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**Title:** Systematic Review of Clinical Practice Guidelines for the Improvement of Medication Adherence

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## **Abstract**

**Background:** Poor adherence to medications is a significant problem that leads to increased morbidity, mortality, and health care costs. Recommended approaches to address medication adherence vary, and existing practice guidelines are unclear.

**Purpose:** This review evaluated clinical practice guidelines designed to help health care providers address patients' medication adherence.

**Methods:** Multiple search methods were used to identify national or international guidelines addressing medication adherence. We included guidelines published in English, as well as guidelines with an English-language summary or translation.

**Results:** We identified 23 guidelines of varying detail and quality. Recommendations were categorized as assessment strategies (n=20 guidelines); educational strategies (n=18); behavioral strategies (n=17); therapeutic relationship, communication, and provider factors (n=19); and addressing outside influences/co-morbidities (n=10).

**Conclusions:** Future guidelines should be more clearly guided by research findings and comparative effectiveness methods. When implemented, guidelines will facilitate health care providers and health systems in supporting optimal adherence and improved health outcomes.

**Keywords:** medication adherence, guidelines, systematic review, evidence-based practice

## Systematic Review of Clinical Practice Guidelines for the Improvement of Medication Adherence

### Introduction

*Adherence to medications* is defined as the process by which patients take their medications as prescribed and is composed of three parts: initiation (obtaining the medication and taking the first dose), implementation (taking each prescribed dose in a timely manner), and discontinuation (ceasing to take the medication) [1]. This definition assumes that the prescribing is appropriate and that the patient and provider agree on the treatment plan. This agreement on the treatment plan, often called concordance, is considered to be a separate, but related, concept from adherence. It is essential for medications to be used effectively and for patients to achieve the clinical benefit from medication therapy.

The World Health Organization, in a 2003 report, declared non-adherence to medical treatment a major public health concern, particularly among patients with chronic conditions [2], with about half of patients estimated to be non-adherent [3]. Suboptimal adherence to prescribed medication regimens exists with all clinical conditions and populations, leading to poorer treatment outcomes [4], inappropriate dose escalation [5], increased risk for adverse health events, misdiagnosis, and higher utilization of health care services, hospitalizations, and health care costs [6, 5]. Estimates of the annual total (direct and indirect) cost of non-adherence range as high as \$300 billion USD [7]. The high prevalence and detrimental impact on clinical and economic outcomes point toward a need for guidance on assessment of medication non-adherence, as well as strategies to overcome it.

Clinical practice guidelines are defined by the U.S. Institute of Medicine as “statements that include recommendations intended to optimize patient care” [8]. Clinical practice guidelines should have a clear scope and purpose, and should ideally include all stakeholders in the guideline development process [8, 9]. Guidelines should be developed from a systematic review of existing knowledge using a transparent process that avoids or minimizes conflicts of interest and bias [9, 8]. When appropriate, clinical practice guidelines development should involve patient and caregiver groups, and potentially have versions developed directed at caregivers [8, 10]. It is currently unclear which guidelines include recommendations for how clinicians should address medication non-adherence. Clinicians look to clinical practice guidelines as sources of best practices for delivering evidence-based health care. It is important to review such

guidelines to ensure that the recommendations have been developed using appropriate methods and reflect what is known to be effective according to the current research literature.

This article reports the results of a systematic review of national and international guidelines on the management of patient adherence to medications. This review was conducted as part of the 'Ascertaining Barriers for Compliance (ABC)' Project, an initiative funded by the European Union 7<sup>th</sup> Framework Programme, and followed the PRISMA guidelines for reporting systematic reviews [11].

