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## **Classifying clinical practice guidelines**

### **Introduction**

As defined by the Institute of Medicine, clinical practice guidelines (CPGs) are:

**“systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances”<sup>1</sup>.**

Another possible (but less comprehensive) definition is **“All the information relevant to a diagnostic and therapeutic approach to the solution and care of a patient’s medical problem”<sup>2</sup>.**

Inferring from these definitions, a primary purpose of a CPG is to improve quality of care by supplying the practitioner with information regarding the specific problem with which he or she is dealing. Many authors find two other issues that stimulate development of CPGs: The need to reduce variability in clinical practice and to control costs.

Searching through the medical literature, paper-based and electronic, one can find myriad CPGs published by various medical organizations.

The variety of the CPGs in the medical literature is a consequence of several factors, among which I will mention a few:

- The infinite variations of medical problems- a different guideline can be created for each of the problems.
- The local tailoring of common guidelines to the needs or opinions of each medical institution or practitioner creates new variations of a guideline.
- The variety of types of caregivers that can use guidelines. For a clinical problem, a guideline may be targeted to the specialist, general practitioner, nurse, paramedic and even the patient. Therefore, different guidelines (or different views of the same guideline) can be dealing with the same medical subject.

Classifying guidelines, as any other classification, depends on the use of the proposed classification. Considering representing and implementing guidelines one can classify

them in many different ways, each of them might reveal different aspect needed to be considered. In general, we need the classification to help us determine:

- how much structure is required for a specific guideline
- what classes and attributes need to be specified
- In what venue will it be exchanged and utilized

The purpose of this document is to delineate a map of possible guidelines' classifications that cover various aspects of representing guidelines in GLIF. I describe the characteristics of each classification and emphasize some central points that we should consider. At the end of this document there are references to some representative published guidelines.

### **Methods**

- A survey of literature was used to find the obstacles of implementing guidelines.
- A search for published CPGs was undertaken using the Internet and Medline.
- Combining the above different ways of classifying guidelines were figured.
- Possible attributes that reflect various aspects of modeling guidelines for computation were used to characterize some of the classes.

## **Discussion**

In the following paragraphs I will describe possible classifications of CPGs.

### **1. The medical purpose.**

This classification is based on the medical characteristics of the guideline: in what field of medicine is it used.

The suggested classification is as follows:

- **Management of disease**
  - **Chronic disease** (e.g. Guidelines for the Management of Patients with chronic Stable Angina).
  - **Acute disease** ( e.g. Unstable Angina: Diagnosis and Management)
- **Emergency medicine** – guidelines that reflect the need to immediate decisions (e.g. The ATLS or ACLS guidelines).
- **Preventive medicine** – use of vaccines. (e.g. Prevention of Varicella: Recommendations of the Advisory Committee on Immunization Practices).
- **Risk assessment** – finding the risk of a particular patient's states (e.g. Guidelines for Assessing and Managing the Perioperative Risk from Coronary Artery Disease Associated with Major Non-cardiac Surgery).
- **Appropriateness criteria / eligibility** – finding if a suggested procedure (diagnostic or therapeutic) is appropriate for a specific patient (e.g. appropriateness of coronary artery bypass).
- **Diagnostic steps** – steps towards the diagnosis of a patient's disease causing a specific symptom (e.g. Diagnosing Syncope).
- **Screening** – deciding whether screening is necessary for a particular disease and a specific patient, and choosing the appropriate procedure (e.g. Screening for Thyroid Disease).
- **Appropriate use of a specific technology** – various aspects of using a single technology (diagnostic or therapeutic) (e.g. Quality Determinants of Mammography).
- **Specific therapeutic modality** – various aspects of using a single therapeutic modality in different clinical states (e.g. Pulmonary Rehabilitation).
- **Clinical trial protocol**

Characterization of the different classes by some attributes:

