline or the concept of guidelines in general. Although physicians commonly indicate a lack of agreement when asked about guidelines in theory, from this analysis and others, when asked about specific guidelines, physician lack of agreement is less common.¹⁵ The results of studies that examine physician attitudes to guidelines in general should be interpreted with caution when applied to specific guidelines.

*References 16-18, 23, 28, 29, 32, 36, 38, 40, 41, 43, 47, 48, 50, 51, 54, 58, 61-63, 68, 70, 72, 75, 78, 80-83.

Lack of Self-efficacy. Self-efficacy is the belief that one can actually perform a behavior. It influences whether a behavior will be initiated and sustained despite poor outcomes.⁹¹ For example, higher self-efficacy in prescribing cholesterol-lowering medications was associated with physicians initiating therapy consistent with national guidelines.⁹² Low self-efficacy due to a lack of confidence in ability or a lack of preparation may lead to poor adherence. Sixty-eight percent of the surveys that reported this barrier involved preventive health education and counseling, which suggests that poor self-efficacy may be a common barrier to adherence for such guidelines.

Lack of Outcome Expectancy. Outcome expectancy is the expectation that a given behavior will lead to a particular consequence.⁹¹ If a physician believes that a recommendation will not lead to an improved outcome, the physician will be less likely to adhere. For example, the USPSTF recommends that physicians provide smoking cessation counseling.⁹³ Although most physicians are aware of and agree with the recommendation,⁹⁴ many smokers are not counseled to quit during a physician visit.^{95,96} An important reason for physician nonadherence is a belief that the physician will not succeed.^{97,98}

Although counseling may increase a population's quit rate from 3% to only 5%,⁹⁹ given smoking prevalence even this small change is enormously beneficial.¹⁰⁰ However, since physicians see patients individually, they may not discern success at the population level. Overlooking population-level successes can negatively influence outcome expectancy and lead to nonadherence. Seventy-five percent of surveys reporting lack of outcome expectancy, such as those reporting lack of self-efficacy, involved preventive health counseling and education guidelines.

Inertia of Previous Practice. Physicians may not be able to overcome the inertia of previous practice, or they may not have the motivation to change. Although this barrier has not been investigated as widely as others, for all 14 sur-

veys that examined this barrier, more than 20% of respondents indicated that it was a barrier to adherence.

The readiness for change model, developed by Prochaska and DiClemente,¹⁰¹ describes behavior change as a continuum of steps that include precontemplation, contemplation, preparation, action, and maintenance¹⁰¹ and was applied to physician attitudes toward cancer screening guidelines. The results suggest that close to half of physicians surveyed were in a precontemplation stage and not ready to change behavior (ie, adopt guideline recommendations).⁷⁹ The change process model described by Geertsma et al¹⁰² and the theory of learning and change model described by Fox et al¹⁰³ also suggest similar constructs, ie, a priming phase and the need for an initial force for change, professional, personal, and/or social.

External Barriers. Appropriate knowledge and attitudes are necessary but not sufficient for adherence.⁸⁰ A physician may still encounter barriers that limit his/her ability to perform the recommended behavior due to patient, guideline, or environmental factors.

External barriers that limit the ability to perform a recommended behavior are distinct from lack of self-efficacy. For example, well-trained physicians confident about their counseling skills can still be affected by external barriers (time limitations, lack of a reminder system) that prevent them from adhering to a counseling guideline. However, the persistence of these barriers may also eventually affect physicians' self-efficacy, outcome expectancy, or motivation (Figure).

Guideline-Related Barriers. Physicians were more likely to describe guidelines as not easy to use or not convenient when asked about guidelines in theory. When physicians were asked about barriers for specific guidelines, a significant percentage (more than 10% of respondents) described them as inconvenient or difficult to use in only 6 (38%) of 16 cases.

Other guideline characteristics may also affect adherence. Guidelines rec-

ommending elimination of an established behavior may be more difficult to follow than guidelines that recommend adding a new behavior.¹⁰⁴ Trialability of a guideline and its complexity are also described as significant predictors of adoption.¹⁰⁵ *Trialability* is "the degree to which an innovation may be experimented with on a limited basis."¹⁰⁶

Patient-Related Barriers. The inability to reconcile patient preferences with guideline recommendations is a barrier to adherence.¹⁰⁷ Patients may be resistant or perceive no need for guideline recommendations. In addition, a patient may perceive the recommendation as offensive or embarrassing. In all the surveys that included patient-related factors, more than 10% of physicians indicated them as a barrier to adherence.