### **Methods**

To meet this objective, a search strategy was developed to locate and identify clinical practice guidelines for medication adherence meeting the following criteria:

#### *Inclusion/Exclusion criteria:*

1. A publication (e.g., journal article, white paper, consensus document) outlining guidelines for addressing medication adherence in clinical practice, health care systems, or research.
2. The guidelines must be national or international in scope (i.e., not center-specific).
3. The guidelines must deal primarily with medication adherence behavior
4. The publication's purpose must have been to develop guidelines to improve at least one component of medication adherence, according to the ABC Taxonomy (i.e., initiation, implementation, or persistence) [1]. Only papers that had the development of guidelines or recommendations as the primary aim were included.
5. The publication must have been presented as an official guideline of a national/international organization or society with the standing to establish guidelines or policy for health care delivery. Expert opinion papers by researchers or clinicians working independently that did not have the standing of official guidelines will be excluded.

The search for guidelines was initiated by identifying and obtaining national and international guidelines known to the ABC Project partners. We then expanded this by sending an e-mail request out to all members of the European Society for Persistence, Adherence, and

Compliance (ESPACOMP; [www.espacomp.eu](http://www.espacomp.eu)). Guidelines suggested by these experts were obtained to be reviewed for eligibility.

A literature search was conducted simultaneously in MEDLINE (PubMed), CINAHL, EMBASE, and the Cochrane Library from inception through August 2013 using English-language search terms. Terms included synonyms for adherence, as the terminology is inconsistently used and has changed over time. The PubMed search strategy is shown in Table 1. The search strings for other databases can be obtained from the authors upon request.

[Insert Table 1 here]

Additionally, internet searches were conducted using applicable search engines to identify any possible adherence management guidelines that had not been published in the indexed academic literature (i.e. grey literature). We conducted general searches and also searches specific to results from specific European countries/regions which were the designated focus area for the ABC Project (e.g., .eu [European Union], .uk [United Kingdom], .be [Belgium], .fr [France], .de [Germany], .pl [Poland], .ch [Switzerland], .nl [Netherlands], .dk [Denmark], .at [Austria], .es [Spain], .it [Italy], .pt [Portugal], .gr [Greece], .hu [Hungary], .cz [Czech Republic], .fi [Finland], .hr [Croatia], .ie [Ireland], .is [Iceland], .lu [Luxembourg], .no [Norway], .se [Sweden]). We reviewed the first 100 results for general searches and the first 10 results for country/region specific searches using combinations of the same search terms used in the scientific literature databases.

Titles and abstracts of search results for all searches were independently reviewed by two reviewers. Final eligibility was determined by reviewing the full text of any reports deemed to be potentially eligible on the initial screening.

Data extracted from the eligible guidelines included the citation information, year of publication, health condition of interest, intended scope of the guideline, how the guideline was developed, what specific recommendations were made, and whether the guideline included an algorithm for adherence management. Guideline quality was rated using the Global Rating Scale of the Appraisal of Guidelines, Research, and Evaluation II (AGREE II-GRS), a five-item instrument containing rating the quality of the methods, reporting, presentation, and recommendations of guidelines [9]. Each item is scored on a seven-point scale. Quality was independently rated by two doctorally-prepared researchers with expertise in medication adherence interventions. Reported scores are the average of the reviewers' ratings, in

accordance with the published methods of the AGREE II-GRS instrument. Disagreements between reviewers during data extraction and quality rating were resolved through discussion until consensus was reached.

Since the guidelines varied greatly in the types of recommendations and the detail provided, the lead author conducted a content analysis leading to categories of interventions for the purposes of organizing the results. Although taxonomies are being developed to provide standardization of types of behavioral interventions, such taxonomies are still under development at this time, and the published categories do not include interventions directed at health care providers or health systems [12-14]. Thus, we used content analysis guided by categories previously used in medication adherence meta-analyses to describe and categorize the interventions recommended in the reviewed guidelines.

## Results

Experts provided 17 guidelines. The database searches identified 3872 unique citations, and our grey literature search yielded an additional five new documents that were subsequently screened against inclusion and exclusion criteria (see Figure 1). The most common reason for exclusion was that the publication did not provide practice recommendations for improving or managing medication adherence. For example, many guidelines provided instructions for which medications to prescribe, but did not include any guidance for managing adherence to the prescribed medications. Table 2 contains an overview of the 23 guidelines included in this review.

