PHQ-9 Automatable Guidelines

Dr. Steve Hasley, MD
Chief Medical Officer (CMO),
shasley@Trisotech.com

Denis Gagne
Chief Executive Officer (CEO),
dgagne@Trisotech.com
Disambiguating Clinical Guidelines

The challenge is that Clinical Practice Guidelines are authored in natural language, using different approaches and styles, and are often ambiguous or incomplete.

Assuring high-quality care and best-practice support across facilities and community care providers necessitates compliance with good industry clinical practices.
A shareable clinical pathway is a visual workflow and decision model that is both human readable and machine automatable.

Such a standardized workflow can improve the efficiency and quality of healthcare processes.
BPM+ International Open Standards

The BPM+ family of standards addresses these concerns through the use of formal expression languages, allowing for the visual capture/depiction of activities of care workflows and the logic of clinical decisions using intuitive and unambiguous visual notations

Unambiguous Visual Notations
Introduction to BPM+

Open standards for machine interpretable Models based on unambiguous graphical Notations visual languages (MN)

<table>
<thead>
<tr>
<th>Language</th>
<th>Provides</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP (Business Processes) MN</td>
<td>Process diagram</td>
<td>Flow diagram, guideline</td>
</tr>
<tr>
<td>CM (Case Management) MN</td>
<td>Unstructured processes</td>
<td>Personalized patient care</td>
</tr>
<tr>
<td>D (Decision) MN</td>
<td>Decision (trees)</td>
<td>Decision tables, equations</td>
</tr>
</tbody>
</table>

www.OMG.org
Supports Interoperability Goals

- Apply modern techniques to guideline development through use of formal languages
- Promote the sharing and promulgation of clinical knowledge via open standards
- Enhance and improve consumption of knowledge assets
- Promote and advance process interoperability across care settings and institutions
Solution

- This specific project exemplifies how Depression Screening can be scaled to support multiple vendor implementations in a consistent way, across EHRs and health systems.

- It demonstrates how data collected from multiple different instantiations can be aggregated for analysis, and aligns with ONC goals promoting data interoperability.

- It illustrates care pathway interoperability, combined with clinical decision support elements to form a recognized assessment and treatment plan.
In the US, depression affects up to 9 percent of patients and accounts for more than $43 billion in medical care costs.*

The PHQ-9 is a self-report tool and incorporates the DSM-IV depression diagnostics criteria along with other leading major depressive symptoms.

The PHQ-9 uses the frequency of the symptoms which factor into the scoring severity index.

* https://www.aafp.org/afp/2012/0115/p139.html
BPM+ PHQ-9

• A BPM+ model (workflow and decision) for the PHQ-9 questionnaire and scoring system has been developed and exposed as an API.

• The PHQ-9 questions are presented in a user interface, with drop-down menus to record the responses, scoring done automatically, and suggested follow-up actions recommended. PDF form ingestion also available.

• The de-identified data is archived in a cloud log which would be available for future analysis.
### Severity of Depression

<table>
<thead>
<tr>
<th>PHQ-9 Score Eval</th>
<th>Severity of Depression</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Depression severity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;No depression&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Minimal depression&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Mild depression&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Moderate depression&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Moderately severe depression&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Severe depression&quot;</td>
<td></td>
</tr>
</tbody>
</table>

- **Number**: $< 1$
- **Severity**: "No depression"

- **Number**: $[1.5]$
- **Severity**: "Minimal depression"

- **Number**: $[5.10]$
- **Severity**: "Mild depression"

- **Number**: $[10.15]$
- **Severity**: "Moderate depression"

- **Number**: $[15.20]$
- **Severity**: "Moderately severe depression"

- **Number**: $[20.27]$
- **Severity**: "Severe depression"
This solution is ready for deployment within VA and available for licensing to other end-user organizations (vendors).

Integration via REST, OpenAPI, and CDS Hooks standards allows this approach to be EHR platform neutral so that it can be integrated into a host of potential implementations (patient facing apps, scripts for telehealth and websites).
Value

- This solution enhances screening across systems and care organizations, facilitating depression detection and directing patients to appropriate care.

- The application portability allows this solution to be system agnostic, based upon use of open standards.

- This API can be available to any (EHR) vendor who supports a provider.
Future

- Future plans include building many more BPM+ models for specific care pathways.

- Support from specialty societies in model development and content review is planned through the BPM+ Health organization, several specialty societies are already on-board.

- More than 800 models already exists. Go have a look.

https://CDS.Trisotech.com
Demo

PHQ-9
Any questions?

THANKS!

PHQ-9