Applying the Guideline Elements Model (GEM) Cutter II Tool to Guidelines Represented in the National Guideline Clearinghouse™ (www.guideline.gov)

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GEM - Guideline Elements Model

- An XML-based guideline document model that can store and organize the heterogeneous information contained in clinical practice guidelines (CPGs)
- Facilitates translation of natural language guideline documents into a format that can be processed by computers and read by humans
- GEM Cutter II is the tool used to abstract or parse the guideline information from text contained in clinical practice guidelines into GEM II formatted XML
- Developed by Richard Shiffman and colleagues, Yale Center for Medical Informatics

National Guideline Clearinghouse™ (NGC)

www.guideline.gov

- The Agency for Healthcare Research and Quality's (AHRQ's) online database of structured summaries of evidence-based clinical practice guidelines
- Freely available since 1999
- Currently has summaries for more than 2600 guidelines from over 200 different guideline developers
- 1/2 million visits each month

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Research Question…

- Could the GEM Cutter II tool be used to abstract the major recommendations from NGC's guidelines into XML format?
- Is this feasible? Practical? Reliable?

If so,….

"GEM cut" recommendations could be offered as an additional output on the NGC Web site.

NGC Research Study (Funded by AHRQ) Designed to Answer These Questions:

- Can the abstraction of recommendations into GEM be done outside of the current research environment at Yale?
- Is it scalable in a production environment such as NGC?
- How much time (cost) will this add to the NGC process?
- What are the challenges associated with this type of effort?

Overview of the Process: Abstraction

- A convenience sample of 20 guidelines "GEM cut" (parsed) in parallel by 3 NGC abstractors.
- Each abstractor first parsed major recommendations and other elements (title, target population, users, etc.) into a modified NGC template, then GEM cut this same content using the GEM Cutter II Tool.
- We examined how long it took them to complete the GEM-cut output as compared to the NGC, how often did they agree/disagree with each other on GEM abstraction, how often did they agree/disagree with the Yale team.

How Were Guidelines Selected for the Study?

- Guidelines must be **recently submitted** and **meet all NGC inclusion criteria**.
- In addition....

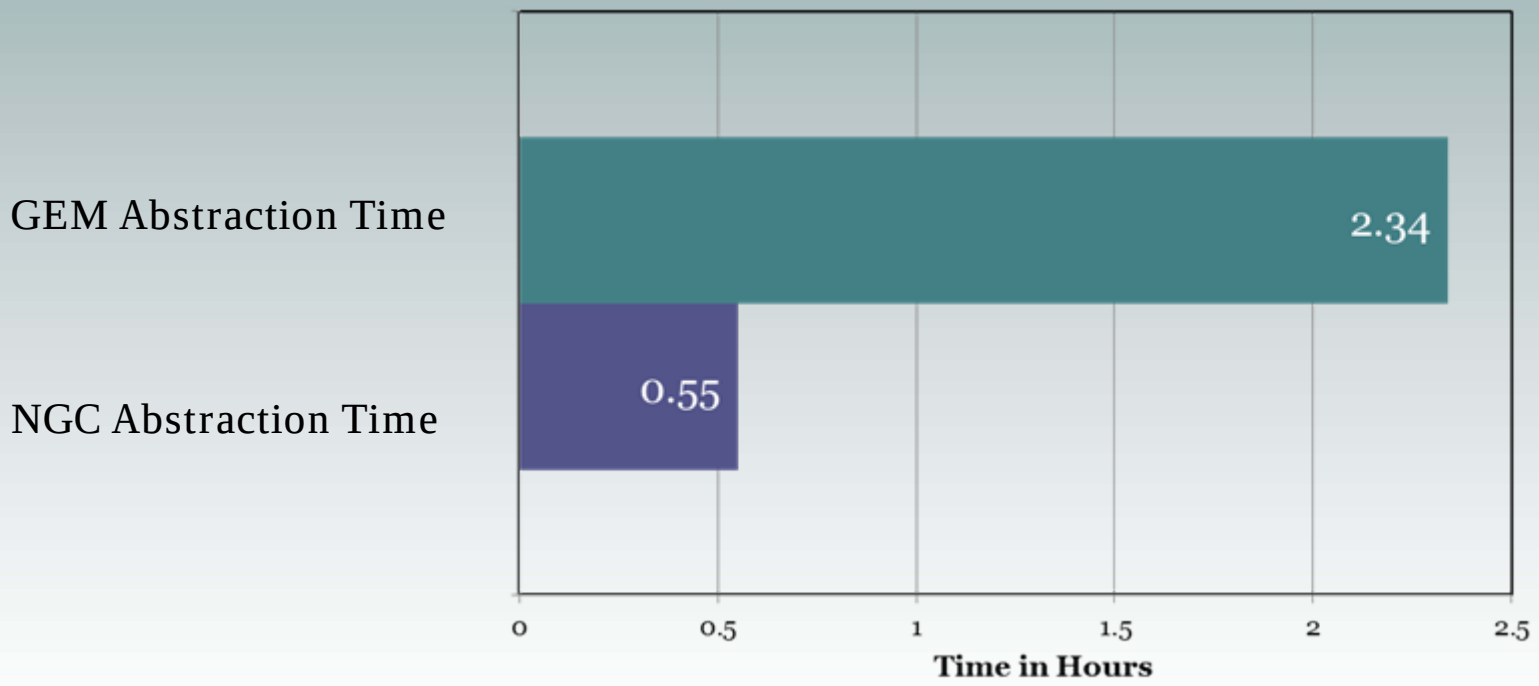
  We established the **GEM-Specific Inclusion Criteria**