[Insert Figure 1 and Table 2 approximately here]

Nine of the 23 guidelines originated from authors or organizations based in the United States, three in Canada, three in the United Kingdom (UK), and one each in Australia and Spain. Six guidelines had authors from multiple countries in specific regions—one from Central and South America, one in the Middle East, one in Europe. Three guidelines were developed by authors from a diverse set of nations not focused on any one region. Regarding the intended scope of the guidelines, eleven were intended for their country of origin, seven were intended for an international audience, and five guidelines did not include specific information about the guideline's intended scope. The guidelines' treatment foci included HIV/AIDS [15-19], cardiovascular disease [20-24], contraception [25, 26], menopause [27, 28], mental health [29] or depression [30], multiple sclerosis [31], osteoporosis [32], renal transplant [33], and asthma

[34]. Three guidelines were general guidelines, and did not specify a health condition focus [35-38]. Some guidelines included direction for proper prescribing along with how to address medication adherence [15]. Others were adherence-focused guidelines that could be used along with prescribing guidelines published by the same organization(s) [20].

Table 2 reports a summary of the reported methods used to develop each guideline. Although most guidelines used a formal expert consensus panel (n=17), reviewed existing literature (n=17), or a combination of both methods (n=13), only seven guidelines provided a detailed description of the methods used, including details of the literature search and the criteria for consideration, or the procedures for how the expert panel functioned to reach their final recommendations.

The initial review of included publications extracted a list of 48 types of recommendations. This initial list of recommendations was re-reviewed, merging similar recommendations under broader themes that emerged as the content of the guideline recommendations was reviewed. A summary of strategies suggested by each guideline is presented in Table 3.

[Insert Table 3 approximately here]

### *Assessment Strategies*

A majority of the guidelines (n=20; 87%) recommended some type of assessment of adherence or of risk factors for non-adherence. Ten studies (43%) recommended that health care providers should regularly assess patients' adherence to medications. Six of the ten suggested self-report measures of adherence as an option, although three of these recommended that other measures (e.g. pharmacy refill data, electronic monitoring, clinician estimate) should be used as well. Most of the guidelines (n=15; 65%) recommended multiple types of assessments (e.g., medication adherence (n=10), readiness to change (n=5), lifestyle factors (n=5), patient treatment goals (n=4), barriers to adherence (n=4), side effects or persistent symptoms (n=4), literacy (n=3), etc.).

Five guidelines recommended assessing a patient's readiness to change. This assessment permits the provider to gauge the patient's level of motivation for enacting changes in medication-taking behavior to improve adherence. Adherence management approaches can then be tailored to the patient's perceived level of readiness to change his or her behavior [37,



36, 15]. The Case Management Adherence Guidelines [36] provided examples of tools for assessing readiness to change.

Recommendations to assess barriers to adherence were found in four guidelines. A significant amount of literature addresses potential barriers to effective medication adherence [39, 40]. Potential barriers included, but are in no way limited to: medication cost, co-morbidities, depression, health beliefs, perceived benefits from the medication, and cognitive function [41, 39, 42].

### *Educational Strategies*

Educational strategies are those which recommended that patients or caregivers be taught about the patients' medications, how to take the medications, or about the health condition for which the medication was prescribed. Eighteen of the guidelines (78%) included an educational component to their recommendations. Those guidelines that provided detailed instructions about educational approaches specified the need to provide clear instructions for how patients should take their medications. Three of the guidelines (two focused on contraceptives and one general guideline) suggested that health care professionals provide instructions to patients for what to do in the case of missed doses.

Some guidelines also stated the usefulness of providing additional education for patients who may lack the necessary insight into their condition [29, 36]. Providing educational content on the consequences of non-adherence and the therapeutic benefits of effective medication adherence, it was reasoned, helps the patient to understand the need for adequate adherence, providing the necessary knowledge for establishing motivation to adhere. One guideline, dealing with adherence in mentally ill patients, recommended cognitive-behavioral therapy and/or patient psycho-education to reduce negative perceptions (stigma) regarding medication-taking [29].