<b>Guideline class</b>	<b>Complexity</b>	<b>Points of entry</b>	<b>Time</b>	<b>encounters</b>	<b>Use of subguidelines</b>	<b>Eligibility criteria</b>
<b>Chronic disease</b>	Most complex	Multiple	Months / years	Multiple	Usual (parallel)	complex
<b>Acute disease</b>	Complex (May variable)	Usually one	Days / weeks	multiple	Yes	Usually simple
<b>Emergency medicine</b>	Simple	One	Immediate	One	None	Very simple
<b>Preventive medicine</b>	Simple	One	Immediate	One	None	simple
<b>Risk assessment</b>	Simple	One	Short	One or few	Usually none	Simple
<b>Appropriateness criteria</b>	Simple	One	Short	One or few	Usually none	Simple
<b>Diagnostic steps</b>	Moderate	One	Weeks	Multiple	May use	Simple
<b>Screening</b>	Simple	One	Short	One or few	None	Simple
<b>Use of Technology</b>	Simple	One	Immediate	One	None	Simple
<b>Therapeutic modality</b>	Simple	One	Variable	Variable	None	Simple
<b>Clinical protocol</b>	Simple	One	Months	Multiple	May use	simple

## **2. The intended use of the guideline.**

Guidelines can be used for these listed purposes:

- **Management of patients:**
  - **Workflow facilitation/encounter support** – helping the physician to manage the entire encounter. Many of the above mentioned CPGs intend to do so.
  - **Following a protocol** – research or treatment
  - **Consultation aid**
    - **Critical path/care plan** – helping the physician in solving a specific problem and finding the appropriate care plan for the patient.
    - **Referral/appropriateness determination** – deciding whether the patient should be referred to an expert, diagnostic procedure or therapeutic procedure.
    - **Prevention of disease** – screening and other modalities
  - **Creating alerts / reminders** – a guideline or part of it can be used to create alerts and reminders (electronic or paper based).
- **Reference tool** – to medical literature or other guidelines (for that reason the guideline should specify clearly if it is appropriate to use it on any specific patient. If it is not – it should refer the physician to another suitable guideline).
- **Reviewing previous decisions/ management (quality assurance)** – checking retrospectively if the documented management of a patient or a group of patients is compatible to guideline recommendations.
- **Education/training** – in order to facilitate this important purpose the guideline should be well annotated with as many as possible references to supplemental material.

Ideally the representation of each guideline should enable all of the above possible uses of a guideline.

### **3. The user.**

The simple way to classify CPGs by its “target” is as follows:

- Physicians
- Nurses
- EMR technicians
- Physician assistants
- Other paramedical personnel
- Administrative personnel
- Patients

Most of the guidelines published in the medical literature are aimed for physician’s use, but we can find examples that target each of the above mentioned groups. In many instances, a specific guideline is written in a different way to target several populations. For example, each of the AHCPR guidelines has a version that is directed to patients<sup>4</sup>. Usually, the guidelines aimed for other caregivers than physicians deal with narrower subjects and tend to get into much more details (e.g. “If the patient is unable to provide this information, try to interview a family member” or another “Have patient shift weight every 15 minutes if able.”). The steps in these guidelines are usually less vague and less ambiguous than one occasionally finds in CPGs (statement like “**consider** doing action x” is typical in a guideline directed for physicians’ use). Therefore I find the guidelines of other caregivers than physicians less complicated to model. Though, we should consider how “deep” the GLIF guideline will dive into details (e.g. In level C should the guideline “notify” every 15 minutes that the patient should shift weight as a part of management of decubitus ulcers guideline?).

The most important consideration of guidelines from the user’s point of view is whether the user is an **EXPERT** or a **NOVICE** in the field that the guideline is dealing with. While the novice expects to be directed step by step, the expert takes shortcuts and chunk clinical data into higher level concepts<sup>9,2</sup>. Ideally, GLIF should support both version of use of the same guideline: the user should be able to choose to skip some steps or to expend the flowchart depending on his skills in the specific field.

#### **4. The developer.**

CPGs are developed by some kinds of institutions:

- National agencies (e.g. AHCPR)
- Professional organizations – international, national or local (e.g. ACP/ASIM, European Association of Poisons Centers and Clinical toxicologists / American Academy of Clinical Toxicology)
- Medical Insurance agencies / payers (e.g. Harvard Pilgrim Health Care, Inc.)
- Individual institutes (e.g. Brigham and Women's Hospital)

The same topic of guideline may differ in the level of representation, depending on the developing institute. Individual institution guideline tends to be more specific. Our model should support changing of a guideline published by higher level institute (national or professional) to a local institute.