GEM-Specific Inclusion Criteria:

- Guideline recommendations must be clearly identified rather than 'hidden' in narrative.
- Recommendations that are 'actionable' (decidable and executable) are preferred to statements of fact.
- Recommendations should not be presented as tables or algorithms.
- The number of recommendation statements should be manageable (<50).

Results?

Time Required for Abstraction (Average Mean)



1.8 hours more, on average, to perform GEM Abstraction of the same content.

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Why? Complexity of GEM Process

STATEMENT 1. DIAGNOSIS: Clinicians should diagnose hoarseness (dysphonia) in a patient with altered voice quality, pitch, loudness, or vocal effort that impairs communication or reduces voice-related QOL. *Recommendation based on observational studies with a preponderance of benefit over harm.*

Recommendations

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Major Recommendations

The evidence grades (**A-D, X**) and evidence-based statements (**Strong Recommendation, Recommendation** and **Option,**) are defined at the end of the "Major Recommendations" field.

Statement 1. Diagnosis

Clinicians should diagnose hoarseness (dysphonia) in a patient with altered voice quality, pitch, loudness, or vocal effort that impairs communication or reduces voice-related quality of life (QOL).

Recommendation based on observational studies with a preponderance of benefit over harm.

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In GEM abstraction, this same content can be parsed multiple ways.

RECOMMENDATION: STATEMENT 1. DIAGNOSIS:

Conditional:	Clinicians should diagnose hoarseness (dysphonia) in a patient with altered voice quality, pitch, loudness, or vocal effort that impairs communication or reduces voice-related QOL.
	Decision Variable: patient with altered voice quality, pitch, loudness, or vocal effort that impairs communication or reduces voice-related QOL
	Action: Clinicians should diagnose hoarseness (dysphonia)
	Benefit: Identify patients who may benefit from treatment or from further investigation to identify underlying conditions that may be serious, promote prompt recognition and treatment, and discourage the perception of hoarseness as a trivial condition that does not warrant attention
	Risk/Harm: Potential anxiety related to diagnosis
	Evidence Quality: Grade C, observational studies for symptoms with one systematic review of QOL in voice disorders and two systematic reviews on medication side effects
	Recommendation Strength: Recommendation based on observational studies with a preponderance of benefit over harm.
	Cost: Time expended in diagnosis, documentation, and discussion

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Results?

Inter-Abstractor Variability

GEM-Cut Recommendations

Degree of Agreement	Recommendations
Good	47%
Fair	28%
Poor	25%

Results?

Inter-Abstractor Variability

Other Content (e.g., title, developer name, target population)

Degree of Agreement	Recommendations	Other Content
Good	47%	72%
Fair	28%	19%
Poor	25%	9%

Results?