### *Behavioral Strategies*

Behavioral strategies involve approaches designed to directly change medication-taking behavior or some aspect of the behavior, as opposed to teaching the patient about their medication or the reasons for taking medication. Seventeen of the guidelines (74%) included a recommendation for a behavioral strategy. The most frequent strategies recommended were simplification of the medication regimen (n=10), symptom or side effect monitoring (n=8), and providing reminders or medication organizer containers as needed (n=7). Eight guidelines also

made nonspecific recommendations for “behavioral strategies” and five recommended individually tailoring medication regimens. Behavioral approaches would also include teaching patients to associate medication-taking with another habitual behavior. Unfortunately, the lack of specificity of the behavioral strategy recommendations in many guidelines made it difficult to reach conclusions on which behavioral approaches are actually the most recommended.

### *Therapeutic Relationship, Communication, and Health Care Provider Factors*

The Therapeutic Relationship, Communication, and Health Care Provider Factors category includes any recommendations that were focused on changing some aspect of how the health care provider should interact with the patient. Nineteen guidelines (83%) made recommendations to improve the patient-provider relationship, improve communication between patients and providers, or otherwise improve health care providers’ ability to address patients’ medication needs and concerns.

The most common recommendations in this category were to involve the patient in treatment decisions (n=9, 47%) and to improve the therapeutic relationship (n=7, 37%). Guidelines were generally vague on specific steps providers could take to actually improve therapeutic relationship with patients. Particular recommendations that were offered included (in addition to including the patient in treatment decisions) improving communication, asking open-ended questions, being open-minded about patient viewpoints and patients’ right to autonomy, providing rationales for treatment recommendations, and asking patients about their specific concerns. Other less commonly recommended strategies included clinician training to address adherence; telephone resources and improved telephone support, particularly after treatment initiation; involving other health care disciplines in a multidisciplinary intervention; expanding medication management support services for patients with poor adherence; choosing medications based on evidence-based guidelines, and creating a medication adherence program or having written, updated adherence strategies.

Three guidelines recommended motivational interviewing as a method for improving adherence to medications [17, 19, 36]. The rationale for these approaches are for the provider to develop a rapport with the patient, assess the patient’s motivation to adhere and readiness to change, and then collaborating with the patient to establish goals and make behavioral changes necessary to improve medication adherence behavior [36, 29]. The guidelines acknowledged that evidence supporting the efficacy of motivational interviewing, cognitive-behavioral therapy, and patient psycho-education to improve adherence to medications is inconclusive.

### *Outside Influences and Co-Morbidities*

The final category involved strategies to address outside influences on adherence and to manage co-morbidities. Seven guidelines (70%) recommended engaging or improving family or other social support networks. Three (30%) suggested that health care providers should address financial barriers to adherence in some manner. Finally, one guideline recommended addressing substance abuse in patients with adherence concerns.

## **Discussion**

Accepted methods exist for what is considered to be the state of the art for developing clinical practice guidelines. These methods include systematically reviewing all available evidence and rating the strength of the evidence for each recommendation made [8]. The clinical practice guidelines for improving adherence to medications largely did not follow recommended guideline development methods. Most adherence guidelines provided limited details about the methodologies used to determine their recommendations. Further, the recommendations should be subjected to external review, and the procedures for guideline development should be published and transparent. Only two of the guidelines in this review clearly met these criteria, the International Association of Physicians in AIDS Care [16] and the Kidney Disease: Improving Global Outcomes guidelines [33]. Future adherence guideline development work should incorporate systematic reviews of existing research, as well as meta-analytic syntheses of tested interventions to determine the most effective intervention strategies for specific patient populations. Guideline developers may also benefit from looking at adherence literature from outside their specific clinical focus.