#### **5. The source of the guideline.**

Possible sources of guidelines can be:

- Own developed by the institution
- Revised version of a previous self-developed guideline.
- Adapted guideline from another source.
- Local tailored version of an adapted guideline.

This classification emphasizes the fact that guidelines are dynamic “objects” that change over time and place. The implementation in GLIF should enable changing of guidelines (while saving the information of the source guideline, who developed it, who changed it and when). It should support a mechanism to update a guideline (including a warning message if the guideline was not updated for a long time, like two years).

## **6. Utilization site.**

Guidelines can be used in the following sites:

- Out of hospital (road, field)
- Ambulatory care facility.
- Outpatient clinics.
- Acute care site (emergency department, ICU, operating room).
- Inpatient wards

Creating a tool that will enable the use of CPGs in the field setting is challenging. In addition to a very friendly and quick user interface, the guidelines should be represented in a very clear and unambiguous way. The same is the rule for implementing guidelines in acute care site.

Guideline of the same topic may be quite different when they are applied in different sites. For example, the treatment of head injury will be different in the field than in the ER, and in the treatment of acute asthmatic attack in an ambulatory care facility we will consider mainly when to send the patient to hospital.

Using that classification we should also consider how will the guidelines be distributed to the different sites (not all of them connected to online services).

## **7. Types of guidelines presentations.**

Guidelines can be represented to the user in various ways<sup>10</sup>:

- **Text**
  - Prose
  - List format algorithms (protocols)
  - Flowcharts (algorithms)
- **Text with easy accessibility** (index or search engine)
- **Interactive algorithm** – the user enters patient data and gets specific recommendations regarding his patient.
- **Guideline that works in conjunction with EMR** – data is transferred automatically or on request from the patient EMR to the guideline engine and the recommendations are embedded in the EMR.



- The guideline is a separate entity that can be connected to EMR and collect information as needed.
- The guideline is an integral part of the EMR

The text representation can be on paper or screen. The rest must use computers. Text representation is level A, While interactive algorithm and EMR based guidelines are level C. The physician is likely to adopt the EMR guideline better than the text based, as it can be used without interrupting (or rather then that – improving) his workflow.

I believe that the aim of GLIF is to be able to represent guidelines that will work in conjunction with the EMR. Nonetheless, it shouldn't lose the ability to work as a stand alone tool and even to be able to print charts that will be used as paper based guidelines.

### **8. Possible ways to distribute guidelines**

- Medical books
- Medical journals
- Letters to practitioners
- Posting the guideline on a WEB site
- Posting the guideline on the institute WEB (intranet)
- Implementing the guideline in the EMR

Needless to say that as we go down the list the guideline will probably have a better distribution and implementation.

### **9. Mode of usage.**

Guidelines can be used in different modes:

- Education – the guideline serves to educate the practitioners, and thus to improve their practice.
- “Off line” usage – the guideline is used when the patient already is gone. The physician gets the recommendation after the patient left.
- “Online” usage – data is entered into the guideline in front of the patient. The decision and recommendation are taken while the patient is still available in the room.

## **10. Information management services model.**

Shiffman et al<sup>11,12</sup> designed a model to evaluate implementation of CPGs. Though it is not pure classification I preferred to present their model since the list of their attributes might predict successful implementation of guidelines. Some of the ideas were introduced earlier in this document.

The information management services model comprises eight components:

- **Recommendation** – this is the essence of the guideline: how clear and in what medium the guideline recommendations are presented.
- **Documentation** – does the guideline tool support documentation processes? How is the data captured into the guideline tool?
- **Explanation** – are the guideline's recommendations supported by supplemental material? Are there any references to supporting material?
- **Presentation** – what is the way the output of the guideline tool is presented? Is it friendly (charts, graphs etc.).
- **Calculation** – can the guideline tool save the physician necessary calculations (like calculating a dose of drug on the basis of body weight).
- **Registration** – is it possible to get patient administrative data from other application? Is the guideline tool a stand-alone tool?
- **Communication** – the transmission and recipient of electronic messages from other information providers.
- **Aggregation** – derivation of population based information from individual patient data.