Inter-Abstractor Variability

Overall…

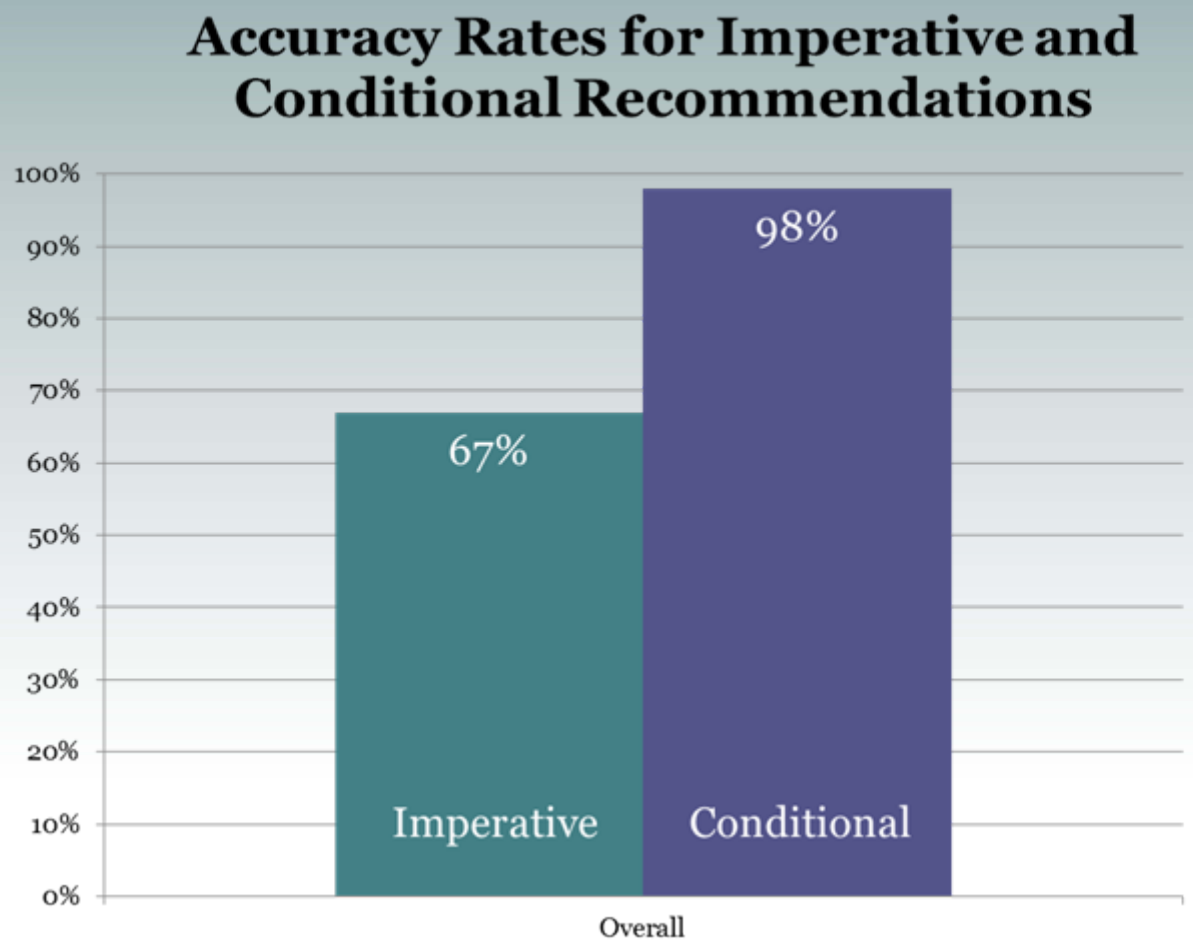
Degree of Agreement	Recommendations	Other Content	Combined
Good	47%	72%	60%
Fair	28%	19%	24%
Poor	25%	9%	17%

Rituximab in combination with chemotherapy agents other than fludarabine and cyclophosphamide is not recommended for the first-line treatment of chronic lymphocytic leukaemia.

- **Conditional?**
  - If-then relationship?
- **Imperative?**
  - Directed at the entire target population without limitation?

Correct answer? **Either!**

How well did the NGC Abstraction Team Agree with the Yale Team?



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Did We Answer the Research Questions?

- Can the abstraction of recommendations into GEM be done outside of the current research environment at Yale?
  Yes.
- Is it scalable in a production environment such as NGC?
  Yes.
- How much time (cost) will this add to the NGC process?
  Additional time required is significant, but we can reduce time/cost through more efficient work process.
- What are the challenges associated with this type of effort?
  Several, but not insurmountable.

Challenges Encountered:

- Locating guidelines that meet GEM–specific inclusion criteria
- Establishing consistent ‘rules’ for GEM abstraction
- Reducing inter-abstractor variability

Next Steps to Operationalize GEM in NGC:

- Lock down the GEM–Specific Inclusion Criteria to ensure that only guidelines appropriate for the model are GEM cut.
- Keep the scope manageable by GEM cutting only the guideline elements that are important to NGC users, such as:
  - Major Recommendations
  - Target Population
  - Users

Suggestions…

- Reduce time/cost by having a team of NGC abstractors and reviewers dedicated to GEM.
- Educate guideline developers to understand and review GEM-cut output of their guidelines so that they can approve it for publication to NGC.
- Educate guideline developers who would like their guidelines GEM cut on the changes needed to make that happen, e.g., when possible, replacing statements of fact with actionable recommendations.

Next Steps for the CDSs Field?

How can we ensure that the best and most rigorously developed guidelines are candidates for CDSs?

- By engaging and educating guideline developers and those actively involved in CDSs applications, including designers and vendors.
- Ongoing research in this area continues through the AHRQ-sponsored GLIDES (GuideLines Into DEcision Support) Project.

Thank you!

Questions?

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