Educational approaches have long been at the forefront of interventions necessary to improve adherence to medications. The guidelines, however, recognize that education to change health behavior works best in conjunction with more active, behavioral approaches, and that no approach should rely solely on patient education [43, 44]. Behavioral strategies are an important component of intervention programs to manage and improve adherence to medications [43-45]. Behavioral strategies vary, but can include unit-dose packaging, medication self-monitoring, symptom or side-effect self-monitoring, reminders or other stimuli or cues to take medications, feedback, and associating medication-taking with other daily

activities. Such approaches help patients to apply knowledge gained from educational approaches by actually doing things to modify behavior [43, 44] .

A large number of guidelines recommended strategies designed to improve the patient-provider relationship or to improve communication between patients and providers. This demonstrates the importance of implementing strategies that focus not only on patients but also on health care providers, in accordance with recent insights from structured literature reviews and meta-analyses [46-48]. Patient-provider relationships may also be improved through interventions at the health care system, or even health policy level to improve management of medication adherence. For example, if policies or systems were changed to facilitate insurance reimbursement for behavioral medicine interventions or for patient-provider interactions other than face-to-face appointments, providers may be more open to communicating with patients about their health and health behavior through methods that patients find more convenient. Using such multi-level approaches to adherence improvement is more likely to reach greater numbers of patients and yield greater overall improvement than focusing solely on patient-level interventions [49, 50].

Fewer than half of the guidelines recommended strategies addressing patients' motivation to change medication-taking behavior. Motivation is being increasingly recognized as a key factor in many types of health behavior changes. Motivation interventions are relatively new, compared to many of the intervention approaches for medication adherence. Although interventions such as motivational interviewing have been shown to be modestly effective for some health behaviors, additional research is needed at this point to further evaluate the effectiveness of approaches as part of programs to improve medication adherence [51, 52].

### *What is Missing*

The guidelines often provided vague strategies, with few specifics. While the particular details for implementing adherence management strategies will certainly differ between clinical practice locations, guidelines can be more useful if they provide examples of specific interventions to assist health care providers in developing the necessary skills and resources to better address adherence to medications. For example, Machtiger and Bangsberg [19] provide example scripts to use when interviewing patients about their medication regimen and to assess patient adherence. The general guideline by Aliotta, Vlasnik, and De Lor [36] provides a number of tools to assess factors such as social support, medication knowledge, and readiness to change..The use of standardized behavioral change intervention taxonomies, such as that

proposed by Michie and colleagues may make it easier to recommend adherence behavior change approaches [14].

One piece that was noticeably missing from most guidelines was an algorithm to assist health care providers in determining what intervention strategies to use in which situations or to address specific modifiable risk factors. While adherence management rarely fits a 'recipe' approach, for health care providers with minimal formal training in addressing adherence issues, practice algorithms can be a useful tool until the novice provider reaches a greater level of expertise in working with patients to improve and maintain effective medication adherence.

Interactive health technology is an emerging area of medication adherence interventions [46]. Based on this review, technology interventions are not sufficiently incorporated into medication adherence guidelines. Future guidelines should evaluate the efficacy of such interventions and include them as potential intervention approaches, if supported by evidence of efficacy in the literature. As a whole, the existing guidelines do not sufficiently present the evidence base for their recommendations.

Dissemination plans for existing guidelines are also lacking. Failure to adequately disseminate and promote new guidelines impedes the adoption of useful guidelines into clinical practice. Future guidelines should include dissemination plans as part of the development process.

### *Limitations*

This review does have some limitations. It is possible that our search strategy missed some guidelines, particularly national guidelines published in languages other than English that may not have been found in our searches. Our electronic database and web searches were conducted in English, which may have limited our search results. It is also possible that by limiting our scope to national and international guidelines, we excluded regional guidelines that may have contributed useful information. We attempted to mediate this limitation by conducting broad searches and engaging a network of adherence experts in a diverse set of countries through the ESPACOMP mailing list. Finally, due to the small number of guidelines per country and the differences health condition focus among the guidelines, we decided that comparisons between studies would not be appropriate.