The authors states that a tool that has all of the above qualities has a better chance to succeed. Although the authors fail to improve their thesis by examining 20 systems (mainly due to lack of scientific data on the evaluation of the systems' effectiveness), their model seems reasonable and useful to consider before implementing a system.

## **Conclusion**

I presented here 10 ways to classify guidelines. Some of them are more important to us.

They are all interconnected and no one should be considered alone.

Each of the classifications might teach us something about the required structure of guidelines and the way to represent it in GLIF

Appendix : examples of common guidelines

<b>Name</b>	<b>Developer</b>	<b>Reference</b>
Prevention of Varicella: Recommendations of the Advisory Committee on Immunization Practices (ACIP)	CDC	<a href="http://aepo-xdv-www.epo.cdc.gov/wonder/prevguid/m0042990/m0042990.htm">http://aepo-xdv-www.epo.cdc.gov/wonder/prevguid/m0042990/m0042990.htm</a> MMWR Morb Mortal Wkly Rep 1996 Jul 12;45(RR-11):1-36
Adult immunizations (only the part that deals with chemoprophylaxis against influenza A)	United States Preventive Services Task Force (USPSTF)	<a href="http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=000210&amp;sSearch_string=influenza+immunization">http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=000210&amp;sSearch_string=influenza+immunization</a> Guide to clinical preventive services. 2nd ed. Baltimore (MD): Williams & Wilkins; 1996. 791-814 [202 references]
Guidelines for the Management of Patients with chronic Stable Angina	ACC/AHA/A CP-ASIM	<a href="http://www.acc.org/clinical/guidelines/june99/index.html">http://www.acc.org/clinical/guidelines/june99/index.html</a> Circulation 1999; 99:2829-2848 J Am Col Cardiol 1999; 33:2092-2197
Urinary Incontinence In Adults: Acute and Chronic Management	AHCPR	<a href="http://text.nlm.nih.gov/frs/pick?dbName=cuic&amp;frsK=43240&amp;cp=1&amp;t=943900270&amp;collect=ahcpr">http://text.nlm.nih.gov/frs/pick?dbName=cuic&amp;frsK=43240&amp;cp=1&amp;t=943900270&amp;collect=ahcpr</a> Rockville (MD): U.S. Department of Health and Human Services, Public Health Service, AHCPR; 1996 Mar. 125 p. (Clinical practice guideline; no. 2 [update]).
Cataract in Adults: Management of Functional Impairment	AHCPR	<a href="http://text.nlm.nih.gov/frs/pick?dbName=cac&amp;frsK=43240&amp;cp=1&amp;t=943900270&amp;collect=ahcpr">http://text.nlm.nih.gov/frs/pick?dbName=cac&amp;frsK=43240&amp;cp=1&amp;t=943900270&amp;collect=ahcpr</a>
1998 clinical practice guidelines for the management of diabetes in Canada	CMA	<a href="http://www.cma.ca/cmaj/vol-159/issue-8/diabetescpg/index.htm">http://www.cma.ca/cmaj/vol-159/issue-8/diabetescpg/index.htm</a> Supplement to CMAJ 1998;159 (8 Suppl)
Unstable Angina: Diagnosis and Management	AHPCR/ <b><u>NHLBI</u></b>	<a href="http://text.nlm.nih.gov/frs/pick?dbName=angc&amp;frsK=49672&amp;cp=1&amp;t=943909321&amp;collect=ahcpr">http://text.nlm.nih.gov/frs/pick?dbName=angc&amp;frsK=49672&amp;cp=1&amp;t=943909321&amp;collect=ahcpr</a> Rockville (MD): U.S. Department of Health and Human Services, Public Health Service, AHCPR; 1994 Mar. 154 (Clinical practice guideline; no. 10).
Upper respiratory infection		2 (pp 83-4)
Guidelines for Assessing and Managing the Perioperative Risk from Coronary Artery Disease Associated with Major Non-cardiac Surgery	<b><u>ACP</u></b>	<a href="http://www.acponline.org/journals/annals/15aug97/ppcad1.htm">http://www.acponline.org/journals/annals/15aug97/ppcad1.htm</a>  Ann Intern Med. 1997;127:309-312.
Guidelines for Risk Stratification after Myocardial Infarction	ACP	<a href="http://www.acponline.org/journals/annals/01apr97/ppmi.htm">http://www.acponline.org/journals/annals/01apr97/ppmi.htm</a> Ann Intern Med. 1997;126:556-560.
Surgery for thoracic outlet syndrome (TOS).	Washington State Medical Association	<a href="http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=001126&amp;sSearch_string=surgery">http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=001126&amp;sSearch_string=surgery</a>  Medical treatment guidelines. Washington State Department of Labor and Industries, 1999 Jun. 88 p.
Diagnosing Syncope	ACP	<a href="http://www.acponline.org/journals/annals/15jun97/ppsyncop.htm">http://www.acponline.org/journals/annals/15jun97/ppsyncop.htm</a> Ann Intern Med. 1997;126:989-996.
Managing Cough as a Defense Mechanism and as a Symptom	ACCP	<a href="http://www.chestnet.org/health.science.policy/chest.114.suppl2.html">http://www.chestnet.org/health.science.policy/chest.114.suppl2.html</a> CHEST 1998; 114 (2; suppl 2)
Laboratory Evaluation in the Diagnosis of Lyme Disease	ACP-ACIM	<a href="http://www.acponline.org/journals/annals/15dec97/pplyme1.htm">http://www.acponline.org/journals/annals/15dec97/pplyme1.htm</a> Ann Intern Med. 1997;127:1106-1108