Environmental-Related Barriers. Adherence to practice guidelines¹⁰⁸ "may require changes not under physician control, such as acquisition of new resources or facilities."^{108,109} For example, unavailability of an anesthesiologist 24 hours a day may interfere with physician ability to adhere to guidelines aimed at decreasing the rate of elective cesarean deliveries.¹⁰⁹ Many factors described as barriers by more than 10% of respondents, such as lack of a reminder system, lack of counseling materials, insufficient staff or consultant support, poor reimbursement, increased practice costs, and increased liability, may also be factors beyond physician control.

With adequate resources or referral privileges, physicians may be able to compensate for other external barriers. Although lack of time is commonly described as a barrier to adherence by more than 10% of respondents (11/17 cases), time limitations were not a barrier for mammography referral or breast examination guidelines (4 surveys), management of fever (1 survey), and hyperbilirubinemia (1 survey).

Limitations

Because this review only includes published articles, it is susceptible to pub-

lication bias.¹¹⁰ All included articles, except 5 qualitative studies⁸⁴⁻⁸⁸ were surveys using closed-ended questions, and the barriers examined were dependent on investigator selection. For example, physician discomfort with uncertainty, a compulsion to treat (despite the lack of effective interventions), opinion leaders who may have nonevidence-based opinions, pharmaceutical representatives, and fear of standing out may all be additional barriers but were not specifically investigated in the included studies.

In addition, surveys of barriers depend on physicians' perceptions of them. The perceptions may not accurately reflect how problematic the barrier actually is. Whether the problem is actual or perceived may also affect the type of intervention needed to overcome the barrier.

Finally, barriers to adherence in different situations may facilitate adherence. For example, although patient pressure may be a barrier to adherence in some cases, patient requests for mammograms may improve physician adherence to mammography referral guidelines.⁵¹

Implications

Our results suggest several implications for guideline implementation and research. This analysis offers a differential diagnosis of why physicians may not follow clinical practice guidelines. There are a variety of barriers to guideline adherence, which include lack of awareness, lack of familiarity, lack of agreement, lack of self-efficacy, lack of outcome expectancy, the inertia of previous practice, and external barriers.

Few studies consider the variety of barriers that must be overcome to achieve adherence. Although we found 76 articles that included 120 surveys investigating possible barriers to guideline adherence, 70 (58%) of the 120 surveys examined only 1 type of barrier. By not considering the variety of barriers, interventions to improve adherence are less likely to address these factors and are less likely to be successful.

In addition, the interpretation of successful interventions to improve physician adherence should be reviewed carefully. Strategies successful in one setting (in which a single external barrier exists—eg, lack of a reminder system) may be less useful in a setting where barriers differ (eg, poor physician knowledge and attitudes in addition to the lack of a reminder system). This framework might be useful to standardize the reporting of barriers to adherence. Just as clinical trials report baseline patient comorbidities in treatment and control groups, interventions to improve adherence should report baseline barriers to adherence. The effectiveness of interventions to improve adherence is dependent not only on the intervention itself but also on the existence and intensity of baseline barriers.

It is difficult to compare any framework with other similar frameworks or checklists.^{41,42} However, this framework is based on a comprehensive review, which is specific to physician guideline adherence. In addition, it incorporates different behavioral constructs. Unlike the awareness to adherence model, which is based on immunization guideline adherence, this framework incorporates self-efficacy and outcome expectancy, which are important considerations in improving adherence to other preventive health guidelines, besides immunizations.⁴⁰ Focusing on barriers to adherence may also be more direct in improving physician behavior, instead of investigating predisposing factors, which may be too broad in helping select possible interventions.¹¹¹

In summary, this review offers a differential diagnosis for why physicians do not follow practice guidelines. Few studies consider this diversity of barriers that we describe. By not entertaining the full spectrum of barriers, important interventions to improve physician behavior might not be investigated or implemented. This framework may also be useful to help document the generalizability of studies used to improve guideline adherence.

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The beauty and genius of a work of art may be reconceived, though its first material expression be destroyed; a vanished harmony may yet again inspire the composer; but when the last individual of a race of living things breathes no more, another heaven and another earth must pass before such a one can be again.

—Charles William Beebe (1877-1962)