## **Conclusion and Recommendations**

Given the high prevalence and high costs of medication non-adherence, it was surprising how few practice guidelines exist for improving and managing patient adherence to medications. Many health care organizations establish guidelines for proper prescribing of medications for specific health conditions, but do not provide guidelines for addressing how to support patients in taking the prescribed medications to ensure the greatest possible health benefits from treatment are obtained. It is possible that the groups designing the prescribing guidelines do not have members with the background in behavioral medicine and medication adherence to facilitate including guidelines for adherence management.

The range of recommendations and differences in level of detail make comparing and evaluating the guidelines difficult. Future work in guideline development should be more clearly guided by research findings and appropriate synthesis of existing studies. Furthermore, comparative effectiveness research methods should then be used to evaluate guidelines to ensure that guideline implementation does yield improvements in adherence and health outcomes.

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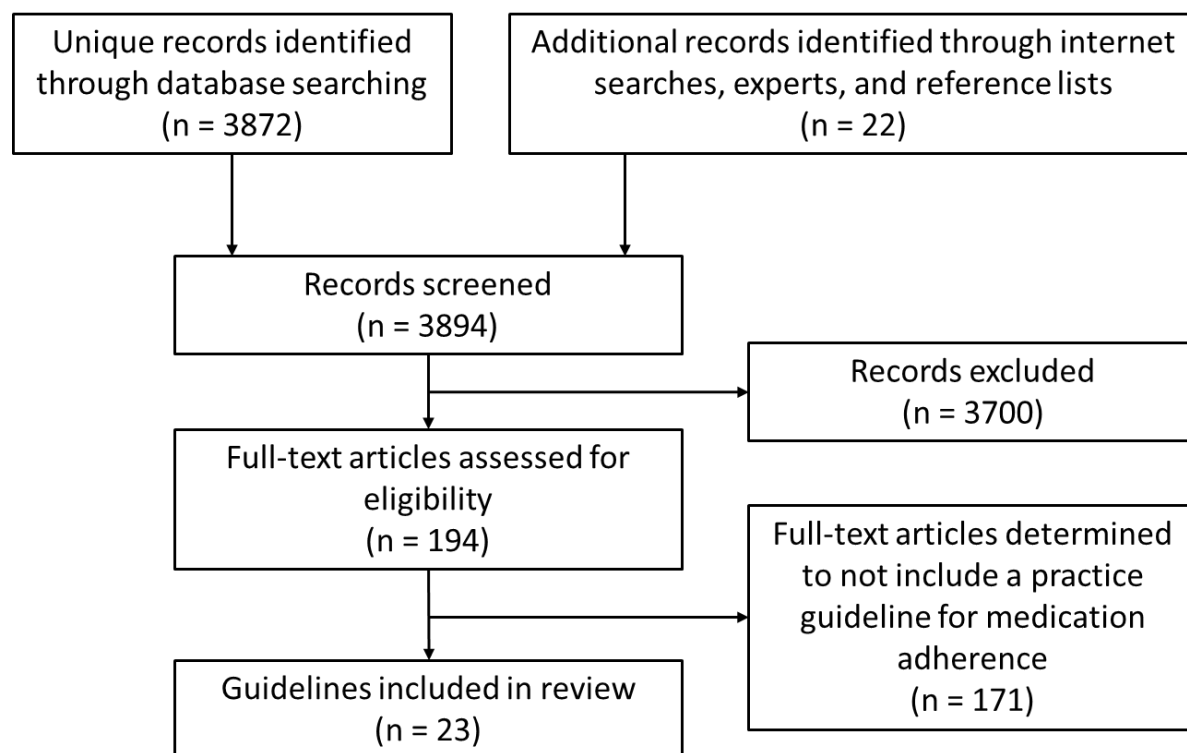
Figure 1. *Search Flow Diagram*