<b>name</b>	<b>developer</b>	<b>Ref</b>
Screening for Thyroid Disease	ACP	<a href="http://www.acponline.org/journals/annals/15jul98/ppthyroid1.htm">http://www.acponline.org/journals/annals/15jul98/ppthyroid1.htm</a> Ann Intern Med. 1998;129:141-143
Screening for Prostate Cancer	ACP	<a href="http://www.acponline.org/journals/annals/15mar97/ppscreen.htm">http://www.acponline.org/journals/annals/15mar97/ppscreen.htm</a> Ann Intern Med. 1997;126:480-484
Cholesterol Screening in Asymptomatic Adults	ACP	<a href="http://www.acponline.org/journals/annals/01mar96/cholepp1.htm">http://www.acponline.org/journals/annals/01mar96/cholepp1.htm</a> Ann Intern Med. 1996;124:515-517
Quality Determinants of Mammography	AHCPR	<a href="http://text.nlm.nih.gov/ftsr/pick?dbName=mamc&amp;ftsrK=49672&amp;cp=1&amp;t=943909321&amp;collect=ahcpr">http://text.nlm.nih.gov/ftsr/pick?dbName=mamc&amp;ftsrK=49672&amp;cp=1&amp;t=943909321&amp;collect=ahcpr</a> Rockville (MD): U.S. Department of Health and Human Services, Public Health Service, AHCPR; 1994 Oct. 153 (Clinical practice guideline; no. 13)
Acute Pain Management: Operative or Medical Procedures and Trauma	AHCPR	<a href="http://text.nlm.nih.gov/ftsr/pick?dbName=apmc&amp;ftsrK=43240&amp;cp=1&amp;t=943900270&amp;collect=ahcpr">http://text.nlm.nih.gov/ftsr/pick?dbName=apmc&amp;ftsrK=43240&amp;cp=1&amp;t=943900270&amp;collect=ahcpr</a>
Pulmonary Rehabilitation	ACCP/AAC VPR	<a href="http://www.chestnet.org/health.science.policy/chest.112.1363.html">http://www.chestnet.org/health.science.policy/chest.112.1363.html</a> CHEST 1997; 112:1363-1396

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<http://www.acponline.org/sci-policy/guidelines/index.html>
4. AHCPR guidelines  
<http://text.nlm.nih.gov/ftsr/pick?collect=ahcpr&dbName=0&cc=1&t=944070498>
5. National guideline clearinghouse  
<http://www.guideline.gov/index.asp>  
a very useful site that have references to over 600 guidelines published by various American medical societies.
6. CDC preventive guidelines  
<http://aepo-xdv-www.epo.cdc.gov/wonder/prevguid/topics.htm>
7. Canadian medical association – CPG infobase  
<http://www.cma.ca/cpgs/index.htm>
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