Table 1: Database Search Terms

	<b>MEDLINE:</b>
	<p>Patient compliance [majr] OR treatment refusal [majr] OR "compliance" OR adherence OR persistence or concordance OR nonadherence OR non-adherence OR noncompliance OR non-compliance</p> <p>AND</p> <p>practice guideline OR position paper OR white paper OR policy document OR consensus statement OR consensus report OR consensus conference OR policy report OR policy guideline OR consensus meeting OR practice recommendation OR round table OR roundtable OR task force OR consensus guideline</p>

Table 2: List of Included Guidelines

Primary Author	Year/ Region of Origin	Health Population Focus	Guideline Scope	Detailed guideline methods	Methods	Quality of evidence rated? <sup>a</sup>	Decision Algorithm Included?	Mean Guideline Quality Score <sup>b</sup>
Aliotta [36]	2004 USA	Not specified	Not specified	N	Methods not described	N	Y	3.0
International Working Group on Enhancing Patient Compliance and Oral Contraceptive Efficacy [26]	1993 International	Contraception	International	N	Literature review	N	N	2.0
Canadian Hypertension Education Program [24, 53]	2006 Canada	Hypertension	National	N	Expert panel; literature review	Y	N	4.5
Advisory Committee on Adherence to the Management of High Blood Pressure [21]	1998 Canada	Hypertension	National	N	Expert panel; literature review	Y	N	5.0
Society of Obstetricians and Gynaecologists of Canada [25]	2008 Canada	Contraception	National	Y	Expert panel; literature review	Y	Y	6.5
American Society of Hypertension Writing Group [20]	2010 USA	Hypertension	National	N	Literature review	N	N	3.5
American Heart Association [22]	1997 USA	Cardiovascular disease	National	N	Expert panel; literature review	N	N	3.5
European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO); International Osteoporosis Foundation (IOF) [32]	2013 Europe	Osteoporosis	International	N	Literature review	N	N	4.0
Kidney Disease: Improving Global Outcomes (KDIGO) [33]	2010 International	Renal transplant	International	Y	Expert panel; literature review	Y	N	6.5

Primary Author	Year/ Region of Origin	Health Population Focus	Guideline Scope	Detailed guideline methods	Methods	Quality of evidence rated? <sup>a</sup>	Decision Algorithm Included?	Mean Guideline Quality Score <sup>b</sup>
Grupo de Estudio de Sida (GESIDA); Sociedad Española de Farmacia Hospitalaria (SEFH); Plan Nacional sobre el Sida (PNS) [18]	2000 Spain	HIV/AIDS	National	(Abstract only available for review)	Expert panel	Unknown	Y	3.5
Machtiger [19]	2007 USA	HIV/AIDS	Not specified	N	Literature review	N	N	4.0
Maia [28]	2007 Latin America	Menopause (ERT/HRT)	International	Y	Literature review; expert opinion survey (n=72)	N	Y	5.0
National Asthma Council [34]	2005 Australia	Asthma	National	N	Expert consensus workshop; literature review	N	N	4.0
North American Menopause Society [27]	1998 USA	Menopause (ERT/HRT)	International	N	Expert consensus conference	N	N	3.5
National Collaborating Centre for Primary Care (NICE) [37]	2009 UK	Not specified	National	Y	Literature review; expert panel	N	N	6.5
American College of Cardiology [23]	2002 USA	Cardiovascular disease	Not specified	N	Expert panel consensus meeting; literature review	N	N	4.5
Panel on Clinical Practices for Treatment of HIV Infection, U.S. Department of Health and Human Services [15]	2001 USA	HIV/AIDS	National	N	Expert panel	N	N	5.0
British HIV Association (BHIVA); British Association for Sexual Health and HIV (BASHH) [17]	2004 UK	HIV/AIDS	National	N	Expert panel; review of meta-analyses (2) and RCTs (9)	N	N	3.5

Primary Author	Year/ Region of Origin	Health Population Focus	Guideline Scope	Detailed guideline methods	Methods	Quality of evidence rated? <sup>a</sup>	Decision Algorithm Included?	Mean Guideline Quality Score <sup>b</sup>
Royal Pharmaceutical Society [35]	2013 UK	Not specified	National	Y	Expert panel; literature review	N	N	4.5
International Association of Physicians in AIDS Care (IAPAC) [16]	2012 International	HIV/AIDS	International	Y	Expert panel; literature review	Y	Published separately	7.0
Trivedi [30]	2007 USA	Depression	Not specified	N	Methods not described	N	N	2.5
Expert Consensus Panel on Adherence Problems in Serious and Persistent Mental Illness [29]	2009 USA	Mental health	Not specified	Y	Expert panel survey (n=41); literature review	N	Y	4.5
Middle East MS Advisory Group [31]	2010 Middle East	Multiple Sclerosis	International	N	Expert panel	N	N	4.5

<sup>a</sup>Quality of Evidence Rated refers to whether the guideline authors reported having utilized a rating system for the evidence used to develop the practice guideline.

<sup>b</sup>Mean guideline quality score is the mean score of the overall guideline quality assessed by the AGREE II-GRS Instrument [9]. Scores range from 1 (lowest quality) to 7 (highest quality).

Table 3. *Intervention Categories by Guideline*

Primary Author	Health Population Focus	Assessment	Educational Approaches	Behavioral Strategies	Therapeutic Relationship/ Communication	Address Outside Influences & Co-morbidities
Aliotta [36]	Not specified	Y	Y	Y	Y	Y
International Working Group on Enhancing Patient Compliance and Oral Contraceptive Efficacy [26]	Contraception	N	Y	Y	N	N
Canadian Hypertension Education Program [24, 53]	Hypertension	Y	Y	Y	Y	Y
Advisory Committee on Adherence to the Management of High Blood Pressure [21]	Hypertension	Y	Y	Y	N	Y
Society of Obstetricians and Gynaecologists of Canada [25]	Contraception	N	Y	N	Y	N
American Society of Hypertension Writing Group [20]	Hypertension	Y	N	Y	Y	N
American Heart Association [22]	Cardiovascular disease	Y	Y	Y	Y	N
ESCEO/IOF [32]	Osteoporosis	Y	Y	Y	Y	N
KDIGO [33]	Renal transplant	Y	Y	N	N	N
GESIDA/SEFH/PNS [18]	HIV/AIDS	Y	Y	N	N	N
Machtiger [19]	HIV/AIDS	Y	N	N	Y	N
Maia [28]	Menopause (ERT/HRT)	Y	Y	Y	Y	N
National Asthma Council [34]	Asthma	Y	N	Y	Y	N
North American Menopause Society [27]	Menopause (ERT/HRT)	N	Y	Y	Y	Y
NICE [37]	not specified	Y	Y	Y	Y	Y
American College of Cardiology [23]	Cardiovascular disease	Y	Y	Y	Y	N



<b>Primary Author</b>	<b>Health Population Focus</b>	<b>Assessment</b>	<b>Educational Approaches</b>	<b>Behavioral Strategies</b>	<b>Therapeutic Relationship/ Communication</b>	<b>Address Outside Influences &amp; Co-morbidities</b>
Panel on Clinical Practices for Treatment of HIV Infection [15]	HIV/AIDS	Y	Y	Y	Y	Y
BHIVA/BASHH [17]	HIV/AIDS	Y	N	Y	Y	Y
Royal Pharmaceutical Society [35]	Not specified	Y	N	N	Y	N
IAPAC [16]	HIV/AIDS	Y	Y	Y	Y	Y
Trivedi [30]	Depression	Y	Y	Y	Y	Y
Expert Consensus Panel on Adherence Problems in Serious and Persistent Mental Illness [29]	Mental health	Y	Y	Y	Y	Y
Middle East MS Advisory Group [31]	Multiple Sclerosis	Y	Y	N	Y	N